Sun Ethernet Fabric Operating System

CLI Base Reference Manual

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Contents

Using This Documentation

This document describes the Base CLI commands. The intended audience is users and system administrators who configure SEFOS through the CLI interface.

Product Notes

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

Oracle Switch ES1-24:

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

Sun Network 10GbE Switch 72p:

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

Sun Blade 6000 Ethernet Switched NEM 24p 10GbE:

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

Related Documentation

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

Acronyms and Abbreviations

The following acronyms and abbreviations are used in this book:

Acronym or Abbreviation	Explanation
AAA	Authentication authorization and accounting
AARP	AppleTalk address resolution
ACL	Access control list
APNIC	Asia-Pacific Network Information Centre
ARIN	American Registry for Internet Addresses
ARP	Address Resolution Protocol
AS	Autonomous system
ASBR	Autonomous border system router

Acronym or Abbreviation	Explanation
BGP	Border Gateway Protocol
BPBDU	Bridge protocol data unit
BSD	Berkeley Software Distribution
CBS	Committed burst size
CEP	Customer edge port
CIDR	Classless inter-domain routing
CIR	Committed information rate
CIST	Common Internal Spanning Tree
CNA	Converged netwaork adapter
DCB	Data cebter bridging
DCBX	Data Center Exchange Protocol
DEC	Digital Equipment Corporation
DHCP	Dynamic Host Control Protocol
DSCP	Differentiated services code point
EBS	Excess burst size
ECMP	Equal cost multiple path
EF DSCP	Expidited forwarding DSCP
EIR	Excess information rate
ETS	Enhancement transmission selection
EIGRP	Enhanced Interior Gateway Protocol
FCoE	Fiber Channel over Ethernet
FDB	Forwarding database
FSAP	Flexible software architecture for portability
GARP	Generic Attribute Registration Protocol
GMRP	GARP Multicast Registration Protocol
GVRP	GARP VLAN Registration Protocol
ICMP	Internet Control Message Protocol
ICMPv4	Internet Control Message Protocol version 4
ICMPv4	Internet Control Message Protocol version 6
IGMP	Internet Group Management Protocol
IGS	IGMP snooping

Acronym or Abbreviation	Explanation
IP TOS	IP type of service
IPv6	IP version 6
ISL	Inter-switch link
IVL	Independent VLAN learning
LA	Link aggregation
LACP	Link Aggregation Control Protocol
LACNIC	Latin American and Caribbean Network Information Centre
LBG	Load balancing group
LLDP	Link Layer Discovery Protocol
MD5	Message digest
MEF	Metro Ethernet forum
MIB	Management information base
MLD	Multicast listener discovery
MLDS	Multicast listener discovery snooping
MSTP	Multiple Spanning Tree Protocol
NAS	Network access security
NetBIOS	Network basic input/output system
NPAPI	Network processor application programming interface
OPSF	Open Shortest Path First
PDU	Protocol description unit
PFC	Priority-based flow control
PG	Priority group
PHB	Per-hop behavior
PIM	Protocol independent multicast
PMTU	Path MTU
PMTUD	PMTU discovery
PVID	Port VLANI ID
PVRST	Per-VLAN rapid spanning tree
PVRST+	Per-VLAN rapid spanning tree plus
PVST	Per-VLAN spanning tree
RFC	Request for comments

Acronym or Abbreviation	Explanation
RIP	Routing Information Protocol
RIPE NCC	Reseaux IP Europeens Network Coordination Centre
RMON	Remote monitoring
RRD	Route redistribution
RST	Rapid Spanning Tree
RTM	Route table manager
SHA	Secure Hash Algorithm
SLA	Service-level agreement
SLB	Server load balancer
SLB L2	Server load balancer level two
SLI	Socket layer interface
SNMP	Simple Network Management Protocol
srTCM	Single rate three color marker
STP	Spanning Tree Protocol
SVL	Shared VLAN learning
TACACS	Terminal access controller access control system
TCP/IP	Transmission Control Protocol/Internet Protocol
TCP ACK bit	TCP acknowledgement bit
TCP RST bit	TCP reset bit
TCN	Topology change notification
TFTP	Trivial File Transfer Protocol
trTCM	Two rate three color marker
TSWTCM	Time sliding window three color marker
TLV	Type, length, and value
TTL	Time-to-live value
UDP	User Datagram Protocol
USM	User- based security model
VACM	View- based access control model
VINES	Virtual integrated network service
VIP	Virtual IP address prefix
VLAN	Virtual LAN

Acronym or Abbreviation	Explanation
VLAN ID	VLAN identifier
XNS	Xerox network systems
XVLAN	Exclusive VLAN

CLI Command Modes

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

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

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CHAPTER 1

CLI

This chapter describes the configuration SEFOS using the CLI. Use the CLI to configure SEFOS software from a console attached to the serial port of the switch or from a remote terminal using `ssh`.

1.1 SEFOS Overview

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

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

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

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

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

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

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

Refer to the user's guide and software configuration guide for details on how to start SEFOS. When SEFOS is started, you must enter the root user name and password at the login prompt to access the CLI shell:

```
                Sun Ethernet Fabric Operating System

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

SEFOS>
```

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

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

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

1.2 CLI Command Modes

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

1.2.1 User EXEC Mode

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

1.2.2 Privileged EXEC Mode

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

1.2.3 Global Configuration Mode

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

1.2.4 Interface Configuration Mode

1.2.4.1 Physical Interface Mode

Performs interface-specific operations.

1.2.4.2 Port Channel Interface Mode

Performs port-channel-specific operations.

1.2.4.3 VLAN Interface Mode

Performs L3-IPVLAN-specific operations.

1.2.4.4 Tunnel Interface Mode

Performs tunnel-specific operations.

1.2.5 Interface Range Mode

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

1.2.6 Config-VLAN Mode

Performs VLAN specific operations.

1.2.7 Line Configuration Mode

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

1.2.8 Profile Configuration Mode

Performs profile-specific operations.

1.2.9 Protocol-Specific Modes

1.2.9.1 PIM Component Mode

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

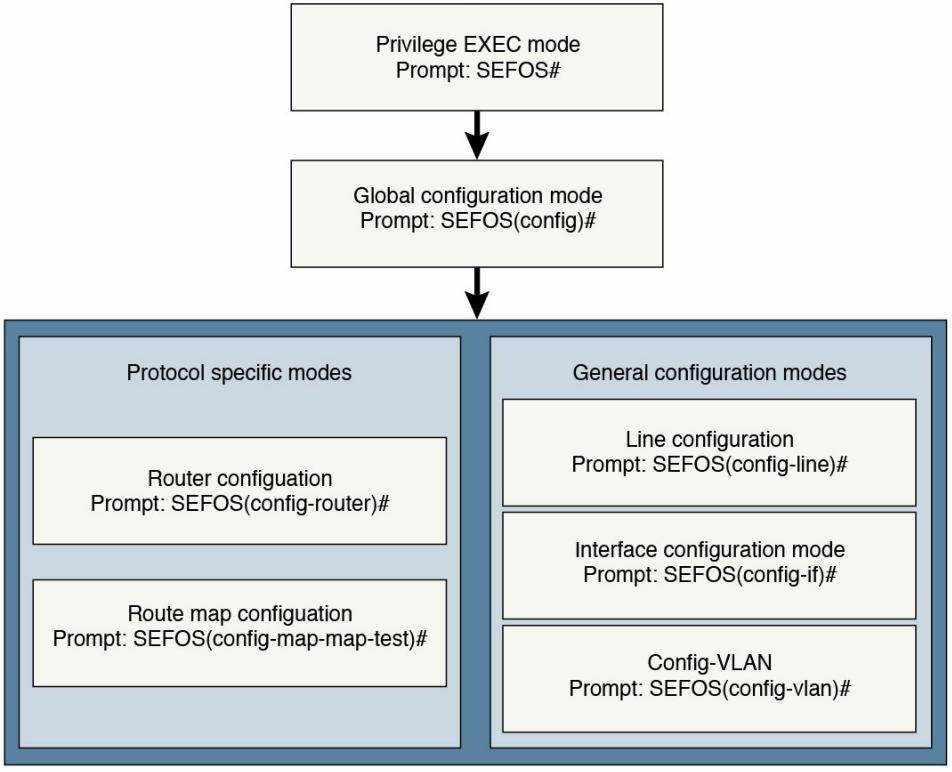
1.2.9.2 Router Configuration Mode

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

1.2.9.3 Route Map Configuration Mode

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

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



CHAPTER 2

IP

IP 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 zero 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. 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, 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 is gradually replacing the system based on classes A, B, and C.

2.1 IP Commands

The following SEFOS commands are available for the IPv4 module:

- `ip redirects` / `ip icmp redirects`
- `ip unreachables`
- `ip mask-reply`

- ip echo-reply
- maximum-paths
- ip rarp client request
- ip aggregate-route
- traffic-share
- ip path mtu discover
- ip path mtu
- ip rarp client
- ip directed-broadcast
- show ip rarp
- show ip pmtu
- ping ip-address
- ip route
- ip routing
- ip default-ttl
- arp timeout
- arp ip-address
- ip arp max-retries
- show ip traffic
- show ip route
- show ip arp
- show ip information

2.1.1 ip redirects

Enables sending ICMP redirect messages. The no form of the command disables sending ICMP redirect messages.

```
ip redirects
```

```
no ip redirects
```

Mode Global Configuration

Defaults	Sending of ICMP redirect messages is enabled.
Example	`SEFOS(config)# ip redirects`
Notes	The router may send an ICMP redirect message to the originator of the packet, when the packet enters an IP interface and exits the same interface. This message notifies the originator that there is a better gateway for the assigned destination address.

Related Commands

`show ip information` - Displays IP configuration information

2.1.2 ip icmp redirects

Enables sending ICMP redirect messages. The `no` form of the command disables sending ICMP redirect messages.

```
ip icmp redirects {host | subnet}
```

```
no ip icmp redirects
```

Syntax Description	**host** – Sends ICMP host redirect messages. **subnet** – Sends ICMP subnet redirect messages.
Mode	Global Configuration
Defaults	Sending of ICMP redirect messages is enabled.
Example	`SEFOS(config)# ip redirects`
Notes	The router may send an ICMP redirect message to the originator of the packet, when the packet enters an IP interface and exits the same interface. This message notifies the originator that there is a better gateway for the assigned destination address.

2.1.3 ip unreachables

Enables sending ICMP unreachable message. The `no` form of the command disables sending ICMP unreachable messages.

```
ip unreachables
```

```
no ip unreachables
```

Mode	Global Configuration
Defaults	Enabled
Example	`SEFOS(config)#` **`ip unreachables`**
Notes	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. ICMP messages provide feedback about problems that occur in the communication environment.

Related Commands

`show ip information` - Displays IP configuration information

2.1.4 ip mask-reply

Enables sending ICMP mask-reply messages. The `no` form of the command disables sending ICMP mask-reply messages.

```
ip mask-reply
```

```
no ip mask-reply
```

Mode	Global Configuration
Defaults	Enabled
Example	`SEFOS(config)#` **`ip mask-reply`**
Notes	ICMP is an extension to the Internet Protocol (IP) defined by RFC 792. ICMP supports packets containing error, control, and informational messages. The `ping` command, for example, uses ICMP to test an internet connection. Hosts can find subnet masks by sending an Internet Control Message Protocol (ICMP) mask request message. Routers respond to this request with an ICMP mask reply message. A gateway receiving an address mask request must return it with the address mask field set to the 32-bit mask of the bits identifying the subnet and network.

Related Commands

`show ip information` - Displays IP configuration information

2.1.5 ip echo-reply

Enables sending ICMP echo reply messages. The no form of the command disables sending ICMP echo reply messages.

```
ip echo-reply
```

```
no ip echo-reply
```

Mode	Global Configuration
Defaults	Enabled.
Example	SEFOS(config)# **ip echo-reply**
Notes	ICMP echo messages are sent to a remote host and are returned in an echo-reply response. The primary use of these messages is to check the availability of the target machine.

Related Commands

show ip information - Displays IP configuration information

2.1.6 maximum-paths

Sets the maximum number of multipaths. The no form of the command sets the maximum number of multipaths to its default value.

```
maximum-paths 1-16
```

```
no maximum-paths
```

Mode	Global Configuration
Defaults	2
Example	SEFOS(config)# **maximum-paths 3**
Notes	This configuration is not saved and thus will not be effective once the switch is restarted.

Related Commands

show ip information - Displays IP configuration information

2.1.7 ip rarp client request

Sets the number of RARP client request retries or interval between requests. The no form of the command sets the RARP client request retries or interval between retries to their default values.

```
ip rarp client request {interval 30-3000 | retries 2-10}
```

```
no ip rarp client request {interval | retries}
```

Syntax Description

interval – The interval (in seconds) after which an unanswered RARP request is transmitted.

retries – The maximum number of retransmissions of RARP request packets.

Mode Global Configuration

Defaults 2

Example

```
SEFOS(config)# ip rarp client request interval 30
```

Notes

Reverse Address Resolution Protocol (RARP) is used for diskless computers to determine their IP address using the network. RARP provides the opposite service to ARP in that it is used only when the Ethernet address is known and the IP address is needed.

RARP requests are most commonly sent by diskless clients and JumpStart clients during bootup. The client uses the RARP protocol to broadcast the Ethernet address and asks for the corresponding IP address.

Related Commands

show ip rarp - Displays RARP configuration information

2.1.8 ip aggregate-route

Sets the maximum number of aggregate routes. The no form of the command sets the maximum number of aggregate routes to its default value.

```
ip aggregate-route 5-4095
```

```
no ip aggregate-route
```

Mode	Global Configuration
Defaults	10
Example	`SEFOS(config)# ip aggregate-route 5`
Notes	This command takes effect only after the configuration is saved and the router is restarted.

Related Commands

`show ip information` - Displays IP configuration information

2.1.9 traffic-share

Enables traffic sharing (load sharing of IP packets). Traffic sharing finds routes with the least cost to evenly distrubute load. EIGRP provides intelligent traffic sharing.

Traffic sharing is controlled by selecting the mode of distribution. Traffic-sharing balances and distributes traffic proportionately to the ratio of metrics of different routes.

The `no` form of this command disables traffic sharing.

```
traffic-share
```

```
no traffic-share
```

Mode	Global Configuration
Defaults	Load sharing is disabled.
Example	`SEFOS(config)# traffic-share`

Related Commands

`show ip information` - Displays IP configuration information

2.1.10 ip path mtu discover

Enables path MTU discovery. The `no` form of the command disables path MTU discovery.

```
ip path mtu discover
```

```
no ip path mtu discover
```

Mode	Global Configuration
Defaults	Disabled
Example	`SEFOS(config)# ip path mtu discover`
Notes	Overrides the route-based and application-level requests. When disabled, the MTU path is not discovered when requested by an application.

Related Commands

`show ip information` - Displays IP configuration information

2.1.11 ip path mtu

Sets the MTU for usage in PMTU discovery. The `no` form of the command removes MTU in PMTU discovery.

```
ip path mtu dest-ip-addr type-of-service 68-65535
```

```
no ip path mtu dest-ip-addr type-of-service
```

Syntax Description	*dest-ip-addr* – Destination IP address. *type-of-service* – Type of service of the configured route. *68-65535* – Maximum transmission unit.
Mode	Global Configuration
Defaults	*type-of-service* – 0
Example	`SEFOS(config)# ip path mtu 10.0.0.1 0 1800`
Notes	Path MTU discovery must be enabled to execute this command.

Related Commands

- `ip path mtu discover` - Enables PMTU discovery
- `show ip pmtu` - Displays the configured PMTU entries

2.1.12 ip rarp client

Enables RARP client. The no form of the command disables RARP client.

```
ip rarp client
```

```
no ip rarp client
```

Mode	Interface Configuration
Defaults	Enabled
Example	`SEFOS(config-if)# ip rarp client`
Notes	When the IP address configuration mode is dynamic, the IP address of the default interface is obtained through RARP. The RARP server is disabled when the RARP client is enabled.

Related Commands

`show interfaces` - Displays all the interface details

`show ip rarp` - Displays RARP configuration information

2.1.13 ip directed-broadcast

Enables forwarding of directed broadcasts. The IP directed broadcast is an IP packet with a destination that has 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.

```
ip directed-broadcast
```

```
no ip directed-broadcast
```

Mode	Interface Configuration
Defaults	Disabled
Example	`SEFOS(config-if)# ip directed-broadcast`
Notes	Broadcasts a message to the particular subnet that the host belongs.

Related Commands

`show interfaces` - Displays the interface status and configuration

2.1.14 show ip rarp

Displays RARP configuration information.

```
show ip rarp
```

Mode	Privileged EXEC

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 Commands

`ip rarp client request` - Sets the number of RARP client request retries

`ip rarp client` - Enables RARP client

2.1.15 show ip pmtu

Displays the configured PMTU entries.

```
show ip pmtu
```

Mode Privileged EXEC

Example

```
SEFOS# show ip pmtu
Ip Path MTU Table
-----------------
Destination     TOS      PMTU

10.0.0.1        0        1800
```

Related Commands

`ip path mtu` - Sets the MTU for usage in PMTUD

2.1.16 ping *ip-address*

Sends echo messages.

ping [ip] address [{repeat|count} *packet_count(1-10)*] **[size** *packet_size(36-2080)*] **[source {** *ip-address* | **vlan** *short(1-4094)* **}**] **[timeout** *time_out(1-100)*]

Syntax Description

ip-address – IP address of the node to be pinged.

size – Size of the data portion of the `ping` PDU. This value ranges between 36 and 2080.

count – Number of times the given node address is to be pinged. This value ranges between 1 and 10.

timeout – Time in seconds after which the entity waiting for the `ping` response times out. This value ranges between 1 and 100 seconds.

Mode User EXEC

Defaults

size packet_size – 40

count packet_count – 3

timeout – 1

Example

```
SEFOS(config)# ping 10.0.0.2
Reply Received From :10.0.0.2, TimeTaken : 20 msecs
Reply Received From :10.0.0.2, TimeTaken : 10 msecs
Reply Received From :10.0.0.2, TimeTaken : 10 msecs
--- 10.0.0.2 Ping Statistics ---
3 Packets Transmitted, 3 Packets Received, 0% Packets
Loss
```

2.1.17 ip route

Adds a static route. The no form of the command deletes a static route. By default, no static routes are created.

```
ip route prefix mask {next-hop | Vlan 1-4094 | interface-type
interface-id Cpu0} private
```

```
no ip route prefix mask {next-hop | Vlan 1-4094 | interface-type
interface-id Cpu0} private
```

Syntax Description

prefix – IP route prefix for the destination (destination IP address).

mask – Subnet mask for the destination.

next-hop – IP address or IP alias of the next hop that can be used to reach that network. You can add the route of the next hop only if the next hop network is accessible from SEFOS.

Vlan – VLAN identifier (1-0494).

interface-type – Interface type.

interface-id – Interface identifier.

Cpu0 – Out of band management interface.

private – Private route.

Mode Global Configuration

Defaults Distance – 1

Example

```
SEFOS(config)# ip route 192.168.0.0 255.255.0.0 Vlan 1
private
```

Notes

- When the next-hop object is unknown or not relevant, its value must be set to zero.
- Interface must be a router port.
- The IP address that you enter must match the subnet mask. In other words, if the IP address that you enter is 192.168.0.0, then the mask must be 255.255.0.0.
- The no ip route command used with the private option (for example, no ip route 192.168.0.0 255.255.0.0 Vlan 1 private) will resets the private flag in the routing entry. This command does not remove the route. To remove the route, run the no ip route command without the private option.
- When you are adding a static route, you might see the error message "Nexthop name, Permanent options are not supported." Disregard this message. The static route will continue to be added.

Related Commands

show ip route - Displays the IP routing table

2.1.18 ip routing

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

```
ip routing
```

```
no ip routing
```

Mode	Global Configuration
Defaults	Enabled.
Example	SEFOS(config)# **ip routing**
Notes	A static route is appropriate when SEFOS cannot dynamically build a route to the destination.

Related Commands

- show ip information - Displays IP configuration information
- show ip route - Displays the IP routing table

2.1.19 ip default-ttl

Sets the TTL value. The no form of the command sets the TTL to the default value.

```
ip default-ttl 1-255
```

```
no ip default-ttl
```

Mode	Global Configuration
Defaults	64 seconds.
Example	SEFOS(config)# **ip default-ttl 1**
Notes	TTL is a value in an IP packet that tells a network router whether or not the packet has been in the network too long and must be discarded. The default Windows 95/98 TTL value is 32 seconds.

Related Commands

show ip information - Displays IP configuration information

2.1.20 arp timeout

Sets the ARP cache timeout. The no form of the command sets the ARP cache timeout to its default value.

```
arp timeout 30-86400
```

```
no arp timeout
```

Mode	Global Configuration
Defaults	300 (seconds)
Example	`SEFOS(config)# arp timeout 35`

Related Commands

`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.

2.1.21 arp *ip-address*

Adds a static entry in the ARP cache. The no form of the command deletes a static entry from the ARP cache.

```
arp ip-address hardware-address {Vlan 1-4094 | interface-type
interface-id | Cpu0}
```

```
no arp ip-address
```

Syntax Description

ip-address – IP address or IP alias to map to the specified MAC address.

hardware-addr – MAC address to map to the specified IP address or IP alias.

Vlan – VLAN identifier (1-4094).

Cpu0 – Out-of-band management interface.

interface-type – Interface type.

interface-id – Interface identifier.

Mode	Global Configuration
Example	`SEFOS(config)#` **`arp 10.203.120.21 00:11:22:33:44:55 Vlan 1`**
Notes	ARP is a protocol used by IP, specifically IPv4, to map IP network addresses to the hardware addresses used by a data link protocol. The phrase *address resolution* refers to the process of finding an address of a computer in a network.

Related Commands

`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.

2.1.22 ip arp max-retries

Sets the maximum number of ARP request retries. The no form of the command sets the maximum number of ARP request retries to its default value.

```
ip arp max-retries 2-10
```

```
no ip arp max-retries
```

Mode	Global Configuration
Defaults	3
Example	`SEFOS(config)#` **`ip arp max-retries 2`**
Notes	Configures the maximum number of ARP requests that the switch generates before deleting an unresolved ARP entry.

Related Commands

`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.

2.1.23 show ip traffic

Displays the IP protocol statistics.

show ip traffic [interface {Vlan *1-4094* **| tunnel** *1-128* **|** *interface-type interface-id* **hc}**

Syntax Description

Vlan – VLAN identifier (1-4094).
tunnel – tunnel identifier (1-128).
interface-type – Interface type.
interface-ID – Interface identifier.
hc – High counters.

Mode

Privileged EXEC

Example

```
SEFOS# show ip traffic
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
```

2.1.24 show ip route

Displays the IP routing table.

show ip route [{*ip-address mask* **| connected | ospf | rip | static | summary}]**

Syntax Description

ip-address – Destination IP address.
mask – Prefix mask for the destination.
connected – Directly connected network routes.
ospf –OSPF.
rip – RIP.
static – Static routes.
summary – Summary of all routes.

Mode Privileged EXEC

Example

```
SEFOS# show ip route

S 20.0.0.0/8   [1] via 100.20.6.20
S 30.0.0.0/8   [4] via 120.20.6.20
S 40.0.0.0/8   is directly connected, vlan1
S 50.0.0.0/8   [1] via 100.20.6.21
C 100.0.0.0/8   is directly connected, vlan1
C 110.0.0.0/8   is directly connected, vlan2
C 120.0.0.0/8   is directly connected, vlan3

SEFOS# show ip route 20.0.0.0

Codes: C - connected, S - static, R - RIP, O - OSPF
S 20.0.0.0/8   [1] via 100.20.6.20

SEFOS# show ip route 30.0.0.0   255.0.0.0

Codes: C - connected, S - static, R - RIP, O - OSPF
S 30.0.0.0/8   [4] via 120.20.6.20
```

Related Commands

- ip route - Adds a static route
- ip routing - Enables IP routing

2.1.25 show ip arp

Displays IP ARP table.

```
show ip arp [{Vlan 1-4094 | interface-type interface-id |
ip-address | mac-address | summary | information}]
```

Syntax Description

Vlan – VLAN ID (1-4094).
interface-type – Interface type.
interface-ID – Interface identifier.
ip-address – IP address of ARP entry.
mac-address – MAC address of ARP entry.
summary – IP ARP table summary.
information – ARP configuration information.

Mode

Privileged EXEC

Example

```
SEFOS# show ip arp
Address            Hardware Address    Type   Interface   Mapping
-------            ----------------    ----   ---------   -------
110.20.6.99       00:11:22:44:55:66   ARPA   vlan1       Static
100.20.6.99       00:11:22:33:44:55   ARPA   vlan2       Static
110.20.6.101      00:5e:01:00:11:55   ARPA   vlan2       Static
SEFOS# show ip arp vlan 1
Address            Hardware Address    Type   Interface   Mapping
-----------       ----------------    ----   ---------   -------
110.20.6.99       00:11:22:44:55:66   ARPA   vlan1       Static
SEFOS# show ip arp 00:10:b5:66:a7:0e
Address            Hardware Address    Type   Interface   Mapping
-------            ----------------    ----   ---------   -------
100.20.6.20       00:10:b5:66:a7:0e   ARPA   vlan1       Dynamic
SEFOS# show ip arp 100.20.6.99
Address            Hardware Address    Type   Interface   Mapping
-----------       ----------------    ----   ---------   -------
100.20.6.99       00:11:22:33:44:55   ARPA   vlan2       Static
SEFOS# show ip arp summary
3 IP ARP entries, with 0 of them incomplete
SEFOS# show ip arp information
ARP Configurations:
-------------------
 Maximum number of ARP request retries is 10
 ARP cache timeout is 7200 seconds
```

Related Commands

- `arp timeout` - Sets the ARP cache timeout
- `ip arp max-retries` - Sets the maximum number of ARP request retries

2.1.26 show ip information

Displays IP configuration information.

```
show ip information
```

Mode Privileged EXEC

Example

```
SEFOS# show ip information
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 10
Number of multi-paths is 2
Load sharing is disabled
Path MTU discovery is disabled
```

Related Commands

- `ip redirects` / `ip icmp redirects` - Enables sending ICMP
- `ip unreachables` - 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 aggregate-route` - Sets the maximum number of aggregate routes
- `ip path mtu discover` - Enables PMTU discovery
- `traffic-share` - Enables traffic sharing

CHAPTER 3

DHCP

Note – This chapter applies to the Sun Network 10GbE Switch 72p product only. DHCP is not supported on the Sun Blade 6000 Ethernet Switched NEM 24p 10GbE, so do not use any of the procedures in this chapter for that product.

DHCP allows dynamic configuration of a host computer. When a DHCP client is turned on, it initially does not have an IP address assigned to it. It issues a broadcast message to any DCHP servers that are on the network. An exchange takes place during which the DHCP server assigns an IP address to the client and tells the client certain key network configuration parameters.

Many ISPs require that their customers use a DHCP client, so the ISP may dynamically assign IP addresses and control other network settings. Another use is for laptop computers connected to more than one network. For example, when a laptop is connected to a network in the office and at home, the laptop need not be manually reconfigured for use in the two different networks. Instead, with a DHCP server on both the office network and the home network and with a DHCP Client in the laptop, this can be achieved easily.

3.1 DHCP Commands

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

DHCP Client

- `debug ip dhcp client`
- `release`
- `renew`
- `show ip dhcp client stats`

DHCP Relay

- service dhcp-relay
- ip dhcp server
- ip helper-address
- ip dhcp relay information option
- ip dhcp relay circuit-id
- ip dhcp relay remote-id
- debug ip dhcp relay
- show ip dhcp relay information
- show dhcp server

DHCP Server

- service dhcp-server
- service dhcp
- ip dhcp pool
- ip dhcp next-server
- ip dhcp bootfile
- bootfile config-file
- ip dhcp
- ip dhcp option
- network
- excluded-address
- ip dhcp excluded-address
- domain-name
- dns-server
- netbios-name-server
- netbios-node-type
- default-router
- option
- lease
- utilization threshold
- host hardware-type
- debug ip dhcp server
- show ip dhcp server information
- show ip dhcp server pools

- show ip dhcp server binding
- show ip dhcp server statistics

3.2 DHCP Client

Details for DHCP Client commands.

3.2.1 debug ip dhcp client

Sets the debug level for tracing the DHCP client module. The no form of the command disables the debug level for the DHCP client.

```
debug ip dhcp client {all | event | packets | errors | bind}
```

```
no debug ip dhcp client {all | event | packets | errors | bind}
```

Syntax Description

all – All trace messages.
event – Trace management messages.
packets – Packets related messages.
errors – Trace error code debug messages.
bind – Trace bind messages.

Mode Privileged EXEC

Defaults Debugging is disabled.

Example

```
SEFOS# debug ip dhcp client all
```

Related Commands

- show ip dhcp client stats - Displays the DHCP client statistics information

3.2.2 release

Immediately releases the DHCP lease on the interface specified.

```
release dhcp [{vlan 1-4094 | interface-type interface-id}]
```

Syntax Description	**vlan** – VLAN identifier. *interface-type* – Interface type. *interface-id* – Interface identifier.
Mode	Privileged EXEC
Defaults	Disabled.
Example	SEFOS# **renew dhcp vlan 1**
Notes	• VLAN interface must have an IP address assigned by the DHCP server. • If the router interface was not assigned an IP address by the DHCP server, the renew DHCP command fails and displays the following error message: Interface does not have a DHCP originated address

Related Commands

- ip address - Configures the current VLAN interface to dynamically acquire an IP address from the DHCP server
- show ip dhcp client stats - Displays the DHCP client statistics information
- show ip interface - Displays the IP interface configuration

3.2.3 renew

Immediately renews the DHCP lease for the interface specified.

renew dhcp [{vlan *1-4094* | *interface-type interface-id***}]**

Syntax Description	**vlan** – VLAN identifier. *interface-type* – Interface type. *interface-id* – Interface identifier.
Mode	Privileged EXEC
Defaults	Disabled.
Example	SEFOS# **renew dhcp vlan 1**
Notes	• VLAN interface must have an IP address assigned by the DHCP server. • If the router interface was not assigned an IP address by the DHCP. Server, the renew DHCP command fails and displays the following error message: Interface does not have a DHCP originated address

Related Commands

- `ip address` - Configures the current VLAN interface to dynamically acquire an IP address from the DHCP server
- `show ip dhcp client stats` - Displays the DHCP client statistics information
- `show ip interface` - Displays the IP interface configuration

3.2.4 show ip dhcp client stats

Displays the DHCP client statistics.

```
show ip dhcp client stats
```

Mode Privileged EXEC

Example

```
SEFOS# show ip dhcp client stats

Dhcp Client Statistics
--------------------------

Interface                          : vlan3
Client IP Address                 : 0.0.0.0
Client Lease Time                 : 0
Client Remain Lease Time         : 0
Message Statistics
------------------
DHCP DISCOVER                      : 1
DHCP REQUEST                       : 0
DHCP DECLINE                       : 0
DHCP RELEASE                       : 0
DHCP INFORM                        : 0
DHCP OFFER                         : 1
```

Related Commands

- `ip address` - Configures the current VLAN interface to dynamically acquire an IP address from the DHCP server
- `release` - Releases the DHCP lease on the interface specified
- `renew` - Renews the DHCP lease for the interface specified

3.3 DHCP Relay

Details for DHCP Relay commands.

3.3.1 service dhcp-relay

Enables the DHCP relay agent in the switch. The no form of the command disables the DHCP relay agent. The relay agent becomes active once it is enabled.

```
service dhcp-relay
```

```
no service dhcp-relay
```

Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# service dhcp-relay`
Notes	The DHCP server should be disabled before enabling the DHCP relay.

Related Commands

- `no service dhcp-server` / `no service dhcp` - Disables the DHCP server
- `show dhcp server` - Displays the DHCP server information
- `show ip dhcp relay information` - Displays the DHCP relay information

3.3.2 ip dhcp server

Sets the IP address of the DHCP server. The relay agent now starts forwarding the packets (that is, UDP broadcasts including BOOTP) from the client to the specified DHCP server. This command allows to add more than one DHCP server. The no form of the command deletes the DHCP server IP address.

```
ip dhcp server ip-address
```

```
no ip dhcp server ip-address
```

Syntax Description	*ip-address* – IP address of the server to which the packets are to be forwarded.
Mode	Global Configuration
Defaults	The IP address is 0.0.0.0 and the status of the DHCP relay servers only is disabled.
Example	`SEFOS(config)#` **`ip dhcp server 12.0.0.1`**
Notes	The relay agent will start forwarding the packets from the client to a specific DHCP server only when the relay agent is in the enabled state.

Related Commands

- `show ip dhcp relay information` - Displays the DHCP relay information
- `show dhcp server` - Displays the DHCP server information

3.3.3 ip helper-address

Sets the IP address of the DHCP server. The relay agent now starts forwarding the packets (that is, UDP broadcasts including BOOTP) from the client to the specified DHCP server. This command allows to add more than one DHCP server.

This command operates similar to the command `ip dhcp server`. This command also explicitly enables the DHCP relay and disables the DHCP server.

`ip helper-address` *ip-address*

Syntax Description	*ip-address* – IP address of the server to which the packets are to be forwarded.
Mode	Interface Configuration
Defaults	The IP address is 0.0.0.0 and the status of **only the DHCP Relay Servers** is disabled.
Example	`SEFOS(config-if)#` **`ip helper-address 12.0.0.1`**
Notes	The relay agent will start forwarding the packets from the client to a specific DHCP server only when the relay agent is in the enabled state.

Related Commands

- `show ip dhcp relay information` - Displays the DHCP relay information
- `show dhcp server` - Displays the DHCP server information

3.3.4 ip dhcp relay information option

Enables the relay agent to perform any processing related to relay agent Information Options. The agent will insert DHCP relay information in DHCP request messages forwarded to the DHCP server, when the relay information option is enabled. The no form of this command disables the insertion of relay information.

```
ip dhcp relay information option
```

```
no ip dhcp relay information option
```

Mode Global Configuration
Can also be executed in the VLAN Interface Configuration for a code base with industry-standard commands.

Defaults Relay information option is disabled.

Example
```
SEFOS(config)# ip dhcp relay information option

SEFOS(config-if)# ip dhcp relay information option
```

Notes Only when enabled, the relay agent does any processing related to relay agent Information Options - like inserting the necessary options while relaying a packet from a client to a server and examining or stripping of options when relaying a packet from a server to a client.

Related Commands

- show ip dhcp relay information - Displays the DHCP relay information
- show dhcp server - Displays the DHCP server information

3.3.5 ip dhcp relay circuit-id

Configures circuit-id value for this interface. The no form of the command deletes the circuit-id configuration for this interface.

```
ip dhcp relay circuit-id 1-2147483647
```

```
no ip dhcp relay circuit-id
```

Syntax Description **circuit-id** – Value ranges from 1 to 2147483647.

Mode Interface Configuration

Example SEFOS(config-if)# **ip dhcp relay circuit-id 1**

3.3.6 ip dhcp relay remote-id

Configures the remote-id value for this interface. The no form of the command deletes the remote-id configuration.

ip dhcp relay remote-id *name*

no ip dhcp relay remote-id

Syntax Description **remote-id** – Name of the remote identifier.

Mode Interface Configuration

Example SEFOS(config-if)# **ip dhcp relay remote-id Aricent**

3.3.7 debug ip dhcp relay

Enables the debug level for tracing the DHCP relay module. The no form of the command disables the debug level for tracing the DHCP relay module.

debug ip dhcp relay {all | errors}

no debug ip dhcp relay {all | errors}

Syntax Description **all** – All trace messages.
errors – Trace error code debug messages.

Mode Privileged EXEC

Defaults Debugging is disabled.

Example SEFOS# **debug ip dhcp relay all**

Related Commands

- show ip dhcp relay information - Displays the DHCP relay information
- show dhcp server - Displays the DHCP server information

3.3.8 show ip dhcp relay information

Displays the DHCP relay information.

```
show ip dhcp relay information [vlan 4-1094]
```

Mode Privileged EXEC

Example

```
SEFOS# show ip dhcp relay information

Dhcp Relay                        : Disabled
Dhcp Relay Servers only       : Disabled

DHCP server                       : 0.0.0.0

Dhcp Relay RAI option         : Disabled
Debug Level                       : 0x1

No of Packets inserted RAI option                   : 0
No of Packets inserted circuit ID suboption      : 0
No of Packets inserted remote ID suboption       : 0
No of Packets inserted subnet mask suboption     : 0
No of Packets dropped                                  : 0
No of Packets which did not inserted RAI option : 0
```

Related Commands

- `service dhcp-relay` - Enables the DHCP relay agent in the switch
- `ip dhcp server` / `ip helper-address` - Sets the IP address of the DHCP server
- `ip dhcp relay information option` - Enables the relay agent to perform any processing related to relay agent Information Options

3.3.9 show dhcp server

Displays the DHCP server information.

```
show dhcp server
```

Mode Privileged EXEC

Example

```
SEFOS# show dhcp server

DHCP server:  40.0.0.4
```

Related Commands

- `service dhcp-relay` - Enables the DHCP relay agent in the switch
- `ip dhcp server` / `ip helper-address` - Sets the IP address of the DHCP server
- `ip dhcp relay information option` - Enables the relay agent to perform any processing related to relay agent Information Options

3.4 DHCP Server

Details of DHCP Server commands.

3.4.1 service dhcp-server

Enables the DHCP server. The `no` form of this command disables the DHCP server.

```
service dhcp-server
```

```
no service dhcp-server
```

Mode Global Configuration

Defaults Disabled.

Example

```
SEFOS(config)# service dhcp-server
```

Notes DHCP relay must be disabled before enabling the DHCP server.

Related Commands

- `no service dhcp-relay` - Disables the DHCP Relay
- `show ip dhcp server information` - Displays the DHCP server information

3.4.2 service dhcp

Enables the DHCP server. The no form of this command disables the DHCP server. This command operates similar to the command `service dhcp-server`.

```
service dhcp
```

```
no service dhcp
```

Mode	Global Configuration
Defaults	DHCP server is disabled.
Example	`SEFOS(config)#` **`service dhcp`**
Notes	DHCP Relay must be disabled before enabling the DHCP server.

Related Commands

- `no service dhcp-relay` - Disables the DHCP Relay
- `show ip dhcp server information` - Displays the DHCP server information

3.4.3 ip dhcp pool

Creates a DHCP server address pool and places the user in the DHCP pool configuration mode. The no form of the command deletes the DHCP server address pool.

```
ip dhcp pool index_1-2147483647
```

```
no ip dhcp pool index_1-2147483647
```

Syntax Description	*index_1-2147483647* – Pool number.
Mode	Global Configuration
Defaults	Address pools are not created by default.
Example	`SEFOS(config)#` **`ip dhcp pool 1`**
Notes	On execution of this command, the configuration mode changes to DHCP pool configuration mode, identified by the `(config-dhcp)#` prompt. In this mode, the administrator can configure pool parameters.

Related Commands

- `network` - Sets the network number and mask in DHCP server configuration parameters
- `excluded-address` / `ip dhcp excluded-address` - Creates an excluded pool to prevent DHCP from assigning certain addresses
- `domain-name` - Sets the domain name in the DHCP server configuration parameters
- `dns-server` - Specifies the IP address of a DNS server
- `netbios-name-server` - Sets the NetBIOS (WINS) name servers in the DHCP server configuration parameters
- `netbios-node-type` - Sets the NetBios node type in the DHCP server configuration parameters
- `default-router` - Sets the default router in the DHCP server configuration parameters
- `option` - Sets the pool specific DHCP server option
- `lease` - Sets the lease period
- `host hardware-type` - Specifies the hardware address of a Dynamic Host Configuration Protocol (DHCP) client
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools

3.4.4 ip dhcp next-server

Sets the next boot server in the DHCP server configuration parameters. The no form of this command deletes the next boot server from the DHCP server configuration parameters.

ip dhcp next-server *ip-address*

no ip dhcp next-server

Syntax Description	*ip-address* – IP address of the server (TFTP server).
Mode	Global Configuration
Example	`SEFOS(config)#` **`ip dhcp next-server 12.0.0.1`**

Related Commands

- `service dhcp-server` - Enables the DHCP server

- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server statistics` - Displays the DHCP server statistics

3.4.5 ip dhcp bootfile

Defines the name of the boot image file that the DHCP client should download during auto install process. The DHCP server passes this file name to the DHCP client. The `no` form of this command deletes the specified boot file name and assigns the value of boot file name as None (that is, no file is set as boot image file).

```
ip dhcp bootfile 63
```

```
no ip dhcp bootfile
```

Syntax Description	**bootfile** – Name of the boot image file that should be downloaded by the DHCP client.
Mode	Global Configuration
Defaults	None (Null terminated string).
Example	`SEFOS(config)# ip dhcp bootfile boot.img`

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information

3.4.6 bootfile config-file

Defines the name of the boot image file that the DHCP client should download during auto install process. The DHCP server passes this file name to the DHCP client. The `no` form of this command deletes the specified boot file name and assigns the value of boot file name as None (that is, no file is set as boot image file).

This command operates similar to the command `ip dhcp bootfile`.

```
bootfile config-file 63
```

```
no bootfile config-file
```

Syntax Description	**bootfile** – Name of the boot image file that should be downloaded by the DHCP client.
Mode	Global Configuration
Defaults	None (Null terminated string).
Example	SEFOS(config)# **bootfile config-file boot.img**

Related Commands

- show ip dhcp server information - Displays the DHCP server information

3.4.7 ip dhcp

Sets the DHCP server parameters such as enabling ICMP echo mechanism or offer-reuse timeout. The no form of this command is used to set the DHCP server parameters like disabling ICMP echo mechanism or server offer-reuse to its default value or removing a bind entry from the server binding table.

ip dhcp {ping packets [*count_0-10***] | server offer-reuse** *timeout_1-120***}**

no ip dhcp {ping packets | server offer-reuse | binding *ip-address*

Syntax Description	**ping packets** – Enable icmp echo prior to assigning a pool address. The no form of this command option prevents the server from pinging pool addresses. The count feature of this parameter allows to set the number of ping packets to be sent from the DHCP server to the pool address before assigning the address to a requesting client. The pinging of pool addresses is disabled, if the count value is set as 0. **server offer-reuse** – The amount of time the DHCP server entity would wait for the DHCP REQUEST from the client before reusing the offer. **binding** – The binding option if specified deletes the specified address from binding.
Mode	Global Configuration Mode
Defaults	**server offer-reuse** – 10
Example	SEFOS(config)# **ip dhcp ping packets**
Notes	The DHCP server pings a pool address before assigning the address to a requesting client. If the ping is unanswered, the DHCP server assumes (with a high probability) that the address is not in use and assigns the address to the requesting client.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server statistics` - Displays the DHCP server statistics

3.4.8 ip dhcp option

Sets the DHCP server options.

```
ip dhcp option code_1-2147483647 {ascii string | hex hex-string |
ip address}
```

```
no ip dhcp option code_1-2147483647
```

Syntax Description

code – Option code.

ascii – ASCII string.

hex – Hexadecimal string.

ip – IP address.

Mode

Global Configuration

Example

```
SEFOS(config)# ip dhcp option 19 hex d
```

Notes

- RFC 2132 provides details about option code to option name mapping and the option length information.
- The following is the list of supported/configurable DHCP options with their corresponding option length values.

1. Options 19, 20, 27, 29, 30, 31, 34, 36, 39, 46 must have length 1.
2. Options 12, 14, 15, 17, 18, 40, 43, 47, 64, 66, 67 must have length >=1.
3. Option 16 must have minimum length 4 and the value for this option must be an IP address and Option 25 can have a length of 2 and 2*n.
4. Option 68 must have length 4 and the value for this option must be an IP address.
5. Options 1-11, 41, 42, 44, 45, 48, 49, 65, 69, 70-76 must have a length of 4. Value for these options must be an IP address.
6. Options 21, 33 must have minimum length as 8 and 8*n.
7. Options 0, 255, 50-60 are non-configurable options.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server

- `show ip dhcp server pools` - Displays the DHCP server pools
- `ip dhcp relay information option` - Sets the pool specific DHCP server option

3.4.9 network

Sets the network IP address and mask in DHCP server configuration parameters. The `no` form of the command deletes the network IP address and mask from DHCP server configuration.

```
network network-IP [ {mask | / prefix-length_1-31}] [end ip]
```

```
no network
```

Syntax Description

network-IP – Network IP address of the DHCP pool.

mask – Subnet mask of the DHCP pool.

prefix-length_1-31 – The number of bits that comprise the address prefix. Prefix is an alternative way of specifying the network mask of the client. The prefix length must be preceded by a forward slash (/).

end ip– End IP address of the pool.

Mode

DHCP Pool Configuration

Example

```
SEFOS(dhcp-config)# network 20.0.0.0 255.0.0.0
20.0.0.100
```

Notes

This command is valid for DHCP sub network address pools only.

Related Commands

- `ip dhcp pool` - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics

3.4.10 excluded-address

Creates an excluded pool to prevent DHCP server from assigning certain addresses to DHCP clients. The no form of the command deletes the excluded pool.

```
excluded-address low-address high-address
```

```
no excluded-address low-address high-address
```

Syntax Description	*low-address* – The excluded IP address, or first IP address in an excluded address range. *high-address* – The last IP address in the excluded address range.
Mode	DHCP Pool Configuration
Example	`SEFOS(dhcp-config)# excluded-address 20.0.0.20 20.0.0.30`
Notes	The DHCP server assumes that all pool addresses may be assigned to clients. This command is used to exclude a single IP address or a range of IP addresses. Subnet pool should have been created before creating an excluded pool. This excluded pool should be within the range of the created subnet pool. For example, the excluded pool 20.0.0.20 - 20.0.0.30 created using this command is within the already created subnet pool 20.0.0.0 - 20.0.0.100.

Related Commands

- `ip dhcp pool` - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics

3.4.11 ip dhcp excluded-address

Creates an excluded pool to prevent DHCP server from assigning certain addresses to DHCP clients. The no form of the command deletes the excluded pool.

This command operates similar to the command excluded-address. This command is used to exclude a single IP address or a range of IP addresses.

```
ip dhcp excluded-address low-address high-address
```

```
no ip dhcp excluded-address low-address high-address
```

Syntax Description	**low-address** – The excluded IP address, or first IP address in an excluded address range. **high-address** – The last IP address in the excluded address range.
Mode	Global Configuration
Example	`SEFOS(config)# ip dhcp excluded-address 20.0.0.20 20.0.0.30`
Notes	• The DHCP server assumes that all pool addresses may be assigned to clients. • Subnet pool should have been created before creating an excluded pool. This excluded pool should be within the range of the created subnet pool. For example, the excluded pool 20.0.0.20 - 20.0.0.30 created using this command is within the already created subnet pool 20.0.0.0 - 20.0.0.100.

Related Commands

- ip dhcp pool - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- service dhcp-server / service dhcp - Enables or disables the DHCP server
- show ip dhcp server information - Displays the DHCP server information
- show ip dhcp server pools - Displays the DHCP server pools
- show ip dhcp server binding - Displays the DHCP server binding information
- show ip dhcp server statistics - Displays the DHCP server statistics

3.4.12 domain-name

Sets the domain name in the DHCP server configuration parameters. The no form of the command deletes the domain name from the DHCP server configuration parameters.

```
domain-name domain_63
```

```
no domain-name
```

Syntax Description	*domain_63* – Client's domain name string.
Mode	DHCP Pool Configuration
Example	`SEFOS(dhcp-config)# domain-name aricent`
Notes	The configuration of this command will take effect only after configuring the network address pool using network command.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics
- `network` - Configures the network IP address of the DHCP Address Pool

3.4.13 dns-server

Specifies the IP address of a DNS server that is available to a DHCP client. The `no` form of the command deletes the DNS server from the DHCP server configuration parameters.

```
dns-server ip-address
```

```
no dns-server
```

Mode	DHCP Pool Configuration
Example	`SEFOS(dhcp-config)# dns-server 20.0.0.1`
Notes	If DNS IP servers are not configured for a DHCP client, the client cannot correlate host names to IP addresses. The configuration of this command will take effect only after configuring the network address pool using network command.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools

- show ip dhcp server binding - Displays the DHCP server binding information
- show ip dhcp server statistics - Displays the DHCP server statistics
- network - Configures the network IP address of the DHCP Address Pool

3.4.14 netbios-name-server

Sets the NetBIOS (WINS) name servers in the DHCP server configuration parameters. The no form of the command deletes the NetBIOS name server from the DHCP configuration parameters.

```
netbios-name-server ip-address
```

```
no netbios-name-server
```

Mode	DHCP Pool Configuration
Example	`SEFOS(dhcp-config)# netbios-name-server 20.0.0.3`
Notes	The configuration of this command will take effect only after configuring the network address pool using network command.

Related Commands

- service dhcp-server / service dhcp - Enables or disables the DHCP server
- show ip dhcp server information - Displays the DHCP server information
- show ip dhcp server pools - Displays the DHCP server pools
- show ip dhcp server binding - Displays the DHCP server binding information
- show ip dhcp server statistics - Displays the DHCP server statistics
- network - Configures the network IP address of the DHCP Address Pool

3.4.15 netbios-node-type

Sets the NetBIOS node type in the DHCP server configuration parameters. The no form of this command is used to delete the NetBios node type from the DHCP server configuration parameters.

The NetBIOS node type for Microsoft DHCP clients can be one of the four settings: broadcast, peer-to-peer, mixed, or hybrid.

```
netbios-node-type {0-FF | b-node | h-node | m-node | p-node}
```

```
no netbios-node-type
```

Syntax Description

0-FF – Node type value.
b-node – Broadcast node.
h-node – Hybrid node.
m-node – Mixed node.
p-node – Peer-to-peer node.

Mode DHCP Pool Configuration

Example

```
SEFOS(dhcp-config)# netbios-node-type h-node
```

Notes

- The recommended type is hybrid node
- The configuration of this command will take effect only after configuring the network address pool using network command

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics
- `network` - Configures the network IP address of the DHCP Address Pool

3.4.16 default-router

Sets the default router in the DHCP server configuration parameters. The `no` form of the command deletes the default router from the DHCP server configuration parameters.

```
default-router ip-address
```

```
no default-router
```

Mode DHCP Pool Configuration

Example `SEFOS(dhcp-config)# default-router 10.23.2.99`

Notes The configuration of this command will take effect only after configuring the network address pool using network command.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics
- `network` - Configures the network IP address of the DHCP Address Pool

3.4.17 option

Sets the pool specific DHCP server option. The `no` form of the command deletes the pool specific DHCP server option.

```
option code_1-2147483647 {ascii string | hex hex-string | ip address}
```

```
no option code_1-2147483647
```

Syntax Description
code – Option code.
ascii – ASCII string.
hex – Hexadecimal string.
ip – IP address.

Mode DHCP Pool Configuration

Example `SEFOS(dhcp-config) # option 19 hex f`

Notes

- RFC 2132 provides details about option code to option name mapping and the option length information.
- The following is the list of supported/configurable DHCP options with their corresponding option length values.
- Options 19, 20, 27, 29, 30, 31, 34, 36, 39, 46 must have length 1.
- Options 12, 14, 15, 17, 18, 40, 43, 47, 64, 66, 67 must have length>=1.
- Option 16 must have minimum length 4 and the value for this option must be an IP address and Option 25 can have a length of 2 and 2*n.
- Option 68 must have length 4 and the value for this option must be an IP address.
- Options 1-11, 41, 42, 44, 45, 48, 49, 65, 69, 70-76 must have a length of 4. Value for these options must be an IP address.
- Options 21, 33 must have minimum length as 8 and 8*n.
- Options 0, 255, 50-60 are non-configurable options.
- Network pool must be configured prior to the execution of this command. Only then the configured option will be visible to the user in the show command output. If the network pool.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `ip dhcp pool` - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- `ip dhcp option` - Sets the DHCP server options
- `show ip dhcp server information` - Displays the DHCP server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server statistics` - Displays the DHCP server statistics
- `network` - Configures the network IP address of the DHCP Address Pool

3.4.18 lease

Configures the duration of the lease for an IP address that is assigned from SEFOS DHCP server to a DHCP client. The `no` form of this command restores the default value of 3600 seconds.

```
lease {days_0-365 [hours_0-23 [minutes_1-59]] | infinite}
```

```
no lease
```

Syntax Description	**days** – Duration of the lease in number of days. **hours** – Number of hours in lease. **minutes** – Number of minutes in lease. **infinite** – Duration of the lease is unlimited.
Mode	DHCP Pool Configuration
Defaults	3600 seconds.
Example	`SEFOS(dhcp-config)# lease 1`

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `show ip dhcp server information` - Displays the server information
- `show ip dhcp server pools` - Displays the DHCP server pools
- `show ip dhcp server binding` - Displays the DHCP server binding information
- `show ip dhcp server statistics` - Displays the DHCP server statistics

3.4.19 utilization threshold

Sets the pool usage threshold value in percentage. If the pool usage reaches this threshold level, a syslog event and an SNMP trap message will be generated. The `no` form of this command sets pool usage threshold to its default value.

utilization threshold {*0-100***}**

no utilization threshold

Mode	DHCP Pool Configuration
Defaults	75
Example	`SEFOS(dhcp-config)# utilization threshold 76`

Related Commands

- `show ip dhcp server pools` - Displays the DHCP server pools
- `logging` - Enables Syslog server and configures the Syslog Server IP address, the log-level and other Syslog related parameters

3.4.20 host hardware-type

Specifies the hardware address of a DHCP client and host specific DHCP options. The no form of the command deletes the host option.

```
host hardware-type type_1-2147483647 client-identifier
mac-address option code_1-2147483647 {ascii string | hex
hex-string | ip address}
```

```
no host hardware-type host-hardware-type_1-2147483647
client-identifier client-mac-address option code_1-2147483647
```

Syntax Description

type – Host hardware address type.

client-identifier– Host MAC address. The client identifier keyword is not supported.

option – The tag octet of the DHCP option.

ascii – ASCII string.

hex – Hex string.

ip – Host IP address.

Mode DHCP Pool Configuration

Example

```
SEFOS(dhcp-config)# host hardware-type 1
client-identifier 00:11:22:33:44:55 option 254 ip
10.0.0.1
```

Notes The current valid values are only 0 and 1.

Related Commands

- service dhcp-server / service dhcp - Enables or disables the DHCP server
- ip dhcp pool - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode

3.4.21 debug ip dhcp server

Enables the debug level for tracing the DHCP server module. The no form of this command disables the debug level for tracing the DHCP server module.

```
debug ip dhcp server {all | events | packets | errors | bind |
linkage}
```

```
no debug ip dhcp server {all | events | packets | errors | bind |
linkage}
```

Syntax Description	**all** – All trace messages. **events** – Trace management messages. **packets** – Packet related messages. **errors** – Trace error code debug messages. **bind** –Trace bind messages. **linkage** – Database linkage messages.
Mode	Privileged EXEC
Defaults	Debugging is disabled.
Example	SEFOS# **debug ip dhcp server all**
Notes	

Related Commands

- service dhcp-server / service dhcp - Enables or disables the DHCP server
- show ip dhcp server information - Displays the server information
- show ip dhcp server binding - Displays the DHCP server binding information

3.4.22 show ip dhcp server information

Displays the DHCP server information.

show ip dhcp server information

Mode	Privileged EXEC
Example	SEFOS# **show ip dhcp server information** DHCP server status : Enable Send Ping Packets : Disable Debug level : None Server Address Reuse Timeout : 5 secs Next Server Adress : 0.0.0.0 Boot file name : None

Related Commands

- service dhcp-server / service dhcp - Enables or disables the DHCP server
- ip dhcp next-server - Sets the next boot server in the DHCP server configuration parameters
- ip dhcp bootfile / bootfile config-file - Sets the boot file name in the DHCP server configuration parameters

- `ip dhcp` - Sets the DHCP server parameters such as enabling ICMP echo mechanism or offer-reuse timeout

3.4.23 show ip dhcp server pools

Displays the DHCP server pools.

```
show ip dhcp server pools
```

Mode Privileged EXEC

Example

```
SEFOS# show ip dhcp server pools
Pool Id : 1
_____________________________________________
Subnet : 12.0.0.0
Subnet Mask : 255.0.0.0
Lease time : 3600 secs
Utilization threshold : 75%
Start Ip : 12.0.0.1
End Ip : 12.255.255.255
Subnet Options
_____________
Code : 1, Value : 255.0.0.0
```

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `ip dhcp pool` - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- `lease` - Configures the duration of the lease for an IP address that is assigned from ISS Dynamic Host Configuration Protocol (DHCP) server to a DHCP client
- `network` - Sets the network IP and mask in DHCP server configuration parameters
- `excluded-address` / `ip dhcp excluded-address` - Creates an excluded pool to prevent DHCP server from assigning certain addresses to DHCP clients

3.4.24 show ip dhcp server binding

Displays the DHCP server binding information.

```
show ip dhcp server binding
```

Mode Privileged EXEC

Example

```
SEFOS# show ip dhcp server binding
Ip          Hw         Hw                    Binding   Expire
Address   Type       Address              State     Time
-------   ----       -------              ------    ------
12.0.0.2 Ethernet 00:02:02:03:04:01 Assigned May 12
13:22:41 2009
```

Notes Binding refers to the state of binding. This can be offered, assigned or probing. In offered state offer is sent, but no req has been received from the client. In assigned state the address is assigned to the client. In probing state the address is currently being probed by the DHCP server.

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `host hardware-type` - Specifies the hardware address of a Dynamic Host Configuration Protocol (DHCP) client
- `ip dhcp option` - Sets the DHCP server options

3.4.25 show ip dhcp server statistics

This command displays the DHCP server statistics.

```
show ip dhcp server statistics
```

Mode Privileged EXEC Mode

Example

```
SEFOS# show ip dhcp server statistics
Address pools : 2
Message                    Received
-------                    --------
DHCPDISCOVER              6
DHCPREQUEST               2
DHCPDECLINE               0
DHCPRELEASE               0
DHCPINFORM                0
Message                    Sent
-------                    ----
DHCPOFFER                 6
DHCPACK                    2
DHCPNAK                    0
```

Related Commands

- `service dhcp-server` / `service dhcp` - Enables or disables the DHCP server
- `ip dhcp pool` - Creates a DHCP server address pool and places the user in the DHCP pool configuration mode
- `ip dhcp` - Sets the DHCP server parameters such as enabling ICMP echo mechanism or offer-reuse timeout
- `show ip dhcp server pools` - Displays the DHCP server pools

CHAPTER 4

STP

4.1 STP

STP is a link management protocol that provides path redundancy while preventing undesirable loops in the network that are created by multiple active paths between devices. To establish path redundancy, STP creates a tree that spans all of the switches in an extended network, forcing redundant paths into a standby or blocked state.

For an Ethernet network to function properly, only one active path must exist between two stations. Multiple active paths between stations in a bridged network can cause loops in which Ethernet frames can endlessly circulate. STP can logically break such loops and prevent looping traffic from clogging the network. The dynamic control of the topology provides continued network operation in the presence of redundant or unintended looping paths.

4.2 STP Commands

The following commands enable you to configure STP:

- `spanning-tree mode mst|rst`
- `spanning-tree`
- `spanning-tree compatibility`
- `spanning-tree timers`
- `spanning-tree mst forward-time` / `spanning-tree mst max-age`
- `spanning-tree transmit hold-count`

- spanning-tree mst max-hops
- spanning-tree priority / spanning-tree mst root
- spanning-tree mst configuration
- name
- revision
- instance
- spanning-tree auto-edge
- spanning-tree
- spanning-tree restricted-role
- spanning-tree restricted-tcn
- spanning-tree mst - Properties of an interface for MSTP
- spanning-tree mst hello-time
- clear spanning-tree counters
- spanning-tree pathcost dynamic [lag-speed]
- clear spanning-tree detected protocols
- shutdown spanning-tree
- debug spanning-tree
- show spanning-tree
- show spanning-tree redundancy
- show spanning-tree detail
- show spanning-tree active
- show spanning-tree interface
- show spanning-tree root
- show spanning-tree bridge
- show spanning-tree mst - CIST or Specified MST Instance
- show spanning-tree mst configuration
- show spanning-tree mst - Port Specific Information
- show customer spanning-tree
- spanning-tree mode-mst|rst|pvrst|pvst
- spanning-tree vlan
- spanning-tree bpduguard
- spanning-tree guard
- spanning-tree encap
- spanning-tree vlan status
- spanning-tree vlan port-priority

- spanning-tree vlan cost
- show spanning-tree vlan - blockedports|pathcost|summary
- show spanning-tree vlan - bridge
- show spanning-tree vlan - root
- show spanning-tree vlan - interface
- show spanning-tree interface
- spanning-tree layer2-gateway-port
- spanning-tree bpdu-receive
- spanning-tree bpdu-transmit / spanning-tree bpdufilter
- spanning-tree mst - pseudoRootID priority
- show spanning-tree interface layer2-gateway-port
- spanning-tree mst max-instance

4.3 PVRST+

PVRST+ is a link management protocol that provides path redundancy while preventing undesirable loops in the network that are created by multiple active paths between stations working on same VLAN. To establish path redundancy, STP creates a tree for each VLAN that spans on the switches working on that VLAN, forcing redundant paths into a standby, or blocked state.

For an Ethernet network to function properly, only one active path must exist between two stations. Multiple active paths between stations in a bridged network can cause loops in which Ethernet frames can endlessly circulate. STP can logically break such loops and prevent looping traffic from clogging the network. The dynamic control of the topology provides continued network operation in the presence of redundant or unintended looping paths.

Note – For each VLAN, a spanning-tree instance is created. The number of spanning-tree instances supported in PVRST+ will depend on the number of instances supported by the hardware. There can be more VLANs operating in the switch, but PVRST+ will be operating only on supported instances.

4.4 PVRST+ Commands

The list of commands used for PVRST+ is as follows:

- spanning-tree mode-mst|rst|pvrst|pvst
- spanning-tree vlan
- spanning-tree bpduguard
- spanning-tree guard
- spanning-tree encap
- spanning-tree vlan status
- spanning-tree vlan port-priority
- spanning-tree vlan cost
- show spanning-tree vlan - blockedports|pathcost|summary
- show spanning-tree vlan - bridge
- show spanning-tree vlan - root
- show spanning-tree vlan - interface
- show spanning-tree interface

4.5 STP and PVRST+ Commands

4.5.1 spanning-tree mode mst|rst

Sets the spanning-tree operating mode.

```
spanning-tree mode {mst | rst}
```

Syntax Description	**mst** – MSTP configuration **rst** – RSTP configuration
Mode	Global Configuration
Defaults	**mst**
Example	SEFOS(config)# **spanning-tree mode rst**

Notes

- When SEFOS boots up, spanning-tree is enabled by default with MSTP operating in the switch.
- This command only starts and enables the spanning-tree mode. However, port-roles and states are computed only after enabling the spanning-tree.
- If the user-input for the spanning-tree mode is different from the current mode of operation, then SEFOS shuts down the operational spanning-tree and starts the spanning-tree per user-input.

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.2 spanning-tree

Enables the spanning-tree operation. The `no` form of the command disables the spanning-tree operation.

```
spanning-tree
```

```
no spanning-tree
```

Mode Global Configuration

Defaults Spanning-tree enabled is MSTP

Example

```
SEFOS(config)# spanning-tree
```

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.3 spanning-tree compatibility

Sets the compatibility version for the spanning-tree protocol. The `no` form of the command sets the compatibility version for spanning-tree protocol to its default value.

```
spanning-tree compatibility {stp | rst | mst}
```

```
no spanning-tree compatibility
```

Syntax Description	**stp** – STP configuration **rst** – RSTP configuration **mst** – MSTP configuration
Mode	Global Configuration
Defaults	If spanning-tree protocol enabled is MST, then MSTP compatible. If spanning-tree protocol enabled is RST, then RSTP compatible.
Example	`SEFOS(config)#` **`spanning-tree compatibility stp`**
Notes	The option mst is available only when MSTP is the operational mode of the spanning-tree. When the spanning-tree mode is `mst`, the fields in the dot1d Bridge-MIB are not updated, even when the compatibility mode has been set to `rst` or `stp`. If you want to use these MIB variables to manage or observe the switch, you must use spanning-tree mode `rst`.

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.4 spanning-tree timers

Sets the spanning-tree timers in seconds. The `no` form of the command sets the spanning-tree timers to the default values.

```
spanning-tree {forward-time 4-30 | hello-time 1-2 | max-age 6-40}
```

```
no spanning-tree { forward-time | hello-time | max-age }
```

Syntax Description	**forward-time** – Controls how fast a port changes its spanning-tree state from blocking state to forwarding state (in seconds). **hello-time**– Determines how often the switch broadcasts its hello message to other switches when it is the root of the spanning-tree (in seconds). **max-age** – The maximum age allowed for the STP information learnt from the network on any port before it is discarded (in seconds).
Mode	Global Configuration

Defaults **forward-time** – 15
hello-time– 2
max-age – 20

Example
```
SEFOS(config)# spanning-tree max-age 6
SEFOS(config)# spanning-tree hello-time 1
SEFOS(config)# spanning-tree forward-time 4
```

Notes The following relation must be observed while configuring the timers:
- 2 * (Forward-time - 1) >= Max-age
- Max-Age >= 2 * (Hello-time +1)

Related Commands

- `show spanning-tree bridge` - Displays spanning-tree configuration of the bridge forward time
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.5 spanning-tree mst forward-time

Configures the forward timer of the spanning-tree. The `no` form of the command sets the forward timer to the default value. The forward timer controls the speed at which a port changes its spanning-tree state from blocking state to forwarding state. The timer value ranges between 4 and 30 seconds.

This command operates similar to that of the command `spanning-tree timers`, but configures only the forward timer.

```
spanning-tree mst forward-time 4-30
```

```
no spanning-tree mst forward-time
```

Mode Global Configuration

Defaults **forward-time** – 15

Example
```
SEFOS(config)# spanning-tree mst forward-time 4
```

Notes The following relation must be observed while configuring the timers:
2 * (Forward-time - 1) >= Max-age

Related Commands

- `show spanning-tree bridge` - Displays spanning-tree configuration of the bridge forward time
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.6 spanning-tree mst max-age

Configures the max-age timer of the spanning-tree. The `no` form of the command sets the `max-age` timer to the default value. The `max-age` timer denotes the time (in seconds) after which the spanning-tree protocol information learnt from the network on any port will be discarded. The timer value ranges between 6 and 40 seconds.

This command operates similar to the command `spanning-tree timers`, but configures only the `max-age` timer.

```
spanning-tree mst max-age 6-40
```

```
no spanning-tree mst max-age
```

Mode	Global Configuration
Defaults	**max-age** – 20
Example	`SEFOS(config)#` **`spanning-tree mst max-age 7`**
Notes	The following relation must be observed while configuring the timers: • 2 * (Forward-time - 1) >= Max-age • Max-Age >= 2 * (Hello-time +1)

Related Commands

- `show spanning-tree bridge` - Displays spanning-tree configuration of the bridge forward time
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.7 spanning-tree transmit hold-count

Sets the transmit hold-count value. The no form of the command sets the transmit hold-count to default value. The transmit hold-count value is a counter used to limit the maximum transmission rate of the switch.

```
spanning-tree transmit hold-count 1-10
```

```
no spanning-tree transmit hold-count
```

Mode	Global Configuration
Defaults	3
Example	SEFOS(config)# **spanning-tree transmit hold-count 5**

Related Commands

- show spanning-tree detail - Displays detailed spanning-tree information
- show spanning-tree active - Displays spanning-tree information of active ports

4.5.8 spanning-tree mst max-hops

Sets the maximum number of hops permitted in the MST. The no form of the command sets the maximum number of hops permitted in the MST to the default value.

```
spanning-tree mst max-hops 6-40
```

```
no spanning-tree mst max-hops
```

Mode	Global Configuration
Defaults	20
Example	SEFOS(config)# **spanning-tree mst max-hops 10**
Notes	The root switch of the instance always sends a BPDU with a cost of 0 and the hop count set to the maximum value.

Related Commands

show spanning-tree mst configuration - Displays multiple spanning-tree instance configuration

4.5.9 spanning-tree priority

Sets the bridge priority for the spanning-tree only in steps of 4096. The no form of the command sets the bridge priority to the default value.

```
spanning-tree [mst instance-id_1-64] [priority 0-61440]
```

```
no spanning-tree [mst instance-id_1-64] priority
```

Mode	Global Configuration
Defaults	32768
Example	`SEFOS(config)# spanning-tree priority 4096`
Notes	**spanning-tree priority** *0-61440* configures the priority in RSTP if RSTP is running, or configures the CIST priority if MSTP is running. **spanning-tree mst** *instance-id_1-64* **priority** *0-61440* configures the priority in MSTI and is supported only if MSTP is running.

Related Commands

- show spanning-tree detail - Displays detailed spanning-tree information
- show spanning-tree active - Displays spanning-tree information of active ports

4.5.10 spanning-tree mst root

```
spanning-tree mst instance-id_1-64 root {primary | secondary}
```

```
no spanning-tree mst instance-id_1-64 root
```

Syntax Description	*instance-id_1-64* – Instance identification number. This value ranges between 1 and 64. **primary** – Sets high enough priority (low value) for the switch so that the switch can be made as the bridge root of the spanning-tree instance. The priority value will be set as 24576. **secondary** – Sets the switch as a secondary root if the primary root fails. The priority value will be set as 28672.
Mode	Global Configuration
Example	`SEFOS(config)# spanning-tree mst instance-id 1 root secondary`

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.11 spanning-tree mst configuration

Helps enter MST configuration submode.

```
spanning-tree mst configuration
```

Mode	Global Configuration
Example	`SEFOS(config)# spanning-tree mst configuration`
Notes	In MST mode, the switch supports up to 64 instances. This MST configuration submode is used to make instance-specific and MST region configurations only. The switch supports up to 64 instances.

Related Commands

`show spanning-tree mst configuration` - Displays multiple spanning-tree instance configurations

4.5.12 name

Sets the configuration name for the MST region. The no form of the command deletes the configuration name.

```
name optional-max-length-string
```

```
no name
```

Mode	MSTP Configuration
Defaults	The default configuration name is 00: 00: 00: 00: 00: 00
Example	`SEFOS(config-mst)# name regionone`
Notes	The name string is case sensitive.

Related Commands

`show spanning-tree mst configuration` - Displays multiple spanning-tree instance configuration

4.5.13 revision

Sets the configuration revision number for the MST region. The no form of the command deletes the configuration revision number.

```
revision 0-65535
```

```
no revision
```

Mode	MSTP Configuration
Defaults	0
Example	`SEFOS(config-mst)# revision 100`

Related Commands

`show spanning-tree mst configuration` - Displays multiple spanning-tree instance configurations

4.5.14 instance

Maps VLANs to an MST instance. The no form of the command deletes the instance and unmaps specific VLANs from the MST instance.

```
instance {instance-id_1-64 | 4094} [vlan vlan-range]
```

```
no instance instance-id_1-64 [vlan vlan-range]
```

Syntax Description	**vlan** – The VLAN range associated with a spanning-tree instance. MST instance 4094 is used only in Provider backbone bridging (BPP-TE) and is not supported in this release.
Mode	MSTP Configuration
Defaults	VLANs mapped for instance 0: 11-1024, 1025-2048, 2049-3072,3073-4094.
Example	`SEFOS(config-mst)# instance 2 vlan 2`
Notes	A single VLAN identified by a VLAN ID number is specified by a range of VLANs separated by a hyphen, or a series of VLANs separated by a comma.

Related Commands

`show spanning-tree mst configuration` - Displays multiple spanning-tree instance configuration

4.5.15 spanning-tree auto-edge

Enables automatic detection of a bridge attached to an interface. The no form of the command disables automatic detection of a bridge attached to an interface.

```
spanning-tree auto-edge
```

```
no spanning-tree auto-edge
```

Mode	Interface Configuration
Example	`SEFOS(config-if)# spanning-tree auto-edge`

Related Commands

`show spanning-tree bridge` - Displays the spanning-tree configuration of the bridge

4.5.16 spanning-tree

Sets the spanning-tree properties of an interface. The no form of the command sets the spanning-tree properties of an interface to the default value.

```
spanning-tree {cost 0-200000000 | disable | link-type
{point-to-point | shared} | portfast | port-priority 0-240}
```

```
no spanning-tree {cost | disable | link-type | portfast |
port-priority}
```

Syntax Description

cost – Path cost value associated with the port.

disable – Disables the spanning-tree on the port.

link-type – The link can be a point-to-point link or can be a shared LAN segment on which another bridge is present. The no form of the command sets the link type as auto.

portfast – Specifies that port has only hosts connected and hence can transition to forwarding rapidly.

port-priority – Port priority value.

Mode Interface Configuration

Defaults

cost – 200000

port-priority – 128.1

portfast – Not in portfast.

link-type – Shared.

Example

```
SEFOS(config-if)# spanning-tree cost 2200
SEFOS(config-if)# spanning-tree link-type point-to-point
SEFOS(config-if)# spanning-tree portfast
SEFOS(config-if)# spanning-tree port-priority 25
```

Notes In MSTP mode, this configuration applies to the CIST context.

Related Commands

show spanning-tree interface - Displays the spanning-tree port specific configuration.

4.5.17 spanning-tree restricted-role

Enables the root-guard or restricted role feature on the port (prevents a specific port from becoming the root port). The no form of the command disables the root-guard or restricted role feature on the port.

```
spanning-tree restricted-role
```

```
no spanning-tree restricted-role
```

Mode	Interface Configuration
Defaults	Disabled.
Example	SEFOS(config-if)# **spanning-tree restricted-role**

Related Commands

- show spanning-tree detail - Displays detailed spanning-tree information

4.5.18 spanning-tree restricted-tcn

Enables the topology change guard or restricted TCN feature on the port (prevents the topology change caused by that port). The no form of the command disables the topology change guard or restricted TCN feature on the port.

```
spanning-tree restricted-tcn
```

```
no spanning-tree restricted-tcn
```

Mode	Interface Configuration
Defaults	Disabled
Example	SEFOS(config-if)# **spanning-tree restricted-tcn**

Related Commands

- show spanning-tree detail - Displays detailed spanning-tree information

4.5.19 spanning-tree mst - Properties of an interface for MSTP

Sets the spanning-tree properties of an interface for MSTP. The no form of the command sets the spanning-tree properties of an interface to the default value. The port-priority must be in increments of 16 with a maximum value of 240.

```
spanning-tree mst instance-id_1-64 {cost 1-200000000 |
port-priority 0-240 | disable}
```

```
no spanning-tree mst instance-id_1-64 {cost | port-priority |
disable}
```

Syntax Description

cost – Cost value associated with the port
port-priority – Port priority value
disable – Disables the spanning-tree on the port

Mode

Interface Configuration

Defaults

cost – 200000
port-priority – 128

Example

```
SEFOS(config-if)# spanning-tree mst 2 cost 4000
SEFOS(config-if)# spanning-tree mst 1 port-priority 32
SEFOS(config-if)# spanning-tree mst 2 disable
```

Notes

- The MST instance must exist for this command.
- If all interfaces have the same priority value, the MST instance places the interface with the lowest interface number in the forwarding state and blocks other interfaces.

Related Commands

show spanning-tree mst - CIST or Specified MST Instance - Displays the spanning-tree properties of an interface for an MSTP instance

4.5.20 spanning-tree mst hello-time

This command configures the spanning tree hello time.

The no form of this command resets the hello time to its default value.

The hello time represents the time interval (in seconds) between two successive

configuration BPDUs generated by the switch on the port. This value is either 1 or 2 seconds. This value is applied to all active MSTIs.

```
spanning-tree mst hello-time seconds_1-2
```

```
no spanning-tree mst hello-time
```

Mode	Global Configuration, Interface Configuration
Defaults	2 seconds.
Example	`SEFOS(config-if)# spanning-tree mst hello-time 1` `SEFOS(config)# spanning-tree mst hello-time 1`
Notes	This command can be executed successfully, only if the spanning tree functionality is not shutdown in the switch. The type of spanning tree mode should be set as mst.

Related Commands

- `shutdown spanning-tree` - Shuts down spanning tree functionality in the switch.
- `spanning-tree mode` - Sets the type of spanning tree to be executed, enables spanning tree operation and starts spanning tree functionality in the switch.
- `show spanning-tree` - Summary, Blockedports, Pathcost, redundancy - Displays spanning tree related information available in the switch for the current STP enabled in the switch.
- `show spanning-tree detail` - Displays detailed spanning tree related information of the switch and all ports enabled in the switch.
- `show spanning-tree interface` - Displays the port related spanning tree information for the specified interface.
- `show spanning-tree root` - Displays the spanning tree root information.
- `show spanning-tree bridge` - Displays the spanning tree bridge information.
- `show spanning-tree mst` - Port Specific Configuration - Displays multiple spanning tree port speci fic information for the specified port.

4.5.21 clear spanning-tree counters

Resets all bridge and port level spanning tree statistics counters.

For RSTP, the information contains the number of:

- Transitions to forwarding state
- RSTP BPDU count received / transmitted

- Config BPDU count received / transmitted
- TCN BPDU count received / transmitted
- Invalid BPDU count transmitted
- Port protocol migration count

For MSTP, the information contains the number of:

- Port forward transitions
- Port received BPDUs
- Port transmitted BPDUs
- Port invalid BPDUs received
- Port protocol migration count
- BPDUs sent / received for each MSTI

For PVRST, the information contains the number of:

- Transitions to forwarding state
- PVRST BPDU count received / transmitted
- Config BPDU count received / transmitted
- TCN BPDU count received / transmitted
- Port protocol migration count

```
clear spanning-tree [mst instance-id] counters [interface
interface-type interface-id]
```

Syntax Description

mst *instance-id* – Clears the statistical counters specific to the MSTP instance already created in the switch. This value ranges between 1 and 64. The special value 4094 can be used only in the switch that supports Provider backbone bridging (BPP-TE) and is not supported in this release. This option is applicable, only if the spanning tree mode is set as `mst`.

interface *interface-type interface-id* – Clears all port-level spanning-tree statistics counters for the given port.

Mode

Global Configuration

Example

```
SEFOS(config)# clear spanning-tree mst 1 counters
```

Notes

The statistics information can be deleted only if the spanning tree functionality is not shutdown in the switch. The type of spanning tree mode should be set if the functionality is already shutdown.

Valid interfaces include physical ports, VLANs, and port channels. Port protocol migration count gets incremented consistently when there is a protocol migration.

Related Commands

- `shutdown spanning-tree` - Shuts down spanning tree functionality in the switch.
- `spanning-tree mode mst|rst` - Sets the type of spanning tree to be executed, enables spanning tree operation and starts spanning tree functionality in the switch.
- `instance` - Creates an MST instance and maps it to VLANs.
- `show spanning-tree detail` - Displays detailed spanning tree related information of the switch and all ports enabled in the switch.
- `show spanning-tree active` - Displays detailed spanning tree related information of the switch and all ports enabled in the switch.
- `show spanning-tree interface` - Displays the port related spanning tree information for the specified interface.
- `show spanning-tree mst` - CIST or Specified MST Instance - CIST or specified mst Instance - Displays multiple spanning tree information for all MSTIs in the switch.
- `show spanning-tree mst` - Port Specific Information - Displays multiple spanning tree port specific information for the specified port.
- `spanning-tree vlan` - Summary, Blockedports, Pathcost - Displays PVRST related information for the speci fied VLAN.
- `show spanning-tree vlan - interface` - Displays interface specific PVRST information for the specified VLAN.

4.5.22 spanning-tree pathcost dynamic [lag-speed]

Enables dynamic path cost calculation feature in the switch. The `no` form of the command disables dynamic path cost calculation. The dynamic pathcost calculation feature is disabled, even if the spanning tree mode is changed.

```
spanning-tree pathcost dynamic [lag-speed]
```

```
no spanning-tree pathcost dynamic [lag-speed]
```

Syntax Description	**lag-speed** - Calculates the path cost for change in speed of the port. This feature is used for LA ports whose speed changes due to addition or deletion of ports from the port channel. The manually assigned path cost is used even if the lag speed feature is enabled in the switch, if the path cost is assigned manually. The lag speed feature can be enabled only after enabling the dynamic pathcost calculation feature.
Mode	Global Configuration
Defaults	Disabled
Example	`SEFOS(config)# spanning-tree pathcost dynamic`
Notes	• The dynamic pathcost calculation feature can be configured in the switch, only if the spanning tree functionality is not shutdown in the switch. The type of spanning tree mode should be set, if the functionality is already shutdown. • This feature is applied only for the ports that are not shutdown during the execution of STP. • On execution of this command, the path cost of all the ports are calculated dynamically based on the speed of the interface. • This feature is applied only for the ports that are not shutdown during the execution of STP. • If the cost has already been configured for a CIST or an RSTP interface, this command has no effect on those interfaces. • If the cost has been configured previously for an MST instance on a particular interface, this command has no effect on that instance in the specified interface. Whereas, the path cost of all the other instances on the same interface are calculated dynamically.

Related Commands

- `spanning-tree compatibility` - Sets the compatibility version for the spanning-tree protocol
- `spanning-tree` - Properties of an interface - Sets the spanning-tree properties of an interface
- `spanning-tree mst` - Properties of an interface for MSTP - Sets the spanning-tree properties of an interface for MSTP

4.5.23 spanning-tree loop-guard

Enables the loop guard feature in a port. This feature prevents the alternative or root ports from becoming designated ports due to failure in a unidirectional link. This feature is useful when the neighbor bridge is faulty, that is, the bridge cannot send BPDUs but continues to send data traffic.

The no form of this command disables the loop guard feature in the port. The loop guard feature is disabled, even if the spanning tree mode is changed.

```
spanning-tree loop-guard
```

```
no spanning-tree loop-guard
```

Mode	Interface Configuration
Default	Disabled in all ports.
Example	`SEFOS(config-if)# spanning-tree loop-guard`
Notes	The loop guard feature can be configured, only if the spanning tree functionality is not shutdown in the switch. The type of spanning tree mode should be set, if the functionality is already shutdown.

Related Commands

- `shutdown spanning-tree` - Shuts down spanning tree functionality in the switch.
- `spanning-tree mode` - Sets the type of spanning tree to be executed, enables spanning tree operation and starts spanning tree functionality in the switch.
- `show spanning-tree detail` - Displays detailed spanning tree related information of the switch and all ports enabled in the switch.
- `show spanning-tree active detail` - Displays detailed spanning tree related information of the switch and all ports enabled in the switch.
- `show spanning-tree interface` - Displays the port related spanning tree information for the specified interface.

4.5.24 clear spanning-tree detected protocols

Restarts the protocol migration process on all the interfaces and forces renegotiation with the neighboring switches.

```
clear spanning-tree detected protocols [{interface interface-type
interface-id | switch context-name}]
```

Syntax Description	**interface** *interface-type interface-id* – Restarts the protocol migration process on the specified interface. Valid interfaces include physical ports, VLANs, and port channels. **switch** *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode	Privileged EXEC
Example	SEFOS# **clear spanning-tree detected protocols interface extreme-ethernet 0/1**
Notes	Port protocol migration count gets incremented consistently when there is a protocol migration.

Related Commands

- `show spanning-tree interface` - Displays the spanning-tree port specific configuration
- `show spanning-tree mst` - Port Specific Information - Displays multiple spanning-tree port specific configuration

4.5.25 shutdown spanning-tree

Shuts down spanning-tree operation.

```
shutdown spanning-tree
```

Mode	Global Configuration
Defaults	MSTP is started and enabled.
Example	SEFOS(config)# **shutdown spanning-tree**
Notes	MSTP and RSTP are mutually exclusive and thus the MSTP module must be shutdown to start the RSTP module. The bridge module must be enabled for RSTP to be started.

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `show spanning-tree detail` - Displays detailed spanning-tree information for STP/RSTP/MSTP configurations

4.5.26 debug spanning-tree

Provides spanning-tree debugging support. The no form of the command disables debugging.

```
debug spanning-tree {global | {all | errors | init-shut |
management | memory | bpdu | events | timer | state-machine
{port-info | port-receive | port-role-selection | role-transition
| state-transition | protocol-migration | topology-change |
port-transmit | bridge-detection | pseudoInfo } | redundancy |
sem-variables} switch context-name}
```

```
no debug spanning-tree {global | {all | errors | init-shut |
management | memory | bpdu |events | timer | state-machine
{port-info | port-receive | port-role-selection | role-transition
| state-transition | protocol-migration | topology-change |
port-transmit | bridge-detection | pseudoInfo } redundancy |
sem-variables} switch context-name}
```

Syntax Description	**global** – Global debug messages (this parameter is specific to multiple instance). **all** – All RSTP or MSTP debug messages. **errors** – Error code debug messages. **init-shut** – Init and Shutdown debug messages. **management** – Management messages. **memory** – Memory related messages. **bpdu** – BPDU related messages. **timer** – Timer module messages. **events** – Events related messages. **state machine** – State-machine related debug messages. **port-info** – Port information messages. **port-recieve** – Port received messages. **port-role-selection** – Port role selection messages. **role-transition** – Role transition messages. **state-transition** – State transition messages. **protocol-migration** – Protocol migration messages. **topology-change** – Topology change messages. **port-transmit** – Port transmission messages. **bridge-detection** – Bridge detection messages. **pseudoInfo** – Pseudo information debug statements. **redundancy** – Redundancy related messages. The keyword `redundancy` is not supported. **sem-variables** – State-machine variables debug messages. **switch** *`context-name`* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.
Mode	Privileged EXEC
Defaults	Debugging is disabled.
Example	`SEFOS#` **`debug spanning-tree all`**

Related Commands

`show spanning-tree detail` - Displays detailed spanning-tree information for STP/RSTP/MSTP configuration

4.5.27 show spanning-tree

Displays spanning-tree information, such as summary, blockedports, and path cost.

```
show spanning-tree [{summary | blockedports | pathcost method}]
[switch context-name]
```

Syntax Description

summary – Summary of port states.

blockedports – Blocked ports in the system.

pathcost method – Path cost method configured for a bridge.

switch *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Defaults

When SEFOS boots up, spanning-tree is enabled by default with MSTP operating in the switch.

Example

```
Single Instance:
SEFOS# show spanning-tree
Root Id           Priority    32768
                   Address     00:02:02:03:04:01
                   Cost         1900
                   Port         73 [po1]
                   Max age 20 Sec, forward delay 15 Sec
                   Hello Time 2 Sec

MST00

Spanning tree Protocol has been enabled

MST00 is executing the mstp compatible Multiple Spanning Tree Protocol
Bridge Id         Priority  32768
                   Address   00:01:02:03:04:01
                   Max age is 20 sec, forward delay is 15 sec
                   Hello Time is 2 sec
                   Dynamic Path Cost is Disabled
                   Dynamic Path Cost Lag-Speed Change is Enabled
Name              Role           State       Cost     Prio    Type
----              ----           -----       ----     ----    ------
Ex0/46           Alternate     Discarding    2000     128     P2P
po1              Root           Forwarding    1900     128     P2P
```

```
SEFOS# show spanning-tree blockedports

Blocked Interfaces List:

The Number of Blocked Ports in the system is :1

SEFOS# show spanning-tree pathcost method

spanning-tree port pathcost method is Long

SEFOS# show spanning-tree summary

spanning-tree enabled protocol is RSTP
spanning-tree port pathcost method is Long

RSTP Port Roles and States

Port-Index   Port-Role     Port-State    Port-Status
----------   ---------     ----------    -----------
1              Designated    Forwarding    Enabled
2              Designated    Forwarding    Enabled
3              Designated    Forwarding    Enabled
4              Designated    Forwarding    Enabled
5              Designated    Forwarding    Enabled
6              Designated    Forwarding    Enabled
7              Designated    Forwarding    Enabled
8              Designated    Forwarding    Enabled


Multiple Instance:
```

```
SEFOS# show spanning-tree
Root Id           Priority    32768
                   Address     00:02:02:03:04:01
                   Cost         1900
                   Port         73 [po1]
                   Max age 20 Sec, forward delay 15 Sec
                   Hello Time 2 Sec

MST00

Spanning tree Protocol has been enabled

MST00 is executing the mstp compatible Multiple Spanning Tree Protocol
Bridge Id         Priority  32768
                   Address   00:01:02:03:04:01
                   Max age is 20 sec, forward delay is 15 sec
                   Hello Time is 2 sec
                   Dynamic Path Cost is Disabled
                   Dynamic Path Cost Lag-Speed Change is Enabled
Name              Role           State       Cost     Prio    Type
----              ----           -----       ----     ----    ------
Ex0/46           Alternate     Discarding    2000     128     P2P
po1              Root           Forwarding    1900     128     P2P

SEFOS# show spanning-tree summary
Switch - default

spanning-tree port pathcost method is Long
spanning-tree enabled protocol is MSTP

MST00 Port Roles and States
Port-Index   Port-Role     Port-State      Port-Status
----------   ---------     ----------      -----------
49             Disabled      Forwarding    Disabled

Switch - cust1

spanning-tree port pathcost method is Long
```

```
spanning-tree enabled protocol is MSTP

MST00 Port Roles and States
Port-Index   Port-Role     Port-State      Port-Status
----------   ---------     ----------      -----------
1              Designated    Forwarding     Enabled
2              Root          Forwarding     Enabled
3              Designated    Forwarding     Enabled
4              Disabled      Discarding     Enabled
5              Disabled      Discarding     Enabled
6              Disabled      Discarding     Enabled


Switch - cust2

spanning-tree port pathcost method is Long
spanning-tree enabled protocol is MSTP
MST00 Port Roles and States
Port-Index   Port-Role     Port-State      Port-Status
----------   ---------     ----------      -----------
7              Designated    Forwarding    Enabled
8              Root           Forwarding    Enabled
9              Alternate     Discarding    Enabled
10             Disabled      Discarding    Enabled
11             Disabled      Discarding    Enabled
12             Disabled      Discarding    Enabled
```

Notes This command is the same for both RSTP and MSTP.

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `spanning-tree` - Enables the spanning-tree operation
- `spanning-tree compatibility` - Sets the compatibility version for the spanning-tree protocol
- `spanning-tree timers` - Sets the spanning-tree timers
- `spanning-tree transmit hold-count` - Sets the transmit hold-count value
- `spanning-tree priority` - Sets the bridge priority for the spanning-tree only in steps of 4096
- `spanning-tree` - Properties of an interface - Sets spanning-tree properties of an interface
- `spanning-tree mst -` Properties of an interface for MSTP - Sets the spanning-tree properties of an interface for MSTP

- `show spanning-tree bridge` - Displays the spanning-tree configuration of the bridge
- `show spanning-tree interface` - Displays spanning-tree port configuration

4.5.28 show spanning-tree redundancy

Displays spanning-tree information.

show spanning-tree [{summary | blockedports | pathcost method | redundancy}] [switch *context-name*]

Syntax Description

summary – Summary of port states.

blockedports – Blocked ports in the system.

pathcost method – Path cost method configured for a bridge.

switch *context-name* – Context or switch name. This parameter is specific to multiple instance.

Mode

Privileged EXEC

Defaults

When SEFOS boots up, spanning-tree is enabled by default with MSTP operating in the switch.

Example

```
SEFOS# show spanning-tree redundancy
Port Role/State for Instance 0 Port 1
=====================
Port Role 3 Port State 5
Port Role/State for Instance 0 Port 2
=====================
Port Role 1 Port State 2

Dumping Data On Port 1
------------------------
RootId 0:00:11:22:33:44:55
Designated BrId 0:00:11:22:33:44:55
Root path Cost 0
Length 0
Protocol Id 0
Port Id 8001
Message Age 0
```

```
Max Age 14
Hello Time 2
Fwd Delay Time f
Dest Addr 00:00:00:00:00:00
Src Addr 00:00:00:00:00:00
Version Length 0
Version 2
BPDU Type 2
Flags e

Dumping Data On Port 2
------------------------
RootId 0:00:11:22:33:44:55
Designated BrId 0:00:11:22:33:44:55
Root path Cost 0
Length 0
Protocol Id 0
Port Id 8002
Message Age 0

Max Age 14
Hello Time 2
Fwd Delay Time f
Dest Addr 00:00:00:00:00:00
Src Addr 00:00:00:00:00:00
Version Length 0
Version 2
BPDU Type 2
Flags e

Instance 0 Port 1
======================
Expected FdWile expiry time 0
Expected rcvdInfo exp Time 4654
Expected rrWhile exp Time 0
Expected rbWhile exp Time 0
Expected tcWhile exp Time 0
Instance 0 Port 1
TCN Var 1
STP Version 1
Proposing Flag 0
Info Is 4
```

```
Instance 0 Port 2
=====================
Expected FdWile expiry time 0
Expected rcvdInfo exp Time 4656
Expected rrWhile exp Time 0
Expected rbWhile exp Time 0
Expected tcWhile exp Time 0
Instance 0 Port 2
TCN Var 1
STP Version 1
Proposing Flag 0
Info Is 4
```

Notes This command is the same for both RSTP and MSTP.

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `spanning-tree` - Enables the spanning-tree operation
- `spanning-tree compatibility` - Sets the compatibility version for the spanning-tree protocol
- `spanning-tree timers` - Sets the spanning-tree timers
- `spanning-tree transmit hold-count` - Sets the transmit hold-count value
- `spanning-tree priority` - Sets the bridge priority for the spanning-tree only in steps of 4096
- `spanning-tree` - Properties of an interface - Sets spanning-tree properties of an interface
- `spanning-tree mst` – Properties of an interface for MSTP - Sets the spanning-tree properties of an interface for MSTP
- `show spanning-tree bridge` - Displays the spanning-tree configuration of the bridge
- `show spanning-tree interface` - Displays spanning-tree port configuration

4.5.29 show spanning-tree detail

Displays detailed spanning-tree information.

show spanning-tree detail [switch *context-name*]

Syntax Description **switch** *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show spanning-tree detail

Spanning tree Protocol has been enabled

MST00 is executing the mstp compatible Multiple Spanning Tree Protocol
Bridge Identifier has Priority 32768, Address 00:01:02:03:04:01

Configured Max age 20 sec, Forward delay 15 sec
Configured Hello Time 2 sec
Dynamic Path Cost Disabled
Flush Interval 0 centi-sec, Flush Invocations 72
Flush Indication threshold 0
Current Root has priority 32768, address 00:02:02:03:04:01
cost of root path is 2000
Number of Topology Changes 1, Time since topology Change 89 seconds ago
Transmit Hold-Count 3
Root Times : Max age 20 Sec Forward delay 15 Sec

Port 45 [Ex0/45] of MST00 is Root , Forwarding
Ex0/45 is operating in the MSTP Mode
Port path cost 2000, Port priority 128,
Port Identifier 128.45. Port HelloTime 2,
Timers: Hello - 1, Forward Delay - 0, Topology Change - 0
Designated root has priority 32768, address 00:02:02:03:04:01

Designated Bridge has priority 32768, address 00:02:02:03:04:01

Designated Port Id is 128.45, Designated pathcost is 0
Operational Forward delay 15, Max age 20
Received Hello Time 2 Sec
Number of Transitions to forwarding State : 1
Auto-Edge is enabled
PortFast is disabled, Oper-Edge is disabled
```

```
Link type is point to Point
BPDUs : sent 4, recieved 4466
Restricted Role is disabled.
Restricted TCN is disabled.
bpdu-transmit enabled
bpdu-receive enabled
Loop Guard is disabled
```

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `spanning-tree` - Enables the spanning-tree operation
- `spanning-tree compatibility` - Sets the compatibility version for the spanning-tree protocol
- `spanning-tree timers` - Sets the spanning-tree timers
- `spanning-tree transmit hold-count` - Sets the transmit hold-count value
- `spanning-tree priority` - Sets the bridge priority for the spanning-tree only in steps of 4096
- `spanning-tree` - Properties of an interface - Sets spanning-tree properties of an interface
- `spanning-tree mst - Properties of an interface for MSTP` - Sets the spanning-tree properties of an interface for MSTP
- `show spanning-tree bridge` - Displays the spanning-tree configuration of the bridge
- `show spanning-tree interface` - Displays spanning-tree port configuration

4.5.30 show spanning-tree active

Displays spanning-tree information of active ports.

show spanning-tree active [detail] [switch *context-name*]

Syntax Description

detail – Displays in detail about the port and bridge. This includes designated bridge details, designated port details, timer values, root bridge, and so on.

switch *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree active
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port 45 [Ex0/45]
 Max age 20 Sec, forward delay 15 Sec
 Hello Time 2 Sec

MST00

Spanning tree Protocol has been enabled

MST00 is executing the stp compatible Multiple Spanning Tree Pr
otocol
Bridge Id Priority 32768
 Address 00:01:02:03:04:01
 Max age is 20 sec, forward delay is 15 sec
 Hello Time is 2 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name    Role   State     Cost   Prio   Type
----    ----   -----     ----   ----   ----
Ex0/45   Root Learning   2000   128    P2P
```

```
SEFOS# show spanning-tree active switch default
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port 45 [Ex0/45]
 Max age 20 Sec, forward delay 15 Sec
 Hello Time 2 Sec

MST00

Spanning tree Protocol has been enabled

MST00 is executing the stp compatible Multiple Spanning Tree Pr
otocol
Bridge Id Priority 32768
 Address 00:01:02:03:04:01
 Max age is 20 sec, forward delay is 15 sec
 Hello Time is 2 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name     Role    State     Cost     Prio    Type
----     ----    -----     ----     ----    -----
Ex0/45   Root    Learning  2000     128     P2P
```

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `spanning-tree` - Enables the spanning-tree operation
- `spanning-tree compatibility` - Sets the compatibility version for the spanning-tree protocol
- `spanning-tree timers` - Sets the spanning-tree timers
- `spanning-tree transmit hold-count` - Sets the transmit hold-count value
- `spanning-tree priority` - Sets the bridge priority for the spanning-tree only in steps of 4096
- `spanning-tree` - Properties of an interface - Sets spanning-tree properties of an interface
- `spanning-tree mst` – Properties of an interface for MSTP - Sets the spanning-tree properties of an interface for MSTP
- `show spanning-tree bridge` - Displays the spanning-tree configuration of the bridge
- `show spanning-tree interface` - Displays spanning-tree port configuration

4.5.31 show spanning-tree interface

Diplays spanning-tree port configuration.

show spanning-tree interface *interface-type interface-id* **[{cost | priority | portfast | rootcost | restricted-role | restricted-tcn | state | stats | detail}]**

Syntax Description

cost – spanning-tree port cost
state – spanning-tree state
stats – Displays the input and output packets by switching path for the interface
priority – spanning-tree port priority
portfast – spanning-tree portfast state
rootcost – spanning-tree rootcost (pathcost to reach the root) value
restricted-role – Spanning-tree Restricted Role
restricted-tcn – Spanning-tree Restricted Topology Change
detail – Displays in detail about the port and bridge

Mode Privileged EXEC

Example

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1

Instance   Role           State          Cost      Prio Type
--------   ----           -----          ----      ---- ----
MST00       Root           Forwarding    200000    128.1 SharedLan

SEFOS# show spanning-tree interface extreme-ethernet 0/1 cost
Port cost is 200000

SEFOS# show spanning-tree interface extreme-ethernet 0/1 priority

Port Priority is 128
SEFOS# show spanning-tree interface extreme-ethernet 0/1 portfast

PortFast is disabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1 rootcost

Root Cost is 200000

SEFOS# show spanning-tree interface extreme-ethernet 0/1 state

Forwarding
```

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1 stats

Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1
Number of RSTP BPDU Count received          : 1692
Number of Config BPDU Count received       : 9
Number of TCN BPDU Count received           : 0
Number of RSTP BPDU Count Transmitted      : 735
Number of Config BPDU Count Transmitted    : 11
Number of TCN BPDU Count Transmitted       : 0
Number of Invalid BPDU Count Transmitted  : 0
Port Protocol Migration Count               : 1
SEFOS# show spanning-tree interface extreme-ethernet 0/1 detail

Port 1 [Ex0/1] of MST00 is Alternate , Discarding
Ex0/1 is operating in the MSTP Mode
Port path cost  2000, Port priority  128,
Port Identifier  128.1. Port HelloTime  2,
Timers: Hello - 1, Forward Delay - 0, Topology Change - 0
Designated root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.1, Designated pathcost is 0
Operational Forward delay 15, Max age 20
Received Hello Time 2 Sec
Number of Transitions to forwarding State : 1
Auto-Edge is disabled
PortFast is disabled, Oper-Edge is disabled
Link type is point to Point
BPDUs : sent 19, recieved 484
Restricted Role is disabled.
Restricted TCN is disabled.
bpdu-transmit enabled
bpdu-receive enabled
Loop Guard is enabled
```

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1
restricted-role

Restricted Role is Disabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1
restricted-tcn

Restricted TCN is Disabled

Multiple Instance:
SEFOS# show spanning-tree interface extreme-ethernet 0/1

Switch - default

Role           State          Cost      Prio Type
----           -----          ----      ---- ----
Root           Forwarding    200000    128   SharedLan

SEFOS# show spanning-tree interface extreme-ethernet 0/1 cost
Port cost is 200000

Switch - default
SEFOS# show spanning-tree interface extreme-ethernet 0/1 priority

Switch - default

Port Priority is 128

SEFOS# show spanning-tree interface extreme-ethernet 0/1 portfast

Switch - default

PortFast is disabled
```

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1 rootcost

Switch - default

Root Cost is 200000

SEFOS# show spanning-tree interface extreme-ethernet 0/1 state

Switch - default

Forwarding

SEFOS# show spanning-tree interface extreme-ethernet 0/1 stats

Switch - default

Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1
Number of RSTP BPDU Count received          : 1692
Number of Config BPDU Count received       : 9
Number of TCN BPDU Count received           : 0
Number of RSTP BPDU Count Transmitted      : 735
Number of Config BPDU Count Transmitted    : 11
Number of TCN BPDU Count Transmitted       : 0
Number of Invalid BPDU Count Transmitted  : 0
Port Protocol Migration Count               : 1

SEFOS# show spanning-tree interface extreme-ethernet 0/1 detail

Port 1 [Ex0/1] of MST00 is Root , Forwarding
Ex0/1 is operating in the MSTP Mode
Port path cost 2000, Port priority 128,
Port Identifier 128.1. Port HelloTime 2,
Timers: Hello - 0, Forward Delay - 0, Topology Change - 0
Designated root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address
```

```
00:02:02:03:04:01
Designated Port Id is 128.1, Designated pathcost is 0
Operational Forward delay 15, Max age 20
Received Hello Time 2 Sec
Number of Transitions to forwarding State : 2
Auto-Edge is enabled
PortFast is disabled, Oper-Edge is disabled
Link type is point to Point
BPDUs : sent 21, recieved 1331
Restricted Role is disabled.
Restricted TCN is disabled.
bpdu-transmit enabled
bpdu-receive enabled
Loop Guard is disabled
```

```
SEFOS# show spanning-tree interface fast 0/1 restricted-role

Switch - default

Restricted Role is Disabled

SEFOS# show spanning-tree interface fast 0/1 restricted-tcn

Switch - default

Restricted TCN is Disabled
```

Notes

Enter each interface separated by a space. Ranges are not supported. Valid interfac es include physical ports. VLANs, and port channels.

Related Commands

- `spanning-tree mst -` Properties of an interface for MSTP - Sets spanning-tree properties of an interface
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports
- `clear spanning-tree detected protocols` - Restarts the protocol migration process on all the interfaces
- `clear spanning-tree counters` - Resets all bridge and port level statistics counters

4.5.32 show spanning-tree root

Displays spanning-tree root information.

show spanning-tree root [{address | cost | forward-time | id | max-age | port | priority | detail }] [switch *context-name*]

Syntax Description

address – Root bridge MAC address.

cost – Cost value associated with the port.

forward-time – Root bridge forward time.

id – Root bridge identifier.

max-age – Root bridge maximum age

port – Root port

priority – Root bridge priority

detail – Displays in detail about the port and bridge. This information includes designated bridge details, designated port details, timer values, root bridge, and so on.

switch *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree root

Root ID     RootCost MaxAge FwdDly RootPort
-------     -------- ------ ------ --------
80:00:00:01:02:03:04:11   0        20      15      0

SEFOS# show spanning-tree root  address

Root Bridge Address is 00:01:02:03:04:11


SEFOS# show spanning-tree root cost

Root Cost is 0

SEFOS# show spanning-tree root forward-time

Forward delay is 15 sec
```

```
SEFOS# show spanning-tree root id

Root Bridge Id is 80:00:00:01:02:03:04:11

SEFOS# show spanning-tree root max-age

Root MaxAge is 20

SEFOS# show spanning-tree root port

Root Port is 0
SEFOS# show spanning-tree root  priority

Root Priority is 32768

SEFOS# show spanning-tree root detail

We are the root of the spanning-tree
Root Id           Priority    32768
                   Address     00:01:02:03:04:11
                   Cost        0
                   Port        0
                  Hello Time 2 Sec, Max Age 20 Sec, Forward     Delay
15 Sec
Multiple Instance:
SEFOS# show spanning-tree root

Switch - default

Instance  Root ID          RootCost   MaxAge FwdDly RootPort
--------  -------          --------   ------ ------ --------
MST00 80:00:00:01:02:03:04:01   0         20      15      0

Switch - cust1
Instance  Root ID                  RootCost   MaxAge FwdDly RootPort
--------  -------                  --------   ------ ------ --------
MST00      00:00:00:01:02:03:04:04 200000     20     15      Ex0/2
```

Related Commands

- `spanning-tree timers` - Sets the spanning-tree Timers

- `spanning-tree priority` - Sets the Bridge Priority for the spanning-tree only in steps of 4096
- `show spanning-tree detail` - Displays detailed spanning-tree information

4.5.33 show spanning-tree bridge

Displays the spanning-tree configuration of the bridge.

```
show spanning-tree bridge [{address | forward-time | hello-time |
id | max-age | protocol | priority | detail}] [switch
context-name]
```

Syntax Description

address – Bridge address.

forward-time – Bridge forward time.

hello-time – Bridge hello time.

id – Bridge identifier.

max-age – Bridge maximum age.

protocol – spanning-tree protocol.

priority – Bridge priority.

detail – Bridge detail.

switch *context-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree  bridge address

Bridge Address is 00:01:02:03:04:21

SEFOS# show spanning-tree bridge forward-time

Bridge Forward delay is  15 sec

SEFOS# show spanning-tree bridge

Bridge ID                   HelloTime MaxAge FwdDly Protocol
---------                   --------- ------ ------ --------
80:00:00:01:02:03:04:21     2           20      15      rstp

SEFOS# show spanning-tree bridge hello-time

Bridge Hello Time is 2 sec
SEFOS# show spanning-tree bridge id

Bridge ID is 80:00:00:01:02:03:04:21

SEFOS# show spanning-tree bridge max-age

Bridge Max Age is 20 sec

SEFOS# show spanning-tree bridge protocol

Bridge Protocol Running is RSTP
SEFOS# show spanning-tree bridge priority

Bridge Priority is 32768

SEFOS# show spanning-tree bridge detail

Bridge Id      Priority 32768,
               Address 00:01:02:03:04:21
               Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
```

```
Multiple Instance:
SEFOS# show spanning-tree bridge

Switch - default
MST Instance Bridge ID             MaxAge FwdDly Protocol

------------ ---------             ------ ------ --------
MST00    0 :00:00:01:02:03:04:01    20      15      mstp

Switch - cust1

MST Instance Bridge ID              MaxAge FwdDly Protocol
------------ ---------              ------ ------ --------
MST00    0 :00:00:01:02:03:04:02     20      15      mstp

SEFOS# show spanning-tree bridge address
Switch - default

MST00      00:01:02:03:04:01

Switch - cust1

MST00      00:01:02:03:04:0
```

Notes

Expressions are case sensitive.

Related Commands

- `spanning-tree timers` - Sets the spanning-tree timers
- `spanning-tree mst forward-time` - Configures the forward timer of the spanning-tree
- `spanning-tree mst max-age` - Configures the max-age timer of the spanning-tree
- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.34 `show spanning-tree mst` - CIST or Specified MST Instance

Displays multiple spanning-tree information for the CIST instance or specified MST instance.

show spanning-tree mst [*instance-id_1-64* **| 4094] [detail] [switch** *context-name***]**

Syntax Description

instance-id_1-64 – Range of spanning-tree instances.

detail – Spanning-tree MST instance specific details.

switch *contex-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree mst 1

## MST01
Vlans mapped:     2
Bridge      Address 00:01:02:03:04:11      Priority 32768
Root        Address 00:01:02:03:04:11      Priority 32768
Root         this switch for MST01

Interface Role         Sts         Cost     Prio.Nbr   Type
--------- ----         ---         ----     --------   ----
Ex0/1  Master   Forwarding   200000    128.1   SharedLan

SEFOS# show spanning-tree mst 1 detail

 ## MST01
Vlans mapped:     2
Bridge      Address 00:01:02:03:04:11      Priority 32768
Root        Address 00:01:02:03:04:11      Priority 32768
Root         this switch for MST01

Ex0/1 of MST01 is Master     , Forwarding
Port info   port id 128.1     priority 128   cost 200000
Designated root   address 00:01:02:03:04:11     priority
32768 cost 0
Designated bridge address 00:01:02:03:04:11     priority
32768 port id 128.1
```

```
Multiple Instance:
SEFOS# show spanning-tree mst 1

Switch - default

## MST01
Vlans mapped:     2
Bridge      Address 00:01:02:03:04:11      Priority 32768
Root        Address 00:01:02:03:04:11      Priority 32768
Root         this switch for MST01

Interface Role        Sts         Cost     Prio.Nbr   Type
--------- ----        ---         ----     --------   ----
Ex0/1  Master   Forwarding   200000    128.1    SharedLan
```

Notes The option mst is available only when MSTP is the operational mode of the spanning-tree.

Related Commands

- `instance` - Maps VLANS to an MST instance
- `spanning-tree priority` - Sets the Bridge Priority for the spanning-tree only in steps of 4096
- `spanning-tree mst -` Properties of an interface for MSTP - Sets the spanning-tree properties of an interface for MSTP

4.5.35 show spanning-tree mst configuration

Diplays multiple spanning-tree instance configuration.

```
show spanning-tree mst configuration [switch context-name]
```

Syntax Description **switch** *context-name* – Context or switch name. This parameter is specific to multiple instance.

The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree mst configuration

Name               [00:01:02:99:99:99]
Revision           0
Instance           Vlans mapped
 --------       ----------------------------------------
  0                 11-1024,1025-2048,2049-3072,3073-4094
  1                 -
  2                 -
  4094              1-10
 ---------------------------------------------------------

Multiple Instance:
SEFOS# show spanning-tree mst configuration

Switch - default

Name               [00:01:02:03:04:01]
Revision           0
Instance           Vlans mapped
 --------        ----------------------------------------
  0                  1-1024,1025-2048,2049-3072,3073-4094
 ---------------------------------------------------------

Switch - cust1

Name               [00:01:02:03:04:02]
Revision           0
Instance           Vlans mapped
 --------        ----------------------------------------
  0                  1-1024,1025-2048,2049-3072,3073-4094
 ---------------------------------------------------------
```

Related Commands

- `name` - Sets Configuration name
- `revision` - Sets the configuration revision number
- `instance` - Maps VLANs to an MST instance

4.5.36 `show spanning-tree mst` - Port Specific Information

Displays multiple spanning-tree port specific configuration.

show spanning-tree mst [*instance-id_1-64* **] interface** *interface-type interface-id* **[{stats | hello-time | detail}]**

Syntax Description

instance-id – Range of spanning-tree instances.

interface – Details about a particular interface.

stats – Displays the input and output packets by switching path for the interface.

hello-time – Determines how often the switch broadcasts its hello. message to other switches when it is the root of the spanning-tree.

detail – Detailed multiple spanning-tree port specific configuration.

Mode Privileged EXEC

Example

```
SEFOS# show spanning-tree mst 1 interface
extreme-ethernet 0/1

Instance  Role          Sts           Cost      Prio.Nbr
--------  ----          ---           ----      --------
1        Master      Forwarding      200000     128.1

SEFOS# show spanning-tree mst 1 interface
extreme-ethernet 0/1 stats

MST01      Bpdus sent 2, Received 0

SEFOS# show spanning-tree mst 1 interface
extreme-ethernet 0/1 hello-time

MST01      2

SEFOS# show spanning-tree mst 1 interface
extreme-ethernet 0/1 detail

Ex0/1 of MST01 is Master     , Forwarding
Port info          port id 128.1              priority
128    cost 200000
Designated root   address 00:01:02:03:04:11     priority
32768 cost 0
Designated bridge address 00:01:02:03:04:11     priority
32768 port id 128.1
```

Notes Valid interfaces include physical ports and port channels.

Related Commands

- `instance` - Maps VLANS to an MST instance
- `spanning-tree mst hello-time` - Sets the port based hello timer value
- `spanning-tree` - Properties of an interface - Sets spanning-tree properties of an interface
- `show spanning-tree mst` - CIST or Specified MST Instance - CIST or specified mst Instance- Displays multiple spanning-tree information for the CIST Instance or specified MST Instance
- `show spanning-tree interface` - Displays Spanning-tree port configuration
- `clear spanning-tree detected protocols` - Restarts the protocol migration process on all the interfaces
- `clear spanning-tree counters` - Resets all bridge and port level statistics counters

4.5.37 show customer spanning-tree

Displays the detailed customer spanning-tree information.

```
show customer spanning-tree [cep interface interface-type
interface-id] [{detail [active] | active [detail]}]
```

Syntax Description

cep interface *interface-type interface-id* – Customer edge port

detail – Displays in detail about the port and bridge. This includes designated Bridge details, designated port details, timer values, root bridge, and so on.

active – Displays the bridge and details of the active (active ports are those ports that are participating in the spanning-tree) ports.

Mode Privileged EXEC

Example

```
Single Instance:
SEFOS# show customer spanning-tree cep interface fast 0/1

Port [Ex0/1]
We are the root of the spanning-tree
Root Id           Priority    65535
                   Address     00:01:02:03:04:01
                   Cost         0
                   Root Ports
                  Hello Time 2 Sec, Max Age 0 Sec, Forward Delay 0 Sec

Customer spanning-tree Enabled Protocol RSTP
Bridge Id         Priority 65535
                   Address 00:01:02:03:04:01
                   Hello Time 2 sec, Max Age 20 sec, Forward Delay 15
sec

Name              Role          State         Cost      Prio    Type
----              ----          -----         ----      ----    ------
PEP-Service: 2 Designated   Forwarding       128       32   SharedLan
CEP-Ex0/1       Designated    Forwarding    200000      32   SharedLan

SEFOS# show customer spanning-tree

Port [Ex0/1]
We are the root of the spanning-tree
Root Id           Priority    65535
                   Address     00:01:02:03:04:01
                   Cost         0
                   Root Ports
                  Hello Time 2 Sec, Max Age 0 Sec, Forward Delay 0 Sec

Customer spanning-tree Enabled Protocol RSTP
Bridge Id         Priority 65535
                   Address 00:01:02:03:04:01
                   Hello Time 2 sec, Max Age 20 sec, Forward Delay 15
sec
Name              Role          State         Cost      Prio    Type
----              ----         -----          ----      ----    ------
PEP-Service: 2   Designated    Forwarding    128     32      SharedLan
CEP-Ex0/1         Designated    Forwarding   200000    32     SharedLan

 -------------------------------------------------------
```

```
Multiple Instance:
SEFOS# show customer spanning-tree

Switch default

Port [Ex0/1]
We are the root of the spanning-tree
Root Id           Priority    65535
                   Address     00:01:02:03:04:01
                   Cost        0
                   Root Ports
                   Hello Time 2 Sec, Max Age 0 Sec, Forward Delay 0
Sec

Customer spanning-tree Enabled Protocol RSTP
Bridge Id         Priority 65535
                   Address 00:01:02:03:04:01

 Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
Name               Role          State         Cost      Prio    Type
----               ----          -----         ----      ----    ------
PEP-Service: 2   Designated   Forwarding   128        32       SharedLan
CEP-Ex0/1         Designated   Forwarding    200000   32       SharedLan

SEFOS# show customer spanning-tree cep interface fastethernet 0/1

Switch default

Port [Ex0/1]
We are the root of the spanning-tree
Root Id           Priority    65535
                   Address     00:01:02:03:04:01
                   Cost        0
                   Root Ports
                  Hello Time 2 Sec, Max Age 0 Sec, Forward Delay 0 Sec
Customer spanning-tree Enabled Protocol RSTP
Bridge Id         Priority 65535
```

```
 Address 00:01:02:03:04:01
                  Hello Time 2 sec, Max Age 20 sec, Forward Delay 15
sec
Name                 Role          State       Cost     Prio    Type
----                 ----          -----       ----     ----    ------
PEP-Service: 2   Designated    Forwarding    128      32     SharedLan
CEP-Ex0/1        Designated    Forwarding    200000   32     SharedLan
```

Notes The port must be configured as CEP.

Related Commands

`show customer spanning-tree` - Displays the detailed customer spanning information

4.5.38 spanning-tree mode-mst|rst|pvrst|pvst

Sets the spanning-tree operating mode. The `no` form of the command sets the default spanning-tree operating mode.

```
spanning-tree mode {mst | rst | pvrst | pvst}
```

```
no spanning-tree mode
```

Syntax Description

mst – Multiple spanning-tree configuration.

rst – Rapid spanning-tree configuration.

pvrst – Per-VLAN-rapid spanning-tree configuration.

pvst – Per-VLAN-spanning-tree configuration. The keyword `pvst` is not supported.

Mode Global Configuration

Defaults **mst**

Example

```
SEFOS(config)# spanning-tree mode pvrst
```

Notes

- When SEFOS boots up, spanning-tree is enabled by default with MSTP operating in the switch.
- This command starts and enables only the spanning-tree mode. However, port-roles and states are computed only after enabling the spanning-tree.
- If the user-input for the spanning-tree mode is different from the current mode of operation, SEFOS shuts down the operational spanning-tree and start the spanning-tree as per user-input.
- GVRP must be disabled for setting the spanning-tree mode as PVRST.

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.39 spanning-tree vlan

Configures spanning-tree on a per VLAN basis. The `no` form of the command is used to return to the default setting.

```
spanning-tree vlan 1-4094 {forward-time 4-30 | hello-time 1-10 |
max-age 6-40 | hold-count 1-10 | brg-priority 0-61440 | root
{primary | secondary}}
```

```
no spanning-tree vlan 1-4096 {forward-time | hello-time | max-age
| hold-count | brg-priority | root}
```

Syntax Description

vlan-id – VLAN identifier associated with a spanning-tree instance. The range is 1 to 4094.

forward-time – The range is 4 to 30 seconds. Sets the forward-delay time for the specified spanning-tree instance. The forwarding time controls how long each of the listening and learning states last before the interface begins forwarding.

hello-time – The range is 1 to 10 seconds. Sets the interval between hello bridge protocol data units (BPDUs) sent by the switch.

max-age – The range is 6 to 40 seconds. Sets the interval between messages the spanning-tree receives from the root switch. If a switch does not receive a BPDU message from the root switch within this interval, it recomputes the spanning-tree topology.

hold-count – The range is 1 to 10. Sets the holding limit of the bridge. The bridge responds to the messages only when it is within the range of its hold-count.

brg-priority – Sets the bridge priority for the given instance.

root – Sets the spanning-tree root with two options:

- **primary** – Forces the switch to be the root bridge.
- **secondary** – Forces the switch to be the root switch when the primary root fails.

Mode

Global Configuration

Defaults Spanning-tree is enabled on all VLANs.
forward-delay – 15 seconds.
hello-time – 2 seconds.
max-age – 20 seconds.
hold-count – 3
brg-priority – 32768 + *vlan-id*

Example
```
SEFOS(config)# no spanning-tree vlan 5 hello-time

SEFOS(config)# spanning-tree vlan 20 forward-time 18
```

Related Commands

`show spanning-tree active` - Displays spanning-tree information of active ports

4.5.40 spanning-tree bpduguard

Places an interface in the error-disabled state when it receives a bridge protocol data unit (BPDU). The `no` form of the command sets it to the default configuration of `bpduguard`.

```
spanning-tree bpduguard {disable | enable}
```

```
no spanning-tree bpduguard
```

Syntax Description **disable** – Disables BPDU guard on the specified interface
enable – Enables BPDU guard on the specified interface

Mode Interface Configuration

Defaults BPDU guard is disabled.

Example
```
SEFOS(config-if)# switchport mode trunk

SEFOS(config-if)# spanning-tree bpduguard enable
```

4.5.41 spanning-tree guard

Enables root guard or loop guard on all the VLANs associated with the selected interface. The `no` form of the command is used to return to the default setting.

```
spanning-tree guard {root | none | loop}
```

```
no spanning-tree guard
```

Syntax Description	**root** – Enables root guard on the specified interface. Root guard restricts which interface is allowed to be the spanning-tree root port or the path-to-the-root for the switch. **none** – Disables root guard on the specified interface **loop** – Enables loop guard on the specified interface. Loop guard prevents alternate or root ports from becoming designated ports when a failure creates a unidirectional link.
Mode	Interface Configuration
Defaults	Root guard is disabled.
Example	`SEFOS(config-if)# spanning-tree guard root`
Notes	VLAN port mode should be configured as trunk port prior to the execution of this command.

Related Commands

`switchport mode` - Configures the VLAN port mode.

4.5.42 spanning-tree encap

Sets the encapsulation type on the interface. The no form of the command sets the encapsulation type to `dot1q`.

```
spanning-tree encap {dot1q | ISL}
```

```
no spanning-tree encap
```

Syntax Description	**dot1q** – Sets the encapsulation type as `dot1q` **ISL** – Sets the encapsulation type as ISL
Mode	Interface Configuration
Defaults	`dot1q` encapsulation is set.

Example	`SEFOS(config-if)# switchport mode trunk`
	
	`SEFOS(config-if)# spanning-tree encap ISL`

4.5.43 spanning-tree vlan status

Enables or disables the PVRST status of an instance on a port.

```
spanning-tree vlan 1-4094 status {disable | enable}
```

Syntax Description	**vlan-id** *1-4094* – VLAN identifier **disable** – Disables the PVRST status for the VLAN-ID **enable** – Enables the PVRST status for the VLAN-ID
Mode	Interface Configuration
Defaults	PVRST status is enable
Example	`SEFOS(config-if)# spanning-tree vlan 1 status disable`

Related Commands

`show spanning-tree vlan - interface` - Displays spanning-tree port information

4.5.44 spanning-tree vlan port-priority

Sets port priority for the given VLAN. The `no` form of the command sets port priority for the given VLAN to the default value.

```
spanning-tree vlan 1-4094 port-priority 0-240
```

```
no spanning-tree vlan 1-4094 port-priority
```

Syntax Description	**vlan** – VLAN identifier **port-priority** – Port priority value
Mode	Interface Configuration
Defaults	**port-priority** – 128
Example	`SEFOS(config-if)# spanning-tree vlan 1 port-priority 16`

Related Commands

`show spanning-tree vlan - interface` - Displays spanning-tree port information

4.5.45 spanning-tree vlan cost

Sets port cost for the given VLAN. The no form of the command sets the spanning-tree VLAN cost to the default value.

```
spanning-tree vlan 1-4094 cost 0-200000
```

```
no spanning-tree vlan 1-4094 cost
```

Syntax Description
vlan – VLAN identifier.
cost – Cost value per VLAN.

Mode Interface Configuration

Defaults Cost on the port is 200000.

Example
```
SEFOS(config-if)# spanning-tree vlan 1 cost 250
```

Related Commands

show spanning-tree vlan - interface - Displays spanning-tree port information

4.5.46 show spanning-tree vlan - blockedports|pathcost|summary

Displays spanning-tree information, such as summary, blocked ports, and path cost.

```
show spanning-tree vlan 1-4094 [{active [detail] | blockedports |
detail [active] | pathcost-method | summary}]
```

Syntax Description
vlan – VLAN identifier.
active [detail] – Displays details about the port and bridge, including: designated bridge details, designated port details, timer values, root bridge, and so on.
blockedports – Blocked ports in the system.
detail [active] – Displays the bridge and details of the active ports (active ports are those ports that are participating in the spanning-tree).
pathcost-method – spanning-tree port priority.
summary – Summary of port states.

Mode Privileged EXEC

Example

```
Single Instance:

SEFOS# show spanning-tree vlan 1 active

Spanning-tree for VLAN 1

Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port Ex0/46
 Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec

Spanning Tree Enabled Protocol PVRST
Bridge Id Priority 32769
 Address 00:01:02:03:04:01
 Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name Role State Cost Prio Type
---- ---- ----- ---- ---- ------
Ex0/46 Root Forwarding 2000 128 P2P
```

```
Name      Role           State          Cost      Prio    Type
----      ----           -----          ----      ----    ------
Ex0/1     Designated    Forwarding    200000    128     SharedLan
```

```
SEFOS# show spanning-tree vlan 1 active detail
Spanning-tree for VLAN 1

Bridge is executing the rstp compatible PVRST Protocol
Bridge Identifier has priority 32769, Address 00:01:02:03:04:01
Configured Hello time 2 sec, Max Age 20 sec, Forward Delay 15 sec
Dynamic Path Cost is Disabled
Number of Topology Changes 1
Time since topology Change 0 seconds ago
Transmit Hold-Count 3
Root Times: Max Age 20 Sec, Forward Delay 15 Sec, Hello Time 2 Sec

Port 46 [Ex0/46] of VLAN 1 is Root , Forwarding
Port PathCost 2000 , Port Priority 128 , Port Identifier 128.46
Designated Root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.46, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 3 , recieved 46
```

```
SEFOS# show spanning-tree vlan 1 blockedports

Blocked Interfaces List:
Ex0/2,Ex0/3,Ex0/4,Ex0/5,Ex0/6,Ex0/7,Ex0/8,Ex0/9,Ex0/10, ...
```

```
The Number of Blocked Ports in the system is :23

SEFOS# show spanning-tree vlan 1 detail active
Spanning-tree for VLAN 1

Bridge is executing the rstp compatible PVRST Protocol
Bridge Identifier has priority 32769, Address 00:01:02:03:04:01
Configured Hello time 2 sec, Max Age 20 sec, Forward Delay 15 sec
Dynamic Path Cost is Disabled
Number of Topology Changes 1
Time since topology Change 0 seconds ago
Transmit Hold-Count 3
Root Times: Max Age 20 Sec, Forward Delay 15 Sec, Hello Time 2 Sec

Port 46 [Ex0/46] of VLAN 1 is Root , Forwarding
Port PathCost 2000 , Port Priority 128 , Port Identifier 128.46
Designated Root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.46, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 3 , recieved 46
```

```
SEFOS# show spanning-tree vlan 1 pathcost-method

spanning-tree port pathcost method is Long


SEFOS# show spanning-tree vlan 1 summary

spanning-tree enabled protocol is PVRST
Spanning-tree pathcost method is long

PVRST Port Roles and States
Port-Index   Port-Role     Port-State    Port-Status
----------   ---------     ----------    -----------
1              Designated    Forwarding    Enabled
2              Designated    Forwarding    Enabled
3              Designated    Discarding    Enabled
4              Designated    Discarding    Enabled
5              Designated    Discarding    Enabled
6              Designated    Discarding    Enabled
7              Designated    Discarding    Enabled
8              Designated    Discarding    Enabled
...
```

```
Multiple Instance:

SEFOS# show spanning-tree
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port 45 [Ex0/45]
 Max age 20 Sec, forward delay 15 Sec
 Hello Time 2 Sec

MST00

Spanning tree Protocol has been enabled

MST00 is executing the stp compatible Multiple Spanning Tree Pr
otocol
Bridge Id Priority 32768
 Address 00:01:02:03:04:01
 Max age is 20 sec, forward delay is 15 sec
 Hello Time is 2 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name     Role    State      Cost    Prio     Type
----     ----    -----      ----    ----     -----
Ex0/45   Root    Learning   2000    128      P2P
```

```
SEFOS# show spanning-tree vlan 1 active
Spanning-tree for VLAN 1
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port Ex0/46
 Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec

Spanning Tree Enabled Protocol PVRST
Bridge Id Priority 32769
 Address 00:01:02:03:04:01
 Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name Role State Cost Prio Type
---- ---- ----- ---- ---- ------
Ex0/46 Root Forwarding 2000 128 P2P


SEFOS# show spanning-tree vlan 1 active detail switch default
Spanning-tree for VLAN 1
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port Ex0/46
 Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec

Spanning Tree Enabled Protocol PVRST
Bridge Id Priority 32769
 Address 00:01:02:03:04:01
 Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name Role State Cost Prio Type
---- ---- ----- ---- ---- ------
Ex0/46 Root Forwarding 2000 128 P2P
```

```
Port 46 [Ex0/46] of VLAN 1 is Root , Forwarding
Port PathCost 2000 , Port Priority 128 , Port Identifier 128.46
Designated Root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.46, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 3 , recieved 235
```

```
SEFOS# show spanning-tree vlan 1 blockedports switch default

Switch default

Blocked Interfaces List:
The Number of Blocked Ports in the system is :0

SEFOS# show spanning-tree vlan 1 detail active switch default
Spanning-tree for VLAN 1

Bridge is executing the rstp compatible PVRST Protocol
Bridge Identifier has priority 32769, Address 00:01:02:03:04:01
Configured Hello time 2 sec, Max Age 20 sec, Forward Delay 15 sec
Dynamic Path Cost is Disabled
Number of Topology Changes 1
Time since topology Change 0 seconds ago
Transmit Hold-Count 3
Root Times: Max Age 20 Sec, Forward Delay 15 Sec, Hello Time 2 Sec

Port 46 [Ex0/46] of VLAN 1 is Root , Forwarding
Port PathCost 2000 , Port Priority 128 , Port Identifier 128.46
Designated Root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.46, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 3 , recieved 235

SEFOS# show spanning-tree vlan 1 pathcost-method switch default

Switch default

spanning-tree port pathcost method is Long
SEFOS# show spanning-tree vlan 1 summary switch default
```

```
Switch default

spanning-tree enabled protocol is PVRST
Spanning-tree pathcost method is long

PVRST Port Roles and States
Port-Index   Port-Role     Port-State    Port-Status
----------   ---------     ----------    -----------
1              Designated    Discarding    Enabled
2              Designated    Forwarding    Enabled
```

Notes

Enter each interface separated by a space. Ranges are not supported.
Valid interfaces include physical ports, VLANs, and port channels.

4.5.47 show spanning-tree vlan - bridge

Displays the spanning-tree configuration of the bridge.

show spanning-tree vlan *1-4094* **bridge [{address | detail | forward-time | hello-time | id | max-age | priority [system-id] | protocol}]**

Syntax Description

vlan – VLAN identifier.
address – Bridge address.
detail – Bridge detail.
forward-time – Bridge forward time.
hello-time – Bridge hello time.
id – Bridge identifier.
max-age – Bridge max age.
priority – Bridge priority.
system-id – Bridge system identifier.
protocol – Spanning-tree protocol.

Mode

Privileged EXEC

Example

```
Single Instance:

SEFOS# show spanning-tree vlan 1 bridge

Bridge ID                   HelloTime MaxAge FwdDly Protocol
---------                   --------- ------ ------ --------
80:00:00:01:02:03:04:01     2           20      15      Pvrst

SEFOS# show spanning-tree vlan 1 bridge address

Bridge Address is 00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 bridge detail

Bridge Id         Priority 32769,
                    Address 00:01:02:03:04:01
                    Hello Time 2 sec, Max Age 20 sec,

Forward Delay 15 sec
SEFOS# show spanning-tree vlan 1 bridge forward-time

Bridge Forward delay is  15 sec

SEFOS# show spanning-tree vlan 1 bridge hello-time

Bridge Hello Time is 2 sec
SEFOS# show spanning-tree vlan 1 bridge id

Bridge ID is 80:00:00:01:02:03:04:01
SEFOS# show spanning-tree vlan 1 bridge max-age

Bridge Max Age is 20 sec
SEFOS# show spanning-tree vlan 1 bridge priority

Bridge Priority is 32769
SEFOS# show spanning-tree vlan 1 bridge priority system-id

Bridge Address is 00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 bridge protocol

Bridge Protocol Running is PVRST
```

```
Multiple Instance:

SEFOS# show spanning-tree vlan 1 bridge switch default

Switch default

Bridge ID                  HelloTime MaxAge FwdDly Protocol
---------                  --------- ------ ------ --------
80:00:00:01:02:03:04:01    2           20      15      Pvrst
SEFOS# show spanning-tree vlan 1 bridge address

Switch default

Bridge Address is 00:01:02:03:04:01
SEFOS# show spanning-tree vlan 1 bridge detail switch default

Switch default

Bridge Id        Priority 32769,
                   Address 00:01:02:03:04:01
                  Hello Time 2 sec, Max Age 20 sec, Forward Delay 15
sec
SEFOS# show spanning-tree vlan 1 bridge forward-time switch default

Switch default

Bridge Forward delay is  15 sec

SEFOS# show spanning-tree vlan 1 bridge hello-time switch default

Switch default

Bridge Hello Time is 2 sec
SEFOS# show spanning-tree vlan 1 bridge id switch default

Switch default
```

```
Bridge ID is 80:00:00:01:02:03:04:01
SEFOS# show spanning-tree vlan 1 bridge max-age switch default

Switch default

Bridge Max Age is 20 sec switch default
SEFOS# show spanning-tree vlan 1 bridge priority

Switch default

Bridge Priority is 32769
SEFOS# show spanning-tree vlan 1 bridge priority system-id switch
default
Switch default

Bridge Address is 00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 bridge protocol switch default

Switch default

Bridge Protocol Running is PVRST
SEFOS# show spanning-tree vlan 1 bridge switch default

Switch default
Bridge ID                  HelloTime MaxAge FwdDly Protocol
---------                  --------- ------ ------ --------
80:00:00:01:02:03:04:01    2           20      15      Pvrst
```

Notes

Expressions are case sensitive.

Related Commands

- `spanning-tree mode mst|rst` - Sets the spanning-tree operating mode
- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.48 show spanning-tree vlan - root

Displays spanning-tree root information.

show spanning-tree vlan *1-4094* **root [{address | cost | detail | forward-time | hello-time |** *root-bridge-id* **| max-age | port | priority [***system-id***]}]**

Syntax Description

vlan-id *1-4094* – VLAN identifier.

address – Root bridge MAC address.

cost – Cost value associated with the port.

detail – Displays in detail about the port and bridge. This includes designated Bridge details, designated port details, timer values, root bridge, and so on.

forward-time – Root bridge forward time.

hello-time – Root bridge hello time.

root-bridge-id – Root bridge identifier.

max-age – Root bridge maximum age.

port – Root port.

priority – Root bridge priority.

system-id – Root bridge system identifier.

Mode

Privileged EXEC

Example

```
Single Instance:

SEFOS# show spanning-tree vlan 1

Spanning-tree for VLAN 1
Root Id Priority 32768
 Address 00:02:02:03:04:01
 Cost 2000
 Port Ex0/46
 Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec

Spanning Tree Enabled Protocol PVRST
Bridge Id Priority 32769
 Address 00:01:02:03:04:01
 Hello Time 2 sec, Max Age 20 sec, Forward Delay 15 sec
 Dynamic Path Cost is Disabled
 Dynamic Path Cost Lag-Speed Change is Disabled
Name Role State Cost Prio Type
---- ---- ----- ---- ---- ------
Ex0/46 Root Forwarding 2000 128 P2P
```

```
SEFOS# show spanning-tree vlan 1 root address

Root Bridge Address is 00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 root cost

Root Cost is 0

SEFOS# show spanning-tree vlan 1 root detail

We are the root of the spanning-tree
Root Id       Priority    32769
              Address     00:01:02:03:04:01
              Cost         0
              Port         0
               Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec

SEFOS# show spanning-tree vlan 1 root forward-time

Forward delay is 15 sec

SEFOS# show spanning-tree vlan 1 root hello-time

Hello Time is 2 sec

SEFOS# show spanning-tree vlan 1 root id

Root Bridge Id is 80:01:00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 root max-age

Root MaxAge is 20

SEFOS# show spanning-tree vlan 1 root port

Root Port is 0

SEFOS# show spanning-tree vlan 1 root priority

Root Priority is 32769
```

```
Multiple Instance:

SEFOS# show spanning-tree vlan 1 root switch default
Switch default

Root ID                   RootCost HelloTime MaxAge FwdDly RootPort
-------                   -------- --------- ------ ------ --------
80:01:00:01:02:03:04:01      0         2         20      15      0

SEFOS# show spanning-tree vlan 1 root address switch default
Switch default

Root Bridge Address is 00:01:02:03:04:01
SEFOS# show spanning-tree vlan 1 root cost

Switch default

Root Cost is 0

SEFOS# show spanning-tree vlan 1 root detail switch default

Switch default
We are the root of the spanning-tree
Root Id       Priority    32769
               Address     00:01:02:03:04:01
               Cost         0
               Port         0
              Hello Time 2 Sec, Max Age 20 Sec, Forward Delay 15 Sec
SEFOS# show spanning-tree vlan 1 root forward-time

Switch default
```

```
Forward delay is 15 sec
SEFOS# show spanning-tree vlan 1 root hello-time switch default

Switch default

Hello Time is 2 sec
SEFOS# show spanning-tree vlan 1 root id switch default

Switch default

Root Bridge Id is 80:01:00:01:02:03:04:01

SEFOS# show spanning-tree vlan 1 root max-age switch default

Switch default

Root MaxAge is 20

SEFOS# show spanning-tree vlan 1 root port switch default

Switch default

Root Port is 0
SEFOS# show spanning-tree vlan 1 root priority switch default

Switch default

Root Priority is 32769
SEFOS# show spanning-tree vlan 1 root priority system-id switch
default

Switch default
```

Related Commands

- `spanning-tree vlan` - Configures spanning-tree on a per-VLAN basis
- `show spanning-tree detail` - Displays detailed spanning-tree information

4.5.49 show spanning-tree vlan - interface

Displays instance specific interface information.

show spanning-tree vlan *1-4094* **interface** *ifXtype ifnum* **[{cost | detail | priority | rootcost | state | stats}]**

Syntax Description

vlan – VLAN identifier.
ifXtype – Interface type.
ifnum – Interface number.
cost – Spanning-tree port cost.
detail – Displays detaisl about the port and bridge.
priority – Spanning-tree port priority.
rootcost – Spanning-tree root cost value (path cost to reach the root).
state – Spanning-tree state.
stats – Displays input and output packets by switching path for the interface

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1

Role           State          Cost      Prio
----           -----          ----      ----
Designated    Forwarding    200000    128

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 cost

Port cost is 200000

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
detail

Port 1 [Ex0/1] of VLAN 1 is Designated, Forwarding
Port PathCost 200000    , Port Priority 128       , Port Identifier
128.1
Designated Root has priority 32769, address 00:01:02:03:04:01
Designated Bridge has priority 32769, address 00:01:02:03:04:01
Designated Port Id is 128.1, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 59 , recieved 0
```

```
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
priority

Port Priority is 128

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
rootcost

Root Cost is 0

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 state

Forwarding
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 stats

Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1

Number of RSTP BPDU Count received          : 0
Number of Config BPDU Count received        : 0
Number of TCN BPDU Count received           : 0
Number of RSTP BPDU Count Transmitted       : 97
Number of Config BPDU Count Transmitted     : 0
Number of TCN BPDU Count Transmitted        : 0
Port Protocol Migration Count               : 0

Multiple Instance:

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 cost

Switch default

Port cost is 200000

SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
detail

Switch default

Port 1 [Ex0/1] of VLAN 1 is Designated, Forwarding
Port PathCost 200000    , Port Priority 128       , Port Identifier
128.1
```

```
Designated Root has priority 32769, address 00:01:02:03:04:01
Designated Bridge has priority 32769, address 00:01:02:03:04:01
Designated Port Id is 128.1, Designated PathCost 0
Timers: Hello Time - 2, MaxAge - 20, Forward Delay - 15, Hold - 1
No of Transitions to forwarding State :1
BPDUs : sent 233 , recieved 0
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
priority

Switch default

Port Priority is 128
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1
rootcost

Switch default

Root Cost is 0
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 state

Switch default

Forwarding
SEFOS# show spanning-tree vlan 1 interface extreme-ethernet 0/1 stats

Switch default

Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1
Number of RSTP BPDU Count received          : 0
Number of Config BPDU Count received       : 0
Number of TCN BPDU Count received           : 0
Number of RSTP BPDU Count Transmitted      : 261
Number of Config BPDU Count Transmitted    : 0
Number of TCN BPDU Count Transmitted       : 0
Port Protocol Migration Count               : 0
```

Related Commands

- `show spanning-tree detail` - Displays detailed spanning-tree information
- `show spanning-tree active` - Displays spanning-tree information of active ports

4.5.50 show spanning-tree interface

Displays the spanning-tree port configuration.

This command is an extension of the `show spanning-tree interface` command. Additional options `bpduguard`, `encapsulation type`, and `rootguard` are added for PVRST.

show spanning-tree *interface interface-type interface-id*
[{bpduguard | cost | encapsulationtype | priority | portfast | rootcost | rootguard | restricted-role | restricted-tcn | state | stats | detail}]

Syntax Description

bpduguard – Spanning-tree BPDU guard.
cost – Spanning-tree port cost.
encapsulationtype – spanning-tree encapsulation type.
state – Spanning-tree state.
stats – Displays input and output packets per switching path for the interface.
priority – Spanning-tree port priority.
portfast – Spanning-tree portfast state.
rootcost – Spanning-tree rootcost (pathcost to reach the root) value.
rootguard – Spanning-tree rootguard.
restricted-role – Spanning-tree restricted role.
restricted-tcn – Spanning-tree restricted topology change.
detail – Displays details about the port and bridge.

Mode Privileged EXEC

Example

```
Single Instance:

SEFOS# show spanning-tree interface extreme-ethernet 0/1

Role           State          Cost      Prio Type
----           -----          ----      ---- ----
Root           Forwarding    200000    128   SharedLan

SEFOS# show spanning-tree interface extreme-ethernet 0/1 cost
```

```
Port cost is 200000

SEFOS# show spanning-tree interface extreme-ethernet 0/1 priority

Port Priority is 128

SEFOS# show spanning-tree interface extreme-ethernet 0/1 portfast

PortFast is disabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1 rootcost

Root Cost is 200000
SEFOS# show spanning-tree interface extreme-ethernet 0/1 state

Forwarding

SEFOS# show spanning-tree interface extreme-ethernet 0/1 stats

Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1
Number of RSTP BPDU Count received         : 1692
Number of Config BPDU Count received       : 9
Number of TCN BPDU Count received          : 0
Number of RSTP BPDU Count Transmitted      : 735
Number of Config BPDU Count Transmitted    : 11
Number of TCN BPDU Count Transmitted       : 0
Number of Invalid BPDU Count Transmitted   : 0
Port Protocol Migration Count              : 1
```

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1 detail

Port 1 [Ex0/1] of MST00 is Alternate, Discarding
Ex0/1 is operating in the MSTP Mode
Port path cost  2000, Port priority  128,
Port Identifier  128.1. Port HelloTime  2,
Timers: Hello - 1, Forward Delay - 0, Topology Change - 0
Designated root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.1, Designated pathcost is 0
Operational Forward delay 15, Max age 20
Received Hello Time 2 Sec
Number of Transitions to forwarding State : 1
Auto-Edge is disabled
PortFast is disabled, Oper-Edge is disabled
Link type is point to Point
BPDUs : sent 19, recieved 484
Restricted Role is disabled.
Restricted TCN is disabled.
bpdu-transmit enabled
bpdu-receive enabled
Loop Guard is enabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1
restricted-role

Restricted Role is Disabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1
restricted-tcn


Restricted TCN is Disabled
```

```
Multiple Instance:
SEFOS# show spanning-tree interface extreme-ethernet 0/1

Switch - default

Role           State          Cost      Prio Type
----           -----          ----      ---- ----
Root           Forwarding    200000   128   SharedLan

SEFOS# show spanning-tree interface extreme-ethernet 0/1 cost
Port cost is 200000

Switch - default

SEFOS# show spanning-tree interface extreme-ethernet 0/1 priority
Switch - default

Port Priority is 128

SEFOS# show spanning-tree interface extreme-ethernet 0/1 portfast

Switch - default

PortFast is disabled

SEFOS# show spanning-tree interface extreme-ethernet 0/1 rootcost

Switch - default
Root Cost is 200000

SEFOS# show spanning-tree interface extreme-ethernet 0/1 state

Switch - default

Forwarding

SEFOS# show spanning-tree interface extreme-ethernet 0/1 stats

Switch - default
```

```
Statistics for Port Ex0/1
Number of Transitions to forwarding State : 1
Number of RSTP BPDU Count received          : 1692
Number of Config BPDU Count received       : 9
Number of TCN BPDU Count received           : 0
Number of RSTP BPDU Count Transmitted      : 735
Number of Config BPDU Count Transmitted    : 11
Number of TCN BPDU Count Transmitted       : 0
Number of Invalid BPDU Count Transmitted   : 0
Port Protocol Migration Count               : 1
```

```
SEFOS# show spanning-tree interface extreme-ethernet 0/1 detail

Port 1 [Ex0/1] of MST00 is Root , Forwarding
Ex0/1 is operating in the MSTP Mode
Port path cost 2000, Port priority 128,
Port Identifier 128.1. Port HelloTime 2,
Timers: Hello - 0, Forward Delay - 0, Topology Change - 0
Designated root has priority 32768, address 00:02:02:03:04:01
Designated Bridge has priority 32768, address 00:02:02:03:04:01
Designated Port Id is 128.1, Designated pathcost is 0
Operational Forward delay 15, Max age 20
Received Hello Time 2 Sec
Number of Transitions to forwarding State : 2
Auto-Edge is enabled
PortFast is disabled, Oper-Edge is disabled
Link type is point to Point
BPDUs : sent 21, recieved 1331
Restricted Role is disabled.
Restricted TCN is disabled.
bpdu-transmit enabled
bpdu-receive enabled
Loop Guard is disabled
```

```
SEFOS# show spanning-tree interface fast 0/1 restricted-role

Switch - default

Restricted Role is Disabled

SEFOS# show spanning-tree interface fast 0/1 restricted-tcn

Switch - default

Restricted TCN is Disabled
```

Related Commands

- `spanning-tree mst - Properties of an interface for MSTP` – Sets the spanning-tree properties of an interface for MSTP
- `show spanning-tree detail` – Displays detailed spanning-tree information
- `show spanning-tree active` – Displays spanning-tree information of active ports
- `clear spanning-tree detected protocols` – Restarts the protocol migration process on all the interfaces
- `clear spanning-tree counters` – Resets all bridge and port level statistics counters

4.5.51 spanning-tree layer2-gateway-port

Configures port as layer two gateway port. The `no` form of the command withdraws layer two gateway port status.

```
spanning-tree layer2-gateway-port
```

```
no spanning-tree layer2-gateway-port
```

Mode	Interface Configuration
Defaults	By default, the port is not configured as layer two gateway port.
Example	`SEFOS(config-if)# spanning-tree layer2-gateway-port`
Notes	The BPDU transmit status of the port must be disabled before configuring the port as layer two gateway port.

Related Commands

- `show spanning-tree detail` - Displays in detail about the spanning-tree port and bridge configuration.
- `spanning-tree layer2-gateway-port` - Displays spanning-tree layer two gateway port specific configuration.

4.5.52 spanning-tree bpdu-receive

Configures the BPDU receive status of the port.

```
spanning-tree bpdu-receive {enabled | disabled}
```

Syntax Description	**enabled** – Receives the BPDUs on the port. **disabled** – Ignores the BPDUs received on the port.
Mode	Interface Configuration
Defaults	Enabled.
Example	`SEFOS(config-if)# spanning-tree bpdu-receive enabled`

Related Commands

- `show spanning-tree detail` - Displays in detail about the spanning-tree port and bridge configuration.

4.5.53 spanning-tree bpdu-transmit

Configures BPDU transmit status of the port.

```
spanning-tree bpdu-transmit {enabled | disabled}
```

Syntax Description	**enabled** – The port transmits BPDUs. **disabled** – The port does not transmit BPDUs.
Mode	Interface Configuration
Defaults	Enabled.
Example	`SEFOS(config-if)# spanning-tree bpdu-transmit enabled`
Notes	The BPDU transmit status of the port must be disabled before configuring the port as layer two gateway port.

Related Commands

- `show spanning-tree detail` - Displays in detail about the spanning-tree port and bridge configuration.

4.5.54 spanning-tree bpdufilter

Enables or disables the BPDU filter on an interface. The `no` form of the command returns to the default setting.

This command operates similar to that of the `spanning-tree bpdu-receive` and `spanning-tree bpdu-transmit` commands.

```
spanning-tree bpdufilter {disable | enable}
```

```
no spanning-tree bpdufilter
```

Syntax Description	**enable** – Enables BPDU filtering on the interface. **disable** – Disables BPDU filtering on the interface.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)#` **spanning-tree bpdufilter enable**
Notes	The BPDU transmit status of the port must be disabled before configuring the port as layer two gateway port.

Related Commands

- `show spanning-tree detail` - Displays in detail about the spanning-tree port and bridge configuration.

4.5.55 spanning-tree mst - pseudoRootID priority

Sets the `pseudoroot` MAC address and priority for the spanning-tree in steps of 4096. The `no` form of the command resets the `pseudoroot` identifier for the spanning-tree to bridge identifier.

```
spanning-tree [mst instance-id_1-64] pseudoRootID priority
0-61440 mac-address ucast-mac
```

```
no spanning-tree [mst instance-id_1-64] pseudoRootId
```

Syntax Description

mst – Specifies the spanning-tree instance. This value ranges from 1 to 64.

priority – Specifies the pseudoroot priority. This value ranges from 0 to 61440.

mac-address – Specifies the pseudoroot unicast MAC address.

Mode Interface Configuration

Defaults Default bridge identifier is set for the spanning-tree.

Example

```
SEFOS(config-if)# spanning-tree mst 1 pseudoRootId
priority 8192 mac-address 00:00:12:34:45:55
```

Notes The pseudoroot identifier is used by layer two gateway port as the root identifier in generated BPDUs.

Related Commands

- show spanning-tree detail - Displays in detail about the spanning-tree port and bridge configuration
- spanning-tree layer2-gateway-port - Displays spanning-tree layer two gateway port specific configuration

4.5.56 show spanning-tree interface layer2-gateway-port

Displays the spanning-tree layer two gateway port specific configuration.

```
show spanning-tree interface [interface-type interface-id]
layer2-gateway-port [switch context_name]
```

Syntax Description

interface-type – Type of interface.

interface-id – Interface identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword switch is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show spanning-tree int extreme-ethernet 0/1
layer2-gateway-port

 Port Ex0/1
                          PseudoRootId
 Instance        Priority          MacAddress           State
----------     ----------    -------------------   ----------
 MST00             32768        00:01:02:99:99:99    Discarding
 MST01             8192         00:00:12:34:45:55    Forwarding
```

Related Commands

- `spanning-tree layer2-gateway-port` - Configures the port as layer two gateway port
- `spanning-tree mst - pseudoRootID priority` - Sets the pseudoroot MAC address and priority for the spanning-tree in steps of 4096

4.5.57 spanning-tree mst max-instance

Sets maximum MSTP instance value. The `no` form of the command resets maximum MSTP instance value.

```
spanning-tree mst max-instance 1-64
```

```
no spanning-tree mst max-instance
```

Mode Global Configuration

Example

```
SEFOS(config)# spanning-tree mst max-instance 1
```

CHAPTER 5

LA

LA is a method of combining physical network links into a single logical link for increased bandwidth. LA increases the capacity and availability of the communications channel between devices (both switches and end devices) using existing Gigabit Ethernet technology. LA also provides load balancing where the processing and communication activity is distributed across several links in a trunk, so that no single link is overwhelmed. By taking multiple LAN connections and treating them as a unified, aggregated link, practical benefits in many applications can be achieved. LA provides the following important benefits:

- Higher link availability
- Increased link capacity
- Improvements are obtained using existing hardware (no upgrading to higher-capacity link technology is necessary)

5.1 LA Commands

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

- `set port-channel` / `channel-protocol`
- `lacp system-priority`
- `interface port-channel`
- `port-channel load-balance`
- `lacp port-priority`
- `lacp port-identifier`
- `channel-group`
- `lacp wait-time`
- `lacp timeout` / `lacp rate`

- lacp
- default port
- port-channel max-ports
- shutdown port-channel
- debug lacp / debug etherchannel
- show etherchannel
- show etherchannel - redundancy
- show interfaces
- show lacp

5.1.1 set port-channel

Enables or disables link aggregation in the switch.

```
set port-channel {enable | disable}
```

Syntax Description	**enable** – Enables link aggregation in the switch. **disable** – Disables link aggregation in the switch.
Mode	Global Configuration
Defaults	Disabled.
Example	SEFOS(config)# **set port-channel enable**

Related Commands

show etherchannel - Displays Etherchannel information

channel-protocol - Enables link aggregation

5.1.2 channel-protocol

Enables link aggregation in the switch. The no form of the command disables link aggregation in the switch. This command operates similar to that of the command set port-channel.

```
channel-protocol {lacp}
```

```
no channel-protocol
```

Syntax Description	**lacp** – Specifies LACP (Link Aggregation Control Protocol) to manage channeling.
Mode	Global Configuration
Defaults	Disabled
Example	`SEFOS(config)#` **`channel-protocol lacp`**

Related Commands

`show etherchannel` - Displays Etherchannel information

`set port-channel` - Enables port-channel

5.1.3 lacp system-priority

Sets the LACP priority for the system. The `no` form of the command sets the LACP priority for the system to the default value. System priority represents a 2-octet value indicating the priority value associated with the system involved in link aggregation.

```
lacp system-priority 0-65535
```

```
no lacp system-priority
```

Mode	Global Configuration
Defaults	0x8000 or 32768.
Example	`SEFOS(config)#` **`lacp system-priority 5`**
Notes	• The switch with the lowest system priority value decides the standby and active links in the aggregation. • Although this is a Global Configuration command, the priority only takes effect on Etherchannels that have physical interfaces with LACP enabled.

Related Commands

`show etherchannel` - Displays LACP system-priority value

5.1.4 interface port-channel

Create a port-channel. The no form of the command deletes a port channel.

interface port-channel *port-channel-id_1-65535*

no interface port-channel *port-channel-id_1-65535*

Mode	Interface Configuration
Example	SEFOS(config)# **interface port-channel 5**
Notes	The MAC address configured must not be a null MAC address or a multicast MAC address.

Related Commands

- show etherchannel - Displays lacp system-identifier
- show running-config - Displays the current operating configuration in the system

5.1.5 lacp system-identifier

Sets the global LACP system ID. The no form of the command sets the global LACP system identifier to the default value.

lacp system-identifier *aa:aa:aa:aa:aa:aa*

no lacp system-identifier

Mode	Interface Configuration
Example	SEFOS(config)# **lacp system-identifier 00:14:4F:7C:63:0A**
Notes	The MAC address configured must not be a null MAC address or a multicast MAC address.

Related Commands

- show etherchannel - Displays lacp system-identifier
- show running-config - Displays the current operating configuration in the system

5.1.6 port-channel load-balance

Sets the load balancing policy for aggregated ports on each of the previously created port channels. The `no` form of the command sets the load balancing policy to the default value.

```
port-channel load-balance {src-mac | dest-mac | src-dest-mac |
src-ip | dest-ip | src-dest-ip | vlan-id | src-dest-ip-port-proto}
[port-channel-index_1-65535]
```

```
no port-channel load-balance port-channel-index_1-65535
```

Syntax Description

src-mac – Load distribution is based on the source MAC address. Packets from different hosts use different ports in the channel, but packets from the same host use the same port.

dest-mac – Load distribution is based on the destination host MAC address. Packets to the same destination are sent on the same port, but packets to different destinations are sent on different ports in the channel.

src-dest-mac – Load distribution is based on the source and destination MAC address.

src-ip – Load distribution is based on the source IP address.

dest-ip – Load distribution is based on the destination IP address.

src-dest-ip – Load distribution is based on the source and destination IP address.

vlan-id – Load distribution is based on VLAN identifier.

src-dest-ip-port-proto – Load distribution is based on the source IP address, source port, destination IP address, destination port and transport protocol. (The keyword `src-dest-ip-port-proto` can be used only with the Sun Network 10GbE Switch 72p.)

port-channel-index – Port channel number.

Mode

Global Configuration

Defaults

Source and destination IP address based.

Example

```
SEFOS(config)# port-channel load-balance dest-mac 200
```

Notes

- If the port-channel index is not mentioned in this command, the load-balancing must apply for all port-channels configured in the system.
- Initially, the port channel interface must have been configured for this command.

Related Commands

`show etherchannel` - Displays Etherchannel load balance information

5.1.7 lacp port-priority

Sets the LACP port priority. The no form of the command sets the LACP port priority to the default value. Port priority determines whether the link is an active link or a standby link when the number of ports in the aggregation exceeds the maximum number supported by the hardware.

```
lacp port-priority 0-65535
```

```
no lacp port-priority
```

Mode	Interface Configuration
Defaults	**port-priority** – 128
Example	SEFOS(config-if)# **lacp port-priority 1**
Notes	• This command takes effect only on Etherchannel interfaces that are already configured for LACP. • If the number of links in an aggregation exceeds the maximum supported by the hardware, then the links with lower priority become active links.

Related Commands

- lacp system-priority - Globally sets the LACP priority
- show etherchannel - Displays Etherchannel detailed and port information

5.1.8 lacp port-identifier

Sets the LACP actor admin port to be filled in the LACP PDUs.

```
lacp port-identifier 1-65535
```

Mode	Interface Configuration
Example	SEFOS(config-if)# **lacp port-identifier 2**

Related Commands

- show etherchannel - Displays Etherchannel detailed and port information
- show interfaces - Displays interface specific port-channel information

5.1.9 channel-group

Configures an Etherchannel. The no form of the command removes an interface from the Etherchannel.

```
channel-group 1-65535 mode {on | active | passive}
```

```
no channel-group
```

Syntax Description	**mode** – Represents any one of the following: • **active** – LACP negotiation is started unconditionally. • **passive** – LACP negotiation is started only when an LACP packet is received from a peer. • **on** – Force the interface to channel without LACP. This is equivalent to manual aggregation.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# channel-group 1 mode active`
Notes	If the port-channel is not present, the port-channel must be created.

Related Commands

show etherchannel - Displays Etherchannel detailed and port information

5.1.10 lacp wait-time

Sets the LACP wait-time. The no form of the command sets the LACP wait-time to the default value.

```
lacp wait-time 0-10
```

```
no lacp wait-time
```

Mode	Interface Configuration
Defaults	2
Example	`SEFOS(config-if)# lacp wait-time 1`
Notes	Configuring the wait-time value as 0 ensures that links get aggregated immediately.

Related Commands

`show etherchannel` - Displays Etherchannel detailed and port information

5.1.11 lacp timeout

Sets the LACP timeout period and the no form of the command sets the LACP timeout period to the default value.

```
lacp timeout {long | short}
```

```
no lacp timeout
```

Syntax Description
long – Long timeout value.
short – Short timeout value.

Mode
Interface Configuration

Defaults
long

Example
`SEFOS(config-if)#` **`lacp timeout short`**

Notes
- The long timeout value means that LACP PDU will be sent every 30 seconds and LACP timeout value (no packet is received from peer) is 90 seconds.
- The short timeout value sends LACP PDU every 1 second and the timeout value is 3 seconds.

Related Commands

`show etherchannel` - Displays Etherchannel detailed and port information

5.1.12 lacp rate

Sets the LACP timeout period. The `no` form of the command sets the LACP timeout period to the default value This command operates similar to that of the command `lacp timeout`.

```
lacp rate {normal | fast }
```

```
no lacp rate
```

Syntax Description	**normal** – LACP control packets are ingressed at the normal rate. That is, LACP PDU will be sent every 30 seconds and the timeout value will be set as 90 seconds. **fast** – LACP control packets are ingressed at the fast rate. That is, LACP PDU will be sent every 1 second and the timeout value will be set as 3 seconds.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# lacp rate fast`
Notes	• The **normal** timeout value means that LACP PDU will be sent every 30 seconds and LACP timeout value (no packet is received from peer) is 90 seconds. • The **fast** timeout value means that LACP PDU will be sent every 1 second and timeout value is 3 seconds.

Related Commands

`show etherchannel` - Displays Etherchannel detailed and port information

5.1.13 default port

Configures the default physical interface for the port channel and the no form of the command removes default port for a port channel.

```
default port interface-type interface-id
```

```
no default port
```

Syntax Description	*interface-type* – Interface type. *interface-id* – Interface identifier.
Mode	Port Channel Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# default port extreme-ethernet 0/1`

Related Commands

`lacp` - Sets the LACP Actor Admin key and/or LACP mode for the port

`show etherchannel` - Displays Etherchannel information

5.1.14 lacp

Sets the LACP actor admin key and LACP mode for the port.

```
lacp [admin-key 1-65535] [mode {active | passive}]
```

Syntax Description	**admin-key** – LACP actor admin key. **mode** – LACP mode.
Mode	Port Channel Interface Configuration
Defaults	**mode** – **active**
Example	`SEFOS(config-if)#` **lacp admin-key 1 mode active**
Notes	This command can be configured only after configuring the default port.

Related Commands

`default port` - Configures the default physical interface for the port channel.

5.1.15 port-channel max-ports

Configures the maximum number of ports for a port channel.

```
port-channel max-ports 2-16
```

Mode	Interface Configuration
Defaults	8
Example	`SEFOS(config-if)#` **port-channel max-ports 5**

5.1.16 shutdown port-channel

Shuts down link aggregation in the switch. The `no` form of the command starts and enables link aggregation in the switch.

```
shutdown port-channel
```

```
no shutdown port-channel
```

Mode	Global Configuration

Example	SEFOS(config)# **shutdown port-channel**
Notes	When shutdown, all resources used by the link aggregation module are released to the system.

Related Commands

- show etherchannel - Displays Etherchannel information
- show interfaces - Displays interface specific port-channel information

5.1.17 debug lacp

Enables trace messages for link aggregation. The no form of the command disables trace messages for link aggregation.

```
debug lacp [{init-shutdown | mgmt | data | events | packet | os |
failall | buffer | all}]
```

```
no debug lacp [{ init-shutdown | mgmt | data | events | packet |
os | failall | buffer | all}]
```

Syntax Description	**init-shutdown** – Initialization and shutdown traces. **mgmt** – Management traces. **data** – Data path traces. **events** – Event traces. **packet** – Packet dump traces. **os** – Traces related to all resources except buffers. **failall** – All failure traces. **buffer** – Buffer traces. **all** – All traces.
Mode	Privileged EXEC
Defaults	**init-shutdown**
Example	SEFOS# **debug lacp data**

5.1.18 debug etherchannel

Enables trace messages for link aggregation. The no form of the command disables trace messages for link aggregation.

This command operates similar to that of the command `debug lacp`.

```
debug etherchannel {[all] [detail] [error] [event] [idb]}
```

```
no debug etherchannel {[all] [detail] [error] [event] [idb]}
```

Syntax Description

all – All traces.
detail – Detailed debug traces.
error – All failure traces.
event – Event traces.
idb – Interface descriptor block messages.

Mode Privileged EXEC

Example

```
SEFOS# debug etherchannel detail
```

5.1.19 show etherchannel

Displays Etherchannel information.

```
show etherchannel [[channel-group-number] {detail | load-balance
| port | port-channel | summary | protocol}]
```

Syntax Description

channel-group-number – Number of the channel group. Valid numbers range from maximum number of ports in the system to maximum number of aggregations supported.
detail – Detailed Etherchannel information.
load-balance – Load-balance or frame-distribution scheme among ports in the port channel.
port – Etherchannel port information.
port-channel – Port channel information.
summary – Protocol that is being used in the Etherchannel.
protocol – One-line summary per channel-group.

Mode Privileged EXEC

Example

```
SEFOS# show etherchannel

Port-channel Module Admin Status is enabled
Port-channel Module Oper Status is enabled
Port-channel System Identifier is 00:01:02:03:04:01

                    Channel Group Listing
                    ---------------------

Group : 1
----------
Protocol : LACP

SEFOS# show etherchannel 1 detail

Port-channel Module Admin Status is enabled
Port-channel Module Oper Status is enabled
Port-channel System Identifier is 00:01:02:03:04:01
LACP System Priority: 32768

                    Channel Group Listing
                    ---------------------

Group: 1
----------
Protocol :LACP

                    Ports in the Group
                    ------------------

Port : Ex0/1
-------------

Port State = Up in Bundle
Channel Group : 1
Mode : Active
Pseudo port-channel = Po1
LACP port-priority  = 128
LACP Wait-time  = 2 secs
LACP Activity : Active
LACP Timeout : Long
```

```
Aggregation State : Aggregation, Sync, Collecting, Distributing,
Defaulted
                   LACP Port   Admin Oper    Port   Port
Port      State    Priority   Key    Key Number   State
-----------------------------------------------
Ex0/1     Bundle   128           1       1       0x1      0xbe

Port-channel : Po1
------------------

Number of Ports = 1
HotStandBy port = null
Port state = Port-channel Ag-Inuse
Protocol = LACP
Aggregator-MAC 00:01:02:03:04:19
Default Port = None
SEFOS# show etherchannel 1  port

                    Channel Group Listing
                    ---------------------
Group: 1
----------
Protocol :LACP

                    Ports in the Group
                    ------------------

Port : Ex0/1
-------------

Port State = Up in Bundle
Channel Group : 1
Mode : Active
port-channel = Po1
Pseudo port-channel = Po1
LACP port-priority  = 128
LACP Wait-time  = 2 secs
LACP Port Identifier = 2
LACP Activity : Active
LACP Timeout : Long
```

```
Aggregation State : Aggregation, Sync, Collecting, Distributing,
Port : Ex0/2
-------------
Port State = Up in Bundle
Channel Group : 1
Mode : Active
port-channel = Po1
Pseudo port-channel = Po1
LACP port-priority  = 128
LACP Wait-time  = 2 secs
LACP Activity : Active
LACP Timeout : Long
Aggregation State : Aggregation, Sync, Collecting, Distributing,

                  LACP Port   Admin Oper    Port   Port
Port      State    Priority   Key    Key Number   State
-----------------------------------------------
Ex0/1     Bundle   128           1       1       0x1      0xbc
Ex0/2     Bundle   128           1       1       0x2      0xbc


SEFOS# show etherchannel 1  port-channel
Port-channel Module Admin Status is enabled
Port-channel Module Oper Status is enabled
Port-channel System Identifier is 00:01:02:03:04:01
                    Channel Group Listing
                    ---------------------

Group : 1
----------
                  Port-channels in the group:
                  ---------------------------

Port-channel : Po1
-------------------
```

```
Number of Ports = 1
HotStandBy port = null
Port state = Port-channel Ag-Inuse
Protocol = LACP
Aggregator-MAC 00:01:02:03:04:19
Default Port = None
SEFOS# show etherchannel 1  summary

Flags:
D - down          P - in port-channel
I - stand-alone  S - suspended
H - Hot-standby (LACP only)

Port-channel is enabled
Port-channel System Identifier is 00:14:4F:7C:63:0A
Number of channel-groups in use: 1
Number of aggregators: 1

Group  Port-channel     Protocol    Ports
------------------------------------------------------------
1       Po1(P)            LACP        Ex0/1(P),Ex0/2(P)

SEFOS# show etherchannel 1  protocol

                   Channel Group Listing
                   ---------------------
Group : 1
----------
Protocol : LACP

SEFOS# show etherchannel load-balance

                   Channel Group Listing
                   ---------------------
Group : 1
----------
Source & Destination MAC Address
```

Notes If the channel group number is not specified details on all channels are displayed.

Related Commands

- `channel-group` - Assigns an Ethernet interface to an Etherchannel group
- `set port-channel` - Enables or disables link aggregation in the switch

- channel-protocol - Enables or disables link aggregation in the switch
- lacp system-priority - Sets the LACP priority for the system
- port-channel load-balance - Sets the load balancing policy
- lacp port-priority - Sets the LACP port priority
- lacp wait-time - Sets the LACP wait-time
- lacp timeout - Sets the LACP timeout period
- lacp rate - Sets the LACP timeout period
- show interfaces - Displays interface specific port-channel information

5.1.20 show etherchannel - redundancy

Displays Etherchannel information.

show etherchannel [[*channel-group-number***] {detail | load-balance | port | port-channel | summary | protocol | redundancy}]**

Syntax Description

channel-group-number – Number of the channel group. Valid numbers range from maximum number of ports in the system to maximum number of aggregations supported.

detail – Detailed Etherchannel information.

load-balance – Load-balance or frame-distribution scheme among ports in the port channel.

port – Etherchannel port information.

port-channel – Port channel information.

summary – Protocol that is being used in the Etherchannel.

protocol – One-line summary per channel-group.

redundancy – Synced messages. The keyword redundancy is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show etherchannel redundancy

Actor Information for Port : Ex0/1
----------------------------------
Channel Group : 1
Pseudo port-channel = Po1
CurrentWhile Split Interval Tmr Count = 1
Synced Partner Information for Port : Ex0/1
----------------------------------
```

```
Partner System ID                  : 00:11:22:33:44:55
Flags                                : A
LACP Partner Port Priority        : 128
LACP Partner Oper Key              : 1

Port State Flags Decode
------------------------
Activity : Active
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing,

Actor Information for Port : Ex0/2
-------------

Channel Group : 1
Pseudo port-channel = Po1
CurrentWhile Split Interval Tmr Count = 1

Synced Partner Information for Port : Ex0/2
-------------
Partner System ID                  : 00:11:22:33:44:55
Flags                                : A
LACP Partner Port Priority        : 128
LACP Partner Oper Key              : 1

Port State Flags Decode
-------------------------
Activity : Active
LACP Timeout : Long
Aggregation State : Aggregation, Sync, Collecting, Distributing,
-----------------------------------------------------------------
```

Notes If the channel group number is not specified, details on all channels are displayed.

Related Commands

- `channel-group` - Assigns an Ethernet interface to an Etherchannel group
- `set port-channel` - Enables or disables link aggregation in the switch
- `channel-protocol` - Enables or disables link aggregation in the switch
- `lacp system-priority` - Sets the LACP priority for the system
- `port-channel load-balance` - Sets the load balancing policy
- `lacp port-priority` - Sets the LACP port priority
- `lacp wait-time` - Sets the LACP wait-time

- `lacp timeout` - Sets the LACP timeout period
- `lacp rate` - Sets the LACP timeout period
- `show interfaces` - Displays interface specific port-channel information

5.1.21 show interfaces

Displays interface specific port-channel information.

show interfaces *interface-type interface-id* **etherchannel**

Syntax Description **ehterchannel** – Interface Etherchannel information.

Mode Privileged EXEC

Example

```
SEFOS# show interfaces extreme-ethernet 0/1 etherchannel

Port : Ex0/1
-------------

Port State = Up in Bundle
Channel Group :  2
Mode : Active
Pseudo port-channel = Po2
LACP port-priority  = 128
LACP Port Identifier = 2
LACP Wait-time  = 2 secs
LACP Activity : Passive
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing,

                     LACP Port    Admin   Oper    Port     Port
Port      State    Priority     Key     Key     Number   State
-----------------------------------------------------------------
Ex0/1     Bundle   128           2       2       0x1      0x3c
```

```
SEFOS# show interfaces etherchannel

Port : Ex0/1
-------------
Port State = Up in Bundle
Channel Group : 2
Mode : Active
Pseudo port-channel = Po2
LACP port-priority  = 128
LACP Wait-time  = 2 secs
LACP Activity : Passive
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing,

Port : Ex0/2
-------------

Port State = Up in Bundle
Channel Group : 2


Mode : Active
Pseudo port-channel = Po2
LACP port-priority  = 128
LACP Wait-time  = 2 secs
LACP Activity : Passive
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing,

                    LACP Port    Admin   Oper    Port     Port
Port      State     Priority     Key     Key     Number   State
-----------------------------------------------------------------
Ex0/1     Bundle   128           2       2       0x1      0x3c
Ex0/2     Bundle   128           2       2       0x2      0x3c
```

```
Port-channel : Po2
-------------------

Number of Ports = 2
HotStandBy port = null
Port state = Port-channel Ag-Inuse
Protocol = LACP
Aggregator-MAC  00:01:02:03:04:23
Default Port = None
```

Notes

- Expressions are case sensitive.
- The port channel range is 1 to 64.

Related Commands

- `set port-channel` - Enables or disables link aggregation in the switch
- `channel-group` - Assigns an Ethernet interface to an Etherchannel group
- `port-channel load-balance` - Sets the load balancing policy
- `lacp port-priority` - Sets the LACP port priority
- `lacp wait-time` - Sets the LACP wait-time
- `lacp timeout` - Sets the LACP timeout period
- `show etherchannel` - Displays Etherchannel information

5.1.22 show lacp

Displays port-channel traffic and neighbor information.

show lacp [*port-channel_1-65535***] {counters | neighbor [detail]}**

Syntax Description

port-channel – Number of the channel group.
counters – **disable** – Traffic information.
neighbor – Neighbor information.
detail – Neighbor detail information.

Mode

Privileged EXEC

Example

```
SEFOS# show lacp 1 counters

       LACPDUs     Marker    Marker Response   LACPDUs
Port Sent Recv Sent   Recv   Sent    Recv     Pkts Err
---------------------------------------
Channel group: 1
------------------
Ex0/1     394    352     0      0       0      0     0    0
Ex0/2     318    297     0      0       0      0     0    0


SEFOS# show lacp neighbor detail

Flags:

A - Device is in Active mode
P - Device is in Passive mode

Channel group 1 neighbors

Port Ex0/1
----------
Partner System ID                 : 00:01:02:03:04:21
Flags                               : P
LACP Partner Port Priority       : 128
LACP Partner Oper Key             : 2
LACP Partner Port State           : 0x3c
Port State Flags Decode
------------------------

Activity : Passive
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing

Port Ex0/2
```

```
----------
Partner System ID                 : 00:01:02:03:04:21
Flags                             : P
LACP Partner Port Priority        : 128
LACP Partner Oper Key             : 2
LACP Partner Port State           : 0x3c

Port State Flags Decode
-----------------------
Activity : Passive
LACP Timeout : Long

Aggregation State : Aggregation, Sync, Collecting, Distributing
```

Notes

Expressions are case sensitive.

Related Commands

- `lacp wait-time` - Sets the LACP wait-time.
- `lacp timeout` - Sets the LACP timeout period.
- `channel-group` - Assigns an Ethernet interface to an Etherchannel group.
- `show interfaces` - Displays interface specific port-channel information.
- `show etherchannel` - Displays Etherchannel detailed information.

CHAPTER 6

IGMP Snooping

IGMP is a protocol for IP hosts to manage their dynamic multicast group membership. The SEFOS IGMP conforms with RFC 3376 for IGMP v3 router functionality and supports the MIBs defined in `draft-ietfmagma-rfc2933-update-00.txt`.

6.1 IGMP Snooping Commands

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

- `ip igmp snooping` / `ip igmp snooping - VLAN`
- `ip igmp snooping proxy-reporting`
- `snooping multicast-forwarding-mode`
- `ip igmp snooping mrouter-time-out` / `ip igmp querier-timeout`
- `ip igmp snooping port-purge-interval` / `ip igmp snooping source-only learning age-timer`
- `ip igmp snooping report-suppression interval`
- `ip igmp snooping retry-count`
- `ip igmp snooping group-query-interval`
- `ip igmp snooping report-forward`
- `ip igmp snooping version`
- `ip igmp snooping fast-leave` / `ip igmp snooping vlan - immediate leave`
- `ip igmp snooping querier`
- `ip igmp snooping query-interval`
- `ip igmp snooping mrouter` / `ip igmp snooping vlan mrouter`

- shutdown snooping
- debug ip igmp snooping
- snooping leave-process config-level
- ip igmp snooping enhanced-mode
- ip igmp snooping multicast-vlan / mvr
- ip igmp snooping filter
- ip igmp snooping blocked-router
- ip igmp snooping multicast-vlan profile
- ip igmp snooping leavemode
- ip igmp snooping ratelimit
- ip igmp snooping limit / ip igmp max-groups
- ip igmp snooping filter-profileId / ip igmp filter
- ip igmp snooping proxy
- ip igmp snooping max-response-code
- ip igmp snooping mrouter-port -time-out
- ip igmp snooping mrouter-port-version
- show ip igmp snooping mrouter
- show ip igmp snooping mrouter - redundancy
- show ip igmp snooping globals
- show ip igmp snooping
- show ip igmp snooping - redundancy
- show ip igmp snooping groups
- show ip igmp snooping forwarding-database
- show ip igmp snooping forwarding-database - redundancy
- show ip igmp snooping statistics
- show ip igmp snooping blocked-router
- show ip igmp snooping multicast-receivers
- show ip igmp snooping port-cfg
- show ip igmp snooping multicast-vlan

6.1.1 ip igmp snooping

Enables IGMP snooping in the switch or a specific VLAN. The no form of the command disables IGMP snooping in the switch or a specific VLAN.

```
ip igmp snooping
```

```
no ip igmp snooping
```

Mode	Global Configuration Mode and Config-VLAN. Applicable only in Config-VLAN.
Defaults	IGMP snooping is globally disabled, including in all VLANs.
Example	SEFOS(config)# **ip igmp snooping** SEFOS(config-vlan)# **ip igmp snooping**
Notes	• When IGMP snooping is enabled globally, it is enabled in all the existing VLAN interfaces. • When IGMP snooping is disabled globally, it is disabled in all the existing VLAN interfaces. • GMRP has to be disabled for the IGMP snooping to be enabled.

Related Commands

- shutdown snooping - Shuts down IGMP snooping in the switch.
- show ip igmp snooping - Displays IGMP snooping information for all VLANs or a specific VLAN.
- show ip igmp snooping globals - Displays the IGMP snooping information for all VLANs or a specific VLAN.
- snooping multicast-forwarding-mode - Specifies the snooping multicast forwarding mode.
- show ip igmp snooping multicast-receivers - Displays IGMP multicast host information for all VLANs or a specific VLAN or specific VLAN and group address for a given switch or for all switches (if no switch is specified).

6.1.2 ip igmp snooping - VLAN

Enables IGMP snooping in the switch globally or for a specific VLAN. The no form of the command disables IGMP snooping in the switch globally or for a specific VLAN.

When globally enabled, IGMP snooping is enabled in all the existing VLAN interfaces. When globally disabled, the IGMP snooping is disabled in all the existing VLAN interfaces.

```
ip igmp snooping [vlan 1-4094]
```

```
no ip igmp snooping [vlan 1-4094]
```

Syntax Description	**vlan** – VLAN identifier in which IGMP snooping is to be enabled or disabled. This value ranges between 1 and 4094.
Mode	Global Configuration
Defaults	IGMP snooping is disabled globally and in all VLANs.
Example	`SEFOS(config)# ip igmp snooping vlan 1`
Notes	GMRP has to be disabled for the IGMP snooping to be enabled globally. There is no need to disable GMRP for enabling the IGMP snooping for a particular VLAN.

Related Commands

- `show ip igmp snooping` - Displays IGMP snooping information for all VLANs or a specific VLAN.
- `show ip igmp snooping globals` - Displays the global information of IGMP snooping.
- `show ip igmp snooping multicast-receivers` - Displays IGMP multicast host information for all VLANs or a specific VLAN or specific VLAN and group address for a given switch or for all switches (if no switch is specified).
- `shutdown snooping` - Shuts down IGMP snooping in the switch.

6.1.3 ip igmp snooping proxy-reporting

Enables proxy reporting in the IGMP snooping switch. The `no` form of the command disables proxy reporting in the IGMP snooping switch.

```
ip igmp snooping proxy-reporting
```

```
no ip igmp snooping proxy-reporting
```

Mode	Global Configuration
Defaults	Proxy-reporting is enabled.

Example	`SEFOS(config)# ip igmp snooping proxy-reporting`
Notes	Proxy reporting can be enabled in the IGMP snooping switch only if the proxy is disabled in the switch.

Related Commands

- `show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN
- `ip igmp snooping proxy` - Enables or disables proxy in the IGMP snooping switch.

6.1.4 snooping multicast-forwarding-mode

Specifies the snooping multicast forwarding mode (IP based or MAC based).

```
snooping multicast-forwarding-mode {ip | mac}
```

Syntax Description	**ip** – IP Address based. **mac** – MAC Address based.
Mode	Global Configuration
Defaults	mac
Example	`SEFOS(config)# snooping multicast-forwarding-mode mac`

Related Commands

- `show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN
- `ip igmp snooping enhanced-mode` - Enables/disables snooping system enhanced mode in the switch.
- `ip igmp snooping filter-profileId` / `ip igmp filter` - Configures the multicast profile index for a downstream interface

6.1.5 ip igmp snooping mrouter-time-out

Sets the IGMP snooping router port purge time-out after which the port gets deleted if no IGMP router control packets are received. The purge time-out value ranges from 60 to 600 seconds. The no form of the command sets the IGMP snooping router port purge time-out to default value.

```
ip igmp snooping mrouter-time-out 60-600
```

```
no ip igmp snooping mrouter-time-out
```

Mode	Global Configuration
Defaults	125
Example	`SEFOS(config)# ip igmp snooping mrouter-time-out 70`

Related Commands

- `show ip igmp snooping mrouter` - Displays the router ports for all VLANs or specific VLAN
- `show ip igmp snooping globals` - Displays the global information of IGMP snooping

6.1.6 ip igmp querier-timeout

Sets the IGMP snooping router port purge time-out after which the port gets deleted, if no IGMP router control packets are received. The purge time-out value ranges between 60 and 600 seconds.

This command operates similar to that of the `ip igmp snooping mrouter-time-out` command.

```
ip igmp querier-timeout 60 - 600
```

Mode	Global Configuration
Defaults	125
Example	`SEFOS(config)# ip igmp querier-timeout 70`

Related Commands

- `show ip igmp snooping mrouter` - Displays the router ports for all VLANs or specific VLAN

- show ip igmp snooping globals- Displays the global information of IGMP snooping

6.1.7 ip igmp snooping port-purge-interval

Sets the IGMP snooping port purge time interval after which the port gets deleted if no IGMP reports are received. The no form of the command sets the IGMP snooping port purge time to default value.

```
ip igmp snooping port-purge-interval seconds_130-1225
```

```
no ip igmp snooping port-purge-interval
```

Mode	Global Configuration
Defaults	260
Example	`SEFOS(config)# ip igmp snooping port-purge-interval 150`

Related Commands

show ip igmp snooping globals - Displays the IGMP snooping information for all VLANs or a specific VLAN

6.1.8 ip igmp snooping source-only learning age-timer

Sets the IGMP snooping port purge time interval after which the port gets deleted, if no IGMP reports are received. The purge time interval value ranges between 130 and 1225 seconds. The no form of the command sets the IGMP snooping port purge time to the default value.

This command operates similar to that of the command ip igmp snooping port-purge-interval.

```
ip igmp snooping source-only learning age-timer 130-1225
```

```
no ip igmp snooping source-only learning age-timer
```

Mode	Global Configuration
Defaults	260

Example `SEFOS(config)# ip igmp snooping source-only learning age-timer 200`

Related Commands

`show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN

6.1.9 ip igmp snooping report-suppression interval

Sets the IGMP snooping report-suppression time interval for which the IGMPv2 report messages for the same group will not get forwarded onto the router ports. The `no` form of the command sets the IGMP snooping report-suppression interval time to the default value.

```
ip igmp snooping report-suppression-interval 1-25
```

```
no ip igmp snooping report-suppression-interval
```

Mode Global Configuration

Defaults 5

Example `SEFOS(config)# ip igmp snooping report-suppression-interval 20`

Notes This time interval is used when both proxy and proxy-reporting are disabled.

Related Commands

`show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN

6.1.10 ip igmp snooping retry-count

Sets the maximum number of group specific queries sent on a port on reception of a IGMPv2 leave message. The `no` form of the command sets the number of group specific queries sent on a port on reception of leave message to default value.

```
ip igmp snooping retry-count 1-5
```

```
no ip igmp snooping retry-count
```

Mode	Global Configuration
Defaults	2
Example	`SEFOS(config)# ip igmp snooping retry-count 4`

Related Commands

`show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN

6.1.11 ip igmp snooping group-query-interval

Sets the time interval after which the switch sends a group specific query on a port. The `no` form of the command sets the group specific query interval time to default value. The time interval value is in seconds.

```
ip igmp snooping group-query-interval 2-5
```

```
no ip igmp snooping group-query-interval
```

Mode	Global Configuration
Defaults	2
Example	`SEFOS(config)# ip igmp snooping group-query-interval 3`

Related Commands

- `show ip igmp snooping globals` - Displays the IGMP snooping information for all VLANs or a specific VLAN
- `show ip igmp snooping statistics` - Displays IGMP snooping statistics for all VLANs or a specific VLAN
- `show ip igmp snooping groups` - Displays IGMP group information for all VLANs or a specific VLAN

6.1.12 ip igmp snooping report-forward

Specifies if IGMP reports must be forwarded on all ports or router ports of a VLAN. The no form of the command sets IGMP report-forwarding status to the default value.

```
ip igmp snooping report-forward {all-ports | router-ports}
```

```
no ip igmp snooping report-forward
```

Syntax Description	**all-ports** – IGMP reports forwarded on all the ports of a VLAN **router-ports** – IGMP reports forwarded on router ports of a VLAN
Mode	Global Configuration
Defaults	**router-ports**
Example	SEFOS(config)# **ip igmp snooping report-forward all-ports**
Notes	• This configuration is not valid in proxy or proxy-reporting mode. • In snooping mode, snooping module will forward reports only on router ports by default.

Related Commands

show ip igmp snooping globals - Displays the IGMP snooping information for all VLANs or a specific VLAN

6.1.13 ip igmp snooping version

Sets the operating version of the IGMP snooping switch for a specific VLAN.

```
ip igmp snooping version { v1 |v2 | v3}
```

Syntax Description	**v1** – IGMP snooping Version 1. **v2** – IGMP snooping Version 2. **v3** – IGMP snooping Version 3.
Mode	Config-VLAN
Defaults	v3
Example	SEFOS(config-vlan)# **ip igmp snooping version v2**

Related Commands

`show ip igmp snooping` - Displays IGMP snooping information for all VLANs or a specific VLAN

6.1.14 ip igmp snooping fast-leave

Enables fast leave processing for a specific VLAN. The `no` form of the command disables fast leave processing for a specific VLAN.

```
ip igmp snooping fast-leave
```

```
no ip igmp snooping fast-leave
```

Mode	Config-VLAN
Defaults	Disabled.
Example	`SEFOS(config-vlan)#` **`ip igmp snooping fast-leave`**
Notes	Fast leave processing will be enabled in the VLAN only if the IGMP snooping is globally enabled.

Related Commands

- `ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN
- `show ip igmp snooping` - Displays IGMP snooping information for all VLANs or a specific VLAN
- `show ip igmp snooping globals` - Displays the global information of IGMP snooping

6.1.15 ip igmp snooping vlan - immediate leave

Enables fast leave processing for a specific VLAN. The `no` form of the command disables fast leave processing for a specific VLAN. Identifier of the VLAN ranges between 1 and 4094.

This command operates similar to that of the command `ip igmp snooping fast-leave` and also enables IGMP snooping in that particular VLAN if IGMP snooping is globally enabled.

The fast leave processing and the IGMP snooping will not be enabled in the VLAN even if the IGMP snooping is globally enabled, once the IGMP snooping is disabled in the VLAN by the user. User must again enable IGMP snooping in the VLAN for enabling the fast leave process.

```
ip igmp snooping vlan 1-4094 immediate-leave
```

```
no ip igmp snooping vlan 1-4094 immediate-leave
```

Mode	Global Configuration
Defaults	Fast leave processing is disabled in all of the VLANs
Example	`SEFOS(config)# ip igmp snooping vlan 1 immediate-leave`
Notes	Fast leave processing will be enabled in the VLAN, only if the IGMP snooping is globally enabled.

Related Commands

- `ip igmp snooping` - VLAN - Enables IGMP snooping in the switch globally or for a specific VLAN. This command is applicable only for the code using the industrial standard commands.
- `show ip igmp snooping` - Displays IGMP snooping information for all VLANs or a specific VLAN.
- `show ip igmp snooping globals` - Displays the global information of IGMP snooping.

6.1.16 ip igmp snooping querier

Configures the IGMP snooping switch as a querier for a specific VLAN. The `no` form of the command configures the IGMP snooping switch as non-querier for a specific VLAN.

```
ip igmp snooping querier
```

```
no ip igmp snooping querier
```

Mode	Config-VLAN
Defaults	Non-querier
Example	`SEFOS(config-vlan)# ip igmp snooping querier`

Related Commands

`show ip igmp snooping` - Displays IGMP snooping information for all VLANs or a specific VLAN

6.1.17 ip igmp snooping query-interval

Sets the time period with which the general queries are sent by the IGMP snooping switch when configured as querier on a VLAN. The time period value is entered in seconds with a range from 60 to 100. The `no` form of the command sets the IGMP querier interval to the default value.

```
ip igmp snooping query-interval 60-600
```

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

Mode Config-VLAN

Defaults 125

Example
```
SEFOS(config-vlan) # ip igmp snooping query-interval
200
```

Notes In proxy reporting mode, general queries are sent on all downstream interfaces with this interval only if the switch is the querier. In proxy mode, general queries are sent on all downstream interfaces with this interval.

Related Commands

show ip igmp snooping - Displays IGMP snooping information for all VLANs or a specific VLAN

6.1.18 ip igmp snooping mrouter

Statically configures the router ports for a VLAN. The `no` form of the command deletes the statically configured router ports for a VLAN.

```
ip igmp snooping mrouter interface-type 0/a-b, 0/c, ...
```

```
no ip igmp snooping mrouter interface-type 0/a-b, 0/c, ...
```

Mode Config-VLAN

Example `SEFOS(config-vlan)# ip igmp snooping mrouter extreme-ethernet 0/1-3`

Related Commands

- `show ip igmp snooping mrouter` - Displays the router ports for all VLANs or specific VLAN.
- `ip igmp snooping mrouter-port -time-out` - Configures the router port purge time-out interval for a VLAN.
- `ip igmp snooping mrouter-port-version` - Configures the operating version of the router port for a VLAN.

6.1.19 ip igmp snooping vlan mrouter

Configures the router ports statically for a VLAN. This command operates similar to that of the command `ip igmp snooping mrouter`.

ip igmp snooping vlan *1-4094* **mrouter** *ifXtype 0/a-b, 0/c, ...*

no ip igmp snooping vlan *1-4094* **mrouter** *ifXtype 0/a-b, 0/c, ...*

Syntax Description

vlan *1-4094* – ID of the VLAN for which the router ports should be configured statically. This value ranges between 1 and 4094.

ifXtype – Interface type.

0/a-b, 0/c, ... – Interface list which specifies the particular slot and the concerned port number.

Mode Type of the interface. The value is `extreme-ethernet`.

Example `SEFOS(config)# ip igmp snooping vlan 1 mrouter extreme-ethernet 0/1`

Related Commands

- `show ip igmp snooping mrouter` - Displays the router ports for all VLANs or specific VLAN
- `ip igmp snooping mrouter-time-out` - Configures the router port purge time-out interval for a VLAN
- `ip igmp snooping mrouter-port-version` - Configures the operating version of the router port for a VLAN

6.1.20 shutdown snooping

Shuts down snooping in the switch. The no form of the command starts and enables snooping in the switch.

```
shutdown snooping
```

```
no shutdown snooping
```

Mode	Global Configuration
Defaults	no shutdown snooping
Example	SEFOS(config)# **shutdown snooping**
Notes	When shut down, all resources acquired by the snooping module are released to the system. For the IGS feature to be functional on the switch, the system-control status must be set as start and the state must be enabled.

Related Commands

show ip igmp snooping - Enables IGMP snooping in the switch/a specific VLAN

6.1.21 debug ip igmp snooping

Specifies the debug levels for IGMP snooping module. The no form of the command resets debug options for IGMP snooping module.

```
debug ip igmp snooping {[init] [resources] [tmr] [src] [grp] [qry]
[vlan] [pkt] [fwd] [mgmt] [redundancy] | all} [switch switch-name]
```

```
no debug ip igmp snooping {[init] [resources] [tmr] [src] [grp]
[qry] [vlan] [pkt] [fwd] [mgmt] [redundancy] | all} [switch
switch-name]
```

Syntax Description	**init** – Init and shutdown messages. **resources** – System resources management messages. **tmr** – Timer messages. **src** – Source information messages. **grp** – Group information messages. **qry** – Query related messages. **vlan** – VLAN information messages. **pkt** – Packet dump messages. **fwd** – Forwarding database messages. **mgmt** – Management related messages. **redundancy** – Redundancy Related messages. The keyword `redundancy` is not supported. **all** – All messages. **switch** *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.
Mode	Privileged EXEC
Defaults	Debugging is disabled.
Example	`SEFOS# debug ip igmp snooping fwd`

Related Commands

`show debugging` - Displays state of each debugging option

6.1.22 snooping leave-process config-level

Specifies the configuration level of the leave processing mechanisms.

```
snooping leave-process config-level {vlan | port}
```

Syntax Description	**vlan** – Configures the leave processing mechanisms at VLAN level. **port** – Configures the leave processing mechanisms at Interface level.
Mode	Global Configuration
Defaults	**vlan**
Example	`SEFOS(config)# snooping leave-process config-level port`

Related Commands

- `ip igmp snooping leavemode` - Configures the port leave mode for an interface

- `show ip igmp snooping globals` - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified)

6.1.23 ip igmp snooping enhanced-mode

Enables or disables the snooping system enhanced mode in the switch.

```
ip igmp snooping enhanced-mode {enable | disable}
```

Syntax Description	**enable** – Enables the snooping system enhanced mode in the switch. **disable** – Disables the snooping system enhanced mode in the switch.
Mode	Global Configuration
Defaults	Disable
Example	`SEFOS(config)# ip igmp snooping enhanced-mode enable`
Notes	The snooping multicast forwarding mode must be configured as `ip`.

Related Commands

- `snooping multicast-forwarding-mode` - Specifies the snooping multicast forwarding mode
- `show ip igmp snooping globals` - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified)
- `ip igmp snooping leavemode` - Configures the port leave mode for an interface
- `ip igmp snooping ratelimit` - Configures the rate limit for a downstream interface in units of the number of IGMP packets per second
- `ip igmp snooping limit` - Configures the maximum limit type for an interface
- `ip igmp max-groups` - Configures the maximum number of multicast groups that can be learnt on the interface
- `ip igmp snooping filter-profileId` / `ip igmp filter` - Configures the multicast profile index for a downstream interface

6.1.24 ip igmp snooping multicast-vlan

Enables or disables the multicast VLAN feature.

```
ip igmp snooping multicast-vlan {enable | disable}
```

Syntax Description	**enable** – Enables the multicast VLAN feature. **disable** – Disables the multicast VLAN feature.
Mode	Global Configuration
Defaults	Disable
Example	`SEFOS(config)# ip igmp snooping multicast-vlan enable`

Related Commands

- `show ip igmp snooping multicast-vlan` - Displays multicast VLAN statistics in a switch and displays various profiles mapped to the multicast VLANs
- `show ip igmp snooping globals` - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified)

6.1.25 mvr

Enables the multicast VLAN feature. The `no` form of this command disables the multicast VLAN feature. This command operates similar to that of the command `ip igmp snooping multicast-vlan`.

```
mvr
```

```
no mvr
```

Mode	Global Configuration
Defaults	Multicast VLAN feature is disabled
Example	`SEFOS(config)# mvr`

Related Commands

- `show ip igmp snooping multicast-vlan` - Displays multicast VLAN statistics in a switch and displays various profiles mapped to the multicast VLANs

- show ip igmp snooping globals - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified)

6.1.26 ip igmp snooping filter

Enables the IGMP snooping filter. The no form of the command disables the IGMP snooping filter.

```
ip igmp snooping filter
```

```
no ip igmp snooping filter
```

Mode	Global Configuration
Defaults	The IGMP snooping filter is disabled.
Example	`SEFOS(config)#` **`ip igmp snooping filter`**

Related Commands

- show ip igmp snooping globals - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified).
- ip igmp snooping ratelimit - Configures the rate limit for a downstream interface in units of the number of IGMP packets per second.
- ip igmp snooping limit - Configures the maximum limit type for an interface.
- ip igmp max-groups - Configures the maximum number of multicast groups that can be learnt on the interface.
- ip igmp snooping filter-profileId / ip igmp filter - Configures the multicast profile index for a downstream interface.

6.1.27 ip igmp snooping blocked-router

Statically configures the router ports for a VLAN.

```
ip igmp snooping blocked-router interface-type 0/a-b, 0/c, ...
```

```
no ip igmp snooping blocked-router interface-type 0/a-b, 0/c, ...
```

Syntax Description	*interface-type* – Interface type. *0/a-b, 0/c, ...* – Interface identifier.
Mode	Config-VLAN
Example	`SEFOS(config-vlan)#` **`ip igmp snooping blocked-router extreme-ethernet 0/4-5`**
Notes	The ports to be configured as blocked router ports, must not be configured as static router ports.

Related Commands

`show ip igmp snooping blocked-router` - Displays the blocked router ports for all VLANs or a specific VLAN for a given switch or for all the switches (if no switch is specified)

6.1.28 ip igmp snooping multicast-vlan profile

Configures the profile identifier to VLAN mapping for multicast VLAN classification. The `no` form of the command removes the profile identifier to VLAN mapping for multicast VLAN classification.

`ip igmp snooping multicast-vlan profile` *profile-id 0-4294967295*

`no ip igmp snooping multicast-vlan profile`

Syntax Description	*profile-id* – Specifies multicast profile ID configured for a particular VLAN. This value ranges from 0 to 4294967295.
Mode	Config-VLAN
Defaults	No profile is associated to any VLAN. That is, the profile ID is set to 0.
Example	`SEFOS(config-vlan)#` **`ip igmp snooping multicast-vlan profile 1`**
Notes	• The received packet is associated with the mapped multicast VLAN when any untagged report or leave message (a packet with no tag in a customer, provider, or 802.1ad bridge) is received and if the group and source address in the received packet matches any rule in this profile. • You must first create a multicast profile and set the action to `permit` before executing this command. • You must activate the profile.

6.1.29 ip igmp snooping leavemode

Configures the port leave mode for an interface.

```
ip igmp snooping leavemode {exp-hosttrack | fastLeave |
normalleave} InnerVlanId 1-4094]
```

Syntax Description

exp-hosttrack – Processes the leave messages with the explicit host tracking mechanism.

fastLeave – Processes the leave messages with the fast leave mechanism.

normalleave – Sends a group or group specific query on the interface for every received leave message.

InnerVlanId – Inner VLAN identifier. This value ranges between 1 and 4094.

Mode

Interface Configuration

Defaults

`exp-host track fastLeave normalleave`

Example

```
SEFOS(config-if)# ip igmp snooping leavemode fastLeave
InnerVlanId 1
```

Notes

- Configure the leave processing mechanism at the port level to be able to configure the port leave mode of the interface.
- This command is applicable for processing the IGMPv2 leave messages only.
- Enable the snooping system enhanced mode.

Related Commands

- `snooping leave-process config-level` - Specifies the level of configuring the leave processing mechanisms
- `ip igmp snooping enhanced-mode` - Enables/disables snooping system enhanced mode in the switch
- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch
- `show ip igmp snooping multicast-receivers` - Displays IGMP multicast host information for all VLANs or a specific VLAN or specific VLAN and group address for a given switch or for all switches (if no switch is specified)

6.1.30 ip igmp snooping ratelimit

Configures the rate limit for a downstream interface in units of the number of IGMP packets per second. The no form of the command resets the rate limit to the default value for an interface.

```
ip igmp snooping ratelimit integer [InnerVlanId 1-4094]
```

```
no ip igmp snooping ratelimit [InnerVlanId 1-4094]
```

Syntax Description	**InnerVlanId** – Inner VLAN identifier. This value ranges between 1 and 4094.
Mode	Interface Configuration
Defaults	The rate limit is 4294967295.
Example	`SEFOS(config-if)# ip igmp snooping ratelimit 100 InnerVlanId 1`
Notes	• By default, the rate limit holds the maximum value supported by an unsigned integer and does not rate limit any IGMP packets. • The actual rate supported depends on what the system can support. • The snooping system enhanced mode must be enabled. • The IGMP snooping filter must be enabled.

Related Commands

- `ip igmp snooping enhanced-mode` - Enables/disables snooping system enhanced mode in the switch.
- `ip igmp snooping filter` - Enables the IGMP snooping filter.
- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch.

6.1.31 ip igmp snooping limit

Configures the maximum limit type for an interface. The no form of the command configures the maximum limit type as none for an interface.

```
ip igmp snooping limit {channels | groups} interger32 [InnerVlanId 1-4094]
```

```
no ip igmp snooping limit [InnerVlanId 1-4094]
```

Syntax Description	**channels** – Sets the limit for channel (group, source) registrations. **groups** – Sets the limit for groups. **InnerVlanId** – Inner VLAN identifier. This value ranges between 1 and 4094.
Mode	Interface Configuration
Defaults	The limit is set as none so that no limiting is done.
Example	SEFOS(config-if)# **ip igmp snooping limit groups 10 InnerVlanId 1**
Notes	• The channel limit will be applied only for IGMPv3 include and allow reports, whereas the group limit will be applied for all IGMP reports. • The snooping system enhanced mode must be enabled. • The IGMP snooping filter must be enabled.

Related Commands

- `ip igmp snooping enhanced-mode` - Enables or disables snooping system enhanced mode in the switch
- `ip igmp snooping filter` - Enables the IGMP snooping filter
- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch

6.1.32 ip igmp max-groups

Configures the maximum number of multicast groups that can be learnt on the interface. The `no` form of the command sets the number of multicast groups to the default value. The maximum number can be set between 0 and 254.

This command operates similar to that of the `ip igmp snooping limit`, whereas the maximum limit is set only for the groups. This command explicitly sets the maximum limit type as groups.

ip igmp max-groups *integer32*

no ip igmp max-groups

Mode	Interface Configuration
Defaults	The maximum number of multicast groups is set as zero and the maximum limit type is set as none.
Example	SEFOS(config-if)# **ip igmp max-groups 100**

Notes

- The snooping system enhanced mode must be enabled.
- The IGMP snooping filter must be enabled.

Related Commands

- `ip igmp snooping enhanced-mode` - Enables or disables snooping system enhanced mode in the switch
- `ip igmp snooping filter` - Enables the IGMP snooping filter
- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch

6.1.33 ip igmp snooping filter-profileId

Configures the multicast profile index for a downstream interface. The `no` form of the command resets the multicast profile index to default value.

```
ip igmp snooping filter-profileId integer [InnerVlanId 1-4094]
```

```
no ip igmp snooping filter-profileId [InnerVlanId 1-4094]
```

Syntax Description

InnerVlanId – Inner VLAN identifier. This value ranges between 1 and 4094.

Mode

Interface Configuration

Defaults

No profiles are applied for the interface that is profile ID is configured as 0.

Example

```
SEFOS(config-if)# ip igmp snooping filter-profileId 2
InnerVlanId 1
```

Notes

- The profile contains a set of allowed or denied rules which are to be applied for the IGMP packets received through the downstream interface.
- The snooping system enhanced mode must be enabled.
- The IGMP snooping filter must be enabled.
- The multicast forwarding mode should be set as IP address based.
- The multicast profile should have been already created.
- Only one profile ID can be assigned for the downstream interface. The existing profile ID will be removed and the new profile ID will be assigned, if already a profile ID is assigned to the interface.
- The IP multicast profiling must be enabled (`set ip mcast profiling enable`).

Related Commands

- `ip igmp snooping enhanced-mode` - Enables or disables snooping system enhanced mode in the switch
- `ip igmp snooping filter` - Enables the IGMP snooping filter
- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch

6.1.34 ip igmp filter

Configures the multicast profile index for a downstream interface. The `no` form of the command resets the multicast profile index to the default value.

This command operates similar to that of the command ip `ip igmp snooping filter-profileId`.

ip igmp filter *profile-number*

no ip igmp filter

Syntax Description	*profile-number* – Profile identifier for the multicast profile entry. This value ranges between 1 and 4294967295.
Mode	Interface Configuration
Defaults	No profiles are applied for the interface, that is, profile ID is configured as 0.
Example	`SEFOS(config-if)# ip igmp filter 1`
Notes	• The profile contains a set of allowed or denied rules which are to be applied for the IGMP packets received through the downstream interface. • The snooping system enhanced mode must be enabled. • The IGMP snooping filter must be enabled. • The multicast forwarding mode should be set as IP address based. • The multicast profile should have been already created. • Only one profile ID can be assigned for the downstream interface. The existing profile ID will be removed and the new profile ID will be assigned, if already a profile ID is assigned to the interface.

Related Commands

- `ip igmp snooping enhanced-mode` - Enables or disables snooping system enhanced mode in the switch
- `ip igmp snooping filter` - Enables the IGMP snooping filter

- `show ip igmp snooping port-cfg` - Displays IGS Port configuration information for all Inner VLANs or a specific Inner VlanId or a given switch

6.1.35 ip igmp snooping proxy

Enables proxy in the IGMP snooping switch. The `no` form of the command disables proxy in the IGMP snooping switch.

```
ip igmp snooping proxy
```

```
no ip igmp snooping proxy
```

Mode	Global Configuration
Defaults	The proxy is disabled in the IGMP snooping switch.
Example	`SEFOS(config)#` **`ip igmp snooping proxy`**
Notes	Proxy can be enabled in the IGMP snooping switch only if the proxy reporting is disabled in the snooping switch.

Related Commands

- `ip igmp snooping proxy-reporting` - Enables or disables proxy reporting in the IGMP snooping switch
- `show ip igmp snooping globals` - Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch or for all switch (if switch is not specified)

6.1.36 ip igmp snooping max-response-code

Sets the maximum response code inserted in general queries send to host. The unit of the response code is tenth of second. The `no` form of the command sets the query response code to default value.

```
ip igmp snooping max-response-code 0 - 255
```

```
no ip igmp snooping max-response-code
```

Mode	Config-VLAN
Defaults	**`max-response-code`** – 100.

Example SEFOS(config-vlan)# **ip igmp snooping max-response-code 10**

Related Commands

show ip igmp snooping - Displays IGMP snooping information for all VLANs or a specific VLAN

6.1.37 ip igmp snooping mrouter-port -time-out

Configures the router port purge time-out interval for a VLAN. The no form of the command resets the router port purge time-out interval to default, for a VLAN.

ip igmp snooping mrouter-port *ifXtype iface-list* **time-out** *60-600*

no ip igmp snooping mrouter-port *interface-type 0/a-b, 0/c, ...*

Syntax Description
ifXtype – Interface type. The value is extreme-ethernet.
iface-list – Interface list (0/a-b, 0/c, ...)
time-out *60-600*– Router port purge time-out interval. This value ranges between 60 and 600 seconds.
interface-type – Type of interface.
0/a-b, 0/c, ... **- Interface list**

Mode Config-VLAN

Defaults **time-out** – Router port purge time-out interval. This value ranges between 60 and 600 seconds.

Example SEFOS(config-vlan)# **ip igmp snooping mrouter-port extreme-ethernet 0/1-3 time-out 150**

Notes The router ports must be statically configured for the VLAN.

Related Commands

- show ip igmp snooping mrouter / ip igmp snooping vlan mrouter - Statically configures the router ports for a VLAN
- show ip igmp snooping mrouter - Displays detailed information about the router ports

6.1.38 ip igmp snooping mrouter-port-version

Configures the operating version of the router port for a VLAN. The no form of the command resets the operating version of the router port to the default operating version for a VLAN.

```
ip igmp snooping mrouter-port ifXtype iface-list version {v1 | v2
| v3}
```

```
no ip igmp snooping mrouter-port ifXtype iface-list version
```

Syntax Description

ifXtype – Interface type.

iface-list – Interface list.

version – Operating version of the port for the VLAN.

- v1 - IGMP snooping version 1.
- v2 - IGMP snooping version 2.
- v3 - IGMP snooping version 3.

Mode Config-VLAN

Defaults **version** – v3

Example

```
SEFOS(config-vlan)# ip igmp snooping mrouter-port
extreme-ethernet 0/2 version v1
```

Notes The router ports must be statically configured for the VLAN.

Related Commands

- ip igmp snooping mrouter / ip igmp snooping vlan mrouter - Configures statically the router ports for a VLAN
- show ip igmp snooping mrouter - Displays detailed information about the router ports

6.1.39 show ip igmp snooping mrouter

Displays the router ports for all VLANs or a specific VLAN for a given switch or for all the switch (if no switch is specified).

```
show ip igmp snooping mrouter [Vlan vlan-index] [detail] [switch
switch-name]
```

Syntax Description

`Vlan` – Vlan identifier value

`detail` – Displays detailed information about the router ports

`switch` *`switch-name`* – Contextor switch name. This parameter is specific to multiple instance.

The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping mrouter

Vlan    Ports
-----   ------
     1   Ex0/1(dynamic), Ex0/2(static)
     2   Ex0/1(static), Ex0/2(dynamic)

Multiple Instance
SEFOS# show ip igmp snooping mrouter
Switch cust1

Vlan    Ports
-----   ------
 1   Ex0/1(static)
     2   Ex0/1(static)

Switch cust2

Vlan    Ports
-----   ------
     1   Ex0/9(static)
     2   Ex0/9(static)
```

Related Commands

- `ip igmp snooping mrouter-time-out` / `ip igmp querier-timeout` - Sets the IGMP snooping router port purge time-out after which the port gets deleted, if no IGMP router control packets are received
- `ip igmp snooping mrouter` / `ip igmp snooping vlan mrouter` - Configures statically the router ports for a VLAN
- `ip igmp snooping mrouter-time-out` - Configures the router port purge time-out interval for a VLAN
- `ip igmp snooping mrouter-port-version` - Configures the operating version of the router port for a VLAN

6.1.40 show ip igmp snooping mrouter - redundancy

Displays the router ports for all VLANs or a specific VLAN for a given switch or for all switches (if no switch is specified).

```
show ip igmp snooping mrouter [Vlan vlan-index] [redundancy]
[detail] [switch switch-name]
```

Syntax Description

Vlan – Vlan index value.

redundancy– Synced messages. The keyword redundancy is not supported.

detail – Displays detailed information about the router ports.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword switch is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp snooping mrouter redundancy

Igs Redundancy Vlan Sync Data for Vlan 1
Vlan Router Port List
Vlan    Ports
-----   ------
     1   Ex0/1(dynamic), Ex0/3(dynamic)

IGMP Router Port List
Vlan    IGMP Ports
-----   ----------
     1   Ex0/1(dynamic)
```

Related Commands

- show ip igmp snooping mrouter - Configures statically the router ports for a VLAN
- ip igmp snooping mrouter-time-out - Configures the router port purge time-out interval for a VLAN.
- ip igmp snooping mrouter-port-version - Configures the operating version of the router port for a VLAN

6.1.41 show ip igmp snooping globals

Displays the global information of IGMP snooping.

show ip igmp snooping globals [switch *switch-name*]

Syntax Description

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping globals

Snooping Configuration
------------------------------
IGMP Snooping globally enabled
IGMP Snooping is operationally enabled
IGMP Snooping Enhanced mode is disabled
Transmit Query on Topology Change globally disabled

Multicast forwarding mode is MAC based
Proxy globally disabled
Proxy reporting globally enabled
Filter is disabled
Router port purge interval is 125 seconds
Port purge interval is 260 seconds
Report forward interval is 5 seconds
Group specific query interval is 2 seconds
Reports are forwarded on router ports
Group specific query retry count is 2
Multicast VLAN disabled
Leave config level is Vlan based

Multiple Instance
SEFOS# show ip igmp snooping globals
Switch default

Snooping Configuration
------------------------------
IGMP Snooping globally enabled
IGMP Snooping is operationally enabled
IGMP Snooping Enhanced mode is disabled
Transmit Query on Topology Change globally disabled
Multicast forwarding mode is MAC based
```

```
Proxy globally disabled
Proxy reporting globally enabled
Filter is disabled
Router port purge interval is 125 seconds
Port purge interval is 260 seconds
Report forward interval is 5 seconds
Group specific query interval is 2 seconds
Reports are forwarded on router ports
Group specific query retry count is 2
Multicast VLAN disabled
Leave config level is Vlan based
```

Related Commands

- `ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN
- `ip igmp snooping - VLAN` - Enables IGMP snooping globally or for a specific VLAN
- `ip igmp snooping proxy-reporting` - Enables proxy reporting in the IGMP snooping switch
- `snooping multicast-forwarding-mode` - Specifies the forwarding mode (IP based or MAC based) that will be effective on switch restart
- `ip igmp snooping mrouter-time-out` / `ip igmp querier-timeout` - Configures the router port purge time-out interval for a VLAN
- `ip igmp snooping port-purge-interval` / `ip igmp snooping source-only learning age-timer` - Sets the IGMP snooping port purge time interval after which the port gets deleted if no IGMP reports are received
- `ip igmp snooping report-suppression interval` - Sets the IGMP report-suppression interval
- `ip igmp snooping retry-count` - Sets the maximum number of group specific queries sent on a port on reception of a IGMPV2 leave message
- `ip igmp snooping version` - Specifies the IGMP snooping operating mode of the switch
- `ip igmp snooping fast-leave` / `ip igmp snooping vlan - immediate leave` - Enables fast leave processing for a specific VLAN
- `ip igmp snooping report-forward` - Specifies if IGMP reports must be forwarded on all ports or router ports of a VLAN
- `snooping leave-process config-level` - Specifies the level of configuring the leave processing mechanisms
- `ip igmp snooping enhanced-mode` - Enables/disables snooping system enhanced mode in the switch

- ip igmp snooping multicast-vlan - Enables/disables the multicast VLAN feature
- mvr - Enables the multicast VLAN feature
- ip igmp snooping filter - Enables the IGMP snooping filter
- ip igmp snooping proxy - Enables proxy in the IGMP snooping switch

6.1.42 show ip igmp snooping

Displays IGMP snooping information for all VLANs, or a specific VLAN for a given context. Or this command displays this information for all the context (if no switch is specified).

```
show ip igmp snooping [Vlan vlan-id] [switch switch-name]
```

Syntax Description

vlan – VLAN identifier.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance.

The keyword switch is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping vlan 2

Snooping VLAN Configuration for the VLAN 1
   IGMP Snooping enabled
   IGMP configured version is V3
   Fast leave is disabled
   Snooping switch is acting as Non-Querier
   Query interval is 125 seconds
   Port Purge Interval is 260 seconds
   Max Response Code is 100, Time is 10 seconds
```

Related Commands

- ip igmp snooping - Enables IGMP snooping in the switch/a specific VLAN
- ip igmp snooping - VLAN - Enables IGMP snooping globally or for a specific VLAN.
- ip igmp snooping version - Specifies the IGMP snooping operating mode of switch
- ip igmp snooping fast-leave / ip igmp snooping vlan - immediate leave - Enables fast leave processing for a specific VLAN

- `ip igmp snooping querier` - Configures the IGMP snooping switch as a querier for a specific VLAN
- `ip igmp snooping query-interval` - Sets the time period with which the general queries are sent by the IGMP snooping switch when configured as querier on a VLAN
- `ip igmp snooping max-response-code` - Sets the maximum response code inserted in general queries send to host

6.1.43 show ip igmp snooping - redundancy

Displays IGMP snooping information for all VLANs or a specific VLAN for a given switch. This command also displays this information for all switches (if no switch is specified).

show ip igmp snooping [Vlan *vlan-id*] **[redundancy] [switch** *switch-name*]

Syntax Description

Vlan – VLAN identifier.

redundancy – Synced messages. The keyword `redundancy` is not supported.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance.

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp snooping redundancy

IGMP Snooping VLAN Configuration for VLAN 1
   IGMP snooping switch is acting as Non-Querier
   IGMP current operating version is V1
```

Related Commands

- `ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN
- `ip igmp snooping version` - Specifies the IGMP snooping operating mode of switch
- `ip igmp snooping fast-leave` - Enables fast leave processing for a specific VLAN
- `ip igmp snooping querier` - Configures the IGMP snooping switch as a querier for a specific VLAN
- `ip igmp snooping query-interval` - Sets the time period with which the general queries are sent by the IGMP snooping switch when configured as querier on a VLAN

6.1.44 show ip igmp snooping groups

Displays IGMP group information for all VLANs, or a specific VLAN, or specific VLAN and group address for a given switch. This command also displays this information for all switches (if no switch is specified).

show ip igmp snooping groups [Vlan *vlan-id* **[Group** *address*]] **[switch** *switch-name*]

Syntax Description

Vlan – VLAN index value.

Group – Group address of the VLAN identifier.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
/* IP based */
SEFOS# show ip igmp snooping groups

IGMP Snooping Group information
-------------------------------
VLAN ID:2  Group Address: 227.1.1.1

Filter Mode: EXCLUDE
Exclude sources: None
V1/V2 Receiver Ports:
  Ex0/4
V3 Receiver Ports:
  Port Number: Ex0/2
   Include sources: None
   Exclude sources:
   12.0.0.10, 12.0.0.20
  Port Number: Ex0/3
   Include sources: None
   Exclude sources:
   12.0.0.40, 12.0.0.30
```

```
/* MAC based */
SEFOS# show ip igmp snooping groups

IGMP Snooping Group information
-------------------------------
VLAN ID:2  Group Address: 227.1.1.1
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
Ex0/2, Ex0/3, Ex0/4, Ex0/5

Multiple Instance
SEFOS# show ip igmp snooping groups

Switch cust1

Snooping Group information
-------------------------------
VLAN ID:2  Group Address: 227.2.2.2
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
  Ex0/3, Ex0/5, Ex0/6

Switch cust2

Snooping Group information
-------------------------------
VLAN ID:2  Group Address: 227.2.2.2
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
  Ex0/10
```

Related Commands

`ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN

6.1.45 show ip igmp snooping forwarding-database

Displays multicast forwarding entries for all VLANs or a specific VLAN for a given switch. This command also displays this information for all switches (if no switch is specified). Note that the forwarding table only displays 255 entries.

show ip igmp snooping forwarding-database [Vlan *vlan-id*] **[switch** *switch-name*]

Syntax Description

Vlan – VLAN identifier.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
/* IP based */
SEFOS# show ip igmp snooping forwarding-database

Vlan Source Address Group Address   Ports
 ---- -------------- -------------   -----
  2       12.0.0.10      227.1.1.1   Ex0/1, Ex0/3, Ex0/4
  2       12.0.0.20      227.1.1.1   Ex0/1, Ex0/3, Ex0/4
  2       12.0.0.30      227.1.1.1   Ex0/1, Ex0/2, Ex0/4
  2       12.0.0.40      227.1.1.1   Ex0/1, Ex0/2, Ex0/
/* MAC based */
SEFOS# show ip igmp snooping forwarding-database

 Vlan   MAC-Address            Ports
 ----   -----------------     -----
 2   01:00:5e:01:01:01    Ex0/2, Ex0/3, Ex0/4, Ex0/5
 2   01:00:5e:02:02:02     Ex0/2, Ex0/3
```

```
Multiple Instance
SEFOS# show ip igmp snooping forwarding-database

Switch cust1
 Vlan   MAC-Address            Ports
 ----   -----------------     -----
    2   01:00:5e:02:02:02     Ex0/2, Ex0/3, Ex0/5, Ex0/6

Switch cust2
 Vlan   MAC-Address            Ports
 ----   -----------------     -----
    2   01:00:5e:02:02:02     Ex0/9, Ex0/10
```

Notes IGS must be enabled in the switch prior to the execution of this command.

Related Commands

`ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN

6.1.46 show ip igmp snooping forwarding-database - redundancy

Displays multicast forwarding entries for all VLANs, or a specific VLAN for a given switch. This command also displays this information for all switches (if no switch is specified).

show ip igmp snooping forwarding-database [Vlan *vlan-id*]
[redundancy] [switch *switch-name*]

Syntax Description

Vlan – VLAN identifier.

redundancy – Synced messages. The keyword `redundancy` is not supported.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show ip igmp snooping forwarding-database
redundancy

Igs Redundancy Multicast Group Info Sync Data

Vlan    Group Address   Ports
----    -------------   -----
    1         224.1.1.1   Ex0/2, Ex0/3
    1         224.1.2.3   Ex0/1, Ex0/3
```

Notes

IGS must be enabled in the switch prior to the execution of this command.

Related Commands

`ip igmp snooping` - Enables IGMP snooping in the switch / a specific VLAN

6.1.47 show ip igmp snooping statistics

Displays IGMP snooping statistics for all VLANs, or a specific VLAN for a given switch. This command also displays this information for all switches (if `no` switch is specified).

show ip igmp snooping statistics [Vlan *vlan-id*] **[switch** *switch-name*]

Syntax Description

Vlan – VLAN index.

switch *switch-name* – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping statistics

IGMP Snooping Statistics for VLAN 1
  IGMP Snooping General queries received : 3
  IGMP Snooping Group specific queries received : 0
  IGMP Snooping Group and source specific queries
received : 0
  IGMP Snooping V1/V2 reports received : 10
  IGMP Snooping V3 reports received : 0
  IGMP Snooping V3 IS_INCLUDE messages received : 0
```

```
 IGMP Snooping V3 IS_EXCLUDE messages received : 0
  IGMP Snooping V3 TO_INCLUDE messages received : 0
  IGMP Snooping V3 TO_EXCLUDE messages received : 0
  IGMP Snooping V3 ALLOW messages received : 0
  IGMP Snooping V3 Block messages received : 0
  IGMP Snooping V2 Leave messages received : 0
  IGMP Snooping General queries transmitted : 0
  IGMP Snooping Group specific queries transmitted : 2
  IGMP Snooping V1/V2 reports transmitted : 0
  IGMP Snooping V3 reports transmitted : 3
  IGMP Snooping V2 leaves transmitted : 0
  IGMP Snooping Packets dropped : 1

Multiple Instance
SEFOS# show ip igmp snooping statistics

Switch cust1
Snooping Statistics for VLAN 1
  General queries received : 0
  Group specific queries received : 0
 Group and source specific queries received : 0
  ASM reports received : 20
  SSM reports received : 0
  IS_INCLUDE messages received : 0

 IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0
  Leave messages received : 0
  General queries transmitted : 0
  Group specific queries transmitted : 0
  ASM reports transmitted : 1
  SSM reports transmitted : 0
  Leaves transmitted : 0
  Packets dropped : 0

Snooping Statistics for VLAN 2
  General queries received : 0
  Group specific queries received : 0
 Group and source specific queries received : 0
```

```
 ASM reports received : 19
  SSM reports received : 18
  IS_INCLUDE messages received : 0
  IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0
  Leave messages received : 0
  General queries transmitted : 0

 Group specific queries transmitted : 0
  ASM reports transmitted : 2
  SSM reports transmitted : 0
  Leaves transmitted : 0
  Packets dropped : 0


Switch cust2
Snooping Statistics for VLAN 1
  General queries received : 0
  Group specific queries received : 0

 Group and source specific queries received : 0
  ASM reports received : 0
  SSM reports received : 0
  IS_INCLUDE messages received : 0
  IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0
  Leave messages received : 0
  General queries transmitted : 0
  Group specific queries transmitted : 0
  ASM reports transmitted : 0
  SSM reports transmitted : 0
  Leaves transmitted : 0
  Packets dropped : 0

Snooping Statistics for VLAN 2
  General queries received : 0
  Group specific queries received : 0
 Group and source specific queries received : 0
```

```
ASM reports received : 0
 SSM reports received : 0
 IS_INCLUDE messages received : 0
 IS_EXCLUDE messages received : 0
 TO_INCLUDE messages received : 0
 TO_EXCLUDE messages received : 0
 ALLOW messages received : 0

Block messages received : 0
 Leave messages received : 0
 General queries transmitted : 0
 Group specific queries transmitted : 0
 ASM reports transmitted : 0
 SSM reports transmitted : 0
 Leaves transmitted : 0
 Packets dropped : 0
```

Related Commands

`ip igmp snooping` - Enables IGMP snooping in the switch/a specific VLAN

6.1.48 show ip igmp snooping blocked-router

Displays the blocked router ports for all VLANs, or a specific VLAN for a given switch. This command also displays this information for all the switches (if no switch is specified).

show ip igmp snooping blocked-router [Vlan *vlan-index*] **[switch** *switch-name*]

Syntax Description

Vlan – VLAN index value.

switch *switch-name* – Switch or context name of the switch.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping blocked-router

VlanPorts
---------
1Ex0/1, Ex0/2, Ex0/3, Ex0/4
2Ex0/6, Ex0/7, Ex0/8
```

```
Multiple Instance
SEFOS# show ip igmp snooping blocked-router

Switch default

Vlan    Ports
----    -----
   1     Ex0/1

Switch cust

Vlan    Ports
----    -----
1     Ex0/3
```

Related Commands

`ip igmp snooping blocked-router` - Configures the blocked router ports statically for a VLAN

6.1.49 show ip igmp snooping multicast-receivers

Displays IGMP multicast host information for all VLANs, or a specific VLAN, or a specific VLAN and group address for a given switch. This command also displays this information for all switches (if no switch is specified).

show ip igmp snooping multicast-receivers [Vlan *vlan-id* **[Group** *Address*]] **[switch** *switch-name*]

Syntax Description

Vlan – VLAN identifier.

Group – Multicast group address.

switch *switch-name* – Switch or context name of the switch.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping multicast-receivers

Snooping Receiver Information
-----------------------------

VLAN ID: 1 Group Address: 225.0.0.10
Receiver Port: Ex0/2
Attached Hosts: 12.0.0.10
Exclude Sources: None

VLAN ID: 1 Group Address: 225.0.0.20
Receiver Port: Ex0/2
Attached Hosts: 12.0.0.20
Include Sources: 14.0.0.10
Receiver Port: Ex0/4
Attached Hosts: 12.0.0.40
Include Sources: 14.0.0.20

Multiple instance

SEFOS# sh ip igmp snooping multicast-receivers

Snooping Receiver Information
-----------------------------

Switch switch1

VLAN ID: 1 Group Address: 225.0.0.20
Receiver Port: Ex0/4
Attached Hosts: 12.0.0.30
Include Sources: 14.0.0.10
Attached Hosts: 12.0.0.40
Exclude Sources: None

Switch switch2

VLAN ID: 1 Group Address: 225.0.0.20
Receiver Port: Ex0/2
Attached Hosts: 12.0.0.10
Exclude Sources: None
Attached Hosts: 12.0.0.20
Include Sources: 14.0.0.10
```

Notes

- IGMP snooping must be enabled in the switch.
- The port `leave` mode for an interface must be set as `exp-hosttrack`

Related Commands

- `ip igmp snooping` - Enables IGMP snooping in the switch or a specific VLAN.
- `ip igmp snooping leavemode` - Processes the leave messages using the explicit host tracking mechanism

6.1.50 show ip igmp snooping port-cfg

Displays IGS port configuration information for all inner VLANs, or a specific inner *vlan-id* for a given switch.

```
show ip igmp snooping port-cfg [{interface interface-type
interface-id [InnerVlanId 1-4094] | switch switch-name}]
```

Syntax Description

interface – Specifies the interface type and interface identifier.

InnerVlanId – Inner VLAN identifier. This value ranges between 1 and 4094.

switch *switch-name* – Switch name. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping port-cfg

Snooping Port Configurations
----------------------------
Snooping Port Configuration for Port 2
Leave Process mode is Normal Leave
Rate limit on the interface is 100
Max limit Type is Groups
Max limit is 20
Current member count is 0
Profile Id is 0
```

```
Snooping Port Configuration for Port 3
Leave Process mode is Fast Leave
Rate limit on the interface is -1
Max limit Type is Channels
Max limit is 500
Current member count is 0
Profile Id is 0
```

```
SEFOS# show ip igmp snooping port-cfg interface
extreme-ethernet 0/2

Snooping Port Configurations
----------------------------
Snooping Port Configuration for Port 2
Leave Process mode is Normal Leave
Rate limit on the interface is 100
Max limit Type is Groups
Max limit is 20
Current member count is 0
Profile Id is 0


Multiple Instance

SEFOS# show ip igmp snooping port-cfg

Snooping Port Configurations
----------------------------
Snooping Port Configuration for Port 3
Leave Process mode is Fast Leave
Rate limit on the interface is 1000
Max limit Type is None
Max limit is 0
Current member count is 0
```

```
Profile Id is 0

Snooping Port Configuration for Port 4
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is None
Max limit is 0
Current member count is 0
Profile Id is 1
Snooping Port Configuration for Port 6 and Inner Vlan Id
5
Leave Process mode is Normal Leave
Rate limit on the interface is 200
Max limit Type is None
Max limit is 0
Current member count is 0
Profile Id is 0
Snooping Port Configuration for Port 7 and Inner Vlan Id
0
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is Channels
Max limit is 200
Current member count is 0
Profile Id is 1
Snooping Port Configuration for Port 7 and Inner Vlan Id
6
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is Groups
Max limit is 100
Current member count is 0
Profile Id is 0

SEFOS# show ip igmp snooping port-cfg interface
extreme-ethernet 0/7

Snooping Port Configurations
----------------------------
```

```
Switch switch1
Snooping Port Configuration for Port 7 and Inner Vlan Id
0
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is Channels
Max limit is 200
Current member count is 0
Profile Id is 1

Snooping Port Configuration for Port 7 and Inner Vlan Id
6
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is Groups
Max limit is 100
Current member count is 0
Profile Id is 0

SEFOS# show ip igmp snooping port-cfg switch default

Snooping Port Configurations
----------------------------

Switch default
Snooping Port Configuration for Port 3
Leave Process mode is Fast Leave
Rate limit on the interface is 1000
Max limit Type is None
Max limit is 0
Current member count is 0
Profile Id is 0

Snooping Port Configuration for Port 4
Leave Process mode is Normal Leave
Rate limit on the interface is -1
Max limit Type is None
Max limit is 0
Current member count is 0
Profile Id is 1
```

Related Commands

- `ip igmp snooping leavemode` - Configures the port leave mode for an interface

- `ip igmp snooping ratelimit` - Configures the rate limit for a downstream interface in units of the number of IGMP packets per second
- `ip igmp snooping limit` - Configures the maximum limit type for an interface
- `ip igmp max-groups` - Configures the maximum number of multicast groups that can be learnt on the interface
- `ip igmp snooping filter-profileId` / `ip igmp filter` - Configures the multicast profile index for a downstream interface

6.1.51 show ip igmp snooping multicast-vlan

Displays multicast VLAN statistics in a switch and displays various profiles mapped to the multicast VLANs.

show ip igmp snooping multicast-vlan [switch switch *switch-name*]

Syntax Description

switch *switch-name* – Switch name. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ip igmp snooping multicast-vlan

Multicast VLAN Statistics
=========================
-------------------------------

Multicast VLAN disabled

Profile ID -- Multicast VLAN
---------- -- --------------
     1      --            1
     2      --            2
-------------------------------

Multiple Instance
SEFOS# show ip igmp snooping multicast-vlan

Multicast VLAN Statistics
=========================
```

```
------------------------------

Multicast VLAN disabled

Profile ID   -- Multicast VLAN
----------   -- --------------
     1         --            1
------------------------------
Switch cust

Multicast VLAN disabled

Profile ID   -- Multicast VLAN
----------   -- --------------
     1         --            1
------------------------------
```

Related Commands

- `ip igmp snooping multicast-vlan` - Enables or disables the multicast VLAN feature
- mv`mvr`r - Enables the multicast VLAN feature

CHAPTER 7

MLDS

MLD is a protocol used by an IPv6 router to discover the presence of multicast listeners (nodes willing to receive multicast packets) on its directly attached links. IPv6 routers also use MLD to discover specifically which multicast address is of interest to neighboring nodes. MLD can also be used by applications to listen to some multicast groups.

MLDS software is designed in accordance with the FSAP frame to ensure a high level of portability.

The list of CLI commands for the configuration of MLDS 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 as follows:

```
SEFOS(config)#
```

7.1 MLDS Commands

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

- ipv6 mld snooping
- ipv6 mld snooping proxy-reporting
- snooping multicast-forwarding-mode
- ipv6 mld snooping mrouter-time-out
- ipv6 mld snooping port-purge-interval
- ipv6 mld snooping report-suppression-interval
- ipv6 mld snooping retry-count
- ipv6 mld snooping group-query-interval

- ipv6 mld snooping report-forward
- ipv6 mld snooping version
- ipv6 mld snooping fast-leave
- ipv6 mld snooping querier
- ipv6 mld snooping query-interval
- ipv6 mld snooping mrouter
- shutdown snooping
- debug ipv6 mld snooping
- show ipv6 mld snooping mrouter
- show ipv6 mld snooping globals
- show ipv6 mld snooping
- show ipv6 mld snooping groups
- show ipv6 mld snooping forwarding-database
- show ipv6 mld snooping statistics

7.1.1 ipv6 mld snooping

Enables MLD snooping in the switch or a specific VLAN. The no form of the command disables MLD snooping in the switch or a specific VLAN.

```
ipv6 mld snooping
```

```
no ipv6 mld snooping
```

Mode Global Configuration
Config-VLAN

Defaults MLD snooping is globally disabled

Example
```
SEFOS(config)# ipv6 mld snooping
SEFOS(config-vlan)# ipv6 mld snooping
```

Notes
- When MLD snooping is enabled globally, it is enabled in all the existing VLAN interfaces. When MLD snooping is disabled globally, it is disabled in all the existing VLAN interfaces.
- GMRP must be disabled for MLDS to be enabled.

Related Commands

- shutdown snooping- Shuts down the snooping in the switch

- `show ipv6 mld snooping groups` - Displays the global MLD snooping information
- `show ipv6 mld snooping` - Displays MLD snooping information for all VLANs or a specific VLAN
- `snooping multicast-forwarding-mode` - Specifies the snooping multicast forwarding mode

7.1.2 ipv6 mld snooping proxy-reporting

Enables proxy reporting in the MLD snooping switch. The `no` form of the command disables proxy reporting in the MLD snooping switch.

```
ipv6 mld snooping proxy-reporting
```

```
no ipv6 mld snooping proxy-reporting
```

Mode	Global Configuration
Defaults	Proxy-reporting is enabled
Example	`SEFOS(config)# ipv6 mld snooping proxy-reporting`
Notes	Proxy reporting can be enabled in the MLD snooping switch only if the proxy is disabled in the switch.

Related Commands

- show ipv6 mld snooping globals - Displays the global MLD snooping information.
- no ipv6 mld snooping proxy-reporting - Disables proxy reporting in the MLD snooping switch.

7.1.3 snooping multicast-forwarding-mode

Specifies the snooping multicast forwarding mode (IP based or MAC based).

```
snooping multicast-forwarding-mode {ip | mac}
```

Syntax Description	**ip** – IP address based **mac** – MAC address based
Mode	Global Configuration
Defaults	ip

Example `SEFOS(config)# snooping multicast-forwarding-mode mac`

Related Commands

- `show ipv6 mld snooping globals` - Displays the global MLD snooping information

7.1.4 ipv6 mld snooping mrouter-time-out

Sets the MLD snooping router purge time-out after which the port gets deleted if no MLD router control packets are received. The `no` form of the command sets the MLD snooping router port purge time to the default value.

```
ipv6 mld snooping mrouter-time-out 60-600_seconds
```

```
no ipv6 mld snooping mrouter-time-out
```

Mode Global Configuration

Defaults 125

Example `SEFOS(config)# ipv6 mld snooping mrouter-time-out 75`

Related Commands

- `show ipv6 mld snooping mrouter` - Displays the router ports for all the VLANs or a specific VLAN

7.1.5 ipv6 mld snooping port-purge-interval

Sets the MLD snooping port purge time interval after which the port gets deleted if MLD reports are not received. The `no` form of the command sets the MLD snooping port purge time to default value.

```
ipv6 mld snooping port-purge-interval 130-1225_seconds
```

```
no ipv6 mld snooping port-purge-interval
```

Mode Global Configuration

Defaults 260

Example `SEFOS(config)# ipv6 mld snooping port-purge-interval 200`

Related Commands

- `show ipv6 mld snooping globals` - Displays the MLD snooping information for all VLANs or a specific VLAN

7.1.6 ipv6 mld snooping report-suppression-interval

Sets the MLD snooping report-suppression time interval for which MLDv1 report messages will not get forwarded onto the router ports for the same group. The `no` form of the command sets the MLD snooping report-suppression time to default value.

```
ipv6 mld snooping report-suppression-interval 1-25_seconds
```

```
no ipv6 mld snooping report-suppression-interval
```

Mode Global Configuration

Defaults 5

Example
```
SEFOS(config)# ipv6 mld snooping
report-suppression-interval 20
```

Notes This time interval is used when both proxy and proxy-reporting are disabled.

Related Commands

- `show ipv6 mld snooping globals` - Displays the global MLD snooping information

7.1.7 ipv6 mld snooping retry-count

Sets the maximum number of group specific queries sent on a port on the reception of MLDv1 done message. The `no` form of the command sets the number of group specific queries sent on a port on the reception of done message to default value.

```
ipv6 mld snooping retry-count 1-5
```

```
no ipv6 mld snooping retry-count
```

Mode Global Configuration

Defaults 2

Example `SEFOS(config)# ipv6 mld snooping retry-count 3`

Related Commands

- `show ipv6 mld snooping globals` - Displays the global MLD snooping information

7.1.8 ipv6 mld snooping group-query-interval

Sets the time interval after which the switch sends a group specific query on a port. The `no` form of the command sets the group specific query interval time to default value.

```
ipv6 mld snooping group-query-interval 2-5_seconds
```

```
no ipv6 mld snooping group-query-interval
```

Mode Global Configuration

Defaults 2

Example `SEFOS(config)# ipv6 mld snooping group-query-interval 3`

Related Commands

- `show ipv6 mld snooping globals` - Displays the global MLD snooping information
- `show ipv6 mld snooping groups` - Displays MLDS group information for all VLANs or a specific VLAN or a specific VLAN and group address
- `show ipv6 mld snooping statistics` - Displays MLD snooping statistics for all VLANs or a specific VLAN

7.1.9 ipv6 mld snooping report-forward

Specifies whether the MLD reports are forwarded on all VLAN member ports or router ports. The `no` form of the command sets the MLD report-forwarding status to default value.

```
ipv6 mld snooping report-forward {all-ports | router-ports}
```

```
no ipv6 mld snooping report-forward
```

Syntax Description	**all-ports** – MLD reports forwarded on all the ports of a VLAN **router-ports** – MLD reports forwarded on router ports of a VLAN
Mode	Global Configuration
Defaults	**router-ports**
Example	`SEFOS(config)#` **ipv6 mld snooping report-forward router-ports**
Notes	• This configuration is not valid in proxy or proxy-reporting mode. • In snooping mode, snooping module will forward reports only on router ports by default.

Related Commands

- `show ipv6 mld snooping globals` - Displays the global MLD snooping information

7.1.10 ipv6 mld snooping version

Sets the operating version of the MLD snooping switch for a specific VLAN.

```
ipv6 mld snooping version {v1 | v2}
```

Syntax Description	**v1** – MLD snooping Version 1 **v2** – MLD snooping Version 2
Mode	Config-VLAN
Defaults	v2
Example	`SEFOS(config-vlan)#` **ipv6 mld snooping version v1**

Related Commands

- `show ipv6 mld snooping` - Displays MLD snooping information for all VLANs or a specific VLAN

7.1.11 ipv6 mld snooping fast-leave

Enables fast leave processing for a specific VLAN. The `no` form of the command disables fast leave processing for a specific VLAN.

```
ipv6 mld snooping fast-leave
```

```
no ipv6 mld snooping fast-leave
```

Mode	Config-VLAN
Defaults	Disabled.
Example	`SEFOS(config-vlan)# ipv6 mld snooping fast-leave`

Related Commands

- `show ipv6 mld snooping` - Displays MLD snooping information for all VLANs or a specific VLAN

7.1.12 ipv6 mld snooping querier

Configures the MLD snooping switch as a querier for a specific VLAN. The `no` form of the command configures the MLD snooping switch as non-querier for a specific VLAN.

```
ipv6 mld snooping querier
```

```
no ipv6 mld snooping querier
```

Mode	Config-VLAN
Defaults	Non-querier
Example	`SEFOS(config-vlan)# ipv6 mld snooping querier`

Related Commands

- `show ipv6 mld snooping` - Displays MLD snooping information for all VLANs or a specific VLAN

7.1.13 ipv6 mld snooping query-interval

Sets the time period with which the general queries are sent by the MLD snooping switch when it is configured as a querier on the VLAN. The `no` form of the command sets the MLDS querier interval to default value.

```
ipv6 mld snooping query-interval 60-600_seconds
```

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

Mode	Config-VLAN
Defaults	125
Example	`SEFOS(config-vlan)#` **`ipv6 mld snooping query-interval 65`**
Notes	• In proxy reporting mode, general queries are sent on all downstream interfaces with this interval only if the switch is the Querier. • In proxy mode, general queries will be sent on all downstream interfaces with this interval.

Related Commands

- `show ipv6 mld snooping` - Displays MLD snooping information for all VLANs or a specific VLAN

7.1.14 ipv6 mld snooping mrouter

Configures statically the router ports for a VLAN. The `no` form of the command deletes the statically configured router ports for a VLAN.

```
ipv6 mld snooping mrouter <interface-type> <0/a-b, 0/c, ...
```

```
no ipv6 mld snooping mrouter <interface-type> <0/a-b, 0/c, ...
```

Mode	Config-VLAN
Example	`SEFOS(config-vlan)#` **`ipv6 mld snooping mrouter extreme-ethernet 0/1-3`**

Related Commands

- `show ipv6 mld snooping mrouter` - Displays the router ports for all the VLANs or a specific VLAN.
- `ip igmp snooping mrouter-port -time-out` - Configures the router port purge time-out interval for a VLAN.
- `ip igmp snooping mrouter-port-version` - Configures the operating version of the router port for a VLAN.

7.1.15 shutdown snooping

Shuts down snooping in the switch. The no form of the command starts and enables snooping in the switch.

```
shutdown snooping
```

```
no shutdown snooping
```

Mode	Global Configuration
Defaults	No shutdown snooping
Example	SEFOS(config)# **shutdown snooping**
Notes	• When shutdown, all resources acquired by the snooping module are released to the system • For the MLDS feature to be functional on the switch, the system-control status must be set as start and the state must be enabled.

Related Commands

- ipv6 mld snooping - Enables MLD snooping in the switch

7.1.16 debug ipv6 mld snooping

Specifies the debug levels for MLD snooping module. The no form of the command resets the debug options for MLD snooping module.

```
debug ipv6 mld snooping {[init] [resources] [tmr] [src] [grp]
[qry] [vlan] [pkt] [fwd] [mgmt] | all}
```

```
no debug ipv6 mld snooping {[init] [resources] [tmr] [src] [grp]
[qry] [vlan] [pkt] [fwd] [mgmt] | all}
```

Syntax Description

`init` – Init and shutdown messages.

`resources` – System resources management messages.

`tmr` – Timer messages.

`src` – Source information messages.

`grp` – Group information messages.

`qry` – Query related messages.

`pkt` – Packet dump messages.

`fwd` – Forwarding database messages.

`mgmt` – Management related messages.

`redundancy` – Redundancy related messages. The keyword `redundancy` is not supported.

`all` – All messages.

Mode Privileged EXEC

Defaults Debugging is disabled.

Example

```
SEFOS# debug ipv6 mld snooping fwd
```

7.1.17 show ipv6 mld snooping mrouter

Displays the router ports for all the VLANs or a specific VLAN.

```
show ipv6 mld snooping mrouter [Vlan vlan-index] [detail]
```

Syntax Description

`Vlan` – VLAN index.

`detail` – Displays detailed information about the router ports.

Example

```
Single Instance
SEFOS# show ipv6 mld snooping mrouter Vlan 1

Vlan    Ports
-----   ---------
 1       Ex0/1(static)

Multiple Instance
SEFOS# show ipv6 mld snooping mrouter

Switch cust1

Vlan    Ports
-----   ------
     2   Ex0/4(static)

Switch cust2

Vlan    Ports
-----   ------
     1   Ex0/10(static)
     2   Ex0/9(dynamic)
```

Related Commands

- `ipv6 mld snooping mrouter` - Configures statically the router ports for a VLAN.
- `ip igmp snooping mrouter-port -time-out` - Configures the router port purge time-out interval for a VLAN.
- `ip igmp snooping mrouter-port-version` - Configures the operating version of the router port for a VLAN.

7.1.18 show ipv6 mld snooping globals

Displays the global MLD snooping information for all VLANs or a specific VLAN.

```
show ipv6 mld snooping globals
```

Mode Privileged EXEC Mode

Example

```
SEFOS# show ipv6 mld snooping globals

Snooping Configuration
----------------------------
MLD Snooping globally enabled
MLD Snooping is operationally enabled
Transmit Query on Topology Change  globally disabled
Multicast forwarding mode is MAC based
Proxy globally disabled
Proxy reporting globally enabled
Filter is disabled
Router port purge interval is 125 seconds
Port purge interval is 260 seconds
Report forward interval is 5 seconds
Group specific query interval is 2 seconds
Reports are forwarded on router ports
Group specific query retry count is 2
Multicast VLAN disabled
Leave config level is Vlan based
```

Related Commands

- `ipv6 mld snooping` - Enables MLD snooping in the switch
- `ipv6 mld snooping proxy-reporting` - Enables proxy reporting in the MLD snooping switch
- `snooping multicast-forwarding-mode` - Specifies the snooping multicast forwarding mode
- `ipv6 mld snooping port-purge-interval` - Sets the MLD snooping port purge time interval after which the port gets deleted if MLD reports are not received
- `ipv6 mld snooping report-suppression-interval` - Sets the MLD snooping report-suppression time interval
- `ipv6 mld snooping retry-count` - Sets the maximum number of group specific queries sent on a port on the reception of MLDv1 done message
- `ipv6 mld snooping version` - Sets the operating version of the MLD snooping switch for a specific VLAN
- `ipv6 mld snooping report-forward` - Specifies whether the MLD reports are forwarded on all VLAN member ports or router ports
- `ipv6 mld snooping proxy-reporting` - Enables proxy reporting in the MLD snooping switch

7.1.19 show ipv6 mld snooping

Displays MLD snooping information for all VLANs or a specific VLAN.

show ipv6 mld snooping [Vlan *vlan-id*]

Mode Privileged EXEC

Example

```
Single Instance
SEFOS# show ipv6 mld snooping Vlan 1

Snooping VLAN Configuration for the VLAN 1
  MLD Snooping enabled
  MLD configured version is V2
  Fast leave is disabled
  Snooping switch is configured as Querier
  Snooping switch is acting as Non-Querier
  Query interval is 125 seconds
  Port Purge Interval is 157 seconds
  Max Response Code is 10000, Time is 10 seconds

Multiple Instance
SEFOS# show ipv6 mld snooping

Switch default

Snooping VLAN Configuration for the VLAN 1
MLD Snooping enabled
MLD configured version is V2
Fast leave is disabled
Snooping switch is acting as Non-Querier
Query interval is 125 seconds
Port Purge Interval is 260 seconds
Max Response Code is 10000, Time is 10 seconds
```

Related Commands

- `ipv6 mld snooping` - Enables MLD snooping in the switch
- `ipv6 mld snooping version` - Sets the operating version of the MLD snooping switch for a specific VLAN
- `ipv6 mld snooping fast-leave`- Enables fast leave processing for a specific VLAN

- `ipv6 mld snooping querier` - Configures the MLD snooping switch as a querier for a specific VLAN
- `ipv6 mld snooping query-interval` - Sets the time period with which the general queries are sent by the MLD snooping switch when it is configured as a querier on the VLAN
- `ip igmp snooping max-response-code` - Sets the maximum response code send in general queries

7.1.20 show ipv6 mld snooping groups

Displays the MLDS group information for all VLANs or a specific VLAN or a specific VLAN and group address.

show ipv6 mld snooping groups [Vlan *vlan-id* **[Group** *address*]] *string_32*]

Syntax Description

Vlan – VLAN identifier.

Group – Group address of the VLAN identifier.

Mode

Privileged EXEC

Example

```
Single Instance
SEFOS# show ipv6 mld snooping groups

Snooping Group information
---------------------------
VLAN ID:1   Group Address: ff07::1:1
Filter Mode: EXCLUDE
Exclude sources: None
ASM Receiver Ports:   Ex0/1
```

```
Multiple Instance
SEFOS# show ipv6 mld snooping groups

Switch cust1

Snooping Group information
------------------------------
VLAN ID:2  Group Address: ff02::1:1
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
  Ex0/5

VLAN ID:2  Group Address: ff02::2:2
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
  Ex0/5
  Ex0/11

Switch cust2

Snooping Group information
------------------------------
VLAN ID:2  Group Address: ff02::1:1
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
  Ex0/10

VLAN ID:2  Group Address: ff02::2:2
Filter Mode: EXCLUDE
Exclude sources: None
Receiver Ports:
```

Related Commands

- `ipv6 mld snooping` - Enables MLD snooping in the switch

7.1.21 show ipv6 mld snooping forwarding-database

Displays multicast forwarding entries for all VLANs or a specific VLAN.

show ipv6 mld snooping forwarding-database [Vlan *vlan-id*]

Mode Privileged EXEC

Example

```
Single Instance
/* IP based */
SEFOS# show ipv6 mld snooping forwarding-database

Vlan    Source Address    Group Address    Ports
----    --------------     -------------    -----
 1          fe80::7           ff07::1:1       Ex0/1

/* MAC based */
SEFOS# show ipv6 mld snooping forwarding-database

Vlan   MAC-Address            Ports
----   -----------------     -----
  1     33:33:00:01:00:01     Ex0/1

Multiple Instance
SEFOS# show ipv6 mld snooping forwarding-database

Switch cust1
 Vlan   MAC-Address            Ports
 ----   -----------------     -----
    2   33:33:00:01:00:01     Ex0/5
    2   33:33:00:02:00:02     Ex0/5

Switch cust2

 Vlan   MAC-Address            Ports
 ----   -----------------     -----
    2   33:33:00:01:00:01     Ex0/9, Ex0/10
    2   33:33:00:02:00:02     Ex0/9, Ex0/11
```

Related Commands

- ipv6 mld snooping - Enables MLD snooping in the switch

7.1.22 show ipv6 mld snooping statistics

Diisplays MLD snooping statistics for all VLANs or a specific VLAN.

show ipv6 mld snooping statistics [Vlan *vlan-id***]**

Mode Privileged EXEC

Example

```
Single Instance
SEFOS# show ipv6 mld snooping statistics

Snooping Statistics for VLAN 1
  General queries received : 0
  Group specific queries received : 0
 Group and source specific queries received : 0
  ASM reports received : 1
  SSM reports received : 0
  IS_INCLUDE messages received : 0
  IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0
  Done messages received : 0
  General queries transmitted : 0
  Group specific queries transmitted : 0
  Group and source specific queries transmitted : 0
  ASM reports transmitted : 0
  SSM reports transmitted : 0
  Done messages transmitted : 0
  Unsuccessful joins recieved count Per Vlan : 0
  Active/Successful joins recieved count Per Vlan: 0
  Active Groups count: 0
  Packets dropped : 0
```

```
Multiple Instance
SEFOS# show ipv6 mld snooping statistics

Switch cust1

Snooping Statistics for VLAN 2
  General queries received : 0
  Group specific queries received : 0
 Group and source specific queries received : 0
  ASM reports received : 0
  SSM reports received : 3
  IS_INCLUDE messages received : 0
  IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0

Done messages received : 0
  General queries transmitted : 2
  Group specific queries transmitted : 0
  ASM reports transmitted : 0
  SSM reports transmitted : 0
  Done messages transmitted : 0
  Packets dropped : 0

Switch cust2

Snooping Statistics for VLAN 2
  General queries received : 2
  Group specific queries received : 0
 Group and source specific queries received : 0
  ASM reports received : 58
  SSM reports received : 0
  IS_INCLUDE messages received : 0
  IS_EXCLUDE messages received : 0
  TO_INCLUDE messages received : 0
  TO_EXCLUDE messages received : 0
  ALLOW messages received : 0
  Block messages received : 0
  Done messages received : 0
  General queries transmitted : 0
```

```
Group specific queries transmitted : 0
ASM reports transmitted : 0
SSM reports transmitted : 3
Done messages transmitted : 0
Packets dropped : 0
```

Related Commands

- `ipv6 mld snooping` - Enables MLD snooping in the switch

CHAPTER 8

Syslog

Syslog is a protocol used for capturing log information for devices on a network. The syslog protocol provides a transport to allow a machine to send event notification messages across IP networks to event message collectors, also known as syslog servers. The protocol is simply designed to transport the event messages.

One of the fundamental tenets of the syslog protocol and process is its simplicity. The transmission of syslog messages may be started on a device without a receiver being configured, or even actually physically present. This simplicity has greatly aided the acceptance and deployment of syslog.

8.1 Syslog Commands

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

- `logging`
- `mailserver`
- `sender mail-id`
- `receiver mail-id`
- `cmdbuffs`
- `service timestamps`
- `clear logs`
- `syslog mail`
- `syslog localstorage`
- `syslog filename-one`
- `syslog filename-two`
- `syslog filename-three`

- syslog relay-port
- logging-file
- logging-server
- mail-server
- syslog relay
- syslog relay transport type
- show logging
- show email alerts
- show syslog role
- show syslog mail
- show syslog localstorage
- show logging file
- show logging-server
- show mail-server
- show syslog relay-port
- show syslog profile
- syslog relay transport type
- show syslog file-name
- show syslog information

8.1.1 logging

Enables syslog server and configures the syslog server IP address, the log-level and other syslog related parameters. The no form of the command disables syslog server and resets the configured syslog server IP address, the log-level and other syslog related parameters.

logging {*ip-address* | **buffered** *size_1-200* | **console** | **facility {local0 | local1 | local2 | local3 | local4 | local5 | local6 | local7} | severity [{***level_0-7* | **alerts | critical | debugging | emergencies | errors | informational | notification | warnings}] | on}**

no logging {*ip-address* | **buffered | console | facility | severity | on}**

Syntax Description

ip-address – Host IP address used as a syslog server.

buffered – Limits Syslog messages displayed from an internal buffer. This size ranges between 1 and 200 entries.The size feature is optional only in the code using the industrial standard command, otherwise this feature is required.

console – Limits messages logged to the console.

facility – The facility that is indicated in the message. Can be one of the following values: `local0`, `local1`, `local2`, `local3`, `local4`, `local5`, `local6`, `local7`.

severity – Messages with severity level equal to or higher than the specified value are printed asynchronously. Severity can be configured with numerical value or using the available option. The options are:

- **0** | **emergencies** - System is unusable.
- **1** | **alerts** - Immediate action needed.
- **2** | **critical** - Critical conditions.
- **3** | **errors** - Error conditions.
- **4** | **warnings** - Warning conditions.
- **5** | **notification** - Normal but significant conditions.
- **6** | **informational** - Informational messages.
- **7** | **debugging** - Debugging messages.

alerts – Immediate action needed.

critical – Critical conditions.

debugging – Debugging messages.

emergencies – System is unusable.

errors – Error conditions.

informational – Information messages.

notification – Normal but significant messages.

warnings – Warning conditions.

on – Syslog enabled.

Mode

Global Configuration

Defaults

console – Enabled.

severity – Informational when no option is selected during. configuration debugging at system start-up.

buffered – 50.

facility – `local0`.

Example

```
SEFOS(config)# logging 12.0.0.2
```

Notes

- The log file is stored in ASCII text format. The Privileged EXEC command is used to display its contents.
- The logging process controls the distribution of logging messages to the various destinations, such as the logging buffer, logging file, or syslog server.
- The existing syslog buffers will not be cleared and none of the configured options will be changed, when the syslog feature is disabled.

Related Commands

`show logging` - Displays Logging status and configuration information

8.1.2 mailserver

Sets the mail server IP address to be used for sending email alert messages. The `no` form of the command re-sets the mail server IP address used for sending email alert messages.

```
mailserver ip-address
```

```
no mailserver
```

Mode	Global Configuration
Example	`SEFOS(config)#` **`mailserver 23.78.67.89`**
Notes	Initially, the mail server has to be configured, for the `show email alerts` command.

Related Commands

- `logging` - Enables Syslog Server and configures the Syslog Server IP address, the log-level and other Syslog related parameter
- `show email alerts` - Displays email alerts related configuration

8.1.3 sender mail-id

Sets the sender mail identifier. The `no` form of the command deletes the configured sender mail identifier.

```
sender mail-id 100
```

```
no sender mail-id
```

Mode	Global Configuration
Defaults	`syslog@sun.com`
Example	`SEFOS(config)#` **`sender mail-id smith@sun.com`**

Notes

- The mail server must be configured.
- The sender and receiver email-ids are mandatory for email alert messages to be sent.

Related Commands

- `mailserver` - Sets the mail server IP address to be used for sending email alert messages
- `logging` - Enables Syslog Server and configures the Syslog Server IP address, the log-level and other Syslog related parameter
- `show logging` - Displays Logging status and configuration information
- `show email alerts` - Displays email alerts related configuration
- `receiver mail-id` - Sets the receiver mail identifier

8.1.4 receiver mail-id

Sets the receiver `mail-id`. The `no` form of the command deletes the configured receiver `mail-id`.

```
receiver mail-id 100
```

```
no receiver mail-id
```

Mode Global Configuration

Defaults `admin@sun.com`

Example

```
SEFOS(config)# receiver mail-id smith@sun.com
```

Notes

- The mail server must be configured.
- The sender and receiver email-ids are mandatory for email alert messages to be sent.

Related Commands

- `logging` - Enables Syslog Server and configures the Syslog Server IP address, the log-level and other Syslog related parameter
- `show logging` - Displays Logging status and configuration information

8.1.5 cmdbuffs

Configures the number of syslog buffers for a particular user.

```
cmdbuffs user-name buffers_1-200
```

Syntax Description	*user-name* – User name. *buffers_1-200* – Number of log buffers to be allocated in the system.
Mode	Global Configuration
Defaults	50.
Example	`SEFOS(config)# cmdbuffs products 50`
Notes	CLI related events like commands given by the user (login or logout and so on) can be logged on to the syslog server.

Related Commands

- `logging` - Enables syslog server and configures the syslog server IP address, the log-level and other syslog related parameter
- `show logging` - Displays logging status and configuration information

8.1.6 service timestamps

Enables timestamp option for logged messages. The `no` form of the command disables timestamp option for logged messages.

```
service timestamps
```

```
no service timestamps
```

Mode	Global Configuration
Defaults	Enabled.
Example	`SEFOS(config)# service timestamps`
Notes	• When enabled, the messages (log and email alert messages) will hold the time stamp information. • When disabled, the time stamp information will not be carried with the messages sent to the log and mail servers.

Related Commands

- `logging` - Enables Syslog Server and configures the Syslog Server IP address, the log-level and other Syslog related parameter
- `show logging` - Displays Logging status and configuration information

8.1.7 clear logs

Clears the system syslog buffers.

```
clear logs
```

Mode	Global Configuration Mode
Example	`SEFOS(config)# clear logs`

Related Commands

- `cmdbuffs` - Configures the number of Syslog buffers for a particular user
- `logging` - Enables Syslog Server and configures the Syslog Server IP address, the log-level and other Syslog related parameter
- `show logging` - Displays Logging status and configuration information

8.1.8 syslog mail

Enables the mail option in syslog. The `no` form of command disables the mail option in syslog.

```
syslog mail
```

```
no syslog mail
```

Mode	Global Configuration
Example	`SEFOS(config)# syslog mail`

Related Commands

- `show syslog mail` - Displays the mail option in syslog
- `mail-server` - Adds an entry to mail-server table

8.1.9 syslog localstorage

Enables the syslog local storage. The no form of command disables the syslog local storage.

```
syslog localstorage
```

```
no syslog localstorage
```

Mode	Global Configuration
Example	SEFOS(config)# **syslog localstorage**

Related Commands

- show syslog localstorage - Displays the syslog localstorage.
- syslog filename-one - Configures the file name to store the syslog messages.
- syslog filename-two - Configures the file name to store the syslog messages.
- syslog filename-three - Configures the file name to store the syslog messages
- logging-file - Adds an entry in to file table

8.1.10 syslog filename-one

Configures the file name to store the syslog messages. The maximum size of the file name is 32.

```
syslog filename-one string_32
```

Mode	Global Configuration
Example	SEFOS(config)# **syslog filename-one log1**
Notes	Syslog localstorage must be enabled.

Related Commands

- syslog localstorage - Enables the syslog localstorage
- show syslog file-name - Displays the Syslog localstorage file name
- logging-file - Adds an entry in to file table
- show syslog localstorage - Displays the syslog localstorage

8.1.11 syslog filename-two

Configures the file name to store the syslog messages. The maximum size of the file name is 32.

syslog filename-two *string_32*

Mode	Global Configuration
Example	SEFOS(config)# **syslog filename-two SEFOS2**
Notes	Syslog localstorage must be enabled.

Related Commands

- syslog localstorage - Enables the syslog localstorage
- show syslog file-name - Displays the syslog localstorage file name
- logging-file - Adds an entry in to file table
- show syslog localstorage - Displays the syslog localstorage

8.1.12 syslog filename-three

Configures the file name to store the syslog messages. The maximum size of the file name is 32.

syslog filename-three *string_32*

Mode	Global Configuration
Example	SEFOS(config)# **syslog filename-three SEFOS3**
Notes	Syslog localstorage must be enabled.

Related Commands

- syslog localstorage - Enables the syslog localstorage
- show syslog file-name - Displays the syslog localstorage file name
- logging-file - Adds an entry in to file table
- show syslog localstorage - Displays the syslog localstorage

8.1.13 syslog relay-port

Sets the syslog port through which it receives the syslog messages. The no form of command sets the syslog port to default port 514.

syslog relay-port *integer_0-65535*

no syslog relay-port

Mode	Global Configuration
Example	SEFOS(config)# **syslog relay-port 500**
Notes	Syslog relay must be enabled.

Related Commands

- syslog relay - Changes the syslog role from device to relay
- syslog relay transport type - Sets the syslog relay transport type either as UDP or TCP
- show syslog relay-port - Displays the syslog relay port

8.1.14 logging-file

Adds an entry in to file table. The no form of command deletes an entry from the file table.

logging-file *short_0-191 string_32*

no logging-file *short_0-191 string_32*

Syntax Description	*short_0-191* – Priority of syslog messages. 0-lowest priority, 191-highest priority. *string_32* – File name.
Mode	Global Configuration
Example	SEFOS(config)# **logging-file 134 log1**
Notes	Syslog localstorage must be enabled.

Related Commands

- show logging file - Displays the syslog file table
- syslog localstorage - Enables the syslog localstorage

8.1.15 logging-server

Adds an entry in to logging-server table. The no form of command deletes an entry from forward table.

```
logging-server short_0-191 {ipv4 ucast-address} [ port
integer_0-65535] [{udp | tcp | beep}]
```

```
no logging-server short_0-191 {ipv4 ucast-address}
```

Syntax Description	*short_0-191* – Priority of syslog messages. 0-lowest priority, 191-highest priority. **ipv4** – Version 4 IP address. **port** – Port number. **udp,tcp,beep** – Sets the transport type as either UDP, TCP, or beep.
Mode	Global Configuration
Example	`SEFOS(config)# logging-server 134 ipv4 12.0.0.3`

Related Commands

`show logging-server` - Displays the `syslog logging-server` table

8.1.16 mail-server

Adds an entry to mail-server table. The `no` form of command deletes an entry from mail table.

```
mail-server short_0-191 {ipv4 ucast-address} string_50
```

```
no mail-server short_0-191 {ipv4 ucast-address}
```

Syntax Description	*short_0-191* – Priority of syslog messages. 0-lowest priority, 191-highest priority. **ipv4** – Version 4 IP address.
Mode	Global Configuration
Example	`SEFOS(config)# mail-server 134 ipv4 12.0.0.100 root@localhost`

Related Commands

- `show mail-server` - Displays the syslog mail server table

- `syslog mail` - Enables the mail option in syslog

8.1.17 syslog relay

Changes the syslog role from device to relay. The no form of command changes the syslog role from relay to device.

```
syslog relay
```

```
no syslog relay
```

Mode	Global Configuration
Example	`SEFOS(config)#` **`syslog relay`**

Related Commands

- `show syslog role` - Displays the syslog role.
- `syslog relay transport type` - Sets the Syslog relay transport type either as udp or tcp
- `syslog relay-port` - Sets the syslog port through which it receives the syslog messages

8.1.18 syslog relay transport type

Sets the syslog relay transport type either as `udp` or `tcp`.

```
syslog relay transport type {udp | tcp}
```

Syntax Description	**`udp`** – Sets the relay transport type as UDP. **`tcp`** – Sets the relay transport type as TCP.
Mode	Global Configuration
Example	`SEFOS(config)#` **`syslog relay transport type udp`**
Notes	Syslog relay must be enabled.

Related Commands

- `syslog relay` - Changes the syslog role from device to relay
- `show syslog role` - Displays the syslog role.

- `syslog relay transport type` - Displays the Syslog relay transport type
- `show syslog relay-port` - Displays the Syslog relay port.

8.1.19 show logging

Displays logging status and configuration information.

```
show logging
```

Mode Privileged EXEC

Example

```
SEFOS# show logging

System Log Information
----------------------
Syslog logging    : enabled(Number of messages 0)
Console logging   : enabled(Number of messages 0)
TimeStamp option : enabled
Severity logging      : Debugging
Log server IP     : 10.0.0.1
Facility           : Default (local0)
Buffered size     : 100

LogBuffer(0 Entries, 0 bytes)
```

Related Commands

- `logging` - Enables syslog server and configures the syslog server IP address, the log-level and other syslog related parameter
- `service timestamps` - Enables timestamp option for logged messages

8.1.20 show email alerts

Displays configurations related to email alerts.

```
show email alerts
```

Mode Privileged EXEC

Example

```
SEFOS# show email alerts

Sender email-id    : syslog@sun.com
Receiver email-id : admin@sun.com
Mail server IP     : 12.0.0.3
```

Related Commands

- `mailserver` - Sets the mail server IP address to be used for sending email alert messages
- `receiver mail-id` - Sets the receiver mail identifier
- `sender mail-id` - Sets the sender mail identifier

8.1.21 show syslog role

Displays the syslog role.

```
show syslog role
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog role

Syslog Role     : Relay
```

Related Commands

`syslog relay` - Changes the syslog role from device to relay

8.1.22 show syslog mail

Displays the mail option in syslog.

```
show syslog mail
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog mail

Syslog Mail Option     : Enabled
```

Related Commands

- `syslog mail` - Enables the mail option in syslog

8.1.23 show syslog localstorage

Displays the syslog localstorage.

```
show syslog localstorage
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog localstorage

Syslog Localstorage     : Enabled
```

Related Commands

`syslog localstorage` - Enables the `syslog localstorage`

8.1.24 show logging file

Displays the syslog file table.

```
show logging-file
```

Mode Privileged EXEC

Example

```
SEFOS# show logging-file

Syslog File Table Information
-----------------------------
Priority     File-Name
--------     ----------
134            log1

134            log2

134            log3
```

Related Commands

- syslog filename-one/syslog filename-two/syslog filename-three - Gets the users desired file name to store syslog message
- logging-file - Adds an entry in to the file table

8.1.25 show logging-server

Displays the syslog logging-server table.

```
show logging-server
```

Mode Privileged EXEC

Example

```
SEFOS# show logging-server

Syslog Forward Table Information
--------------------------------
Priority   Address-Type   IpAddress   Port   Trans-Type
--------   ------------   ---------   ----   ----------

129          ipv4            12.0.0.2    514   udp

134          ipv4            12.0.0.1    514   udp
```

Related Commands

`logging-server` - Adds an entry into `logging-server` table

8.1.26 show mail-server

Displays the syslog mail-server table.

```
show mail-server
```

Mode Privileged EXEC

Example

```
SEFOS# show mail-server

Syslog Mail Table Information
 ----------------------------

Priority   Address-Type   IpAddress   Receiver Mail-Id
--------   ------------   ---------   ----------------

134         ipv4             12.0.0.100   root@localhost
```

Related Commands

- mail-server - Adds an entry to mail-server table

8.1.27 show syslog relay-port

Displays the syslog relay-port.

```
show syslog relay-port
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog relay-port

Syslog Port     : 251
```

Related Commands

- syslog relay-port - Sets the syslog port through which it receives the syslog messages
- syslog relay - Changes the syslog role from device to relay

8.1.28 show syslog profile

Displays the syslog profile.

```
show syslog profile
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog profile

Syslog Profile     : raw
```

8.1.29 show syslog file-name

Displays the syslog local storage file name.

```
show syslog file-name
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog file-name

Syslog File Name
----------------------
Syslog File-One :log1

Syslog File-Two :log2

Syslog File-Three :log3
```

Related Commands

- `syslog localstorage` - Enables the syslog localstorage
- `show syslog localstorage` - Displays the syslog localstorage.
- `syslog filename-one` - Configures the file name to store the syslog messages.
- `syslog filename-two` - Configures the file name to store the syslog messages.
- `syslog filename-three` - Configures the file name to store the syslog messages

8.1.30 show syslog information

Displays the syslog information.

```
show syslog information
```

Mode Privileged EXEC

Example

```
SEFOS# show syslog information

System Log Information
----------------------
Syslog Localstorage     : Enabled

Syslog Mail Option     : Enabled

Syslog Port     : 251

Syslog Role     : Relay
```

Related Commands

- `syslog localstorage` - Enables the `syslog localstorage`
- `syslog mail` - Enables the mail option in syslog
- `syslog relay` - Changes the syslog role from device to relay

CHAPTER 9

System Features

SEFOS offers a large set of system features. The related command links provide overview descriptions of the features and include specific information to consider when using these features.

9.1 Commands

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

- `interface`
- `default mode`
- `default restore-file`
- `default vlan id`
- `default ip address`
- `ip address`
- `switchport` (not supported)
- `base-mac`
- `authorized-manager ip-source` (not supported)
- `ip http port` (not supported)
- `set ip http` (not supported)
- `interface - configuration and deletion`
- `mtu` frame-size
- `system mtu`
- `bridge port-type`
- `system-specific port-id` (not supported)
- `set custom-param`

- mac-addr
- snmp trap link-status
- write
- copy
- copy startup-config
- copy running-config startup-config
- copy logs
- copy File
- show files
- erase(not supported)
- flowcontrol
- shutdown - Physical, VLAN, port-channel Interface
- debug-logging
- rollback (not supported)
- set switch maximum - Threshold
- set switch temperature - Threshold (not supported)
- set switch power - Threshold (not supported)
- system contact (not supported)
- system location (not supported)
- clear interfaces - Counters
- clear counters
- show ip interface
- show authorized-managers (not supported)
- show interfaces
- show interfaces phy-info
- show interfaces - Counters
- show system-specific port-id
- show custom-param
- show interface mtu
- show interface bridge port-type
- show nvram
- show system information
- show flow-control
- show debug-logging
- debug npapi

- show debugging
- show clock
- show running-config
- show http server status (not supported)
- show system acknowledgement

9.1.1 interface

Enters the interface mode.

```
interface interface-type interface-id
```

Syntax Description

interface-type – Interface type. The type supported is extreme-ethernet.

interface-id – Interface identifier.

Mode

Global Configuration

Example

```
SEFOS(config)# interface extreme-ethernet 0/1
```

Related Commands

show interfaces - Displays the interface status and configuration

9.1.2 default mode

Specifies how the default interface acquires its IP address.

```
default mode {manual | dynamic}
```

Syntax Description

manual – Manual mode.

dynamic – Dynamic mode. If dynamic mode is selected, the default interface retrieves the IP address through the dynamic IP address configuration protocols such as RARP or BootP based on the configuration executed in the command. The dynamic option is not currently supported.

Mode

Global Configuration

Defaults

manual

Example

```
SEFOS(config)# default mode manual
```

Notes

This command takes effect only on switch restart.

Related Commands

`show nvram` - Displays the current information stored in the NVRAM

9.1.3 default restore-file

Specifies the default restoration file.

```
default restore-file filename
```

Mode	Global Configuration
Defaults	`switch.conf`
Example	`SEFOS(config)#` **`default restore-file /conf/sefos/restore.conf`**
Notes	• The file path in *`filename`* must exist. • The recommended local flash directory path is `/conf/sefos`.

Related Commands

`show nvram` - Displays the current information stored in the NVRAM

9.1.4 default vlan id

Sets the default VLAN identifier in NVRAM.

```
default vlan id count_1-4094
```

Mode	Global Configuration
Defaults	1
Example	`SEFOS(config)#` **`default vlan id 32`**

Related Commands

`show nvram` - Displays the current information stored in the NVRAM.

9.1.5 default ip address

Configures the IP address and subnet mask for the default interface.

```
default ip address ip-address [subnet-mask subnet-mask]
[interface interface-type interface-id]
```

Syntax Description

ip-address – IP address.

subnet-mask – Subnet mask.

interface *interface-type interface-id* – Valid interfaces include physical ports (type, slot, and port number). The interface type is extreme-ethernet.

Mode Global Configuration

Example

```
SEFOS(config)# default ip address 20.0.0.1 subnet-mask
255.0.0.0 interface extreme-ethernet 0/1
```

Notes This IP address, is written into the NVRAM and will take effect when the switch is restarted.

Related Commands

- `show nvram` - Displays the current information stored in the NVRAM

9.1.6 ip address

Sets the IP address of an interface. The `no` form of the command deletes the IP address for the given interface.

```
ip address ip-address subnet-mask [secondary]
```

```
no ip address ip-address subnet-mask [secondary]
```

Syntax Description

ip-address –

subnet-mase –

secondary –

Mode Interface Configuration. Applicable in Physical Interface mode or VLAN Interface mode.

Defaults The default IP address shown in the output of `show nvram` is retrieved as default.

Example

```
SEFOS(config-if)# ip address 10.0.0.3  255.255.255.0
secondary
```

Notes

- The interface must be shutdown prior to execution of this command.
- If you delete or modify the connected IP interface, the connection to the switch is lost.
- When the `no ip address` command is executed without the optional *ip-address* parameter, all the IP addresses configured over the interface are deleted.
- The IP address can be set for the physical port, only if the physical port is configured as a router port.
- The secondary IP address can be created only if the primary IP address is already created for the interface.

Related Commands

- `switchport` - Configures the port as router port
- `show nvram` - Displays the current information stored in the NVRAM
- `show ip interface` - Displays the IP interface statistics and configuration

9.1.7 switchport

This command is not supported.

Configures the port as switch port. The `no` form of the command configures the port as a router port.

```
switchport
```

```
no switchport
```

Mode Interface Configuration

Defaults **switchport**

Example `SEFOS(config-if)#` **switchport**

Notes

- The specified interface must be shutdown.
- Switch port related commands are available when the port is configured as a switch port.
- Router port related commands are available when the port is configured as a router port.

Related Commands

- `ip address` - Sets the IP address of an interface
- `show ip interface`- Displays the IP interface statistics and configuration

9.1.8 base-mac

Configures the base MAC address for the switch in the NVRAM.

```
base-mac mac-address
```

Mode	Global Configuration
Defaults	The switch base MAC address is derived from the standard unique MAC address of the system, shown on the yellow sticker. This MAC address is sufficient for normal functionality of the switch, so you do not have to change it.
Example	`SEFOS(config)# base-mac 09:89:fe:34:55:33`
Notes	This is the base MAC address. If modified, the address takes effect only when the switch is restarted.

Related Commands

`show nvram` - Displays the current information stored in the NVRAM

9.1.9 authorized-manager ip-source

This command is not supported.

Configures an IP authorized manager. The `no` form of the command removes a manager from the authorized managers list.

```
authorized-manager ip-source ip-address [{subnet-mask | /
prefix-length_1-32}] [interface [interface-type <0/a-b, 0/c,
...>] [interface-type 0/a-b, 0/c, ...]] [vlan
a,b_or_a-b_or_a,b,c-d] [cpu0] [service [snmp] [telnet] [http]
[https] [ssh]]
```

```
no authorized-manager ip-source ip-address [{subnet-mask | /
prefix-length_1-32}]
```

Syntax Description	*ip-address* – Specifies either the network or host address. *subnet-mask* – IP address mask to be applied. *prefix-length_1-32* – Prefix length. **interface** – Valid interfaces include physical ports (including type, slot, and port number). **vlan** – The VLANs in which the IP authorized manager can reside. **cpu0** – Out of band management interface. **service** – Indicates service type. Can be one of the following: `telnet`, `ssh`, `http`, `https` or `snmp`.
Mode	Global Configuration
Defaults	All services are allowed for the configured manager.
Example	`SEFOS(config)#` **`authorized-manager ip-source 10.203.113.5 255.255.255.255 interface extreme-ethernet 0/1 vlan 1 service snmp`**
Notes	An address 0.0.0.0 indicates *any manager.*

Related Commands

`show authorized-managers` - Displays the configured authorized managers

9.1.10 ip http port

This command is not supported.

Sets the HTTP port. The `no` form of the command resets the HTTP port.

`ip http port` *1-65535*

`no ip http port`

Mode	Global Configuration
Defaults	80
Example	`SEFOS(config)#` **`ip http port 90`**
Notes	HTTP port number takes effect only when HTTP is disabled and enabled again.

Related Commands

- `set ip http` - Enables or disables HTTP
- `show http server status` - Displays the http server status

9.1.11 set ip http

This command is not supported.

Enables or disables HTTP.

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

Syntax Description	**enable** – Enables HTTP status in the system **disable** – Disables HTTP status in the system
Mode	Global Configuration
Defaults	**enable**
Example	SEFOS(config)# **set ip http disable**

Related Commands

- ip http port - Sets the HTTP port
- show http server status - Displays the http server status

9.1.12 interface - configuration and deletion

Configures interfaces by assigning out of band management, port-channel, tunnel, and so on. The no form of the command deletes interfaces such as VLAN, port-channel, tunnel interface, and so on.

```
interface {cpu0 | vlan 1-4094 | port-channel 1-65535 | tunnel
0-128 | interface-type interface-id | linuxvlan interface-name |
loopback interface-id_0-100}
```

```
no interface {cpu0 | vlan 1-4094 | port-channel 1-65535 | tunnel
0-128 | interface-type interface-id | linuxvlan interface-name |
loopback interface-id_0-100}
```

Syntax Description	**cpu0** – Out of band management interface. **vlan** – VLAN identifier. **port-channel** – Port channel identifier. **tunnel** – Tunnel identifier This tunnel keyword is not supported. **linuxvlan** – Interface name of the Linux VLAN interface. The linuxvlan keyword is not supported. **loopback** – Loopback identifier. The loopback keyword is not supported.
Mode	Global Configuration

Example	`SEFOS(config)# interface extreme-ethernet 2`
Notes	The command `no shutdown` must be executed for the activation of the tunnel.

Related Commands

`show interfaces` - Displays the interface status and configuration

9.1.13 mtu *frame-size*

Configures the maximum transmission unit frame size for an interface.

```
mtu frame-size_90-9216
```

Mode	Interface Configuration
Defaults	1500
Example	`SEFOS(config-if)# mtu 900`
Notes	The interface must be brought down administratively prior to changing the MTU.

Related Commands

- `show interfaces` - Displays the interface status and configuration
- `show interface mtu` - Displays the global maximum transmission unit

9.1.14 system mtu

Configures the maximum transmission unit frame size for all interfaces. The `no` form of the command sets the maximum transmission unit to the default value for all interfaces.

This command operates similar to that of the command `mtu` frame-size.

```
system mtu frame-size_90-9216
```

```
no system mtu
```

Syntax Description	*frame-size_90-9216* – Maximum transmission unit frame size to be set for all interfaces. This value ranges between 90 and 9216.

Mode	Global Configuration
Defaults	1500
Example	`SEFOS(config)# system mtu 200`
Notes	The interface must be brought down administratively prior to changing the MTU.

Related Commands

- `show interfaces` - Displays the interface status and configuration
- `show interface mtu` - Displays the global maximum transmission unit

9.1.15 bridge port-type

Configures the bridge port type.

```
bridge port-type {providerNetworkPort | customerNetworkPort
{port-based | s-tagged | c-tagged} | customerEdgePort |
propCustomerEdgePort | propCustomerNetworkPort |
propProviderNetworkPort | customerBridgePort |
customerBackbonePort}
```

Syntax Description	**providerNetworkPort** – Provider network port type. Applicable in provider bridges and provider backbone b-component bridge modes. **customerNetworkPort** – Customer network port type which can either be port-based or S-tagged or C-tagged. CNP C-tagged can be used only in PBB I component bridge mode. **customerEdgePort** – Customer edge port type. **propCustomerEdgePort** – Proprietary customer edge port type. **propCustomerNetworkPort** – Proprietary customer network port type. **propProviderNetworkPort** – Proprietary provider network port type. **customerBridgePort** – Customer bridge port type. **customerBackbonePort** – Backbone edge bridge port that can receive and transmit I-tagged frames for multiple customers, and assign B-VIDs and translate I-SID on the basis of the received I-SID. CBPs are applicable only on PBB B components. The port-type currently supported is `customerBridgePort`.
Mode	Interface Configuration
Defaults	**providerNetworkPort**
Example	`SEFOS(config-if)# bridge port-type providerNetworkPort`

Notes

- Tunneling must be enabled to change port type from provider network port type.
- Tunneling must be disabled to change port type to provider network port type.
- Port must be shut down administratively when changing to another port type.
- Bridge port-type is supported only in the following bridge modes:
  Provider edge bridge.
  Provider core bridge.
  Provider backbone Bridge I component.
  Provider backbone Bridge B component.
- In provider or customer bridge modes, the bridge port type will always be `customerBridgePort`.
- `customerEdgePort` is valid only in provide edge bridge modes.
- All other port types excluding `customerBridgePort` and `customerEdgePort` are valid in both provider edge bridge and provider core bridge modes.

Related Commands

- `show interface bridge port-type` - Displays the bridge port type of interfaces in the switch

9.1.16 system-specific port-id

This command is not supported.

Configures the system specific index for the port by providing a different numbering space than the `IfIndex` to identify ports.

system-specific port-id *1-16384*

Mode Interface Configuration

Defaults 0

Example
```
SEFOS(config-if)# system-specific port-id 50
```

Notes

- The value 0 is not allowed to be set. If no other value has been configured, 0 is set by default.
- This command is allowed for switch ports only.

Related Commands

`show system-specific port-id` - Displays the custom-param configurations

9.1.17 set custom-param

This command configures the custom parameters for a particular port. The no form of the command deletes the custom parameter configurations.

```
set custom-param {type integer length integer value string |
attribute 1-4 value 0-4294967295}
```

```
no custom-param [type integer] [attribute 1-4]
```

Syntax Description

type – Type of the TLV information.
length – Length of the TLV information.
value – Value of the TLV information.
attribute – Opaque attribute identifier configured on the port.
value – Value for the opaque attribute.

Mode Interface Configuration

Defaults 0

Example

```
SEFOS(config-if)# set custom-param attribute 2 value 40
```

Notes This command is allowed for switch ports only.

Related Commands

- show custom-param - Displays the custom-param configurations.

9.1.18 mac-addr

Configures the MAC address for an interface.

```
mac-addr <aa:aa:aa:aa:aa:aa>
```

Mode Interface Configuration

Defaults The default MAC address for the interface is obtained from the system.

Example

```
SEFOS(config-if)# mac-addr 00:22:33:44:55:66
```

Notes

- The MAC address can be set only when the interface is down.
- MAC address configuration is not mandatory. If it is not configured, the default MAC address for the interface is obtained from the system.

Related Commands

show interfaces - Displays the interface status and configuration.

9.1.19 snmp trap link-status

Enables trap generation on either the physical interface or the port-channel interface. The no form of this command disables trap generation on the respective interface.

```
snmp trap link-status
```

```
no snmp trap link-status
```

Mode	Interface Configuration
Defaults	SNMP trap link status is enabled.
Example	`SEFOS(config-if)# snmp trap link-status`

Related Commands

show interfaces - Displays the interface status and configuration

9.1.20 write

Writes the running-config to a flash file, startup-configuration file, or to a remote site.

```
write {flash:filename | startup-config |
tftp://ip-address/filename |
sftp://username:password@ip-address/filename}
```

Syntax Description

flash: *filename* – Local system flash file name.

startup-config – Startup configuration. If this option is chosen, the switch starts with the saved configuration on reboot.

tftp – Copies a file to a TFTP server.

- *ip-address* - The IP address or host name of the server to receive the file.
- *filename* - the name assigned to the file on the server.

sftp – Copies (uploads) configurations of image to remote location.

- *user-name* - The user name of remote host or server.
- *password* - The password for the corresponding user name of remote host or server.
- *ip-address* - The IP address or host name of the server to receive the file
- *filename* - The name with which the configuration file is stored in remote location

This `sftp` keyword is not supported.

Mode Privileged EXEC

Example

```
SEFOS# write startup-config
```

Notes

- A `startup-config` contains configuration information that the SEFOS uses when it reboots.
- TFTP is a simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, username and password).

Related Commands

- `show nvram` - Displays the current information stored in the NVRAM
- `show system information` - Displays system information

9.1.21 copy

Copies the configuration from a remote site to flash.

```
copy {tftp://ip-address/filename startup-config |
sftp://username:password@ip-address/filename startup-config |
flash:filename startup-config}
```

Syntax Description

tftp:// – File in remote location to be copied.

flash: *filename* **startup-config** – File in flash to be copied.

sftp:// – File in remote location to be copied (downloaded) into configuration file (`switch.conf`). The `sftp` keyword is not supported.

Mode Privileged EXEC

Example

```
SEFOS# copy flash:/conf/sefos/backup.conf startup-config
```

Notes

- Filenames and directory names are case sensitive.
- For copying a file to a new directory, the directory must already exist. The suggested local flash directory is `/conf/sefos`.
- A `startup-config` contains configuration information that SEFOS uses when it reboots.
- TFTP is a simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, username and password).

9.1.22 copy startup-config

Makes a backup of the initial configuration in flash or at a remote location.

copy startup-config {flash:*filename* | **tftp://***ip-address***/***filename* | **sftp://***username***:***password***@***ip-address***/***filename***}**

Syntax Description

flash:*filename* – Local system flash file name.

tftp – Copies a file to a TFTP server.

- *ip-address* - the IP address or host name of the server to receive the file.
- *filename* - the name assigned to the file on the server.

sftp:// – Copies (uploads) configuration file to remote location.

- *username* - the user name of remote host or server.
- *password* - the password for the corresponding user name of remote host or server.
- *ip-address* - the IP address or host name of the server to receive the file.
- *filename* - the name with which the configuration file is stored in remote location.

Mode

Privileged EXEC

Example

```
SEFOS# copy startup-config
flash:/conf/sefos/current_backup.conf
```

Notes

- A `startup-config` contains configuration information that SEFOS uses when it reboots.
- The suggested local flash directory is `/conf/sefos`.
- TFTP is a simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, user name and password)

9.1.23 copy running-config startup-config

Copies the running configuration to the startup configuration file in NVRAM.

This command operates similar to that of the command `copy startup-config`.

```
copy running-config startup-config
```

Mode Privileged EXEC

Example `SEFOS# copy running-config startup-config`

9.1.24 copy logs

Writes the system logs to a remote site. The remote target must be on the in-band switch network for this command to work.

```
copy logs {tftp://ip-address/filename |
sftp://username:password@ip-address/filename}
```

Syntax Description

tftp:// – Copies a log file to a TFTP server.

- *ip-address* - the IP address or host name of the TFTP server to receive the file.
- *filename* - the name assigned to the file on the server.

sftp:// – Copies (uploads) log file to remote location.

- *username* - The user name of remote host or server.
- *password* - The password for the corresponding user name of remote host or server.
- *ip-address* - the IP address or host name of the server to receive the file.
- *filename* - the name with which the configuration file is stored in remote location.

The `sftp` keyword is not supported.

Mode Privileged EXEC

Example `SEFOS # copy logs tftp://10.0.0.10/clcliser`

Notes For the *filename* option, the full path to the file must be included. You can enter an unquoted text string with no spaces and a maximum length of 32 characters.

9.1.25 copy File

Copies a file from a source remote site flash directory to a destination remote site flash. The remote target must be on the in-band switch network for this command to work.

```
copy {tftp://ip-address/filename |
sftp://username:password@ip-address/filename | flash:filename}
{tftp://ip-address/filename |
sftp://username:password@ip-address/filename | flash:filename}
```

Syntax Description

tftp:// – Copies a log file to a TFTP server

- *ip-address* - IP address or host name of the TFTP server to receive the file
- *filename* - the name assigned to the file on the server

Note - Copying files from a remote location to another remote location (tftp to tftp) is not supported.

sftp:// – Copies (uploads) a file from flash to a remote location and vice versa.

- *username* - the user name of remote host or server
- *password* - the password for the corresponding user name of remote host or server
- *ip-address* - the IP address or host name of the server to receive the file
- *filename* - the name with which the configuration file is stored in remote location

The sftp keyword is not supported.

flash:*filename* – Local system flash file name

Mode Privileged EXEC

Example

```
SEFOS# copy tftp://12.0.0.2/clclirel flash:clcliser
```

Notes

- The filename must be an unquoted text string with the appropriate capitalization, no spaces, and a maximum length of 32 characters.
- The entire copying process may take several minutes and differs from protocol to protocol and from network to network.
- The recommended local flash directory to use is /conf/sefos.

9.1.26 show files

Lists the user created configuration and related files on the system.

```
show files [detail]
```

Syntax Description **`detail`** – Shows details for each file, including the modification date and size.

Mode Privileged EXEC

Example

```
SEFOS# show files

switch.conf.mine
switch.conf.test
xvlan.scr
switch.conf

SEFOS# show files detail

total 348
-rw-r--r--   1 108686 May 11 00:56 switch.conf
-rw-r--r--   1 105484 May 10 02:27 switch.conf.mine
-rw-r--r--   1 107782 May 10 02:29 switch.conf.test
-rw-r--r--   1    1069 May 12 04:34 xvlan.scr
```

Related Commands

- `erase` - Clears the contents of the startup configuration or sets parameters in NVRAM to default values
- `copy` - Copies the configuration from a remote site to flash
- `copy startup-config` - Makes a backup of the initial configuration in flash or at a remote location
- `copy` File - Copies a file from a source remote site flash directory to a destination remote site flash

9.1.27 erase

This command is not supported.

Clears the contents of the startup configuration or sets parameters in NVRAM to default values.

`erase {startup-config | nvram: | flash:`*`filename`***`}`**

Syntax Description

`startup-config` – Startup configuration file

`nvram` – Nonvolatile RAM

`flash:`*`filename`* – Local system flash file name

Mode	Privileged EXEC
Example	`SEFOS# erase nvram:`

Related Commands

- `show nvram` - Displays the current information stored in the NVRAM
- `show system information` - Displays system information

9.1.28 flowcontrol

Sets the `send` or `receive` `flow-control` value for an interface. The remote target must be on the in-band switch network for this command to work.

If `flowcontrol send` is on for a device and if the device detects any congestion at the end, the device notifies the link partner or the remote device of the congestion by sending a pause frame.

If `flowcontrol receive` is on for the remote device and it receives a pause frame, the device stops sending any data packets. This prevents any loss of data packets during the congestion period.

Use the `receive off` and `send off` keywords to disable `flow-control`.

```
flowcontrol {send | receive} {on | off}
```

Syntax Description	**send** – Interface to send flow control packets to a remote device. **receive** – Interface to receive flow control packets from a remote device. **on** – If used with `receive`, allows an interface to operate with the attached device to send flow control packets If used with `send`, the interface sends flow control packets to a remote device if the device supports it. **off** – Turns off attached devices (when used with `receive`) or the ability of local ports (when used with `send`) to send flow control packets to an interface or to a remote device respectively.
Mode	Interface Configuration
Defaults	**flowcontrol receive off** **flowcontrol send off**
Example	`SEFOS(config-if)# flowcontrol send on`

Related Commands

- `show interfaces` - Displays the interface status and configuration
- `show flow-control` - Displays the flowcontrol information

9.1.29 shutdown - Physical, VLAN, port-channel Interface

Disables a physical, VLAN, port-channel, tunnel, or OOB interface. The no form of the command enables a respective interface.

```
shutdown
```

```
no shutdown
```

Mode	Interface Configuration for physical interface and port-channel VLAN Interface for VLAN interface
Defaults	• The physical interface extreme-ethernet 0/1 is enabled by default. • The interface VLAN 1 is enabled by default for a VLAN interface. • The port-channel interface is disabled by default.
Example	SEFOS(config-if)# **shutdown**
Notes	All functions on the specified interface are disabled by the shutdown command.

Related Commands

show interfaces - Displays the interface status and configuration

9.1.30 debug-logging

Configures where debug logs are to be displayed. The no form of the command displays debug logs in the console.

```
debug-logging {console | file}
```

```
no debug-logging
```

Syntax Description	**console** – Debug logs are displayed in the console. **file** – Debug logs are displayed in the file.
Mode	Global Configuration
Default	**console**
Example	SEFOS(config)# **debug-logging console**

Notes

- Debug logs are directed to the console screen or to a buffer file, which can later be uploaded based on the input.
- Verify that the interface status is not in `shutdown` state if the `show debug-logging` command returns the following message:

```
Admin status is disabled or invalid context id
```

Related Commands

- `show debug-logging` - Displays the debug logs stored in file
- `show debugging` - Displays state of each debugging option

9.1.31 rollback

This command is not supported.

Enables or disables the rollback function.

```
rollback { enable | disable }
```

Syntax Description

enable – Enables the rollback function
disable – Disables the rollback function

Mode Global Configuration

Defaults Enable

Example

```
SEFOS(config)# rollback enable
```

Related Commands

`show nvram` - Displays the current information stored in the NVRAM

9.1.32 set switch maximum - Threshold

Sets the switch maximum threshold values of RAM, CPU, and flash. This threshold value is represented in percentage and ranges between 1 and 100 percent.

Trap messages are sent for the specified resource and the syslog message is displayed if the current resource usage crosses the maximum threshold limit.

```
set switch maximum {RAM | CPU | flash} threshold 1-100
```

Syntax Description
RAM – Sets the maximum threshold value for RAM.
CPU – Sets the maximum threshold value for CPU.
flash – Sets the maximum threshold value for Flash memory.

Mode Global Configuration

Defaults
RAM – 100 percentage.
CPU – 100 percentage.
flash – 100 percentage.

Example
```
SEFOS(config)# set switch maximum RAM threshold 98
```

9.1.33 `set switch temperature` - Threshold

This command is not supported (no temperature monitoring from SEFOS).

Sets the maximum and minimum temperature threshold values of the switch. This threshold value ranges between -14 and 40 degrees Celsius.

```
set switch temperature {min | max} threshold -14 - 40}
```

Syntax Description
min – Minimum temperature value for the switch.
max – Maximum temperature value for the switch.

Mode Global Configuration

Defaults
min – -14 degree Celsius.
max – 40 degree Celsius.

Example
```
SEFOS(config)# set switch temperature min threshold -10

SEFOS(config)# set switch temperature max threshold 37
```

9.1.34 `set switch power` - Threshold

This command is not supported (no power monitoring from SEFOS).

Sets the maximum and minimum threshold values of the switch power supply. This threshold value ranges between 100 and 230 volts.

```
set switch power {min | max} threshold 100-230
```

Syntax Description	**min** – Minimum threshold value for switch power supply. **max** – Maximum threshold value for switch power supply.
Mode	Global Configuration
Defaults	**min** – 100 volts. **max** – 230 volts.

Example	`SEFOS(config)# set switch power min threshold 110`
	
	`SEFOS(config)# set switch power max threshold 220`

9.1.35 system contact

This command is not supported.

Sets the system contact information.

Note – This command must be set from ILOM and not SEFOS.

---

system contact *contact-info*

Mode	Global Configuration
Example	`SEFOS(config)# system contact support@oracle.com`

Related Commands

`show system information` - Displays system information.

9.1.36 system location

This command is not supported.

Sets the system location.

Note – System location must be set from ILOM and not SEFOS.

---

system location *location-name*

Mode	Global Configuration
Example	`SEFOS(config)#` **`system location Oracle Controls`**

Related Commands

`show system information` - Displays system information.

9.1.37 auto-save trigger

This command is not supported.

Enables or disables the `auto-save trigger` function.

`auto-save trigger {enable | disable}`

Syntax Description	`enable` – Enables the `auto-save trigger` function. `disable` – Disables the `auto-save trigger` function.
Mode	Global Configuration
Details	Enabled.
Example	`SEFOS# auto-save trigger`
Notes	• To enable `auto-save trigger`, the `incremental-save` command has to be enabled. • The configuration update of incremental-save command takes effect only after switch restart. When `incremental-save` is enabled, the configuration of the `auto-save trigger` is immediately reflected in the system. • Enabling or disabling the `auto-save` flag enables or disables updating of the runtime configuration in the configuration file. • The `erase start-up` command configuration cannot be processed when the `auto-save trigger` is enabled. • Changing the auto-save option does not modify the restore option. • When the `auto-save trigger` is enabled, the `config-save` option is set to `start-up save`.

Related Commands

- `show nvram` - Displays the current information stored in the NVRAM

9.1.38 clear interfaces - Counters

Clears the interface counters.

```
clear interfaces [ interface-type interface-id ] counters
```

Syntax Description	*interface-type* – Type of interface. This can be extreme-ethernet *interface-id* – Physical interface ID including slot and port number
Mode	Privileged EXEC
Example	SEFOS# **clear interfaces counters**
Notes	Executing this command also clears the RMON statistics. When you enable the RMON statistics, all of the RMON counters are set to zero.

Related Commands

- show interfaces - Counters - Displays the interface statistics for each port
- show interfaces - Displays the interface status and configuration

9.1.39 clear counters

Clears the interface counters.

This command operates similar to the clear interfaces - Counters command.

```
clear counters [interface-type interface-id]
```

Syntax Description	*interface-type* – Type of interface. This can be extreme-ethernet. *interface-id* – Physical interface ID including slot and port number.
Mode	Privileged EXEC
Example	SEFOS# **clear counters**

Related Commands

- show interfaces - Counters - Displays the interface statistics for each port
- show interfaces - Displays the interface status and configuration

9.1.40 show ip interface

Displays the IP interface configuration.

```
show ip interface [Vlan 1-4094] [interface-type interface-id]
[loopback 0-100]
```

Syntax Description

vlan – VLAN identifier.
interface-type – Type of interface.
interface-id – Interface identifier.
loopback – Loopback identifier.

Mode Privileged EXEC

Example

```
SEFOS# show ip interface vlan 1

vlan1 is up, line protocol is down
Internet Address is 12.0.0.1/8
Broadcast Address 12.255.255.255
```

Notes If executed without the optional parameters, this command displays the IP interface statistics and configuration for all the available interfaces.

Related Commands

- ip address - Sets the IP address of an interface
- show interfaces - Displays the interface status and configuration

9.1.41 show authorized-managers

This command is not supported.

Displays the configured authorized managers.

```
show authorized-managers [ip-source ip-address]
```

Syntax Description

ip-source – Specifies either the network or host IP address

Mode Privileged EXEC

Example

```
SEFOS# show authorized-managers

Ip Authorized Manager Table
---------------------------

Ip Address         : 10.0.0.4
Ip Mask             : 255.255.255.255
Services allowed : SSH
Ports allowed     : Ex0/1
Vlans allowed     : 2
```

Related Commands

`authorized-manager ip-source` - Configures an IP authorized manager

9.1.42 show interfaces

Displays the interface status and configuration.

show interfaces [{[*interface-type interface-id***] [{description | storm-control | flowcontrol | capabilities | status}] | vlan** *1-4094* **| port-channel** *1-65535* **| tunnel** *0-128***}]**

Syntax Description

interface-type – Interface type.

interface-id – Physical interface identifier including type, slot and port number.

description – Description about the interface.

storm-control – Broadcast, multicast, and unicast storm control suppression levels for an interface.

flowcontrol – Receive or send flow control value for an interface.

capabilities – Capabilities of the interface.

status – Status of the interface.

vlan – VLAN Identifier.

port-channel – Port channel identifier.

tunnel – Tunnel identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show interfaces extreme-ethernet 0/1

Ex0/1 up, line protocol is up (connected)
Bridge Port Type: Customer Bridge Port

Hardware Address is 00:01:02:03:04:22
RARP Client is enabled
MTU  1500 bytes, Full duplex, 10 Gbps,  No-Negotiation
HOL Block Prevention enabled.

Invalid flowcontrol Mode

Link Up/Down Trap is enabled

Reception Counters
    Octets                        : 0
    Unicast Packets              : 0
    Discarded Packets           : 0
    Error Packets                : 0
    Unknown Protocol            : 0


Transmission Counters
    Octets                        : 8266
    Unicast Packets              : 0
    Discarded Packets           : 0
    Error Packets                : 0
SEFOS# show interfaces description

Interface         Status    Protocol Description
----------    ---------    ----------------------
Ex0/1              up                up
Ex0/2              up                up

SEFOS# show interfaces extreme-ethernet 0/2 storm-control

Ex0/2
DLF Storm Control               : Disabled
DLF Storm Control Limit        : 0

Broadcast Storm Control        : Enabled
```

```
Broadcast Storm Control         : 0

Multicast Storm Control         : Enabled
Multicast Storm Control         : 0

SEFOS# show interfaces extreme-ethernet 0/2 flow-control

Port    Tx FlowControl    Rx FlowControl    Tx Pause    Rx Pause HC
TxPause      HC R
----    --------------    -------------     --------    --------
-----------    -----
Ex0/2     off                 off                 0            0

SEFOS# show interfaces extreme-ethernet 0/2 capabilities

Ex0/2
Type          : SFP+
Speed         : 1Gbps/10Gbps Fixed
Duplex        : Full
FlowControl : Send, Receive

SEFOS# show interfaces extreme-ethernet 0/2 status

Port    Status         Duplex    Speed       Negotiation
----    ------         ------    ------      ------------
Ex0/2   connected     Full      10 Gbps     No-Negotiation

SEFOS# show interfaces vlan 1

vlan1 up, line protocol is up (connected)

SEFOS# show interfaces port-channel 2

po2 up, line protocol is up (connected)

SEFOS# show interfaces tunnel 0
```

```
tunnel0 up, line protocol is up (connected)
Hardware is Tunnel
MTU 1480 bytes
Encapsulation TUNNEL
Tunnel Source 12.0.0.2,Destination 12.0.0.3
Tunnel Protocol/transport IPV4IP
Checksumming of packets Disabled
Path MTU Discovery Disabled
```

Notes

If executed without the optional parameters this command displays the IP interface statistics and configuration for all the available interfaces.

Related Commands

- `interface - configuration and deletion` - Configures interface such as out of band management, port channel, tunnel and so on
- `interface range` - Selects the range of physical interfaces and VLAN interfaces to be configured
- `mtu frame-size` - Configures the maximum transmission unit frame size for the specific interface
- `system mtu` - Configures the maximum transmission unit frame size for all interfaces.
- `storm-control` - Sets storm control rate for broadcast, multicast, and DLF packets
- `flowcontrol` - Enables flow-control
- `show flow-control` - Displays the flow-control information
- `clear interfaces` - Counters / `clear counters` - Clears the interface counters

9.1.43 show interfaces phy-info

Displays the description of the physical transceiver that the interface is using.

show interface phy-info [*interface-type interface-id***]**

Syntax Description

interface-type – Interface type.

interface-id – Physical interface identifier including type, slot and port number.

Mode

Privileged EXEC

Example

```
SEFOS# show interface phy-info extreme-ethernet 0/1

Port 1 Transceiver Information
SFPP Fiber
OUI            0-14-4f
Supplier     AVAGO    PN       530-4449-01-       Rev
50
Date Code    100126   SN   AD1004A00BG   Secondary  PN
AFBR-703SDDZ-SN1 Rev        11

SEFOS# show interface phy-info extreme-ethernet 0/3
Port 3 Transceiver Information
QSFP [3-6]        Fiber Limiting        HPM 1
OUI                0-14-4f
Supplier     AVAGO    PN       135-1204-01-       Rev
3530
Date Code    091215   SN   AK0950Z0012    Secondary  PN
AFBR-79E4Z-SN2 Rev        11

SEFOS# show interface phy-info extreme-ethernet 0/15
Port 15 XAUI Backplane Connection
```

9.1.44 `show interfaces` - Counters

Displays the interface statistics for each port.

show interfaces [{*interface-type interface-id* **| hc [***interface-type interface-id* **] vlan** *1-4094* **| tunnel** *0-128***}] counters**

Syntax Description

interface-type – Interface type.
interface-id – Physical interface identifier including type, slot and port number.
hc – 64-Bit counters (high count).
Note: The hc keyword can be used only with the Sun Network 10GbE Switch 72p.
vlan – VLAN identifier.
tunnel – Tunnel identifier.
counters – Various counters for the switch or for the specific interface.

Mode

Privileged EXEC

Example

```
SEFOS# show interfaces hc counters

Port       InOctet     InUcast   InDiscard   InErrs      InHCOctet
----       -------     -------   ---------   ------      ---------
Ex0/1      215710      805          1730        1            0
Ex0/2      0            0            0          0           0
Ex0/3      480494016   7507719     384586       0             0
Ex0/4      0            0            0         0            0
Ex0/5      2332132381  103548431   4985914      2            0
Ex0/6      0            0            0           0          0
Ex0/7      0            0            0           0          0
Ex0/8      0            0            0           0          0
...
vlan1      0            0            0           0          0

Port       OutOctet      OutUcast    OutDiscard   OutErrs     OutHCOctet
----       --------      --------    ----------   -------     ----------
Ex0/1      516578823    8064080      0             0                 0
Ex0/2      0             0             0            0                  0
Ex0/3      1403553448   89039198     4486186      0                 0
Ex0/4      0             0             0            0                  0
Ex0/5      455902325    7123224      45            0                 0
Ex0/6      0             0             0            0                  0
Ex0/7      0             0             0            0                  0
Ex0/8      0             0             0            0                  0
...
vlan1      78            1             0            0                  0

SEFOS# show interface extreme-ethernet 0/9 hc count

Port       InHCOctet         InUcastPkts         InMulticastPkts
----       ---------         -----------         --------------------

Ex0/9      1327837163520    0                    20747455680


Port       OutHCOctet        OutUcastPkts        OutMulticastPkts
----       ----------        ------------        ---------------
Ex0/9      1327879857024    0                    20666431734
```

Notes

- If executed without the optional parameters, this command displays the counters for all the available interfaces.
- Only the `InHCOctet` and `OutHCOctet` interfaces are shown in 64 -Bit. All of the other interfaces are shown in 32-Bit only. However, you can get interface statistics in 64-Bit for all interfaces through SNMP.

Related Commands

- `show interfaces` - Displays the interface status and configuration
- `clear interfaces` - Counters / `clear counters` - Clears the interface counters

9.1.45 show system-specific port-id

Displays the interface and port identifiers.

show system-specific port-id

Mode Privileged EXEC

Example

```
SEFOS# show system-specific port-id

Interface PortID
--------  --------

Slot0/1    45
```

Notes This command is allowed for switch ports only.

9.1.46 show custom-param

Displays the `custom-param` configurations.

show custom-param

Mode Privileged EXEC

Example

```
SEFOS# show custom-param
Slot0/1

AttrID     AttrValue
--------   --------
4           5454

Slot0/2

AttrID     AttrValue
--------   --------
2           2424

Type        Length     Value
--------   --------   --------
2           4           root
5           4           root
```

Notes This command is allowed for switch ports only.

9.1.47 show interface mtu

Shows the maximum transmission Unit (MTU) of ports in the switch.

show interface mtu [{Vlan *1-4094* **| port-channel** *1-65535* **|** *interface-type interface-id***}]**

Syntax Description

vlan – VLAN identifier.

port-channel – Port channel identifier.

interface-type – Interface type.

interface-id – Physical interface identifier including type, slot and port number.

Mode Privileged EXEC

Example

```
SEFOS# show interface mtu Vlan 1

vlan1     MTU size is 1500
```

Notes Shows the hardware MTU of the ports on the switch, so you must include the Layer 2 header when you change the MTU.

Related Commands

- `mtu frame-size` - Configures the maximum transmission unit frame size for the interface
- `system mtu` - Configures the maximum transmission unit frame size for all interfaces

9.1.48 show interface bridge port-type

Displays the bridge port type of interfaces in the switch.

```
show interface bridge port-type [{port-channel 1-65535 |
interface-type ifnum}]
```

Syntax Description

port-channel – Port channel identifier.
interface-type – Interface index.

Mode

Privileged EXEC

Example

```
SEFOS# show interface bridge port-type

Ex0/1 Bridge port type is Customer Bridge Port

Ex0/2 Bridge port type is Customer Bridge Port

Ex0/3 Bridge port type is Customer Bridge Port

Ex0/4 Bridge port type is Customer Bridge Port

Ex0/5 Bridge port type is Customer Bridge Port

Ex0/6 Bridge port type is Customer Bridge Port

Ex0/7 Bridge port type is Customer Bridge Port

Ex0/8 Bridge port type is Customer Bridge Port
...
```

Notes

Bridge mode must be a provide bridge.

Related Commands

`bridge port-type` - Configures the bridge port type

9.1.49 show nvram

Displays the current information stored in the NVRAM.

```
show nvram
```

Mode Privileged EXEC

Example

```
SEFOS# show nvram

Default IP Address                          : 12.0.0.3
Default Subnet Mask                         : 255.0.0.0
Default IP Address Config Mode              : Manual
Switch Base MAC Address                     :
00:03:02:03:04:01
Default Interface Name                      : Ex0/1
Default RM Interface Name                   : lo:3
Config Restore Option                       : No restore
Config Save Option                          : No save
Auto Save                                   : Disable
Incremental Save                            : Enable

Roll Back                                   : Enable
Config Save IP Address                      : 0.0.0.0
Config Save Filename                        : switch.conf
Config Restore Filename                     : switch.conf
PIM Mode                                    : Sparse Mode
IGS Forwarding Mode                         : MAC based
Cli Serial Console                          : Yes
SNMP EngineID                               :
80.00.08.1c.04.46.53
SNMP Engine Boots                           : 47
Default VLAN Identifier                     : 1

Stack PortCount                             : 0
ColdStandby                                 : Disable
```

Notes The following parameters are not supported: Default RM Interface Name, Roll Back, Stack PortCount, ColdStandby, NPAPI Mod, and PIM Mode.

Related Commands

- `default mode` - Configures the mode by which the default interface acquires its IP address
- `default restore-file` - Configures the default restoration file

- `default ip address` - Configures the IP address and subnet mask for the default interface
- `ip address` - Sets the IP address of an interface
- `base-mac` - Configures the base MAC address for the switch in the NVRAM
- `write` - Writes the running-config to a file in flash, startup-configuration file or to a remote site
- `erase` - Clears the contents of the startup configuration or sets parameters in NVRAM to default values

9.1.50 show system information

Displays system information.

```
show system information
```

Mode Privileged EXEC

Example

```
SEFOS# show system information

Hardware Version                        : 2.5.5_00166738
Firmware Version                        : 1.0.0
Switch Name                              : SEFOS Switch
System Contact                          : Oracle
System Location                         : Oracle
Logging Option                          : Console Logging
Login Authentication Mode              : Local
Config Save Status                       : Not Initiated
Remote Save Status                      : Not Initiated
Config Restore Status                  : Not Initiated
```

Related Commands

- `write` - Writes the running-config to a file in flash, startup-configuration file or to a remote site
- `erase` - Clears the contents of the startup configuration or sets parameters in NVRAM to default values

9.1.51 show flow-control

Displays the flow-control information.

```
show flow-control [interface interface-type interface-id]
```

Syntax Description

interface

- *interface-type* – Interface type.
- *interface-id* – Physical interface identifier including type, slot and port number.

Mode Privileged EXEC

Example

```
SEFOS# show flow-control interface extreme-ethernet 0/2

Port TxFlowControl RxFlowControl TxPause RxPause HCTxPause HCRxPause
---- ------------- ------------- ------- ------- --------- ---------
Ex0/2   on            on              0       0         0          0
```

Notes If this command is executed without the optional parameter it displays the flowcontrol information of the SEFOS router. Otherwise it displays the flowcontrol information of the specified interface.

Related Commands

- show interfaces - Displays interface status and configuration
- flowcontrol - Enables flowcontrol on an interface

9.1.52 show debug-logging

Displays the debug logs stored in file.

```
show debug-logging
```

Mode Privileged EXEC

Example

```
SEFOS(config)# debug-logging file

SEFOS(config)# exit

SEFOS# debug spanning-tree  events

SEFOS# show debug-logging

AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
AST: MSG: Timer Expiry Event processed...
AST: MSG: Completed processing the event(s).
```

Related Commands

debug-logging - Configures where debug logs are to be displayed

9.1.53 debug npapi

Turns on NPAPI (network processor application programming interface) debug logging. The no form of the command turns off NPAPI debug logging.

```
debug npapi {events | entry-exit | transmission | reception | all}
```

```
no debug npapi {events | entry-exit | transmission | reception |
all}
```

Syntax Description	**events** – Events related traces, such as addition, modification, or deletion of any entry from the hardware. **entry-exit** – NPAPI's entry and exit related traces. **transmission** – Packet transmission traces **reception** – Packet reception traces. **all** – All traces.
Mode	Global Configuration
Example	`SEFOS(config)# debug npapi all`

9.1.54 show debugging

Displays state of each debugging option.

```
show debugging
```

Mode	Privileged EXEC

Example	`SEFOS# show debugging`
	
	`Spanning Tree :`
	`Spanning tree timers related debugging is on`

Related Commands

- `debug spanning-tree` - Provides spanning tree debugging support
- `debug ip igmp snooping`- Specifies the debug levels for the IGMP snooping module
- `debug vlan` - Enables module-wise debug traces for VLAN
- `debug garp` - Enables module-wise debug traces for GARP

9.1.55 show clock

Displays the system date and time.

```
show clock
```

Mode	Privileged EXEC

Example

```
SEFOS# show clock

Tue Oct 18 18:04:11 2005
```

9.1.56 show running-config

Displays the current running VLAN and XVLAN configuration.

```
show running-config [{syslog | qos | stp [ switch context-name] |
ecfm [switch context-name] | la | igs | mlds | vlan 1-4094 [switch
context-name] | interface {port-channel 1-65535 | interfacetype
interfacenum | vlan 1-4094} | ospf | rip | rip6 | ssh | acl | ip
| pim | pimv6 | snmp | rmon | rm | mbsm | ospf3 | igmp | fm |
igmp-proxy | route-map | qosxtd | switch context-name}]
```

Syntax Description

syslog – Syslog module.
qos – Quality of service module.
stp – STP module.
la – LA module.
igs – IGS module.
vlan – VLAN module.
interface – Port-channel, physical, and VLAN interface.

ospf – OSPF module.
rip – RIP module.
rip6 – RIP6 module.
acl – ACL module.
ip – IP module.
pim – PIM module.
snmp – SNMP module.
rmon – RMON module.
rm – RM module.

mbsm – MBSM module.
ospf3 – OSPFv3 module.
igmp – IGMP module.
fm – FM module.
igmp-proxy – IGMP proxy module.
route-map – Route map feature.
Qosxtd – QoS module.
Switch – Context or switch name. This parameter is specific to multiple. instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example The output given below is only a fragment of the whole output. This output differs based on the modules that are configured.

```
SEFOS# show running-config stp

Building configuration...

spanning-tree mode rst

interface extreme-ethernet 0/1

!

interface extreme-ethernet 0/2

!

interface extreme-ethernet 0/3

!

interface extreme-ethernet 0/4

!

interface extreme-ethernet 0/5

!

interface extreme-ethernet 0/6

!

interface extreme-ethernet 0/7

!

interface extreme-ethernet 0/8
```

```
!

...
end
```

Notes If executed without the optional parameters, this command displays the current active configurations other than the default configurations of all the modules in all the interfaces.

Some of the keywords used in this command might not be available.

Related Commands

Related commands include the configuration commands of all the modules that are given as parameters in the `show running-config` command.

9.1.57 show http server status

This command is not supported.

Displays the HTTP server status.

```
show http server status
```

Mode Privileged EXEC

Example

```
SEFOS# show http server status

HTTP server status     : Enabled
HTTP port is            : 80
```

Related Commands

- `ip http port` - Sets the HTTP port
- `set ip http` - Enables or disables HTTP

9.1.58 show system acknowledgement

Displays acknowledgement for open sources used in the system.

```
show system acknowledgement
```

Mode Privileged EXEC

CHAPTER 10

System Commands

System features comprise the system commands that manage access permissions, mode access, and terminal configurations on SEFOS.

10.1 Commands

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

- `help`
- `clear screen`
- `enable` (not supported)
- `disable` (not supported)
- `configure terminal`
- `configure`
- `run script`
- `listuser`
- `username` (not supported)
- `enable password` (not supported)
- `line`
- `alias` - replacement-string
- `alias` - `interface` | `exec` | `configure`
- `exec-timeout`
- `logout`
- `end`
- `exit`

- show privilege
- show line
- show aliases
- show users
- show history

10.1.1 help

Displays help for a particular command.

```
help [command]
```

Syntax Description *command* – The privileged command.

Mode All

Notes
- ? can be used as an alternative for the word help. When help or ? is typed in the specific mode, all commands present in that mode and all general commands are listed.
- When a keyword is typed, all possible commands that start with that keyword are displayed.

10.1.2 clear screen

Clears the screen.

```
clear screen
```

Mode All

10.1.3 enable

This command is not supported.

Turns on privileged commands.

```
enable [Enable Level 0-15]
```

Syntax Description **`Enable Level`** – Level to enter the system.

Mode User EXEC

Notes

- Level 0 is the most restricted level. User created with level 0 has access only to the following commands:

  `disable`

  `enable`

  `exit`

  `help`

  `logout`
- Level 1 includes all user-level commands at the `SEFOS>` prompt.
- Level 15 is the least restricted level and included all commands.
- It is possible to configure additional access levels (from level 2 to 14) to meet the needs of the users while protecting the system from unauthorized access.
- After a user logs in with a username that has privileges, the full set of CLI commands, including those in User mode can be accessed.
- Default privileged level is assigned by the user.

Related Commands

- `disable` - Turns off privileged commands
- `enable password` - Modifies enable password parameters

10.1.4 disable

This command is not supported.

Turns off privileged commands.

```
disable [privilegelevel_0-15]
```

Mode User EXEC

Notes In user mode, you can monitor and display SEFOS parameters, but not change them.

Related Commands

- `enable` - Turns on privileged commands

10.1.5 configure terminal

Enters the configuration mode.

```
configure terminal
```

Mode Privileged EXEC Mode

Example SEFOS# **configure terminal**

Related Commands

- end - Exits from Configuration mode
- exit - Exits the current configuration mode to the next highest configuration mode

10.1.6 configure

Enters the configuration mode. This command operates similar to that of the command configure terminal.

```
configure
```

Mode Privileged EXEC

Example SEFOS# **configure**

Related Commands

- end - Exits from Configuration mode
- exit - Exits the current configuration mode to the next highest configuration mode

10.1.7 run script

Executes CLI commands from the specified script file.

```
run script [flash: | slot0: | volatile:] script-file [output-file]
```

Syntax Description	**flash: | slot0: | volatile:** – Source of the script file. • `flash` - The script file is read from the flash memory. • `slot0` - The script file is read from the PCMCIA card or compactflash memory. • `volatile` - The script file is read from the volatile memory. The keywords `flash:`, `slot0:`, and `volatile:` are not supported. *`script-file`* – The script file to be executed. *`output-file`* – The output file.
Mode	Privileged EXEC
Example	`SEFOS#` **`run script /conf/sefos/enable.nem`**
Notes	Use directory `/conf/sefos` to store script files downloaded to the switch.

10.1.8 listuser

Lists all valid users, along with their permissible mode.

```
listuser
```

Mode	Privileged EXEC
Example	`SEFOS#` **`listuser`**

Related Commands

`show users` - Displays information about terminal lines

10.1.9 lock

Locks the CLI console. This command allows the user or system administrator to lock the console to prevent unauthorized users from gaining access to the CLI command shell.

```
lock
```

Mode	Privileged EXEC
Notes	If you run the `lock` command, you must break the connection with SEFOS to unlock the console. The method you use to release the console lock varies depending on the way you are connected to SEFOS. Refer to the Product Notes that came with your system for more information.

10.1.10 username

This command is not supported.

Creates a user and sets the enable password for that user with the privilege level. The no form of the command deletes a user and disables the enable password for that user.

username *user-name* **[password [0 | 7 | LINE]** *passwd***] [privilege** *1-15***]**

no username *user-name*

Syntax Description

user-name – User ID to be used to login to the system.

password – Password to be entered by the user to login to the system, and password encryption to be used. The password encryption options are:

- 0 - Uses the unencrypted password.
- 7 - Uses the hidden password.
- LINE - Uses the Line password.

Password encryption is not supported.

privilege – Privilege level to be given to the user using the created user ID.

Mode

Global Configuration

Example

```
SEFOS(config)# username products password prod123
privilege 15
The user products is created with the privilege level 15.
Hence, the user will be visible to view all the commands.

SEFOS(config)# username support password supp123
privilege 1
The user support is created with the privilege level 1.
Hence, the user will be visible to view only the below
commands:
Show - Show commands related to all the features.
Enable - Enables the privilege level.
Disable - Disables the privilege level.
Exit
Logout
Clear
Debug
No Debug
```

Related Commands

`enable password` - Modifies enable password parameters

10.1.11 enable password

This command is not supported.

Modifies enable password parameters and the no form of the command disables enable password parameters.

```
enable password [level 1-15] LINE-enable-password
```

```
no enable password [level 1-15]
```

Syntax Description	**level** – Privilege level. *LINE enable password* – The password encryption options are: • 0 - Uses the unencrypted password. • 7 - Uses the hidden password. • LINE - Uses the Line password. Password encryption is not supported.
Mode	Global Configuration
Example	SEFOS(config)# **enable password level 15 LINE**
Notes	• Sets the password for a particular privilege level. • When this command is configured, the SEFOS switch prompts for the password whenever you want to move from lower privilege level to higher privilege level using the enable option.

Related Commands

`username` - Creates a user and sets the enable password for that user with the privilege level

10.1.12 line

This command is not supported.

Configures a console or virtual terminal line.

```
line {console | vty | line-number0-16} [ending-line-number_3-16]
```

Syntax Description	**console** – Console. **vty** – Virtual terminal line. *line-number_3-16* – ID of a specific telnet session or initial telnet session in a configured series of telnet sessions. *ending-line-number_3-16* – ID of the last telnet session in a configured series of telnet sessions.
Mode	Global Configuration
Example	`SEFOS(config)# line console`
Notes	The only line supported for this command is console.

Related Commands

- `end` - Exits from Configuration mode
- `exit` - Exits the current configuration mode to the next highest configuration mode
- `show line` - TTY line information

10.1.13 `alias` - *`replacement-string`*

Replaces the given token by the given string. The `no` form of the command removes the alias created for the given string.

```
alias replacement-string token-to-be-replaced
```

```
no alias alias
```

Syntax Description	*replacement-string* – Replacement string. *token-to-be-replaced* – Abbreviated or short form of the replacement string.
Mode	Global Configuration
Example	`SEFOS(config)# alias sp spanning-tree`
Notes	The purpose of such a replacement string is that commands can be executed using the abbreviated or short form.

Related Commands

`show aliases` - Displays the aliases

10.1.14 alias - interface | exec | configure

Replaces the given token or command with the given string. Operates similar to that of the command alias - replacement-string, except that it allows you to type a command with multiple tokens without quotes.

alias {interface | exec | configure} *alias-name* **{command** *1-10* **| token}**

Syntax Description

interface – Commands executed in Interface Configuration mode.

exec – Commands executed in Privileged EXEC or User EXEC mode.

configure – Commands executed in Configuration mode (That is, global, line, profile, vlan, switch, and protocol specific configuration modes).

alias-name – Alternate name to be used for the command or token.

command – Command and token values for which alias name should be configured (maximum of 10 tokens).

token – Token for which alias name should be configured.

Mode

Global Configuration

Example

```
SEFOS(config)# alias interface up no shutdown
Alias: configuration of mode is not supported
SEFOS(config)# interface ex 0/1
SEFOS(config-if)# up
SEFOS(config-if)# end
```

Notes

- Ignore the following message:

  `Alias: configuration of mode is not supported`
- Alias name can be set only for the commands having equal to or less than 10 tokens.

Related Commands

- show aliases - Displays the aliases

10.1.15 exec-timeout

Sets EXEC timeout (in seconds) for line disconnection. The no form of the command clears EXEC timeout for line disconnection.

exec-timeout *1-18000*

no exec-timeout

Mode	Line Configuration
Defaults	1800 seconds

Example	`SEFOS(config)# line console`
	`SEFOS(config-line)# exec-timeout 1200`
	`SEFOS(config-line)# exit`
	`SEFOS(config)# line vty`
	`SEFOS(config-line)# no exec-timeout`
	`SEFOS(config-line)# end`

Related Commands

`line` - Configures a console or virtual terminal line

10.1.16 logout

Exits from Privileged EXEC or User EXEC mode to SEFOS login prompt in the case of console session.

```
logout
```

Mode	User EXEC
Notes	In the case of a TELNET session, this command terminates the session.

10.1.17 end

Exits from the Configuration mode.

```
end
```

Mode	All
Notes	Can be executed from any mode, but it reverts back to Privileged EXEC mode.

Related Commands

- `exit` - Exits the current configuration mode to the next highest configuration mode

10.1.18 exit

Exits the current configuration mode to the next highest configuration mode in the CLI.

```
exit
```

Mode All

Notes You must reenter the login name and password to gain access to the CLI command shell.

Related Commands

- `end` - Exits from Configuration mode

10.1.19 show privilege

Shows current user privilege level.

```
show privilege
```

Mode Privileged EXEC

Example

```
SEFOS# show privilege

Current privilege level is 15
```

10.1.20 show line

Displays TTY line information.

```
show line {console | vty line}
```

Syntax Description

console – Console.
vty – Virtual terminal line.

Mode Privileged EXEC

Example

```
SEFOS# show line console

Current Session Timeout (in secs) = 1800
```

Notes The command-line history buffer stores CLI commands that are previously entered.

Related Commands

- `line` - Configures a console or virtual terminal line

10.1.21 show aliases

Displays the aliases.

```
show aliases
```

Mode Privileged EXEC

Example

```
SEFOS# show aliases

show -> sh
previlege -> pr
```

Notes Displays the alias commands and associated CLI commands for the current mode.

Related Commands

- `alias` - replacement-string / `alias` - `interface | exec | configure` - Replaces the given token by the given string

10.1.22 show users

Displays information about terminal lines.

```
show users
```

Mode Privileged EXEC

Example

```
SEFOS# show users

Line             User              Peer-Address
0 con             root              Local  Peer
```

Related Commands

- `listuser` - Lists all valid users, along with their permissible mode

10.1.23 show history

Displays the command history list.

```
show history
```

Mode Privileged EXEC

Example

```
SEFOS# show history

  1   show ip int
  2   show debug-logging
  3   show users
  4   show line
  5   show line console
  6   c s
  7   show aliases
  8   show privilege
  9   listuser
 10   show users
 11   show history
```

Notes

- The commands are listed from the first to the latest command.
- The buffer is kept unchanged when entering to configuration mode and returning.

CHAPTER 11

RMON

RMON is a standard monitoring specification that enables various network monitors and console systems to exchange network-monitoring data.

The RMON specification defines a set of statistics and functions that can be exchanged between RMON-compliant console managers and network probes. As such, RMON provides network administrators with comprehensive network-fault diagnosis, planning, and performance-tuning information.

11.1 Commands

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

- `set rmon`
- `rmon collection history`
- `rmon collection stats`
- `rmon event`
- `rmon alarm`
- `show rmon`

Note – The `show snmp community` command is not supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

Note – SEFOS uses the AgentX protocol to communicate events to the ILOM master SNMP agent of the NEM. To forward these events to external entities, the ILOM interfaces for managing alert rules must be used to configure SNMP trap based rules. Refer to the ILOM documentation to learn about the procedures. An event from SEFOS will trigger an SNMP trap for each rule configured in ILOM.

11.1.1 set rmon

Enables or disables the RMON feature.

```
set rmon {enable | disable}
```

Syntax Description	**enable** – Enables the RMON feature in the system. **disable** – Disables the RMON feature in the system.
Mode	Global Configuration
Defaults	The RMON module is disabled by default.
Example	`SEFOS(config)# set rmon enable`
Notes	All other RMON module commands can be executed only when the RMON module is enabled. Warning messages are displayed when commands are executed without enabling the RMON feature.

Related Commands

`show rmon` - Successful execution of this command without any messages indicates that RMON feature is enabled in the system

11.1.2 rmon collection history

Enables history collection of interface statistics in the buckets for the specified time interval. The `no` form of the command disables the history collection on the interface.

```
rmon collection history index_1-65535 [buckets
bucket-number_1-65535] [interval seconds1-3600] [owner
ownername_127]
```

```
no rmon collection history index_1-65535
```

Syntax Description

index – History table index.

buckets – The maximum number of buckets desired for the RMON collection history group of statistics.

interval – The number of seconds in each polling cycle.

owner – Optional field - allows the user to enter the name of the owner of the RMON group of statistics.

Mode Interface Configuration

Defaults

bucket-number_1-65535 – 50.

interval – 1800 seconds.

owner – monitor.

Example

```
SEFOS(config-if)# rmon collection history 1 buckets 2
interval 20
```

Notes

- The RMON feature must be enabled for the successful execution of this command.
- The polling cycle is the bucket interval where the interface statistics details are stored.

Related Commands

show rmon - Displays the history collection for the configured bucket (show rmon history [history-index *1-65535*])

11.1.3 rmon collection stats

Enables RMON statistic collection on the interface. The no form of the command disables RMON statistic collection on the interface.

```
rmon collection stats index_1-65535 [owner ownername_127]
```

```
no rmon collection stats index_1-65535
```

Syntax Description

index – Statistics table index.

owner – Optional field that allows you to enter the name of the owner of the RMON group of statistics with a string length of 127.

Mode Interface Configuration

Defaults

owner – monitor

Example

```
SEFOS(config-if)# rmon collection stats 1
```

Notes

The RMON feature must be enabled for the successful execution of this command.

Related Commands

`show rmon` - Displays the history collection for the configured bucket (`show rmon history [history-index 1-65535]`)

11.1.4 rmon event

Adds an event to the RMON event table. The added event is associated with an RMON event number. The `no` form of the command deletes an event from the RMON event table.

```
rmon event number_1-65535 [description event-description_127]
[log] [owner ownername_127] [trap community_127]
```

```
no rmon event number_1-65535
```

Syntax Description

number – Event number.

description – Description of the event.

log – Used to generate a log entry.

owner – Owner of the event.

trap – Used to generate a trap. The SNMP community string is to be passed for the specified trap.

Mode Global Configuration

Example

```
SEFOS(config)# rmon event 1 log owner sun-qa trap NETMAN
```

Notes

- The RMON feature must be enabled for the successful execution of this command.
- SEFOS uses the AgentX protocol to communicate events to the ILOM master SNMP agent of the NEM. To forward these events to external entities, the ILOM interfaces for managing alert rules must be used to configure SNMP trap based rules. Refer to the ILOM documentation to learn about the procedures. An event from SEFOS will trigger an SNMP trap for each rule configured in ILOM.

Related Commands

- `rmon alarm` - Sets an alarm on a MIB object
- `show rmon` - Displays the RMON events and alarms

11.1.5 rmon alarm

Sets an alarm on a MIB object. The alarm group periodically takes statistical samples from variables in the probe and compares them to thresholds that have been configured. The no form of the command deletes the alarm configured on the MIB object.

rmon alarm *alarm-number mib-object-id_255 sample-interval-time_1-65535* **{absolute | delta} rising-threshold** *value_0-2147483647* **[rising-event-number** *1-65535***] falling-threshold** *value_0-2147483647* **[falling-event-number** *1-65535***] [owner** *owner-name_127***]**

no rmon alarm *number_1-65535*

Syntax Description

alarm-number – Alarm Number. This value ranges between 1 and 65535.

mib-object-id – The mib object identifier.

sample-interval-time – Time in seconds during which the alarm. monitors the MIB variable. This value ranges between 1 and 65535 seconds.

absolute – Used to test each mib variable directly.

delta – Used to test the change between samples of a variable.

rising-threshold – A number at which the alarm is triggered. This value ranges between 0 and 2147483647.

falling-threshold *value* – A number at which the alarm is reset. This value ranges between 0 and 2147483647.

rising-event-number – The event number to trigger when the rising threshold exceeds its limit. This value ranges between 1 and 65535. This feature is optional only in the code using the industrial standard command, otherwise this feature is mandatory.

falling-event-number – The event number to trigger when the falling threshold exceeds its limit. This value ranges between 1 and 65535. This feature is optional only in the code using the industrial standard command, otherwise this feature is mandatory.

owner – Owner of the alarm.

Mode

Global Configuration

Defaults

By default, the least event number in the event table is assigned for the rising and falling threshold as its event number.

Example

```
SEFOS(config)# rmon event 2
SEFOS(config)# rmon alarm  1
1.3.6.1.6.3.16.1.2.1.4.1.4.110.111.110.101 2 absolute
rising-threshold 2 2 falling-threshold 1 2 owner sun-qa
```

Notes

- The RMON Feature must be enabled for the successful execution of this command.
- RMON events must have been configured.
- SEFOS cannot monitor all the MIB objects through RMON. This monitoring is applicable only to the Ethernet interfaces
- Falling threshold must be less than rising threshold.

Related Commands

- `rmon collection stats` - Enables RMON statistic collection on the interface
- `rmon event` - Adds an event to the RMON event table
- `show rmon` - Displays the RMON events and alarms

11.1.6 show rmon

Displays the RMON statistics, alarms, events, and history configured on the interface.

```
show rmon [statistics [stats-index_1-65535]] [alarms] [events]
[history [history-index_1-65535] [overview]]
```

Syntax Description

statistics – The configured stats index value.
alarms – The configured alarm.
events – The configured event.
history – The configured history index.
overview – Displays only the overview of rmon history entries.

Mode Privileged EXEC

Example

```
SEFOS# show rmon statistics 2

RMON is enabled
Collection 2 on Ex0/2 is active, and owned by fsoft,
 Monitors ifEntry.1.2 which has
 Received 1240 octets, 10 packets,
 2 broadcast and 10 multicast packets,
 0 undersized and 1 oversized packets,
 0 fragments and 0 jabbers,
 0 CRC alignment errors and 0 collisions.
 # of packets received of length (in octets):
 64: 0, 65-127: 10, 128-255: 0,
 256-511: 0, 512-1023: 0, 1024-1518: 0
```

```
SEFOS# show rmon

RMON is enabled

SEFOS# show rmon history

RMON is enabled

Entry 1 is active,  and owned by fsoft
 Monitors ifEntry.1.1 every 3000 second(s)
 Requested # of time intervals, ie buckets, is 3,
 Granted # of time intervals, ie buckets, is 3,
  Sample 1 began measuring at 0
   Received 0 octets, 0 packets,
   0 broadcast and 0 multicast packets,
   0 undersized and 0 oversized packets,
   0 fragments and 0 jabbers,
   0 CRC alignment errors and 0 collisions,
   # of dropped packet events is 0
   Network utilization is estimated at 0
  Sample 2 began measuring at 0

 Received 0 octets, 0 packets,
   0 broadcast and 0 multicast packets,
   0 undersized and 0 oversized packets,
   0 fragments and 0 jabbers,
   0 CRC alignment errors and 0 collisions,
   # of dropped packet events is 0
   Network utilization is estimated at 0

SEFOS# show rmon events

RMON is enabled

Event 1 is active, owned by
 Description is
 Event firing causes nothing,
 Time last sent is Aug 27 18:30:01 2009

Event 2 is active, owned by
 Description is
 Event firing causes nothing,
 Time last sent is Aug 27 18:31:36 2009
```

```
SEFOS# show rmon alarms

RMON is enabled
Alarm 4 is active,  owned by Sun
 Monitors 1.3.6.1.6.3.16.1.2.1.4.1.4.110.111.110.101
every 2 second(s)
 Taking absolute samples, last value was 3
 Rising threshold is 2, assigned to event 2
 Falling threshold is 1, assigned to event 2
 On startup enable rising or falling alarm

SEFOS# show rmon statistics 2 alarms events  history 1

RMON is enabled
Collection 2 on Ex0/1 is active, and owned by monitor,
 Monitors ifEntry.1.1 which has
 Received 5194 octets, 53 packets,
 0 broadcast and 0 multicast packets,
 0 undersized and 0 oversized packets,
 0 fragments and 0 jabbers,
 53 CRC alignment errors and 0 collisions.
 # of packets received of length (in octets):
 64: 0, 65-127: 53, 128-255: 0,

256-511: 0, 512-1023: 0, 1024-1518: 0
Alarm 4 is active,  owned by Sun
 Monitors 1.3.6.1.6.3.16.1.2.1.4.1.4.110.111.110.101
every 2 second(s)
 Taking absolute samples, last value was 3
 Rising threshold is 2, assigned to event 2
 Falling threshold is 1, assigned to event 2
 On startup enable rising or falling alarm

Event 1 is active, owned by
 Description is

 Event firing causes nothing,
 Time last sent is Aug 27 18:30:01 2009

Event 2 is active, owned by
 Description is
 Event firing causes nothing,
 Time last sent is Aug 27 18:31:36 2009
```

```
SEFOS#
Ex0/

SEFOS# show rmon history overview

RMON is enabled
Entry 1 is active,  and owned by fsoft
 Monitors ifEntry.1.1 every 3000 second(s)
 Requested # of time intervals, ie buckets, is 3,
 Granted # of time intervals, ie buckets, is 3
```

Notes

If the `show rmon` command is executed without enabling the RMON feature, the following output is displayed:

```
SEFOS# show rmon

RMON feature is disabled
```

Related Commands

- `set rmon` - Enables or disables the RMON feature
- `rmon collection history` - Enables history collection of interface statistics in the buckets for the specified time interval
- `rmon collection stats` - Enables RMON statistic collection on the interface
- `rmon event` - Adds an event to the RMON event table
- `rmon alarm` - Sets an alarm on a MIB object

CHAPTER 12

VLAN

VLANs can be viewed as a group of devices on different physical LAN segments which can communicate with each other as if they were all on the same physical LAN segment. That is, a network of computers that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN. VLANs are configured through software rather than hardware, which makes them extremely flexible.

VLAN provides the following benefits for switched LANs:

- Improved administration efficiency
- Optimized broadcast and multicast activity
- Enhanced network security
- The list of CLI commands for the configuration of VLAN are common to **both** single instance and multiple instance except for a difference in the prompt that appears for the switch with multiple instance support.

Multiple Instance is not supported in this release.

- The prompt for the Global Configuration mode is:

```
SEFOS(config)# vlan 10
```

- The prompt for the VLAN Configuration mode is:

```
SEFOS(config-vlan)# ports extreme-ethernet 0/1 untagged
extreme-ethernet 0/1 forbidden extreme-ethernet 0/2 name vl1
```

- The parameters specific to multiple instance are stated so, against the respective parameter descriptions in this document.
- The output of the `show` commands differ for single instance and multiple instance. Thus, both the output are documented while depicting the `show` command examples.

12.1 Commands

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

- vlan
- interface range
- set gvrp
- set port gvrp
- set port gvrp enable | disable
- set gmrp
- set port gmrp
- set vlan traffic-classes
- mac-address-table static unicast
- mac-address-table static multicast
- mac address-table static mcast
- mac-address-table aging-time
- bridge-mode
- l2protocol-tunnel cos
- clear l2protocol-tunnel counters
- clear vlan statistics
- ports
- vlan active
- switchport pvid
- switchport access vlan
- switchport acceptable-frame-type
- switchport ingress-filter
- switchport priority default
- switchport mode
- switchport mode dot1q-tunnel
- set garp timer
- vlan restricted
- group restricted
- vlan map-priority
- shutdown garp

- debug vlan
- debug garp
- show vlan
- show vlan device info
- show vlan device capabilities
- show vlan traffic-classes
- show garp timer
- show vlan port config
- show vlan statistics
- show mac-address-table
- show dot1d mac-address-table
- show dot1d mac-address-table static unicast
- show dot1d mac-address-table static multicast
- show mac-address-table count
- show mac-address-table static unicast
- show mac-address-table static multicast
- show mac-address-table dynamic unicast
- show mac-address-table dynamic multicast
- show mac-address-table aging-time

12.1.1 vlan

Configures a VLAN in the switch and is also used to enter into the Configuration VLAN mode. The no form of the command deletes a VLAN from the switch.

vlan *1-4094*

no vlan *1-4094*

Mode Global Configuration

Defaults 1

Example SEFOS(config)# **vlan 4**

Notes

Leading zeros must not be entered for VLAN ID.

The default VLAN 1, can not be configured and by default, all ports are members of this VLAN . In order to remove ports from this VLAN, the port has to be configured as an access (untagged) port of some other VLAN. For example, to remove port 7 from the default VLAN, the following config could be done.

```
SEFOS(config)# interface ext 0/7
SEFOS(config-if)# switchport access vlan 56
% Access VLAN does not exist.,Creating vlan
SEFOS(config-if)# end
SEFOS#
```

Related Commands

`show vlan` - Displays VLAN information in the database

12.1.2 interface range

Selects the range of physical interfaces and VLAN interfaces to be configured and the `no` form of the command selects the range of VLAN interfaces to be removed.

```
interface range ({interface-type slot/port-port} {vlan 1-4094 -
2-4094})
```

```
no interface range vlan 1-4094 - 2-4094
```

Syntax Description

interface-type – Interface type.

slot/port-port – Member ports identifier.

vlan – VLAN identifiers.

Mode

Global Configuration

Example

```
SEFOS(config)# interface range extreme-ethernet 0/1-23
vlan 1 - 2
SEFOS(config-if-range)#

SEFOS(config)# interface range vlan 1 extreme-ethernet
0/1
SEFOS(config-if-range)#

SEFOS(config)# interface range vlan 1 - 4
extreme-ethernet 0/1-3
SEFOS(config-if-range)#

SEFOS(config)# interface range vlan 1 - 4
extreme-ethernet 0/1
SEFOS(config-if-range)#

SEFOS(config)# interface range extreme-ethernet 0/1-23
vlan 1 - 128
SEFOS(config-if-range)#
```

Notes

- For specifying the interface VLAN range, space should be provided before and after the dash. That is, the command interface range vlan 1 - 4 is valid, whereas the command interface range vlan 1- 4 is not valid.
- For port channel range, the specified range must be configured using the interface command.

Related Commands

- `interface` - Enters into the interface mode
- `show interfaces` - Displays the interface status and configuration

12.1.3 set gvrp

Enables or disables GVRP on a global basis.

```
set gvrp {enable | disable}
```

Syntax Description

enable – Enables GVRP in the switch.
disable – Disables GVRP in the switch.

Mode

Global Configuration

Defaults

Enabled.

Example

```
SEFOS(config)# set gvrp disable
```

Notes GVRP needs to be explicitly enabled even after GARP is enabled.

Related Commands

- `show vlan` - Displays VLAN information in the database
- `show vlan device info` - Displays the VLAN related global status variables

12.1.4 set port gvrp

Enables or disables GVRP on the interface.

```
set port gvrp interface-type interface-id {enable | disable}
```

Syntax Description
interface-type – Interface type.
interface-id – Interface identifier.
enable – Enables GVRP on the interface.
disable – Disables GVRP on the interface.

Mode Global Configuration

Defaults Enabled.

Example
```
SEFOS(config)# set port gvrp extreme-ethernet 0/1 disable
```

Notes
- The value `enable` indicates that GVRP is enabled on the current port, while global GVRP status is also enabled for the device.
- If port GVRP state is disabled, but global GVRP status is still enabled, GVRP is disabled on the current port. Any GVRP packet received is discarded and no GVRP registrations are propagated from other ports.

Related Commands

`show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.5 set port gvrp enable | disable

Enables or disables GVRP on the interface.

Operates similar to the `set port gvrp` command.

```
set port gvrp {enable | disable} interface-id
```

Syntax Description	**enable** – Enables GVRP on the interface. **disable** – Disables GVRP on the interface. *interface-id* – Interface identifier.
Mode	Global Configuration
Defaults	Enabled.
Example	`SEFOS(config)# set port gvrp disable 0/1`
Notes	• The value `enable` indicates that GVRP is enabled on the current port, as long as global GVRP status is also enabled for the device. • If port GVRP state is disabled, but global GVRP status is still enabled, GVRP is disabled on current port. Any received GVRP packets are discarded and no GVRP registrations are propagated from other ports.

Related Commands

`show vlan port config` - Displays the vlan related parameters specific for ports

12.1.6 set gmrp

Enables or disables GMRP globally on the device.

```
set gmrp {enable | disable}
```

Syntax Description	**enable** – Enables GMRP on the device. **disable** – Disables GMRP on the device.
Mode	Global Configuration
Defaults	Enabled.
Example	`SEFOS(config)# set gmrp disable`
Notes	GMRP must be explicitly enabled even after GARP is enabled.

Related Commands

- `show vlan` - Displays VLAN information in the database
- `show vlan device info` - Displays the VLAN related global status variables

12.1.7 set port gmrp

Enables or disables GMRP on the port.

```
set port gmrp interface-type interface-id {enable | disable}
```

Syntax Description

interface-type – Interface type.

interface-id – Physical interface identifier including type, slot, and port number.

enable – Enables GMRP on the interface.

disable – Disables GMRP on the interface.

Mode Global Configuration

Defaults Enabled.

Example

```
SEFOS(config)# set port gmrp extreme-ethernet 0/1
disable
```

Notes

- The value `enable` indicates that GMRP is enabled on this port in all VLANs while GMRP status is also enabled globally.
- The value `disable` indicates that GMRP is disabled on this port in all VLANs. Any GMRP packet received is silently discarded and no GMRP registrations are propagated from other ports.

Related Commands

`show vlan port config` - Displays the vlan related parameters specific for ports

12.1.8 set vlan traffic-classes

Enables or disables traffic classes.

```
set vlan traffic-classes {enable | disable}
```

Syntax Description

enable – Enables traffic classes.

disable – Disables traffic classes.

Mode Global Configuration

Defaults Enabled.

Example

```
SEFOS(config)# set vlan traffic-classes enable
```

Notes Must be executed prior to executing the `vlan max traffic class` command.

Related Commands

- `show vlan device info` - Displays the VLAN related global status variables
- `show vlan traffic-classes` - Displays the traffic class information of all the available interfaces

12.1.9 mac-address-table static unicast

Configures a static unicast MAC address in the forwarding database. The `no` form of the command deletes a configured static unicast MAC address from the forwarding database.

```
mac-address-table static unicast aa:aa:aa:aa:aa:aa vlan 1-4094
[{recv-port ifXtype ifnum}] interface ([interface-type 0/a-b,
0/c, ...] [interface-type 0/a-b, 0/c, ...] [port-channel
a,b,c-d]) [connection-identifier ucast-mac] [status {permanent |
deleteOnReset | deleteOnTimeout}]
```

```
no mac-address-table static unicast aa:aa:aa:aa:aa:aa vlan 1-4094
[{recv-port ifXtype ifnum}]
```

Syntax Description

aa:aa:aa:aa:aa:aa – Destination MAC address.

vlan – VLAN identifier.

recv-port – Received port's Interface type and ID The keyword `recv-port` is not supported.

interface – Member ports Interface type and identifier.

interface-type 0/a-b, 0/c, ... – Member ports interface type and identifier.

port-channel – Port-channel identifier.

connection-identifier – It references the backbone addresses and other parameters and is used locally for learning in the forwarding database.

status – Status of the static unicast entry.

Mode Global Configuration

Defaults **status** – **permanent**

Example

```
SEFOS(config)# mac-address-table static unicast
22:22:22:22:22:99 vlan 2 interface extreme-ethernet 0/2
status permanent

SEFOS(config)# mac-address-table static unicast
22:22:22:22:22:99 vlan 2 int ex 0/2 status deleteOnReset
```

Related Commands

- `show mac-address-table static unicast` - Displays the statically configured unicast address from the MAC address table.
- `mac-address-table static unicast` - Configures a static multicast MAC address in the forwarding database.
- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode.

12.1.10 mac-address-table static multicast

Configures a static multicast MAC address in the forwarding database. The `no` form of the command deletes a configured static multicast MAC address from the forwarding database.

```
mac-address-table static multicast aa:aa:aa:aa:aa:aa vlan 1-4094
[{recv-port ifXtype ifnum}] interface [interface-type
0/a-b,0/c,...] [interface-type 0/a-b,0/c,...] [port-channel
a,b,c-d] [forbidden-ports [interface-type 0/a-b,0/c,...]
[interface-type 0/a-b,0/c,...] [port-channel a,b,c-d]] [status
{permanent | deleteOnReset | deleteOnTimeout}]
```

```
no mac-address-table static multicast aa:aa:aa:aa:aa:aa vlan
1-4094 [{recv-port ifXtype ifnum}]
```

Syntax Description

aa:aa:aa:aa:aa:aa – Multicast MAC address.

vlan – VLAN identifier.

recv-port – Received port interface type and identifier.

interface – Member port interface type and identifier.

interface-type 0/a-b,0/c,... – Member ports interface type and identifier.

port-channel – Port channel identifier.

forbidden-ports – Forbidden ports interface type and identifier.

interface-type 0/a-b,0/c,... – Forbidden ports interface type and identifier.

port-channel – Port channel identifier.

status – Status of the static multicast entry.

Mode Global Configuration

Defaults **status** – **permanent**

Example

```
SEFOS(config)# mac-address-table static multicast
01:02:03:04:05:06 vlan 2 interface extreme-ethernet 0/1
```

Related Commands

- show mac-address-table static unicast - Displays the statically configured unicast address from the MAC address table.
- mac-address-table static unicast - Configures a static multicast MAC address in the forwarding database.
- vlan - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode.

12.1.11 mac address-table static mcast

Configures a static multicast MAC address in the forwarding database. The no form of the command deletes a configured static multicast MAC address from the forwarding database.

Operates similar to the command mac-address-table static multicast.

mac address-table static *mcast-mac*> **vlan** *1-4094* **[interface** *interface-type 0/a-b,0/c,...*] **[***interface-type 0/a-b,0/c,...***]** **[port-channel** *a,b,c-d***]**

no mac address-table static *mcast-mac* **vlan** *1-4094* **[interface** *ifXtype ifnum***]**

Syntax Description	**mcast-mac** – Multicast MAC address. **vlan** – VLAN identifier that ranges between 1 and 4094. **interface** – Member ports interface type and identifier. *interface-type 0/a-b, 0/c, ...* – Specifies interface type and ID of the member and forbidden ports. **port-channel** – Port channel identifier.
Mode	Global Configuration
Example	SEFOS(config)# **mac address-table static 01:02:03:04:05:06 vlan 2 interface extreme-ethernet 0/1**

Related Commands

- show mac-address-table static unicast - Displays the statically configured unicast address from the MAC address table.
- vlan - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode.

12.1.12 mac-address-table aging-time

Sets the maximum age of a dynamically learned entry in the MAC address table. The no form of the command sets the maximum age of an entry in the MAC address table to its default value.

```
mac-address-table aging-time 10-1000000
```

```
no mac-address-table aging-time
```

Mode	Global Configuration
Defaults	300
Example	`SEFOS(config)# mac-address-table aging-time 200`
Notes	If traffic on an interface is not very frequent, then the aging time must be increased to record the dynamic entries for a longer time. Increasing the time can reduce the possibility of flooding.

Related Commands

- mac-address-table aging-time - Displays the MAC address-table with aging time

12.1.13 bridge-mode

Configures the bridge mode of the switch.

```
bridge-mode {customer | provider | provider-core | provider-edge
| provider-backbone-icomp | provider-backbone-bcomp}
```

Syntax Description	**customer** – Customer bridge mode. **provider** – Provider bridge mode. **provider-core** – Provider core bridge mode. **provider-edge** – Provider edge bridge mode. **provider-backbone-icomp** – Provider backbone bridge I component mode. **provider-backbone-bcomp** – Provider backbone bridge B component mode.
Mode	Global Configuration in SI mode Switch Configuration in MI mode
Defaults	Based on the bridge mode value in `issnvram.txt`.

Example SEFOS(config)# **bridge-mode provider-backbone-icomp**

Notes

- Only one bridge mode can be set at a time. If multiple bridge modes are required, run multiple instances of the bridge.
- To configure the bridge mode of the switch:
  Spanning tree must be shut down.
  GARP must be shut down.
  ECFM must be shutdown.

Related Commands

`show vlan device info` - Displays the VLAN related global status variables

12.1.14 l2protocol-tunnel cos

Configures the priority for the tunneled STP BPDUs. The `no` form of the command configures the default priority for the tunneled STP BPDUs.

l2protocol-tunnel cos *0-7*

no l2protocol-tunnel cos

Mode Global Configuration

Defaults **cos - value** – 7

Example SEFOS(config)# **l2protocol-tunnel cos 5**

Notes The configured priority value will be effective only when the L2 protocol tunnel STP is enabled on an interface.

Related Commands

show l2protocol-tunnel - Displays the entries in VLAN tunnel protocol table containing the number of ingress or egress STP BPDUs tunneled

12.1.15 clear l2protocol-tunnel counters

Clears the L2 protocol tunnel counters.

clear l2protocol-tunnel counters [*interface-type interface-id***]**

Syntax Description	*interface-type* – Interface type *interface-id* – Physical interface identifier including type, slot, and port number
Mode	Global Configuration
Example	`SEFOS(config)# clear l2protocol-tunnel counters`
Notes	If executed without the optional parameters, this command clears the STP tunnel counters of all the available interfaces.

12.1.16 clear vlan statistics

Clears the VLAN counters.

```
clear vlan statistics [vlan 1-4094]
```

Syntax Description	**vlan** – VLAN identifier
Mode	Global Configuration
Example	`SEFOS(config)# clear vlan statistics vlan 1`
Notes	If executed without the optional parameters this command clears all the VLAN counters.

Related Commands

`show vlan statistics` - Displays the VLAN statistics

12.1.17 ports

The `ports` command configures a static VLAN entry with the required member ports, untagged ports, and forbidden ports. The tagged and untagged member ports defined by this command are used for egress tagging for a VLAN at a port.

For ports in PBB bridge mode, this command is used to define member ports for a VLAN in a component.

- For BVLAN in a B component, these member ports can be only PNP.
- For SVLAN in an I component, these member ports can be only CNP-Stagged.
- For CVLAN in an I component, these member ports can be only CNP-Ctagged.

The no form of the command resets the port list or deletes port members for the VLAN.

```
ports [add]([interface-type 0/a-b,0/c,...] [interface-type
0/a-b,0/c,...] [port-channel a,b,c-d]) [untagged interface-type
0/a-b,0/c,... [interface-type 0/a-b,0/c,...] [port-channel
a,b,c-d][all])] [forbidden interface-type 0/a-b,0/c,...
[interface-type 0/a-b,0/c,...] [port-channel a,b,c-d]] [name
vlan-name]
```

```
no ports [interface-type 0/a-b,0/c,...] [interface-type
0/a-b,0/c,...] [port-channel a,b,c-d] [all] [untagged
([interface-type 0/a-b,0/c,...] [interface-type 0/a-b,0/c,...]
[port-channel a,b,c-d] [all])] [forbidden ([interface-type
0/a-b,0/c,...] [interface-type 0/a-b,0/c,...] [port-channel
a,b,c-d] [all])] [name vlan-name]
```

Syntax Description

ports – Member ports interface type and identifier.
add – Add ports to existing VLAN port membership list.
interface-type 0/a-b,0/c,... – Member ports interface type and identifier.
port-channel *a,b,c-d* – Port-channel identifier.
untagged – Untagged ports interface type and identifier.
interface-type 0/a-b,0/c,... – Untagged ports interface type and identifier.

Mode

VLAN Configuration

Example

```
SEFOS# configure terminal
SEFOS(config)# vlan 5
SEFOS(config-vlan)# ports add extreme-ethernet 0/1 untagged
extreme-ethernet 0/1 forbidden extreme-ethernet 0/2 name vl5

SEFOS(config-vlan)# port add ex 0/6
SEFOS(config-vlan)# end
SEFOS# show vlan id 5

Vlan database
-------------
Vlan ID                : 5
Member Ports           : Ex0/1, Ex0/6
Untagged Ports         : Ex0/1
Forbidden Ports        : Ex0/2
Name                   : v15
Status                 : Permanent
-----------------------------------------------------
```

Notes

- Member-ports represent the set of ports permanently assigned to the egress list.
- Forbidden-ports represent the set of ports forbidden for the VLAN.
- Untagged ports represent the set of ports which transmits untagged frames.

Related Commands

- `show vlan` - Displays VLAN information in the database
- `switchport pvid` / `switchport access vlan` - Configures the PVID that would be assigned to untagged, priority-tagged frames, or VLAN tagged frames

12.1.18 vlan active

Activates a particular VLAN in the switch.

```
vlan active
```

Mode Config-VLAN

Example
```
SEFOS(config-vlan)# vlan active
```

12.1.19 switchport pvid

Configures the PVID on a port. The `no` form of the command sets the PVID to the default value on the port.

```
switchport pvid 1-4094
```

```
no switchport pvid
```

Syntax Description **vlan-id** – PVID value to be configured on the port.

Mode Interface Configuration

Example
```
SEFOS(config-if)# switchport pvid 3
```

Notes

- If the frame (untagged, priority tagged, or customer VLAN tagged) is received on a *tunnel* port, the default port VLAN identifier (PVID) associated with the port is used.
- If the received frame cannot be classified as MAC-based or port-and-protocol-based, the PVID associated with the port is used.
- Usage is based on an acceptable frame type of the port. Packets are either dropped or accepted at ingress. Once a packet is accepted, if the packet has a tag, it is processed against that tag. Otherwise, the packet is processed against the PVID.

Related Commands

`show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.20 switchport access vlan

Configures the PVID on a port. The `no` form of the command sets the PVID to the default value on the port. Operates similar to the command `switchport pvid`.

```
switchport access vlan 1-4094
```

```
no switchport access vlan
```

Syntax Description **`vlan`** – PVID value to be configured on the port with a range of 1-4094.

Mode Interface Configuration

Example

```
SEFOS(config-if)# switchport access vlan 3
```

Notes If the frame (untagged, priority tagged, or customer VLAN tagged) is received on a *tunnel* port, the default PVID associated with the port is used.

Usage is based on an acceptable frame type of the port. Packets are either dropped or accepted at ingress. Once a packet is accepted, if the packet has a tag, is be processed against that tag. Otherwise, the packet is processed against PVID.

Related Commands

`show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.21 switchport acceptable-frame-type

Configures the acceptable frame type for the port. The no form of the command sets the default value of acceptable frame type (all frames accepted).

```
switchport acceptable-frame-type {all | tagged |
untaggedAndPrioritytagged}
```

```
no switchport acceptable-frame-type
```

Syntax Description

all – All frames. Both tagged and untagged frames are allowed.

tagged – Tagged frames.

untaggedAndPrioritytagged – Untagged and priority tagged frames.

Mode Interface Configuration

Defaults All

Example

```
SEFOS(config-if)# switchport acceptable-frame-type tagged
```

Notes

- When set to tagged, the device discards untagged and priority tagged frames received on the port and processes only the VLAN tagged frames.
- When set to all, untagged frames or priority-tagged frames received on the port are also accepted.
- When set to untaggedAndPrioritytagged, untagged and priority tagged frames alone are accepted and tagged frames are dropped.

Related Commands

show vlan port config - Displays the VLAN related parameters specific for ports.

12.1.22 switchport ingress-filter

Enables ingress filtering on the port. The no form of this command disables ingress filtering on the port.

```
switchport ingress-filter
```

```
no switchport ingress-filter
```

Mode Interface Configuration

Defaults Enabled.

Example SEFOS(config-if)# **switchport ingress-filter**

Notes
- When ingress-filtering is enabled, the device discards those incoming frames for VLANs which do not include this port in its member set.
- When the ingress filtering is disabled with the no form of the command, the device accepts all incoming frames.

Related Commands

show vlan port config - Displays the VLAN related parameters specific for ports

12.1.23 switchport priority default

Sets the default user priority for the port. The no form of the command sets the default user priority for the port to the default value.

```
switchport priority default 0-7
```

```
no switchport priority default
```

Mode Interface Configuration Mode

Defaults 0

Example SEFOS(config-if)# **switchport priority default 5**

Related Commands

show vlan port config - Displays the VLAN related parameters specific for ports

12.1.24 switchport mode

Configures the VLAN port mode. The no form of the command configures the default VLAN port mode.

```
switchport mode { access | trunk | hybrid | {dynamic {auto |
desirable}}}
```

```
no switchport mode
```

Syntax Description

access – Access port mode.
An access port can accept and send only untagged frames.

trunk – Trunk port mode.
When configured as a trunk port, a port is added as a member of all the existing VLANs and also any new VLAN created.

hybrid – Hybrid VLAN port mode. A hybrid port can send or accept both tagged and untagged frames.

dynamic – Dynamic mode.

- **auto** - Interface converts the link to a trunk link.
- **desirable** - Interface actively attempts to convert the link to a trunk link.

Mode Interface Configuration

Defaults Hybrid mode.

Example
```
SEFOS(config-if)# switchport mode access
```

Notes

- It is not possible to set the `switchport mode` status to `trunk` or `hybrid` if the tunnel is enabled.
- It is not possible to configure the `switchport mode` status to `trunk` if the port is an untagged member of a VLAN.
- It is not possible to configure the `switchport mode` status to access if the ports acceptable frame type is all or tagged.

Related Commands

- `switchport mode dot1q-tunnel` - Enables dot1q-tunneling on the specified interface
- `show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.25 switchport mode dot1q-tunnel

Enables `dot1q-tunneling` on the specified interface. The `no` form of the command disables `dot1q-tunneling` on the specified interface.

```
switchport mode dot1q-tunnel
```

```
no switchport mode dot1q-tunnel
```

Mode Interface Configuration

Defaults Disabled.

Example
```
SEFOS(config-if)# switchport mode dot1q-tunnel
```

Notes

- Bridge mode must be set to `provider` for the `dot1q-tunneling` status to be enabled.
- It is not possible to set the `dot1q-tunnel` status on the port if the port mode is not `access` type.
- If `dot1q tunneling` is enabled on the specified interface, the GMRP is disabled internally.

Related Commands

- `bridge-mode` - Configures the bridge mode of the switch
- `switchport mode` - Configures the VLAN port mode
- `show vlan device info` - Displays the VLAN related global status variables
- `show vlan port config` - Displays the VLAN port information

12.1.26 set garp timer

Configures the GARP join time, leave time, and leaveall time in milli-seconds.

```
set garp timer {join | leave | leaveall} <time in milli seconds>
```

Syntax Description

join – Join time.
leave – Leave time.
leaveall – Leaveall time.

Mode

Interface Configuration

Defaults

join – 20
leave – 60
leaveall – 1000

Example

```
SEFOS(config-if)# set garp timer join 500
```

Notes

- Leave timer must be greater than 2 times join timer and leaveall timer must be greater than leave timer.
- Timer values cannot be set to zero.
- The GARP timer configuration is applied to the GARP applications (GMRP and GVRP) on the specified interface.

Related Commands

`show garp timer` - Displays the GARP timer information of the available interfaces

12.1.27 vlan restricted

Enables or disables restricted VLAN registration on the port.

```
vlan restricted {enable | disable}
```

Syntax Description	**enable** – Enables restricted VLAN registration. **disable** – Disables restricted VLAN registration.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# vlan restricted enable`
Notes	If restricted VLAN registration rules are enabled, then a VLAN is learnt dynamically from the GVRP frame only if the specific VLAN is statically configured in the switch. If restricted VLAN registration rules are disabled, then GVRP packets are processed normally and the VLANs are learnt dynamically even if they are not statically configured in the switch.

Related Commands

`show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.28 group restricted

Enables or disables restricted group registration on a port.

```
group restricted {enable | disable}
```

Syntax Description	**enable** – Enables restricted group registration. **disable** – Disables restricted group registration.
Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# group restricted enable`

Notes

- If restricted group registration rules are **enabled**, a multicast group attribute or service requirement attribute is learned dynamically from the GMRP frame only if the specific multicast group attribute or service requirement attribute is statically configured in the switch.
- If restricted group registration rules are **disabled**, GMRP packets are processed normally and the multicast group attribute or service requirement attribute are learned dynamically even when not statically configured in the switch.

Related Commands

`show vlan port config` - Displays the VLAN related parameters specific for ports

12.1.29 vlan map-priority

Maps a priority to a traffic class on the specified port. The frame received on the interface with the configured priority is processed in the configured traffic class. The `no` form of the command maps the default priority to traffic class value on the port.

```
vlan map-priority 0-7 traffic-class 0-7
```

```
no vlan map-priority 0-7
```

Syntax Description

traffic-class – Traffic class value (0-7).

map-priority – Map priority value (0-7).

Mode

Interface Configuration

Example

```
SEFOS(config-if)# vlan map-priority 2 traffic-class 2
```

Notes

The default traffic class value depends on the configured priority value. Following is the list of default traffic class values for different priority values:

Priority	Default traffic class
0	2
1	0
2	1
3	3
4	4
5	5
6	6
7	7

Related Commands

`show vlan traffic-classes` - Displays the traffic classes information of all the available interfaces

12.1.30 shutdown garp

Shuts down the GARP module. The `no` form of the command starts and enables the GARP module.

```
shutdown garp
```

```
no shutdown garp
```

Mode	Global Configuration
Defaults	GARP module is started and enabled.
Example	`SEFOS(config)#` **`shutdown garp`**
Notes	• GARP cannot be started if VLAN is shutdown. • GARP cannot be shutdown if GVRP or GMRP are enabled.

12.1.31 debug vlan

Sets the debug level. The `no` form of the command sets the debug level to default value.

```
debug vlan {global | [{fwd | priority | | redundancy} [initshut]
[mgmt] [data] [ctpl] [dump] [os] [failall] [buffer] [all]] switch
switch-or-context-name}
```

```
no debug vlan {global | [{fwd | priority | | redundancy}
[initshut] [mgmt] [data] [ctpl] [dump] [os] [failall] [buffer]
[all]] switch switch-or-context-name}
```

Syntax Description	**global** – Global related debug messages. **fwd** – Forwarding module. **priority** – VLAN priority module. **redundancy** – Redundancy related debug messages. **initshut** – Init and shutdown. **mgmt** – Management. **data** – Data path. **ctpl** – Control plane. **dump** – Packet dump. **os** – Traces related to all resources except buffer. **failall**– All failures. **buffer** – Buffer. **all** – All traces. **switch** – Context or switch name. If the switch supports multiple instances, the name of the instance can be specified. Otherwise this parameter need not be given or the context name can be given as `default`. The keyword `switch` is not supported.
Mode	Privileged Exec
Defaults	Disabled.
Example	`SEFOS#` **`debug vlan fwd all`**

Related Commands

`show debugging` - Displays state of each debugging option

12.1.32 debug garp

Sets debug level. The `no` form of the command sets the debug level to default value.

```
debug garp {global | [{protocol | gmrp | gvrp | redundancy}
[initshut] [mgmt] [data] [ctpl] [dump] [os] [failall] [buffer]
[all]] [switch-or-context-name]}
```

```
no debug garp {global | [{protocol | gmrp | garp | redundancy}
[initshut] [mgmt] [data] [ctpl] [dump] [os] [failall] [buffer]
[all]] [switch-or-context-name]}
```

Syntax Description	**global** – Global related debug messages. **protocol** – Protocol related traces. **gmrp** – GMRP related traces. **gvrp** – GVRP related traces. **redundancy** – Redundancy related debug messages. The keyword `redundancy` is not supported. **initshut** – `init` and shut down. **mgmt** – Management. **data** – Data path. **ctpl** – Control plane. **dump** – Packet dump. **os** – Traces related to all resources except buffer. **failall** – All failures. **buffer** – Buffer. **all** – All traces. **switch** – Context or switch name. If the switch supports multiple instances, the name of the instance can be specified. Otherwise, this parameter need not be given or the context name can be given as `default`. The keyword `switch` is not supported.
Mode	Privileged Exec
Defaults	Disabled.
Example	`SEFOS#` **`debug garp protocol all`**

Related Commands

`show debugging` - Displays state of each debugging option

12.1.33 show vlan

Displays the VLAN information in the database.

show vlan [brief | **id** *vlan-range* | **summary] [switch** *context-name***]**

Syntax Description	**brief** – Information about all the VLANs in brief. **id** – Information specific to the VLAN identifier. **summary** – Summary of the VLAN. **switch**– Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.
Mode	Privileged EXEC

Example

```
Single Instance:
SEFOS# show vlan brief
Vlan database
-------------
Vlan ID      : 1
Member Ports : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6,
Ex0/7, Ex0/8, Ex0/9, Ex0/10, Ex0/11, ...
Untagged Ports: Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6,
Ex0/7, Ex0/8, Ex0/9, Ex0/10, Ex0/11, ...
Forbidden Ports: None
Name :
Status : Permanent
--------------------------------------------------

SEFOS# show vlan summary
Number of vlans : 1

Multiple Instance:

SEFOS# show vlan

Switch - default

Vlan database
-------------

Vlan ID               : 1
Member Ports          : Ex0/49
Untagged Ports        : Ex0/49
Forbidden Ports       : None
Name                  :
Status: Permanent
--------------------------------------------------
```

```
Switch - cust1

Vlan database
-------------
Vlan ID                : 1
Member Ports          : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5,
Ex0/6
Untagged Ports        : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5,
Ex0/6
Forbidden Ports       : None
Name                   :
Status                 : Permanent
--------------------------------------------------

Vlan ID                : 20
Member Ports           : Ex0/1
Untagged Ports         : Ex0/1
Forbidden Ports        : None
Name                   :
Status                 : Permanent
--------------------------------------------------

Vlan ID                : 30
Member Ports           : Ex0/2
Untagged Ports         : None
Forbidden Ports        : None
Name                   :
Status                 : Dynamic Gvrp
--------------------------------------------------
```

Notes If the optional parameter is not specified then this command displays the VLAN information of all the available interfaces.

Related Commands

- shutdown vlan - Shuts down VLAN switching. The no form of the command starts and enables VLAN switching
- vlan - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- ports - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports

12.1.34 show vlan device info

Displays the VLAN related global status variables.

```
show vlan device info [switch switch-or-context-name]
```

Syntax Description

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show vlan device info

Vlan device configurations
--------------------------
Vlan Status : Enabled
Vlan Oper status : Enabled
Gvrp status : Enabled
Gmrp status : Enabled
Gvrp Oper status : Enabled
Gmrp Oper status : Enabled
Mac-Vlan Status : Disabled
Subnet-Vlan Status : Disabled
Protocol-Vlan Status : Enabled
Bridge Mode : Customer Bridge
Base-Bridge Mode : Vlan Aware Bridge
Traffic Classes : Enabled
Vlan Operational Learning Mode : IVL
Version number : 1
Max Vlan id : 4094
Max supported vlans : 4094
Unicast mac learning limit : 16334
```

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `set gvrp` - Enables or disables GVRP on a global basis
- `set port gvrp` - Enables or disables GVRP on the interface
- `set gmrp` - Enables or disables GMRP on a global basis
- `set port gmrp` - Enables or disables GMRP on the interface

- `set vlan traffic-classes` - Enables or disables traffic classes

12.1.35 show vlan device capabilities

Displays VLAN capabilities of the device.

```
show vlan device capabilities [switch switch-or-context-name]
```

Syntax Description

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show vlan device capabilities
Vlan device capabilities
-------------------------

Extended filtering services
Traffic classes
Static Entry Individual port
IVL capable
SVL capable
Hybrid capable
Configurable Pvid Tagging
```

Notes

IVL capable is the only capable mode. SVL and hybrid are not supported.

12.1.36 show vlan traffic-classes

Displays the traffic classes information of all the available interfaces.

```
show vlan traffic-classes [{port interface-type interface-id |
switch switch-or-context-name}]
```

Syntax Description

port – Interface type and identifier of the port.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show vlan traffic-classes
Traffic Class table
---------------------
Port      Priority     Traffic Class
-----     ---------    -------------
Ex0/1     0              2
Ex0/1     1              0
Ex0/1     2              1
Ex0/1     3              3
Ex0/1     4              4
Ex0/1     5              5
Ex0/1     6              6
Ex0/1     7              7
Ex0/2     0              2
Ex0/2     1              0
Ex0/2     2              1
Ex0/2     3              3
Ex0/2     4              4
Ex0/2     5              5
Ex0/2     6              6
Ex0/2     7              7

Multiple Instance:
SEFOS# show vlan traffic-classes

Switch - default

Traffic Class table
---------------------
Port      Priority     Traffic Class
-----     ---------    -------------
Ex0/49     0             2
Ex0/49     1             0
Ex0/49     2             1
Ex0/49     3             3
Ex0/49     4             4
Ex0/49     5             5
Ex0/49     6             6
Ex0/49     7             7
```

```
Switch - cust1

Traffic Class table
---------------------
Port      Priority     Traffic Class
-----     ---------    -------------
Ex0/1     0              2
Ex0/1     1              0
Ex0/1     2              1
Ex0/1     3              3
Ex0/1     4              4
Ex0/1     5              5
Ex0/1     6              6
Ex0/1     7              7

Ex0/2     0              2
Ex0/2     1              0
Ex0/2     2              1
Ex0/2     3              3
Ex0/2     4              4
Ex0/2     5              5
Ex0/2     6              6
Ex0/2     7              7
```

Notes If executed without the ports option, this command displays the priority mapped to all the available traffic classes on the port.

Related Commands

- `vlan` - Configures a VLAN in the switch and is used to enter into the VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `set vlan traffic-classes` - Enables or disables traffic classes

12.1.37 show garp timer

Displays the GARP timer information of the available interfaces.

show garp timer [{port *interface-type interface-id* **| switch** *switch-or-context-name*}]

Syntax Description

port – Interface type and identifier of the port

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
Single Instance:
SEFOS# show garp timer port extreme-ethernet 0/1

Garp Port Timer Info (in milli seconds)
---------------------------------------

Port      Join-time       Leave-time       Leave-all-time
-----     ---------       ----------       --------------
Ex0/1     200              600               10000

Multiple Instance:
SEFOS# show garp timer
Switch - default

Garp Port Timer Info (in milli seconds)
---------------------------------------

Port      Join-time       Leave-time       Leave-all-time
-----     ---------       ----------       --------------
Ex0/49    200              600               10000

Switch - cust1

Garp Port Timer Info (in milli seconds)
---------------------------------------

Port      Join-time       Leave-time       Leave-all-time
-----     ---------       ----------       --------------
Ex0/1     200              600               10000
Ex0/2     200              600               10000
Ex0/3     200              600               10000
Ex0/4     200              600               10000
Ex0/5     200              600               10000
Ex0/6     200              600               10000
```

Notes

The timer information is the same for GVRP and GMRP.

Related Commands

- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports

- `show vlan device info` - Displays the VLAN related global status variables
- `set garp timer` - Configures the GARP join time, leave time, and leaveall time in milli-seconds

12.1.38 show vlan port config

Displays the VLAN related parameters specific for ports.

show vlan port config [{port *interface-type interface-id* **| switch** *switch-or-context-name*}]

Syntax Description

port – Interface type and identifier of the port.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show vlan port config

Vlan Port configuration table
-----------------------------
Port Ex0/1
Port Vlan ID : 1
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Enabled
Port Mode : Hybrid
Port Gvrp Status : Enabled
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0
Gvrp last pdu origin : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
```

```
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
-------------------------------------------------------
Port Ex0/2
Port Vlan ID : 1
Port Acceptable Frame Type : Admit All
Port Ingress Filtering : Enabled
Port Mode : Hybrid
Port Gvrp Status : Enabled
Port Gmrp Status : Enabled
Port Gvrp Failed Registrations : 0

Gvrp last pdu origin : 00:00:00:00:00:00
Port Restricted Vlan Registration : Disabled
Port Restricted Group Registration : Disabled
Mac Based Support : Disabled
Subnet Based Support : Disabled
Port-and-Protocol Based Support : Enabled
Default Priority : 0
Dot1x Protocol Tunnel Status : Peer
LACP Protocol Tunnel Status : Peer
Spanning Tree Tunnel Status : Peer
GVRP Protocol Tunnel Status : Peer
GMRP Protocol Tunnel Status : Peer
IGMP Protocol Tunnel Status : Peer
Filtering Utility Criteria : Default
Port Protected Status : Disabled
-------------------------------------------------------
```

Notes

If executed with out the optional parameter, this command displays the port information of all the available ports.

Related Commands

- `set port gvrp` / `set port gvrp enable | disable` - Enables or disables GVRP on the interface
- `set port gmrp` - Enables or disables GMRP on the interface
- `switchport pvid` / `switchport access vlan` - Configures the PVID that would be assigned to untagged, priority-tagged frames, or VLAN tagged frames
- `switchport acceptable-frame-type` - Configures the acceptable frame type for the port
- `switchport ingress-filter` - Enables ingress filtering on the port
- `vlan restricted` - Enables or disables restricted VLAN registration on the port

12.1.39 show vlan statistics

Displays VLAN statistics such as the number of unicast frames forwarded broadcast packets and unknown unicast packets flooded in that VLAN.

show vlan statistics [vlan *1-4094*] **[switch** *switch-or-context-name*]

Syntax Description

vlan – VLAN range (1-4094)

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show vlan statistics

Unicast/broadcast Vlan statistics vlan 1

-------------------------------------
Vlan Id : 1
Unicast frames received : 0
Mcast/Bcast frames received : 10331
Unknown Unicast frames flooded : 0
Unicast frames transmitted : 0
Broadcast frames transmitted : 0
-------------------------------------
```

Notes

If VLAN identifier is not specified in the command, statistics of all the VLAN existing in the system will be displayed.

Related Commands

`clear vlan statistics` - Clears the VLAN counters

12.1.40 show mac-address-table

Displays the static and dynamic unicast and multicast MAC address table.

```
show mac-address-table [vlan 1-4094] [address aa:aa:aa:aa:aa:aa]
[interface interface-type interface-id]
```

Syntax Description

vlan – VLAN range (1-4094).
address – MAC address.
interface – Interface type and identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show mac-address-table vlan 2

Vlan     Mac Address           Type       ConnectionId         Ports
----     -----------           ----       ------------         -----
2         00:01:02:03:04:21    Learnt                           Ex0/1
Total Mac Addresses displayed: 1

SEFOS# show mac-address-table interface extreme-ethernet 0/1
Vlan     Mac Address           Type       ConnectionId         Ports
----     -----------           ----       ------------         -----
2         00:01:02:03:04:21    Learnt                           Ex0/1
1         01:02:03:04:05:06    Static                           Ex0/1

Total Mac Addresses displayed: 2
```

Related Commands

- vlan - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- ports - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- mac-address-table static unicast - Configures a static unicast MAC address in the forwarding database
- mac-address-table static multicast - Configures a static multicast MAC address in the forwarding database

12.1.41 show dot1d mac-address-table

Displays the static or dynamic unicast and dynamic multicast FDB table entries, when the base bridge mode is transparent bridging.

show dot1d mac-address-table [address *aa:aa:aa:aa:aa:aa*]
[{interface *interface-type interface-id* **| switch**
switch-or-context-name}]

Syntax Description

address – MAC address.

interface – Interface type and identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show dot1d mac-address-table address
00:01:02:03:04:21

Mac Address           Type      Ports
-----------           ----      -----
00:01:02:03:04:21    Learnt      Ex0/2
Total Mac Addresses displayed:   1

SEFOS# show dot1d mac-address-table interface
extreme-ethernet 0/2

Mac Address           Type      Ports
-----------           ----      -----
00:01:02:03:04:21     Learnt     Ex0/2
01:02:03:04:05:06     Static     Ex0/2

Total Mac Addresses displayed: 2
```

Notes

If executed without the optional parameters, this command displays all the static or dynamic unicast and dynamic multicast entries

12.1.42 show dot1d mac-address-table static unicast

Displays static unicast MAC address table when the base bridge mode is transparent bridging.

show dot1d mac-address-table static unicast [address *aa:aa:aa:aa:aa:aa*] **[interface** *interface-type interface-id*]

Syntax Description

address – MAC address.

interface – Interface type and identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show dot1d mac-address-table static unicast
address 00:01:02:03:04:21

Mac Address          RecvPort     Status           Ports
-----------          --------     ------           -----
00:11:22:33:44:55                Permanent        Ex0/2
Total Mac Addresses displayed: 1

SEFOS# show dot1d mac-address-table static unicast
address 00:11:22:33:44:55

Mac Address          RecvPort     Status           Ports
-----------          --------     ------           -----
00:11:22:33:44:55                Permanent        Ex0/2

Total Mac Addresses displayed: 1
```

Notes

- If executed without the optional parameters this command displays all the static unicast MAC entries.
- This command is not applicable.

12.1.43 show dot1d mac-address-table static multicast

Displays static multicast MAC address table when the base bridge mode is transparent bridging.

show dot1d mac-address-table static multicast [address *aa:aa:aa:aa:aa:aa*] **[interface** *interface-type interface-id*]

Syntax Description

address – MAC address.

interface – Interface type and identifier.

Mode

Privileged EXEC

Example

```
SEFOS# show dot1d mac-address-table static multicast
address 01:00:5E:01:02:03

Mac Address         RecvPort       Type      Ports
-----------           ----          -----     -----
01:00:5E:01:02:03                 static    Ex0/2-3
Total Mac Addresses displayed: 1


SEFOS# show dot1d mac-address-table static multicast
interface extreme-ethernet 0/2

Mac Address         RecvPort   Type      Ports
    -----------      ------     ----      -----
01:00:5E:01:02:03              static    Ex0/2
01:00:5E:01:02:04              static    Ex0/2
Total Mac Addresses displayed: 2
```

Notes

If executed without the optional parameters, this command displays all the static multicast MAC entries.

This command is not applicable.

12.1.44 show mac-address-table count

Displays the number of MAC addresses present on all the VLANs or on the specified VLAN.

show mac-address-table count [vlan *1-4094*] **[switch** *switch-or-context-name*]

Syntax Description

vlan – VLAN identifier (1-4094).

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show mac-address-table count

Mac Entries for Vlan 1:
------------------------
Dynamic Unicast Address Count : 4
Dynamic Multicast Address Count : 0
Static Unicast Address Count : 0
Static Multicast Address Count : 0
---------------------------------------

Mac Entries for Vlan 5:
------------------------
Dynamic Unicast Address Count : 1
Dynamic Multicast Address Count : 0
Static Unicast Address Count : 0
Static Multicast Address Count : 0
---------------------------------------
```

Notes

If executed without the optional parameter, this command displays the MAC addresses present on all the VLANs.

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `mac-address-table static unicast` - Configures a static unicast MAC address in the forwarding database
- `mac-address-table static multicast` - Configures a static multicast MAC address in the forwarding database

12.1.45 show mac-address-table static unicast

Displays the statically configured unicast addresses from the MAC address table.

```
show mac-address-table static unicast [vlan 1-4094] [address
aa:aa:aa:aa:aa:aa] [{interface interface-type interface-id |
switch switch-or-context-name}]
```

Syntax Description

vlan – VLAN identifier.

address – MAC address.

interface – Interface type and identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show mac-address-table static unicast
Vlan Mac Address RecvPort Status ConnectionId Ports
---- ----------- -------- ------ ------------ -----
1 22:22:22:22:22:99 Permanent Ex0/2

Total Mac Addresses displayed: 1
```

Notes

If executed without the optional parameters, this command displays the MAC address table for all the available interfaces.

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `mac-address-table static unicast` - Configures a static unicast MAC address in the forwarding database
- `show mac-address-table dynamic unicast` - Displays the dynamic MAC address table for the specified address or for all the addresses

12.1.46 show mac-address-table static multicast

Displays the statically configured multicast entries.

```
show mac-address-table static multicast [vlan 1-4094] [address
aa:aa:aa:aa:aa:aa] [{interface interface-type interface-id |
switch switch-or-context-name}]
```

Syntax Description

vlan – VLAN identifier.

address – MAC address.

interface – Interface type and identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show mac-address-table static multicast

Static Multicast Table
----------------------
Vlan : 1
Mac Address : 01:02:03:04:05:06
Receive Port :
Member Ports : Ex0/1
Forbidden Ports :
Status : Permanent
-----------------------------------------------

Total Mac Addresses displayed: 1
```

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `mac-address-table static multicast` / `mac address-table static mcast` - Configures a static multicast MAC address in the forwarding database
- `show mac-address-table dynamic multicast` - Displays the dynamic MAC address table for the specified address or for all the addresses

12.1.47 show mac-address-table dynamic unicast

Displays the dynamically learnt unicast entries from the MAC address table.

```
show mac-address-table dynamic unicast [vlan 1-4094] [address
aa:aa:aa:aa:aa:aa] [{interface interface-type interface-id |
switch switch-or-context-name}]
```

Syntax Description

vlan – VLAN identifier.

address – MAC address.

interface – Interface type and identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show mac-address-table dynamic unicast vlan 2
Vlan Mac Address Type ConnectionId Ports
---- ----------- ---- ------------ -----
2 00:01:02:03:04:21 Learnt Ex0/1
Total Mac Addresses displayed: 1
```

Notes

If executed without the optional parameters, this command displays the MAC address table of all the available interfaces.

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter in to the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `mac-address-table static unicast` - Configures a static unicast MAC address in the forwarding database
- `show mac-address-table static unicast` - Displays the statically configured unicast address from the MAC address table

12.1.48 show mac-address-table dynamic multicast

Displays the dynamically learnt multicast MAC address.

show mac-address-table dynamic multicast [vlan *1-4094*] **[address** *aa:aa:aa:aa:aa:aa*] **[{interface** *interface-type interface-id* | **switch** *switch-or-context-name*}]

Syntax Description

vlan – VLAN identifier.

address – MAC address.

interface – Interface type and identifier.

switch – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode

Privileged EXEC

Example

```
SEFOS# show mac-address-table dynamic multicast
Vlan Mac Address Type ConnectionId Ports
---- ----------- ---- ------------ -----
2 01:03:05:07:09:04 Learnt Ex0/1
Total Mac Addresses displayed: 1
```

Notes If executed without the optional parameters, this command displays the MAC address table of all the available interfaces.

Related Commands

- `vlan` - Configures a VLAN in the switch and is also used to enter into the config-VLAN mode
- `ports` - Configures a static VLAN entry with the required member ports, untagged ports and forbidden ports
- `mac-address-table static multicast` - Configures a static multicast MAC address in the forwarding database
- `show mac-address-table static multicast` - Displays the statically configured multicast entries

12.1.49 show mac-address-table aging-time

Displays the MAC address-table aging time.

show mac-address-table aging-time [switch *switch-or-context-name*]

Syntax Description **switch** – Context or switch name. This parameter is specific to multiple instance. The keyword `switch` is not supported.

Mode Privileged EXEC

Example

```
SEFOS# show mac-address-table aging-time

Mac Address Aging Time: 300
```

Related Commands

- `show mac-address-table` - Displays the static and dynamic MAC entries
- `mac-address-table aging-time` - Configures the MAC address table entry maximum age

CHAPTER 13

XVLAN

An XVLAN consists of two types of XVLANs: principal and restricted XVLANs.

Ports in XVLAN can be classified into three types: internal, external and inter-switch trunk ports. XVLANs require that the ports assigned to internal, external and inter-switch trunk, be mutually exclusive and should not overlap. If the port lists overlap, then the XVLAN will be misconfigured and may not function correctly. Similarly, it is required that the port lists across multiple principal XVLANs be mutually exclusive and should not overlap.

13.1 Principal XVLAN

Principal XVLAN is in fact the actual VLAN, providing communication with network devices outside the XVLAN domain. In effect, it is the main VLAN and is used to carry the XVLAN's traffic upstream to the outside world.

The maximum number of principal XVLANs supported on the switch is 12.

13.2 Restricted XVLANs

There are two types of restricted XVLANs. The main difference between the two types is whether the ports within the restricted XVLAN can communicate to each other or not.

The maximum number of restricted XVLANs configurable under a principal XVLAN is 15.

13.2.1 Solitary (Solo) Restricted XVLAN

This type of XVLAN provides isolation between the ports within the restricted XVLAN. Ports in the solitary restricted XVLAN can not communicate with each other. In order to communicate with devices outside the XVLAN, frames have to go over the principal XVLAN's external ports. Since this type of XVLAN provides isolation within it's member ports, a single Solitary XVLAN is sufficient for a given XVLAN domain.

13.2.2 Group Restricted XVLAN

Group Restricted XVLAN allows communication between its member ports. Isolation between multiple group or solitary restricted XVLANs is maintained. Communication to devices outside the XVLAN domain has to go through the external ports of the principal XVLAN. There could be multiple group restricted XVLANs in a given XVLAN.

13.3 Port Types in XVLANs

Ports in XVLAN can be classified into three types.

13.3.1 External Ports

These ports are used to communicate to the outside world. Frames enter and leave the XVLAN through these ports. Devices like routers and shared resources could be connected to these ports.

13.3.2 Internal Ports

These ports are used to connect to the hosts on the restricted XVLANs.

13.3.3 Inter-Switch Trunk Ports

These ports are a generic trunk (or hybrid) ports, used to interconnect multiple switches that belong to the same XVLAN. The isolation behavior of the restricted XVLANs is extended and maintained on all the switches belonging to the same XVLAN domain. Inter-Switch Trunk ports can be shared with regular VLANs.

13.4 Config Modes and CLI Commands

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

- Global Config Mode
  - `xvlan vid`
  - `no xvlan vid`
- XVLAN Config Mode
  - `ports internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `ports add internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `no ports internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `xvlan vid type ports internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `no xvlan vid`
  - `xvlan vid type ports add internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `xvlan vid type no ports internal IFLIST external IFLIST inter-switch-trunk IFLIST name` *name*
  - `switchport xvlan-vlan-shared`
  - `no switchport xvlan-vlan-shared`
- Privileged EXEC Mode
  - `show xvlan`
  - `show xvlan summary`
  - `show xvlan vid`

13.5 XVLAN Commands

The list of XVLAN commands is as follows:

- xvlan vid
- ports
- ports add
- xvlan vid type ports
- switchport xvlan-vlan-shared
- no switchport xvlan-vlan-shared
- show xvlan
- show running-config
- show vlan port config port

13.5.1 xvlan *vid*

Creates a principal XVLAN and changes the configuration mode to XVLAN configuration mode. GVRP must be disabled before running this command. The no form of the command deletes the XVLAN.

xvlan *2-4094*

no xvlan *2-4094*

Mode	Global Configuration
Example	SEFOS(config)# **xvlan 10** SEFOS(config-xvlan)# SEFOS(config)# **no xvlan 10**
Notes	GVMRP must be disabled.

13.5.2 ports

Configures ports for the principal XVLAN. Ports are designated as internal, external, and inter-switch trunks. The resulting port pool is used by the restricted XVLANs. The no form of the command resets the port list or the subset for the specified XVLAN.

ports (internal [*interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (external [***interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (inter-switch [***interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) [name** *vlan-name***]**

no ports (internal [*interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (external [***interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (inter-switch [***interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) [name** *vlan-name***]**

Syntax Description

internal *interface-type 0/a-b,0/c,...* – Internal and restricted ports interface type and identifier.

external *interface-type 0/a-b,0/c,...* – External ports interface type and identifier.

port-channel *a,b,c-d* – Port-channel identifier.

inter-switch – Inter switch trunk ports interface type and identifier

name – XVLAN identifier name string.

Mode XVLAN Configuration

Example

```
SEFOS(config-xvlan)# ports internal ext 0/2,0/11,0/15
external ext 0/1 inter-switch port-channel 36,710
SEFOS(config-xvlan)#
SEFOS(config-xvlan)# no ports internal ext 0/15
```

Related Commands

- xvlan vid - Create principal XVLAN
- ports add - Add ports to existing principal XVLAN port membership port list
- no ports - Remove ports from an existing XVLAN port membership port list
- xvlan vid type ports - Create a restricted XVLAN and assign port membership from the principal XVLAN's port list pool

13.5.3 ports add

Adds ports for the existing principal XVLAN port list.

ports add (internal [*interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (external [***interface-type 0/a-b,0/c,...***] [interface-type** *0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) (inter-switch [***interface-type 0/a-b,0/c,...***] [***interface-type 0/a-b,0/c,...***] [port-channel** *a,b,c-d***]) [name** *vlan-name***]**

Syntax Description

internal *interface-type 0/a-b,0/c,...*– Internal and restricted ports interface type and identifier.

external *interface-type 0/a-b,0/c,...* – External ports interface type and identifier.

port-channel *a,b,c-d* – Port-channel identifier.

inter-switch – Inter switch trunk ports interface type and identifier.

name – XVLAN identifier name string.

Mode XVLAN Configuration

Example

```
SEFOS(config-xvlan)# ports add internal ext 0/19
SEFOS(config-xvlan)#
```

Notes XVLANs require that the ports assigned to internal, external, and inter-switch trunk, be mutually exclusive. If this mutual exclusion requirement is not followed, the XVLAN will be misconfigured and it may not function correctly.

Related Commands

- `xvlan vid` - Create principal XVLAN
- `ports` - Assign ports to principal XVLAN port membership port list
- `no ports` - Remove ports from an existing XVLAN port membership port list
- `xvlan vid type ports` - Create a restricted XVLAN and assign port membership from the principal XVLAN's port list pool

13.5.4 xvlan vid type ports

Creates a restricted XVLAN and assigns port membership to it. The ports are used from the pool assigned to the principal XVLAN. The type of the restricted XVLAN must be specified as well.

Note – The `vid` of the restricted XVLAN must be higher than the `vid` of the principal XVLAN.

```
xvlan vid type ports (internal [interface-type 0/a-b,0/c,...]
[interface-type 0/a-b,0/c,...] [port-channel a,b,c-d]) (external
[interface-type 0/a-b,0/c,...] [interface-type 0/a-b,0/c,...]
[port-channel a,b,c-d] [all]) (inter-switch-trunk [interface-type
0/a-b,0/c,...] [interface-type 0/a-b,0/c,...] [port-channel
a,b,c-d]) [name vlan-name]
```

Syntax Description

vid – Restricted XVLAN identifier.

type – Restricted XVLAN type:

- `solo`: Restricted solitary.
- `group`: Restricted group.

port – Ports key word.

internal *interface-type 0/a-b,0/c,...*– Internal and restricted ports interface type and identifier.

external *interface-type 0/a-b,0/c,...* – External ports interface type and identifier.

port-channel *a,b,c-d* – Port-channel identifier.

inter-switch – Inter switch trunk ports interface type and identifier

name – XVLAN identifier name string.

Mode

XVLAN Configuration

Example

```
SEFOS(config-xvlan)# xvlan 100 solo ports internal ext
0/2,0/11,0/15 external ext 0/1 inter-switch port-channel
36,710
SEFOS(config-xvlan)#
```

Notes

The `vid` of the restricted XVLAN must be higher than the `vid` of the principal XVLAN.

XVLANs require that the ports assigned to internal, external and inter-switch trunk, be mutually exclusive. If this mutual exclusion requirement is not followed, the XVLAN will be misconfigured and it may not function correctly.

Related Commands

- `xvlan vid` - Create Principal XVLAN
- `ports add` - Add Ports to existing principal XVLAN port membership port list
- `no ports` - Remove ports from an existing XVLAN port membership port list
- `xvlan vid type ports` - Create a restricted XVLAN and assign port membership from the principal XVLAN's port list pool

13.5.5 switchport xvlan-vlan-shared

Allows the configuration of regular VLANs on an internal port of an exclusive VLAN. The no form of the command disables this feature...

```
switchport xvlan-vlan-shared
```

```
no switchport xvlan-vlan-shared
```

Mode	Interface Configuration
Defaults	Disabled.
Example	`SEFOS(config-if)# switchport xvlan-vlan-shared`
Notes	When xvlan-vlan-shared mode is disabled (default), the port can be configured as a member of either a regular or exclusive VLAN. However, the port can not be shared. When xvlan-vlan-shared mode is enabled and the port is configured as an internal port of an exclusive VLAN, the port can be configured as a tagged member of a regular VLAN. However, the port can not be configured as an untagged member of the regular VLAN. The xvlan-vlan-shared command is effective only if the port is in XVLAN mode. Thus, the configuration procedure for XVLAN/VLAN port sharing is as follows: 1. Configure XVLAN. 2. Set xvlan-vlan-shared mode for the ports of interest. 3. Configure regular VLAN.

Related Commands

- show vlan port config port - Displays the VLAN related parameters specific for ports
- show running-config - Displays the current configuration
- ports add - Add Ports to existing principal XVLAN port membership port list
- no ports - Remove ports from an existing XVLAN port membership port list
- xvlan vid type ports - Create a restricted XVLAN and assign port membership from the principal XVLAN's port list pool

13.5.6 show xvlan

Displays XVLAN database.

```
show xvlan vid vid_range
```

Syntax Description **xvlan** – XVLAN interface

Mode Privileged EXEC

Example

```
SEFOS# show xvlan
Exclusive Vlan database
--------------------------
XVlan ID : 100
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/11
ISWTrunk Ports : po36, po710
Name :
-----------------------------------------------------
XVlan ID : 20
Type : Restricted: Group
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/15
ISWTrunk Ports : po36, po710
Name --------------------------
XVlan ID : 10
Type : Principal
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2, Ex0/11, Ex0/15, Ex0/19
ISWTrunk Ports : po36, po710
Name : main
-----------------------------------------------------
```

```
XVlan ID : 600
Type : Restricted: Solitary
Principal XVlan : 10
External Ports : Ex0/1
Internal Ports : Ex0/2
ISWTrunk Ports : po36, po710
Name : sub1

SEFOS# show xvlan summary
Exclusive VLAN 10 Summary
------------------------------
XVLAN ID Type
------------------------------
10: Principal
600: Restricted: Solitary
100: Restricted: Group
20: Restricted: Group

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

SEFOS# show xvlan vid 10
Exclusive Vlan database
---------------------------

XVlan ID              : 10
Type                   : Principal
Principal XVlan      : 10
External Ports       : Ex0/1
Internal Ports       : Ex0/2, Ex0/11, Ex0/15, Ex0/19
ISWTrunk Ports       : po36, po710
Name                   : main
```

Related Commands

- `xvlan vid type ports` - Create restricted XVLAN and assign port membership
- `xvlan vid` - Create principal XVLAN and change to XVLAN configuration mode
- `no xvlan vid` - Delete the principal XVLAN with `vid`
- `ports add` - Add ports to existing principal XVLAN port membership port list
- `no ports` - Remove ports from an existing XVLAN port membership port list

13.5.7 show running-config

Displays the current running VLAN and XVLAN configuration.

```
show running-config vlan
```

Syntax Description **vlan** – XVLAN interface

Mode Privileged EXEC

Example

```
SEFOS# show running-config vlan

Building configuration...
!
!
xvlan 10
  port  internal extreme-ethernet 0/2,0/11,0/15,0/19
external extreme-ethernet 0/1 inter-switch port-channel
36,710 name main

  xvlan 600 solo port  internal extreme-ethernet 0/2
external extreme-ethernet 0/1 inter-switch port-channel
36,710 name sub1

  xvlan 100 group port  internal extreme-ethernet
0/11,0/19 external extreme-ethernet 0/1 inter-switch
port-channel 36,710

  xvlan 20 group port  internal extreme-ethernet 0/15
external extreme-ethernet 0/1 inter-switch port-channel
36,710
!
...
```

Related Commands

- `xvlan vid type ports` - Create restricted XVLAN and assign port membership
- `xvlan vid` - Create principal XVLAN and change to XVLAN configuration mode
- `no xvlan vid` - Delete the principal XVLAN with `vid`
- `ports add` - Add ports to existing principal XVLAN port membership port list
- `no ports` - Remove ports from an existing XVLAN port membership port list
- `show xvlan` - XVLAN port membership

- `show vlan port config port` - Show VLAN related port properties

13.5.8 show vlan port config port

Displays the VLAN properties for a given port.

show vlan port config [{port *interface-type interface-id* **| switch** *switch-or-context-name*}]

Syntax Description

vlan – XVLAN interface

Mode

Privileged EXEC

Example

```
SEFOS# show vlan port config

Vlan Port configuration table
-----------------------------
Port Ex0/1
 Port Vlan ID                          : 10
 Port Acceptable Frame Type            : Admit All
 Port Ingress Filtering                : Enabled
 Port Mode                             : Hybrid
 Exclusive VLAN Port Mode              : External
VLAN & Exclusive VLAN Port Sharing     : Enabled
 Exclusive VLAN VID                    : 10
 Port Gvrp Status                      : Enabled
 Port Gmrp Status                      : Enabled
 Port Gvrp Failed Registrations        : 0
Gvrp last pdu origin                   : 00:00:00:00:00:00
 Port Restricted Vlan Registration     : Disabled
 Port Restricted Group Registration    : Disabled
Mac Based Support                      : Disabled
 Subnet Based Support                  : Disabled
 Port-and-Protocol Based Support       : Enabled
```

```
 Default Priority                          : 0
 Dot1x Protocol Tunnel Status             : Peer
 LACP Protocol Tunnel Status              : Peer
 Spanning Tree Tunnel Status              : Peer
 GVRP Protocol Tunnel Status              : Peer
 GMRP Protocol Tunnel Status              : Peer
 IGMP Protocol Tunnel Status              : Peer
 Filtering Utility Criteria               : Default
 Port Protected Status                     : Disabled
 ---------------------------------------------------------
Port Ex0/2
 Port Vlan ID                               : 600
 Port Acceptable Frame Type               : Admit All
 Port Ingress Filtering                    : Disabled
 Port Mode                                  : Hybrid
 Exclusive VLAN Port Mode                 : Internal
 Exclusive VLAN VID                        : 600
 Port Gvrp Status                          : Enabled
 Port Gmrp Status                          : Enabled
 Port Gvrp Failed Registrations           : 0
 Gvrp last pdu origin                      : 00:00:00:00:00:00
 Port Restricted Vlan Registration        : Disabled
 Port Restricted Group Registration        : Disabled
 Mac Based Support                         : Disabled
 Subnet Based Support                      : Disabled
 Port-and-Protocol Based Support          : Enabled
 Default Priority                          : 0
 Dot1x Protocol Tunnel Status             : Peer
 LACP Protocol Tunnel Status              : Peer
 Spanning Tree Tunnel Status              : Peer
 GVRP Protocol Tunnel Status              : Peer
 GMRP Protocol Tunnel Status              : Peer
 IGMP Protocol Tunnel Status              : Peer
 Filtering Utility Criteria               : Default
 Port Protected Status                     : Disabled
 ---------------------------------------------------
```

The following example shows detailed port information for the given VLAN and XVLAN and configuration. In the example, ports Ex0/1, Ex0/2, Ex0/11, Ex0/15, Ex0/19, port-channel 36, and port-channel 710 belong to principal XVLAN 10 and its restricted XVLANs 20, 100 and 600. Whereas, the rest belong to the default VLAN 1.

```
SEFOS# show xvlan

Exclusive Vlan database
---------------------------

XVlan ID            : 10
Type                : Principal
Principal XVlan     : 10
External Ports      : Ex0/1
Internal Ports      : Ex0/2, Ex0/11, Ex0/15, Ex0/19
ISWTrunk Ports      : po36, po710

Name                : main
-----------------------------------------------------
XVlan ID            : 20
Type                : Restricted: Group
Principal XVlan     : 10
External Ports      : Ex0/1
Internal Ports      : Ex0/15
ISWTrunk Ports      : po36, po710
Name                :
-----------------------------------------------------

XVlan ID            : 100
Type                : Restricted: Group
Principal XVlan     : 10
External Ports      : Ex0/1
Internal Ports      : Ex0/11, Ex0/19
ISWTrunk Ports      : po36, po710
Name                :
-----------------------------------------------------
XVlan ID            : 600
Type                : Restricted: Solitary
Principal XVlan     : 10
External Ports      : Ex0/1
Internal Ports      : Ex0/2
ISWTrunk Ports      : po36, po710
Name                : sub1
-----------------------------------------------------
```

```
SEFOS# show vlan port config

Vlan Port configuration table
-----------------------------
Port Ex0/1
 Port Vlan ID                          : 10
 Port Acceptable Frame Type            : Admit All
 Port Ingress Filtering                : Disabled
 Port Mode                             : Hybrid
 Exclusive VLAN Port Mode              : External
 Exclusive VLAN VID                    : 10
 Port Gvrp Status                      : Enabled
 Port Gmrp Status                      : Enabled
 Port Gvrp Failed Registrations        : 0
 Gvrp last pdu origin                  : 00:00:00:00:00:00
 Port Restricted Vlan Registration     : Disabled
 Port Restricted Group Registration    : Disabled
 Mac Based Support                     : Disabled
 Subnet Based Support                  : Disabled
 Port-and-Protocol Based Support       : Enabled
 Default Priority                      : 0
 Dot1x Protocol Tunnel Status          : Peer
 LACP Protocol Tunnel Status           : Peer
 Spanning Tree Tunnel Status           : Peer
 GVRP Protocol Tunnel Status           : Peer
 GMRP Protocol Tunnel Status           : Peer
 IGMP Protocol Tunnel Status           : Peer
 Filtering Utility Criteria            : Default
 Port Protected Status                 : Disabled
 ------------------------------------------------------
Port Ex0/2
 Port Vlan ID                          : 600
 Port Acceptable Frame Type            : Admit All
 Port Ingress Filtering                : Disabled
Port Mode                             : Hybrid
 Exclusive VLAN Port Mode              : Internal
 Exclusive VLAN VID                    : 600
 Port Gvrp Status                      : Enabled
 Port Gmrp Status                      : Enabled
 Port Gvrp Failed Registrations        : 0
 Gvrp last pdu origin                  : 00:00:00:00:00:00
 Port Restricted Vlan Registration     : Disabled
 Port Restricted Group Registration    : Disabled
 Mac Based Support                     : Disabled
 Subnet Based Support                  : Disabled
 Port-and-Protocol Based Support       : Enabled
```

```
   Default Priority                     : 0
  Dot1x Protocol Tunnel Status         : Peer
  LACP Protocol Tunnel Status          : Peer
  Spanning Tree Tunnel Status          : Peer
  GVRP Protocol Tunnel Status          : Peer
  GMRP Protocol Tunnel Status          : Peer
  IGMP Protocol Tunnel Status          : Peer
  Filtering Utility Criteria           : Default
  Port Protected Status                : Disabled
  ------------------------------------------------------
Port Ex0/11
  Port Vlan ID                         : 100
  Port Acceptable Frame Type           : Admit All
  Port Ingress Filtering               : Disabled
  Port Mode                            : Hybrid
  Exclusive VLAN Port Mode             : Internal
  Exclusive VLAN VID                   : 100
  Port Gvrp Status                     : Enabled
  Port Gmrp Status                     : Enabled
  Port Gvrp Failed Registrations       : 0
  Gvrp last pdu origin                 : 00:00:00:00:00:00
  Port Restricted Vlan Registration    : Disabled
  Port Restricted Group Registration   : Disabled
  Mac Based Support                    : Disabled
  Subnet Based Support                 : Disabled
  Port-and-Protocol Based Support      : Enabled
  Default Priority                     : 0
  Dot1x Protocol Tunnel Status         : Peer
  LACP Protocol Tunnel Status          : Peer
  Spanning Tree Tunnel Status          : Peer
  GVRP Protocol Tunnel Status          : Peer
  GMRP Protocol Tunnel Status          : Peer
  IGMP Protocol Tunnel Status          : Peer
  Filtering Utility Criteria           : Default
```

```
 Port Protected Status                : Disabled
 ------------------------------------------------------
?......
 ------------------------------------------------------
Port Ex0/14
 Port Vlan ID                         : 1
 Port Acceptable Frame Type           : Admit All
 Port Ingress Filtering               : Disabled
 Port Mode                            : Hybrid
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
 Port Restricted Vlan Registration    : Disabled
 Port Restricted Group Registration   : Disabled
 Mac Based Support                    : Disabled
 Subnet Based Support                 : Disabled
 Port-and-Protocol Based Support      : Enabled
 Default Priority                     : 0
 Dot1x Protocol Tunnel Status         : Peer
 LACP Protocol Tunnel Status          : Peer
 Spanning Tree Tunnel Status          : Peer
 GVRP Protocol Tunnel Status          : Peer
 GMRP Protocol Tunnel Status          : Peer
 IGMP Protocol Tunnel Status          : Peer
 Filtering Utility Criteria           : Default
 Port Protected Status                : Disabled
 ------------------------------------------------------
Port Ex0/15
 Port Vlan ID                         : 20
 Port Acceptable Frame Type           : Admit All
 Port Ingress Filtering               : Disabled
 Port Mode                            : Hybrid
 Exclusive VLAN Port Mode             : Internal
 Exclusive VLAN VID                   : 20
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
 Port Restricted Vlan Registration    : Disabled
 Port Restricted Group Registration   : Disabled
 Mac Based Support                    : Disabled
 Subnet Based Support                 : Disabled
 Port-and-Protocol Based Support      : Enabled
 Default Priority                     : 0
 Dot1x Protocol Tunnel Status         : Peer
```

```
 LACP Protocol Tunnel Status          : Peer
 Spanning Tree Tunnel Status          : Peer
 GVRP Protocol Tunnel Status          : Peer
 GMRP Protocol Tunnel Status          : Peer
 IGMP Protocol Tunnel Status          : Peer
 Filtering Utility Criteria           : Default
 Port Protected Status                : Disabled
 -------------------------------------------------------
Port Ex0/16
 Port Vlan ID                         : 1
 Port Acceptable Frame Type           : Admit All
 Port Ingress Filtering               : Disabled
 Port Mode                            : Hybrid
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
 Port Restricted Vlan Registration    : Disabled
 Port Restricted Group Registration   : Disabled
 Mac Based Support                    : Disabled
 Subnet Based Support                 : Disabled
 Port-and-Protocol Based Support      : Enabled
 Default Priority                     : 0
 Dot1x Protocol Tunnel Status         : Peer
 LACP Protocol Tunnel Status          : Peer
 Spanning Tree Tunnel Status          : Peer
 GVRP Protocol Tunnel Status          : Peer
GMRP Protocol Tunnel Status          : Peer
 IGMP Protocol Tunnel Status          : Peer
 Filtering Utility Criteria           : Default
 Port Protected Status                : Disabled
 -------------------------------------------------------
Port Ex0/17
 Port Vlan ID                         : 1
 Port Acceptable Frame Type           : Admit All
 Port Ingress Filtering               : Disabled
 Port Mode                            : Hybrid
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
```

```
 Port Restricted Vlan Registration   : Disabled
 Port Restricted Group Registration  : Disabled
 Mac Based Support                   : Disabled
 Subnet Based Support                : Disabled
 Port-and-Protocol Based Support     : Enabled
 Default Priority                    : 0
 Dot1x Protocol Tunnel Status        : Peer
 LACP Protocol Tunnel Status         : Peer
 Spanning Tree Tunnel Status         : Peer
 GVRP Protocol Tunnel Status         : Peer
 GMRP Protocol Tunnel Status         : Peer
 IGMP Protocol Tunnel Status         : Peer
 Filtering Utility Criteria          : Default
 Port Protected Status               : Disabled
 ------------------------------------------------------
Port Ex0/18
 Port Vlan ID                        : 1
 Port Acceptable Frame Type          : Admit All
 Port Ingress Filtering              : Disabled
 Port Mode                           : Hybrid
 Port Gvrp Status                    : Enabled
 Port Gmrp Status                    : Enabled
 Port Gvrp Failed Registrations      : 0
 Gvrp last pdu origin                : 00:00:00:00:00:00
 Port Restricted Vlan Registration   : Disabled
 Port Restricted Group Registration  : Disabled
 Mac Based Support                   : Disabled
 Subnet Based Support                : Disabled
 Port-and-Protocol Based Support     : Enabled
 Default Priority                    : 0
 Dot1x Protocol Tunnel Status        : Peer
 LACP Protocol Tunnel Status         : Peer
 Spanning Tree Tunnel Status         : Peer
 GVRP Protocol Tunnel Status         : Peer
 GMRP Protocol Tunnel Status         : Peer
 IGMP Protocol Tunnel Status         : Peer
 Filtering Utility Criteria          : Default
 Port Protected Status               : Disabled
 ------------------------------------------------------
Port Ex0/19
 Port Vlan ID                        : 100
 Port Acceptable Frame Type          : Admit All
 Port Ingress Filtering              : Disabled
 Port Mode                           : Hybrid
```

```
 Exclusive VLAN Port Mode             : Internal
 Exclusive VLAN VID                   : 100
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
 Port Restricted Vlan Registration    : Disabled
 Port Restricted Group Registration   : Disabled
 Mac Based Support                    : Disabled
 Subnet Based Support                 : Disabled
 Port-and-Protocol Based Support      : Enabled
 Default Priority                     : 0
 Dot1x Protocol Tunnel Status         : Peer
 LACP Protocol Tunnel Status          : Peer
 Spanning Tree Tunnel Status          : Peer
 GVRP Protocol Tunnel Status          : Peer
 GMRP Protocol Tunnel Status          : Peer
 IGMP Protocol Tunnel Status          : Peer
 Filtering Utility Criteria           : Default
 Port Protected Status                : Disabled
 ------------------------------------------------------
Port Ex0/20
 Port Vlan ID                         : 1
 Port Acceptable Frame Type           : Admit All
 Port Ingress Filtering               : Disabled
 Port Mode                            : Hybrid
 Port Gvrp Status                     : Enabled
 Port Gmrp Status                     : Enabled
 Port Gvrp Failed Registrations       : 0
 Gvrp last pdu origin                 : 00:00:00:00:00:00
 Port Restricted Vlan Registration    : Disabled
 Port Restricted Group Registration   : Disabled
 Mac Based Support                    : Disabled
 Subnet Based Support                 : Disabled
 Port-and-Protocol Based Support      : Enabled
 Default Priority                     : 0
 Dot1x Protocol Tunnel Status         : Peer
 LACP Protocol Tunnel Status          : Peer
 Spanning Tree Tunnel Status          : Peer
 GVRP Protocol Tunnel Status          : Peer
 GMRP Protocol Tunnel Status          : Peer
 IGMP Protocol Tunnel Status          : Peer
 Filtering Utility Criteria           : Default
 Port Protected Status                : Disabled
 ------------------------------------------------------
?.....
```

```
 ------------------------------------------------------
Port po36
 Port Vlan ID                          : 10
 Port Acceptable Frame Type            : Admit All
 Port Ingress Filtering                : Disabled
 Port Mode                             : Hybrid
 Exclusive VLAN Port Mode              : Inter-Switch Trunk
 Exclusive VLAN VID                    : 10
 Port Gvrp Status                      : Enabled
 Port Gmrp Status                      : Enabled
 Port Gvrp Failed Registrations        : 0
 Gvrp last pdu origin                  : 00:00:00:00:00:00
 Port Restricted Vlan Registration     : Disabled
 Port Restricted Group Registration    : Disabled
 Mac Based Support                     : Disabled
 Subnet Based Support                  : Disabled
 Port-and-Protocol Based Support       : Enabled
 Default Priority                      : 0
 Dot1x Protocol Tunnel Status          : Peer
 LACP Protocol Tunnel Status           : Peer
 Spanning Tree Tunnel Status           : Peer
 GVRP Protocol Tunnel Status           : Peer
 GMRP Protocol Tunnel Status           : Peer
 IGMP Protocol Tunnel Status           : Peer
 Filtering Utility Criteria            : Default
 Port Protected Status                 : Disabled
 ------------------------------------------------------
Port po710
 Port Vlan ID                          : 10
 Port Acceptable Frame Type            : Admit All
 Port Ingress Filtering                : Disabled
 Port Mode                             : Hybrid
 Exclusive VLAN Port Mode              : Inter-Switch Trunk
 Exclusive VLAN VID                    : 10
 Port Gvrp Status                      : Enabled

 Port Gmrp Status                      : Enabled
 Port Gvrp Failed Registrations        : 0
 Gvrp last pdu origin                  : 00:00:00:00:00:00
 Port Restricted Vlan Registration     : Disabled
 Port Restricted Group Registration    : Disabled
 Mac Based Support                     : Disabled
 Subnet Based Support                  : Disabled
```

```
Port-and-Protocol Based Support      : Enabled
Default Priority                     : 0
Dot1x Protocol Tunnel Status         : Peer
LACP Protocol Tunnel Status          : Peer
Spanning Tree Tunnel Status          : Peer
GVRP Protocol Tunnel Status          : Peer
GMRP Protocol Tunnel Status          : Peer
IGMP Protocol Tunnel Status          : Peer
Filtering Utility Criteria           : Default
Port Protected Status                : Disabled
```

Related Commands

- `xvlan vid type ports` - Create restricted XVLAN and assign port membership
- `xvlan vid` - Create principal XVLAN and change to XVLAN configuration mode
- `no xvlan vid` - Delete the principal XVLAN with `vid`
- `ports add` - Add ports to existing principal XVLAN port membership port list
- `no ports` - Remove ports from an existing XVLAN port membership port list
- `show xvlan` - XVLAN port membership
- `show vlan port config port` - Show VLAN related port properties

CHAPTER 14

SNMPv3

SNMP is the most widely-used network management protocol on TCP/IP-based networks. SNMPv3 is designed mainly to overcome the security shortcomings of SNMPv1 and v2. USM and VACM are the main features added as part of the SNMPv3 specification. USM provides for both encryption and authentication of the SNMP PDUs, while VACM specifies a mechanism for defining access policies for different users with different MIB trees. Also, SNMPv3 specifies a generic management framework, which is expandable for adding new management engines, security models, access control models, and so on. With SNMPv3, the SNMP communication is completely safe and secure.

SNMPv3 is a multi-lingual agent supporting all three versions of SNMP (SNMPv1, SNMPv2c and SNMPv3) while conforming to the latest specifications.

Because SEFOS is started as an agentX-subagent of the Oracle ILOM automatically, some of the commands listed and described specific for SNMP agent in this chapter are not applicable.

Those unsupported commands are noted in this chapter. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of those unsupported commands. Note that only the USM is supported by ILOM.

14.1 SNMPv3 Commands

The list of CLI commands for the configuration of SNMPv3 is as follows:

- `enable snmpsubagent`
- `disable snmpsubagent`
- `show snmp agentx information`
- `show snmp agentx statistics`

- enable snmpagent
- disable snmpagent
- snmp community index
- snmp group
- snmp access
- snmp engineid
- snmp proxy name
- snmp view
- snmp targetaddr
- snmp targetparams
- snmp user
- snmp notify
- snmp-server enable traps snmp authentication
- snmp-server trap udp-port
- snmp-server trap proxy-udp-port
- snmp tcp enable
- snmp trap tcp enable
- snmp-server tcp-port
- snmp-server trap tcp-port
- snmp-server enable traps
- show snmp
- show snmp community
- show snmp group
- show snmp group access
- show snmp engineID
- show snmp viewtree
- show snmp targetaddr
- show snmp targetparam
- show snmp user
- show snmp notif
- show snmp inform statistics
- show snmp-server traps
- show snmp-server proxy-udp-port
- show snmp tcp

14.1.1 enable snmpsubagent

Enables either snmp agent or agentx-subagent capabilities.

```
enable snmpsubagent {master {ip4 ipv4_address} [port number]}
```

Syntax Description	**snmpsubagent** – Enables SNMP subagent **master** – The master agent address. It can be either ip4 or ip6. **port** – Port number on which master agent listens subagent.
Mode	Global Configuration
Defaults	**port** – 705
Example	SEFOS(config)# **enable snmpsubagent master ip4 10.0.0.5 port 897**
Notes	Commands to enable and disable the snmp subagent are used by the SEFOS automatic scripts. Do not use the enable snmpsubagent or disable snmpsubagent commands from the CLI command interface.

Related Commands

- show snmp agentx information – Displays global information of SNMP agentx communications.
- show snmp agentx statistics – Displays all the information regarding SNMP agentx statistics.

14.1.2 disable snmpsubagent

This command disables agentx-subagent.

```
disable snmpsubagent
```

Mode	Global Configuration
Example	SEFOS(config)# **disable snmpsubagent**
Notes	Commands to enable and disable the snmp subagent are used by the SEFOS automatic scripts. Do not use the enable snmpsubagent or disable snmpsubagent commands from the CLI command interface.

Related Commands

- show snmp agentx information – Displays global information of SNMP agentx communications.

- `show snmp agentx statistics` – Displays all the information regarding SNMP agentx statistics.

14.1.3 show snmp agentx information

Displays global information of SNMP Agentx communications.

```
show snmp agentx information
```

Mode Priveleged EXEC

Example

```
SEFOS# show snmp agentx information

Agentx Subagent is enabled
TransportDomain    :TCP
Master IP Address :10.0.0.2
Master PortNo      :705
```

14.1.4 show snmp agentx statistics

Displays all the information regarding SNMP Agentx statistics.

```
show snmp agentx statistics
```

Mode Global Configuration

Example

```
SEFOS(config)# show snmp agentx statistics

Tx Statistics
  Transmitted Packets                 :860
  Open PDU                            :1
  Index Allocate PDU                  :0
  Index DeAllocate PDU                :0
  Register PDU                        :2
  Add Agent Capabilities PDU          :0
  Notify PDU                          :0
  Ping PDU                            :20
  Remove Agent Capabilities PDU       :0
  UnRegister PDU                      :0
  Close PDU                           :0
  Response PDU                        :837

Rx Statistics
  Rx Packets                          :859
  Get PDU                             :1
  GetNext PDU                         :836
  GetBulk PDU                         :0
  TestSet PDU                         :0
  Commit PDU                          :0
  Cleanup PDU                         :0
  Undo PDU                            :0
  Dropped Packets                     :0
  Parse Drop Errors                   :1
  Open Fail Errors                    :0
  Close PDU                           :0
  Response PDU                        :21
```

14.1.5 enable snmpagent

Enables SNMP agent.

```
enable snmpagent
```

Mode Global Configuration

Defaults SNMP agent is enabled.

Example

```
SEFOS(config)# enable snmpagent
```

Related Commands

- `disable snmpagent` – Disables SNMP agent.
- `enable snmpagent` – Enables either snmp agent or agentx-subagent capabilities.

14.1.6 disable snmpagent

Disables SNMP agent.

```
disable snmpagent
```

Mode	Global Configuration
Example	`SEFOS(config)# disable snmpagent`

Related Commands

- `enable snmpagent` – Enables SNMP agent.
- `enable snmpsubagent` – Enables either snmp agent or agentx-subagent capabilities.

14.1.7 snmp community index

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP community details. The `no` form of the command removes the SNMP community details.

```
snmp community index CommunityIndex name CommunityName security
SecurityName [context ContextName] [{volatile | nonvolatile}]
[transporttag TransportTagIdentifier | none] [contextengineid
ContextEngineID]
```

```
no snmp community index CommunityIndex
```

Syntax Description	*CommunityIndex* – Community index identifier. *CommunityName* – Community name. *SecurityName* – User name. *ContextName* – Context name through which the management information is accessed when using the community string specified by the corresponding instance of SNMP community name. **volatile | nonvolatile** – Storage type. *TransportTagIdentifier* – Transport tag identifier. *ContextEngineIdentifier* – Context engine identifier.
Mode	Global Configuration
Defaults	Community index – NETMAN/PUBLIC Community name – NETMAN/PUBLIC Security name – None Context name – Null Transport tag – Null Storage type – Volatile
Example	`SEFOS(config)#` **`snmp community index myv3com name myv3com security xyz context myinst nonvolatile transporttag myv3tag`**
Notes	The community index identifier must be unique for every community name entry.

Related Commands

- `show snmp` – Displays the status information of SNMP communications.
- `show snmp community` – Displays the configured SNMP community details.

14.1.8 snmp group

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures SNMP group details. The `no` form of the command removes the SNMP group details.

```
snmp group GroupName user UserName security-model {v1 | v2c | v3}
[{volatile | nonvolatile}]
```

```
no snmp group GroupName user UserName security-model {v1 | v2c |
v3}
```

Syntax Description

GroupName – Name of the SNMP group
UserName – User name
security-model – Security model
volatile | nonvolatile – Storage type

Mode Global Configuration

Defaults Group name – iso/initial

Example

```
SEFOS(config)# snmp group myv3group user myv3user
security-model v1 volatile
```

Related Commands

- `show snmp group` – Displays the configured SNMP groups.
- `show snmp user` – Displays the configured SNMP users.

14.1.9 snmp access

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP group access details. The `no` form of the command removes the SNMP group access details.

```
snmp access GroupName {v1 | v2c | v3 {auth | noauth | priv}} [read
ReadView | none] [write WriteView | none] [notify NotifyView |
none] [{volatile | nonvolatile}] [context ContextName]
```

```
no snmp access GroupName {v1 | v2c | v3 {auth | noauth | priv}}
[context ContextName]
```

Syntax Description

GroupName – Name of the group.

v1 | v2c | v3 – Version of the SNMP.

auth – Enables authentication: MD5 or SHA packet authentication.

noauth – Disables authentication.

priv – Specifies both authentication and privacy.

read – A read view identifier.

write – A write view identifier.

notify – A notification view identifier.

volatile | nonvolatile – Storage type.

ContextName – Name of the SNMP context.

Mode

Global Configuration

Defaults

Group name – iso
Read/write/notify view – iso
Storage type – volatile
Group name – initial
Read/write/notify view – restricted
Storage type – non-volatile
Group name – initial
Read/write/notify view – iso
Storage type – non-volatile

Example

```
SEFOS(config)# snmp access myv2group v2 read v2readview
write v2writeview notify v2notifyview nonvolatile
```

Notes

- To configure an SNMP access along with the group, a group must have already been created using the `snmp group` command.
- Version 3 is the most secure model as it allows packet encryption with the `priv` key word.

Related Commands

- `snmp group` – Configures SNMP group details.
- `snmp view` – Configures the SNMP view.
- `show snmp group` – Displays the configured SNMP groups.
- `show snmp group access` – Displays the configured SNMP group access. details.
- `show snmp viewtree` – Displays the configured SNMP tree views.

14.1.10 snmp engineid

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the engine identifier. The `no` form of the command removes the configured engine identifier.

```
snmp engineid EngineIdentifier
```

```
no snmp engine-id
```

Syntax Description	*EngineIdentifier* – Engine identifier.
Mode	Global Configuration
Defaults	80.00.08.1c.04.46.53
Example	`SEFOS(config)# snmp engineid 80.0.08.1c.04.5f.a9`
Notes	• The Engine ID must be given as octets in hexadecimal separated by dots and the allowed length is 5 to 32 octets. • SNMP engine ID is an administratively unique identifier. • Changing the value of the SNMP engine ID has significant effects. • All the user information will be updated automatically to reflect the change

Related Commands

- `snmp engineid` – Displays the engine identifier.
- `show snmp user` – Displays the configured SNMP users.

14.1.11 snmp proxy name

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the proxy. The no form of the command removes the proxy.

```
snmp proxy name ProxyName ProxyType {Read | Write | inform | Trap}
ContextEngineID EngineId TargetParamsIn TargetParam TargetOut
TargetOut [ContextName ProxyContextName] [StorageType {volatile |
nonvolatile}]
```

```
no snmp proxy name ProxyName
```

Syntax Description

ProxyName – The locally arbitrary, but unique identifier associated with the tProxyEntry. This will be the index used for the proxy table.

ProxyType – Type of message that are forwarded using the translation parameters. Options are:

- Read
- Write
- Inform
- Trap

ContextEngineID – Context engine identifier contained in messages that are forwarded using the translation parameters.

TargetParamsIn – This object selects an entry in the snmpTargetParamsTable. The selected entry is used to determine which row of the snmpProxyTable is to be used for forwarding the received messages.

TargetOut – This object selects a management target defined in the snmpTargetAddrTable (in the SNMP-TARGET-MIB). The selected target is defined by an entry in the snmpTargetAddrTable whose index value (snmpTargetAddrName) is equal to this object. This object is only used when selection of a single target is required. That is, when forwarding an incoming read or write request.

ContextName – Context name contained in messages that are forwarded using the translation parameters.

StorageType – Storage type. Options are:

- volatile
- nonvolatile

Mode Global Configuration

Defaults Storage Type – nonvolatile

Example

```
SEFOS(config)# snmp proxy name proxy1 ProxyType write
ContextEngineID 80.00.08.1c.04.46.53 TargetParamsIn
param2 TargetOut target2  ContextName pxyctxtname
StorageType nonvolatile
```

14.1.12 snmp view

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP view. The no form of the command removes the SNMP view.

```
snmp view ViewName OIDTree [mask OIDMask] {included | excluded}
[{volatile | nonvolatile}]
```

```
no snmp view ViewName OIDTree
```

Syntax Description

ViewName – View name
OIDTree – Object identifier
OIDMask | none – Defines views' subtrees
included | **excluded** – Type of view
volatile | **nonvolatile** – Type of storage

Mode

Global Configuration

Defaults

View Name – iso/restricted
OIDTree – 1
OIDMask – None
View type – included
Storage type – non-volatile

Example

```
SEFOS(config)# snmp view v2readview 1.3.6.1 mask 1.1.1.1
included nonvolatile
```

Notes

To configure an SNMP view (read/write/notify), a group must have already been created using the snmp group command and SNMP group access must be configured using the snmp access command.

Related Commands

- snmp access – Configures the SNMP group access details.
- show snmp viewtree – Displays the configured SNMP tree views.
- show snmp group access – Displays the configured SNMP group access details.

14.1.13 snmp targetaddr

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP target address. The no form of the command removes the configured SNMP target address.

```
snmp targetaddr TargetAddressName param ParamName {IPAddress |
IP6Address} [timeout Seconds(1-1500)] [retries RetryCount(1-3)]
[taglist TagIdentifier | none] [{volatile | nonvolatile}]
```

```
no snmp targetaddr TargetAddressName
```

Syntax Description

TargetAddressName – Name of the target address (host).

param – SNMP parameter name.

IPAddress | *IP6Address* – IP/IP6 Address of the host.

timeout – The time the SNMP agent waits for a response from the SNMP manager before retransmitting the inform request message.

retries – The maximum number of times the agent can retransmit the inform request message.

taglist – Tag identifier.

volatile | *nonvolatile* – Storage type.

Mode

Global Configuration

Defaults

ParamName – Internet

IPAddress – 10.0.0.10

taglist – snmp

Storage type – volatile

Example

```
SEFOS(config)# snmp targetaddr sefosmgr param sefosd
10.0.0.10 taglist mytag nonvolatile
```

Notes

Target param must have been configured.

Related Commands

- show snmp targetaddr – Displays the configured SNMP target addresses.
- snmp targetparams – Configures the SNMP target parameters.
- show snmp targetparam – Displays the configured SNMP target address parameters.

14.1.14 snmp targetparams

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP target parameters. The no form of the command removes the SNMP target parameters.

```
snmp targetparams ParamName user UserName security-model {v1 | v2c
| v3 {auth | noauth | priv}} message-processing {v1 | v2c | v3}
[{volatile | nonvolatile}]
```

```
no snmp targetparams ParamName
```

Syntax Description

ParamName – SNMP parameter name.
user – User name.
security-model – Security model.
auth – Enables authentication: MD5 or SHA packet authentication.
noauth – Disables authentication.
priv – Specifies both authentication and privacy.
message-processing – Message processing model.
volatile | nonvolatile – Storage type.

Mode

Global Configuration

Defaults

ParamName – Internet
User/Security Name – None
Security Model – v2c
Security Level – NoauthNoPriv
Message Processing Model – v2c
Storage Type – Non-volatile
ParamName – test1
User/Security Name – None
Security Model – v1
Security Level – NoauthNoPriv
Message Processing Model – v1
Storage Type – Non-volatile

Example

```
SEFOS(config)# snmp targetparams param1 user user1
security-model v3 noauth message-processing v3
```

Notes

User information must have been configured prior to the configuration of SNMP target parameters.

Related Commands

- `snmp user` – Configures the SNMP user details.
- `show snmp targetparam` – Displays the configured SNMP target address parameters.
- `show snmp user` – Displays the configured SNMP users.

14.1.15 snmp user

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP user details. The `no` form of the command removes the SNMP user details.

```
snmp user UserName [auth {md5 | sha} passwd [priv DES passwd]]
[{volatile | nonvolatile}]
```

```
no snmp user UserName
```

Syntax Description

UserName – Name of the user.

auth – Authentication algorithm. Can be MD5 or SHA.

passwd – Password associated with the authentication type.

priv DES – Private encryption password

volatile | *nonvolatile* – Storage type. Cann be either volatile or non-volatile.

Mode

Global Configuration

Defaults

UserName – Initial

Authentication Protocol – None

Privacy Protocol – None

Storage type – Non-volatile

Storage type – Non-volatile

Example

```
SEFOS(config)# snmp user user1
```

Notes

SNMP passwords are localized using the local SNMP engine ID.

Related Commands

- `show snmp engineID` – Displays the engine identifier.
- `show snmp user` – Displays the configured SNMP users.

14.1.16 snmp notify

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the SNMP notification details. The no form of this command removes the SNMP notification details.

```
snmp notify NotifyName tag TagName type {Trap | Inform} [{volatile
| nonvolatile}]
```

```
no snmp notify NotifyName
```

Syntax Description
- *NotifyName* – Notification Name
- **tag** – Tag Name
- **type** – Type of Notification
- *volatile* | *nonvolatile* – Storage type of the notification details

Mode Global Configuration

Defaults
- Notify Name – sefos/sefos1
- Notify Tag – sefos/sefos1
- Storage type – volatile

Example

```
SEFOS(config)# snmp notify note1 tag tag1 type Inform
```

Related Commands

- show snmp notif – Displays the configured SNMP notifications.
- show snmp targetaddr – Displays the configured SNMP target addresses.

14.1.17 snmp-server enable traps snmp authentication

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command enables generation of authentication traps for SNMPv1 and SNMPv2c. The no form of the command disables generation of authentication traps for SNMPv1 and SNMPv2c.

```
snmp-server enable traps snmp authentication
```

```
no snmp-server enable traps snmp authentication
```

Mode Global Configuration

Defaults Generation of authentication traps is disabled by default.

Example
```
SEFOS(config)# snmp-server enable traps snmp
authentication
```

14.1.18 snmp-server trap udp-port

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the udp port over which agent sends the trap. The no form of the command configures the snmp agent to sent trap on default udp port.

```
snmp-server trap udp-port port
```

```
no snmp-server trap udp-port
```

Syntax Description *port* – Port number.

Mode Global Configuration

Example
```
SEFOS(config)# snmp-server trap udp-port 1234
```

Related Commands

- show snmp notif – Displays the configured SNMP notification types.

14.1.19 snmp-server trap proxy-udp-port

Configures the udp port over which agent sends the trap. The no form of the command configures the snmp agent to sent trap on default udp port.

```
snmp-server trap proxy-udp-port port
```

```
no snmp-server trap proxy-udp-port
```

Syntax Description	*port* – Port number.
Mode	Global Configuration
Defaults	162
Example	SEFOS(config)# **snmp-server trap proxy-udp-port 162**

Related Commands

- show snmp-server proxy-udp-port – Displays the proxy udp port.

14.1.20 snmp tcp enable

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command enables sending snmp messages over tcp. The no form of the command disables sending snmp messages over tcp.

```
snmp tcp enable
```

```
no snmp tcp enable
```

Mode	Global Configuration
Defaults	Disabled.
Example	SEFOS(config)# **snmp tcp enable**

Related Commands

- show snmp tcp – Displays the configuration for snmp over tcp.

14.1.21 snmp trap tcp enable

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command enables sending snmp trap messages over tcp. The no form of the command disables sending snmp trap messages over tcp.

```
snmp trap tcp enable
```

```
no snmp trap tcp enable
```

Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# snmp trap tcp enable`

Related Commands

- `show snmp tcp` – Displays the configuration for snmp over tcp.

14.1.22 snmp-server tcp-port

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the tcp port over which agent sends the snmp message. The no form of the command configures the snmp agent to sent snmp message on default tcp port.

```
snmp-server tcp-port port
```

```
no snmp-server tcp-port
```

Syntax Description	*port* – Port number.
Mode	Global Configuration

Defaults 161

Example `SEFOS(config)#` **`snmp-server tcp-port 161`**

Related Commands

- `show snmp tcp` – Displays the configuration for snmp over tcp.

14.1.23 snmp-server trap tcp-port

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command configures the tcp port over which agent sends the trap. The `no` form of the command configures the snmp agent to sent trap on default tcp port.

`snmp-server trap tcp-port` *`port`*

`no snmp-server trap tcp-port`

Syntax Description *`port`* – Port number.

Mode Global Configuration

Defaults 162

Example `SEFOS(config)#` **`snmp-server trap tcp-port 162`**

Related Commands

- `show snmp tcp` – Displays the configuration for snmp over tcp.

14.1.24 snmp-server enable traps

Enables generation of a particular trap. The `no` form of the command disables generation of a particular trap.

`snmp-server enable traps {[firewall-limit] [linkup] [linkdown] [coldstart]}`

```
no snmp-server enable traps {[firewall-limit] [linkup] [linkdown]
[coldstart]}
```

Syntax Description

firewall-limit – Firewall attack summary trap.

linkup – Linkup trap.

linkdown – Linkdown trap.

coldstart – Coldstart trap.

Mode

Global Configuration

Notes

Do not use this command for trapping the link status. Link up (`linkup`) and link down (`linkdown`) are specific to a particular interface, so you must be in that interface mode to enable and disable the link status.

Instead, use the following commands:

`snmp trap link-status` to enable the link up and down events.

`no snmp trap link-status` to disable the link up and down events.

For example:

```
SEFOS(config)# int ex 0/1
SEFOS(config-if)# snmp trap link-status
```

Related Commands

- `show snmp-server traps` – Displays the set of traps that are currently enabled.

14.1.25 show snmp

Displays the status information of SNMP communications.

```
show snmp
```

Mode

Privileged EXEC

Example

```
SEFOS# show snmp

0 SNMP Packets Input
      0 Bad SNMP Version errors
      0 Unknown community name
      0 Get request PDUs
      0 Get Next PDUs
      0 Set request PDUs

 0 SNMP Packets Output
      0 Too big errors
      0 No such name errors
      0 Bad value errors
      0 General errors
      0 Trap PDUs

0 SNMP Rollback failures

 SNMP Manager-role output packets
      0 Drops

 SNMP Informs:
      0 Inform Requests generated
      0 Inform Responses received
      0 Inform messages Dropped
      0 Inform Requests awaiting Acknowledgement

 SNMP Trap Listen Port is 162
```

14.1.26 show snmp community

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP community details.

```
show snmp community
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp community

Community Index: NETMAN
Community Name: NETMAN
Security Name: none
Context Name:
Transport Tag:
Storage Type: volatile
Row Status: active
------------------------------
Community Index: PUBLIC
Community Name: PUBLIC
Security Name: none
Context Name:
Transport Tag:
Storage Type: volatile
Row Status: active
```

Related Commands

- `snmp community index` – Configures the SNMP community details.

14.1.27 show snmp group

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP groups.

```
show snmp group
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp group

Security Model: v1
Security Name: none
Group Name: iso
Storage Type: volatile
Row Status: active
------------------------------
Security Model: v2c
Security Name: none
Group Name: iso
Storage Type: volatile
Row Status: active
------------------------------
Security Model: v3
Security Name: initial
Group Name: initial
Storage Type: nonVolatile
Row Status: active
------------------------------
Security Model: v3
Security Name: templateMD5
Group Name: initial
Storage Type: nonVolatile
Row Status: active
------------------------------
Security Model: v3
Security Name: templateSHA
Group Name: initial
Storage Type: nonVolatile
Row Status: active
```

Notes

Related Commands

- `snmp group` – Configures the SNMP group details.
- `snmp user` – Configures the SNMP user details.

14.1.28 show snmp group access

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP group access details.

```
show snmp group access
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp group access

Group Name: iso
Read View: iso
Write View: iso
Notify View: iso
Storage Type: volatile
Row Status: active
------------------------------
Group Name: iso
Read View: iso
Write View: iso
Notify View: iso
Storage Type: volatile
Row Status: active
------------------------------
Group Name: initial
Read View: restricted
Write View: restricted
Notify View: restricted
Storage Type: nonVolatile
Row Status: active
------------------------------
Group Name: initial
Read View: iso
Write View: iso
Notify View: iso
Storage Type: nonVolatile
Row Status: active
```

Related Commands

- `snmp access` – Configures the SNMP group access details
- `snmp view` – Configures the SNMP view

14.1.29 show snmp engineID

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the engine identifier.

```
show snmp engineID
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp engineID

EngineId: 80.00.08.1c.04.46.53
```

Related Commands

- snmp engineid – Configures the engine identifier.

14.1.30 show snmp viewtree

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP tree views.

```
show snmp viewtree
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp viewtree

View Name: iso
Subtree OID: 1
Subtree Mask:
View Type: included
Storage Type: nonVolatile
Row Status: active
------------------------------
View Name: restricted
Subtree OID: 1
Subtree Mask:
View Type: included
Storage Type: nonVolatile
Row Status: active
------------------------------
```

Related Commands

- `snmp view` – Configures the SNMP view.

14.1.31 show snmp targetaddr

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP target addresses.

```
show snmp targetaddr
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp targetaddr

Target Address Name: sefosmanager
IP Address: 10.0.0.10
Tag List: snmp
Parameters: internet
Storage Type: volatile
Row Status: active
------------------------------
```

Related Commands

- `snmp targetaddr` – Configures the SNMP target address.
- `snmp targetparams` – Configures the SNMP target parameters.
- `snmp notify` – Configures the SNMP notification details.

14.1.32 show snmp targetparam

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP target address parameters.

```
show snmp targetparam
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp targetparam

Target Parameter Name: internet
Message Processing Model: v2c
Security Model: v2c
Security Name: none
Security Level: noAuthNoPriv
Storage Type: volatile
Row Status: active
------------------------------
Target Parameter Name: test1
Message Processing Model: v1
Security Model: v1
Security Name: none
Security Level: noAuthNoPriv
Storage Type: volatile
Row Status: active
```

Related Commands

- `snmp targetparams` – Configures the SNMP target parameters.
- `snmp user` – Configures the SNMP user details.

14.1.33 show snmp user

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP users.

```
show snmp user
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp user

Engine ID: 80.00.08.1c.04.46.53
User: initial
Authentication Protocol: none
Privacy Protocol: none
Storage Type: nonVolatile
Row Status: active
------------------------------
Engine ID: 80.00.08.1c.04.46.53
User: templateMD5
Authentication Protocol: MD5
Privacy Protocol: none
Storage Type: nonVolatile
Row Status: active
------------------------------
Engine ID: 80.00.08.1c.04.46.53
User: templateSHA
Authentication Protocol: SHA
Privacy Protocol: DES_CBC
Storage Type: nonVolatile
Row Status: active
------------------------------
```

Related Commands

- `snmp user` – Configures the SNMP user details.
- `show snmp community` – Displays the configured SNMP community details.

14.1.34 show snmp notif

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configured SNMP notification types.

```
show snmp notif
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp notif

Notify Name: sefos
Notify Tag: sefos
Notify Type: trap
Storage Type: volatile
Row Status: active
-----------------------------
Notify Name: sefos1
Notify Tag: sefos1
Notify Type: trap
Storage Type: volatile
Row Status: active
```

Related Commands

- `snmp notify` – Configures the SNMP notification details.
- `snmp targetparams` – Configures the SNMP target parameters.

14.1.35 show snmp inform statistics

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the inform message statistics.

```
show snmp inform statistics
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp inform statistics

Target Address Name   : sefosmanager
IP Address              : 10.0.0.10
Inform messages sent : 20
Acknowledgement awaited for : 2 Inform messages
Inform messages dropped : 0
Acknowledgement failed for : 0 Inform messages
Informs retransmitted: 0
Inform responses received: 18
```

14.1.36 show snmp-server traps

This command displays the set of traps that are currently enabled.

```
show snmp-server traps
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp-server traps

Currently enabled traps:
------------------------
linkup,linkdown,
```

Related Commands

- `snmp-server enable traps` – Enables generation of a particular trap.

14.1.37 show snmp-server proxy-udp-port

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the proxy udp port.

```
show snmp-server proxy-udp-port
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp-server proxy-udp-port

snmp-server proxy-udp-port : 162
```

Related Commands

- `snmp-server trap proxy-udp-port` – Configures the udp port over which agent sends the trap.

14.1.38 show snmp tcp

Note – This command is not currently supported. Refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Management Protocols Reference Guide* for the ILOM equivalent of this command.

This command displays the configuration for snmp over tcp.

```
show snmp tcp
```

Mode Privileged EXEC

Example

```
SEFOS# show snmp tcp

snmp over tcp disabled

snmp trap over tcp disabled

snmp listen tcp port 161

Snmp listen tcp trap port 162
```

Related Commands

- `snmp tcp enable` – Enables sending snmp messages over tcp.
- `snmp trap tcp enable` – Enables sending snmp trap messages over tcp.
- `snmp-server tcp-port` – Configures the tcp port over which agent sends the snmp message.
- `snmp-server trap tcp-port` – Configures the tcp port over which agent sends the trap.

CHAPTER 15

LLDP

The SEFOS LLDP module is a portable software implementation of the LLDP. The module provides complete management capabilities using SNMP and CLI.

The SEFOS LLDP module conforms to IEEE 802.1AB-2005 standard. The LLDP allows systems on an Ethernet LAN to advertise their key capabilities and also to learn about the key capabilities of other systems on the same Ethernet LAN. This, in turn, promotes a unified network management view of the LAN topology and connectivity to aid network administration and trouble-shooting.

The SEFOS LLDP module provides the following features:

- Provides full conformance to the 802.1AB specification.
- Supports all mandatory TLVs (Chassis identifier, port identifier and time-to-live).
- Supports optional TLVs – port description, system name, system description, system capabilities and management address.
- Supports organizationally specific optional TLVs – port VLAN identifier, port and protocol VLAN identifier, VLAN name, MAC or PHY configuration or status, link aggregation and maximum frame size.
- Supports the basic MIB and the extension MIBs in Appendix F and Appendix G, defined in the 802.1AB specification and a proprietary MIB for management.
- Provides support for notifications through traps.

15.1 LLDP Commands

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

- `shutdown lldp`
- `set lldp`
- `lldp transmit-interval`

- lldp holdtime-multiplier
- lldp reinitialization-delay
- lldp tx-delay
- lldp notification-interval
- lldp chassis-id-subtype
- lldp port-id-subtype
- clear lldp counters
- clear lldp table
- debug lldp
- show lldp
- show lldp interface
- show lldp neighbors
- show lldp traffic
- show lldp local
- show lldp errors
- show lldp statistics
- lldp transmit | receive
- lldp notification
- lldp tlv-select basic-tlv
- lldp tlv-select dot1tlv
- lldp tlv-select dot3tlv

15.1.1 shutdown lldp

Shutdowns LLDP on the system and the no form of the command starts LLDP on the system.

```
shutdown lldp
```

```
no shutdown lldp
```

Mode	Global Configuration
Defaults	**no shutdown lldp**
Example	SEFOS(config)# **shutdown lldp**

15.1.2 set lldp

Enables or disables LLDP on the system.

```
set lldp {enable | disable}
```

Mode	Global Configuration
Defaults	Disabled.
Example	`SEFOS(config)# set lldp enable`

Related Commands

- `show lldp` - Displays LLDP Global Configuration details

15.1.3 lldp transmit-interval

Sets the transmission interval and the `no` form of the command sets the transmission interval to the default value.

```
lldp transmit-interval 5-32768_seconds
```

```
no lldp transmit-interval
```

Syntax Description	**transmit-interval** – Interval at which LLDPDUs are transmitted
Mode	Global Configuration
Defaults	30 seconds.
Example	`SEFOS(config)# lldp transmit-interval 50`

Related Commands

- `show lldp` - Displays LLDP Global Configuration details

15.1.4 lldp holdtime-multiplier

Sets the multiplier value and the no form of the command sets the multiplier to the default value. The multiplier value is used to compute the time-to live(ttl) value (ttl = message transmission interval * hold time multiplier.

```
lldp holdtime-multiplier 2-10
```

```
no lldp holdtime-multiplier
```

Syntax Description	**holdtime-multiplier value** – Used to calculate time-to-live for the LLDP advertisements.
Mode	Global Configuration
Defaults	4
Example	`SEFOS(config)# lldp holdtime-multiplier 5`

Related Commands

- show lldp - Displays LLDP Global Configuration details

15.1.5 lldp reinitialization-delay

Sets the reinitialization delay time and the no form of the command sets the reinitialization delay time to the default value.

```
lldp reinitialization-delay 1-10_seconds
```

```
no lldp reinitialization-delay
```

Syntax Description	**reinitialization-delay** – Time taken by LLDP to re-initialize on any interface.
Mode	Global Configuration
Defaults	2 seconds.
Example	`SEFOS(config)# lldp reinitialization-delay 4`

Related Commands

- show lldp - Displays LLDP Global Configuration details

15.1.6 lldp tx-delay

Sets the transmit delay and the no form of the command sets the transmit delay to the default value.

```
lldp tx-delay 1-8192_seconds
```

```
no lldp tx-delay
```

Syntax Description	**tx-delay** – Minimum amount of delay between successive LLDPDU frame transmissions.
Mode	Global Configuration
Defaults	2 seconds.
Example	`SEFOS(config)# lldp tx-delay 12`

Related Commands

- show lldp - Displays LLDP Global Configuration details

15.1.7 lldp notification-interval

Sets the notification interval and the no form of the command sets the notification interval to the default value.

```
lldp notification-interval 5-3600_seconds
```

```
no lldp notification-interval
```

Syntax Description	**notification-level** – Interval at which LLDP notifications are sent to NMS.
Mode	Global Configuration
Defaults	5 seconds.
Example	`SEFOS(config)# lldp notification-interval 150`

Related Commands

- show lldp - Displays LLDP Global Configuration details

15.1.8 lldp chassis-id-subtype

Configures LLDP chassis identifier subtype and chassis identifier value of the chassis component, port component and local.

The chassis identifier value can be set only for the chassis-component and local system subtypes. For all other subtypes, the command takes the value from the system automatically.

```
lldp chassis-id-subtype {chassis-comp string_255 | if-alias |
port-comp string_255 | mac-addr | nw-addr | if-name | local
string_255}
```

Syntax Description

chassis-comp – Chassis component.
if-alias – Interface alias.
port-comp – Port component.
mac-addr – MAC address.
nw-addr – Network address.
if-name – Interface name.
local – Locally assigned.

Mode Global Configuration

Defaults **mac-addr**

Example

```
SEFOS(config)# lldp chassis-id-subtype chassis-comp
Sunswitch

SEFOS(config)# lldp chassis-id-subtype if-alias
```

Related Commands

- `show lldp` - Displays LLDP Global Configuration details

15.1.9 lldp port-id-subtype

Configures LLDP port identifier subtype and port identifier value for port component and local on a specific interface.

```
lldp port-id-subtype {if-alias | port-comp string_255 | mac-addr
| if-name | local string_255}
```

Syntax Description	**if-alias** – Interface alias. **port-comp** – Port component. **mac-addr** – MAC address. **if-name** – Interface name. **local** – Locally assigned.
Mode	Interface Cofiguration
Defaults	**if-alias**

Example	`SEFOS(config-if)# lldp port-id-subtype mac-addr`
	
	`SEFOS(config-if)# lldp port-id-subtype local slot0/1`

Related Commands

- `show lldp local` - Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces

15.1.10 clear lldp counters

Clears all the interface related transmit and receive counters. This command does not clear the global statistics.

```
clear lldp counters
```

Mode	Global Configuration
Example	`SEFOS(config)# clear lldp counters`

Related Commands

- `show lldp traffic` - Displays the counters

15.1.11 clear lldp table

Clears all the learnt LLDP neighbors information.

```
clear lldp table
```

Mode	Global Configuration
Example	`SEFOS(config)# clear lldp table`

Related Commands

- `show lldp neighbors` - Displays information about neighbors learnt on an interface or all interfaces

15.1.12 debug lldp

Specifies debug level for LLDP module. When no arguments are given, displays current debug level. The `no` form of the command disables debug option for LLDP module.

```
debug lldp [{all | [init-shut] [mgmt] [data-path] [ctrl]
[pkt-dump] [resource] [all-fail] [buf] [neigh-add] [neigh-del]
[neigh-updt] [neigh-drop] [neigh-ageout] [critical][tlv {all |
[chassis-id][port-id] [ttl] [port-descr] [sys-name] [sys-descr]
[sys-capab] [mgmt-addr] [port-vlan] [ppvlan] [vlan-name]
[proto-id] [mac-phy] [pwr-mdi] [lagg] [max-frame]}]
[redundancy]}]
```

```
no debug lldp [{all | [init-shut] [mgmt] [data-path] [ctrl]
[pkt-dump] [resource] [all-fail] [buf] [neigh-add] [neigh-del]
[neigh-updt] [neigh-drop] [neigh-ageout] [critical][tlv {all |
[chassis-id][port-id] [ttl] [port-descr] [sys-name] [sys-descr]
[sys-capab] [mgmt-addr] [port-vlan] [ppvlan] [vlan-name]
[proto-id] [mac-phy] [pwr-mdi] [lagg] [max-frame]}]
[redundancy]}]
```

Syntax Description

all – All trace messages.
init-shut – Init and shutdown debug messages.
mgmt – Management related messages.
data-path – Data path messages.
ctrl – Control plane messages.
pkt-dump – Packet dump messages.
resource – Messages related to all resources except buffers.
all-fail – All failures.
buf – Buffer allocation/release traces.
neigh-add – Neighbor add traces.
neigh-del – Neighbor delete traces.
neigh-updt – Neighbor update traces.
neigh-drop – Neighbor drop traces.
neigh-ageout – Neighbor ageout traces.
critical – Critical traces.
tlv all – TLV traces.
tlv chassis-id – Chassis identifier TLV traces.
tlv port-id – Port identifier TLV trace.
tlv ttl – TTL TLV trace.
tlv port-descr – Port description TLV traces.
tlv sys-name – System name TLV traces.
tlv sys-descr – System description TLV traces.
tlv sys-capab – System capabilities TLV traces.
tlv mgmt-addr – Management address TLV traces.
tlv port-vlan – Port-vlan TLV traces.
tlv ppvlan – Port-protocol-vlan TLV traces.
tlv vlan-name – Vlan-name TLV traces.
tlv proto-id – Protocol identifiers TLV traces.
tlv mac-phy – MAC or PHY TLV traces.
tlv pwr-mdi – Power-through-MDI TLV traces.
tlv lagg – Link aggregation TLV traces.
tlv max-frame – Maximum frame size TLV traces.
redundancy – LLDP redundancy traces. The keyword `redundancy` is not supported.

Mode Privileged EXEC

Defaults Critical.

Example

```
SEFOS# debug lldp init-shut mgmt

SEFOS# debug lldp tlv sys-descr lagg

SEFOS# debug lldp
```

15.1.13 show lldp

Displays LLDP Global Configuration details.

```
show lldp
```

Mode Privileged EXEC

Example

```
SEFOS# show lldp

LLDP is enabled
Transmit Interval          : 30
Holdtime Multiplier        : 4
Reinitialization Delay     : 2
Tx Delay                     : 2
Notification Interval      : 5
Chassis Id SubType         : Mac Address
Chassis Id                   : 00:02:02:03:04:01
```

Related Commands

- `lldp transmit-interval` - Sets the transmission interval
- `lldp holdtime-multiplier` - Sets the multiplier value
- `lldp reinitialization-delay` - Sets the reinitialization delay
- `lldp tx-delay` - Sets the transmit delay
- `lldp notification-interval` - Sets the notification interval
- `lldp chassis-id-subtype` - Configures LLDP chassis identifier subtype and chassis identifier value

15.1.14 show lldp interface

Displays LLDP configuration details on a particular interface or all interfaces.

```
show lldp interface [interface-type interface-id]
```

Syntax Description

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

Mode Privileged EXEC

Example

```
SEFOS# show lldp interface extreme-ethernet 0/1
Ex0/1:
Tx State              : Enabled
Rx State              : Enabled
Tx SEM State          : IDLE
Rx SEM State          : WAIT FOR FRAME
Notification Status : Disabled
Notification Type    : Mis-configuration
```

Related Commands

- `set lldp` - Enables or disables LLDP on the system
- `lldp transmit | receive` - Sets LLDP admin status on an interface to transmit or receive
- `lldp notification` - Enables LLDP trap notification on an interface

15.1.15 show lldp neighbors

Displays information about neighbors learned on an interface or all interfaces.

show lldp neighbors [chassis-id *string_255* **port-id** *string_255*] [*interface-type interface-id*] **[detail]**

Syntax Description

chassis-id – Chassis identifier.
port-id – Port identifier.
interface-type– Interface type.
interface-id – Interface identifier.
detail – Displays the information obtained from all the TLVs received.

Mode

Privileged EXEC

Example

```
SEFOS# show lldp neighbors
Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis ID           Local Intf   Hold-time    Capability     Port Id
----------           ----------   ---------    ----------     -------

00:02:02:03:04:01   Ex0/3         120                           Slot0/2
00:01:02:03:04:01   Ex0/2         120                           Slot0/2
00:01:02:03:04:01   Ex0/3         120                           Slot0/2
```

```
00:01:02:03:04:01   Ex0/2         120                              Slot0/2
00:01:02:03:04:01   Ex0/3         120                              Slot0/2

Total Entries Displayed : 5
```

```
SEFOS# show lldp neighbors chassis-id 00:01:02:03:04:01 port-id
Slot0/2

Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis ID           Local Intf    Hold-time   Capability      Port Id
----------           ----------    ---------   ----------      -------
00:01:02:03:04:01   Ex0/2          120                           Slot0/2
00:01:02:03:04:01   Ex0/3          120                           Slot0/2

Total Entries Displayed : 2
```

```
SEFOS# show lldp neighbors chassis-id 00:01:02:03:04:01 port-id
Slot0/2 extreme-ethernet 0/2

Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
Chassis ID           Local Intf    Hold-time   Capability      Port Id
----------           ----------    ---------   ----------      -------
00:01:02:03:04:01   Ex0/2          120                           Slot0/2

Total Entries Displayed : 1
```

```
SEFOS# show lldp neighbors chassis-id 00:01:02:03:04:01 port-id
Slot0/2 detail

Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other
```

```
Chassis ID          Local Intf    Hold-time   Capability      Port Id
----------          ----------    ---------   ----------      -------
00:01:02:03:04:01   Ex0/2         120                           Slot0/2
00:01:02:03:04:01   Ex0/3         120                           Slot0/2

Total Entries Displayed : 2
```

SEFOS# **show lldp neighbors chassis-id 00:01:02:03:04:01 port-id Slot0/2 extreme-ethernet 0/2**

```
Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis ID          Local Intf    Hold-time   Capability      Port Id
----------          ----------    ---------   ----------      -------
00:01:02:03:04:01   Ex0/2         120                           Slot0/2

Total Entries Displayed : 1
```

SEFOS# **show lldp neighbors chassis-id 00:01:02:03:04:01 port-id Slot0/2 detail**

```
Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis Id SubType              : Mac Address
Chassis Id                       : 00:01:02:03:04:01
Port Id SubType                 : Interface Alias
Port Id                          : Slot0/2
Port Description                : Not Advertised

System Name                      : Not Advertised
System Desc                      : Not Advertised
Local Intf                       : Ex0/2
Time Remaining                  : 92 Seconds
System Capabilities Tlv         : Not Advertised
Management Addresses            : Not Advertised

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
```

```
Auto Negotiation Tlv            : Not Advertised
-Link Aggregation
Link Aggregation Tlv            : Not Advertised
-Maximum Frame Size Tlv         : Not Advertised

Extended 802.1 TLV Info
-Port VLAN Id                    : 0
-Port & Protocol VLAN Id
Protocol Vlan Tlv                : Not Advertised
-Vlan Name
Vlan Id          Vlan Name
-------          ---------

------------------------------------------------------------
Chassis Id SubType               : Mac Address
Chassis Id                        : 00:01:02:03:04:01
Port Id SubType                  : Interface Alias
Port Id                           : Slot0/2
Port Description                 : Not Advertised
System Name                       : Not Advertised
System Desc                       : Not Advertised
Local Intf                        : Ex0/3
Time Remaining                   : 92 Seconds
System Capabilities Tlv         : Not Advertised
Management Addresses            : Not Advertised

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto Negotiation Tlv            : Not Advertised
-Link Aggregation
Link Aggregation Tlv            : Not Advertised
-Maximum Frame Size Tlv         : Not Advertised

Extended 802.1 TLV Info
-Port VLAN Id                    : 0
-Port & Protocol VLAN Id
Protocol Vlan Tlv                : Not Advertised
-Vlan Name
Vlan Id          Vlan Name
-------          ---------
------------------------------------------------------------
```

```
Total Entries Displayed : 2

SEFOS# show lldp neighbors extreme-ethernet 0/1 detail

Capability Codes    :
(R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device,
(W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other

Chassis Id SubType              : Mac Address
Chassis Id                       : 00:01:02:03:04:01
Port Id SubType                 : Interface Alias
Port Id                          : Slot0/1
Port Description                : Ethernet Interface
System Name                      : Oracle Router Ver 1.0
System Desc                      : SNMPV2
Local Intf                       : Ex0/1
Time Remaining                  : 95 Seconds
System Capabilities Supported : B,R
System Capabilities Enabled   : B,R
Management Addresses            :
IfId SubType Address                              OID
---- ------- -------                              ---
33    IPv4     12.0.0.1                           1 3 6 1 2 1 2 2 1 1

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto-Neg Support & Status      : Supported, Disabled
Advertised Capability Bits     : 8000
Other
-Link Aggregation
Capability & Status             : Not Capable, Not In Aggregation
Aggregated Port Id              : 1
-Maximum Frame Size             : 1500

Extended 802.1 TLV Info
-Port VLAN Id                    : 1
-Port & Protocol VLAN Id
Protocol Vlan Id           Support         Status
----------------           -------         ------
1                             Supported       Enabled
2                             Supported       Enabled
```

```
30                              Supported       Enabled
-Vlan Name
Vlan Id          Vlan Name
-------          ---------
1                 vlan1
2                 vlan2
30                vlan30
------------------------------------------------------------

Total Entries Displayed : 1
```

Related Commands

- `set lldp` - Enables or disables LLDP on the system
- `lldp tlv-select basic-tlv` - Configures basic TLV types to be transmitted on a given port
- `lldp tlv-select dot1tlv` - Configures dot1 TLV types to be transmitted on a port
- `lldp tlv-select dot3tlv` - Configures dot3 TLV types to be transmitted on a port

15.1.16 show lldp traffic

Displays LLDP counters on all interfaces or on a specific interface. This includes the following:

- Total frames out
- Total entries aged
- Total frames in
- Total frames received in error
- Total frames discarded
- Total TLVs unrecognized

Total TLVs discarded

show lldp traffic [*iftype ifnum***]**

Syntax Description
iftype – Interface type
ifnum – Interface number

Mode Privileged EXEC

Example

```
SEFOS# show lldp traffic
Total Frames Out                  : 107
Total Entries Aged                : 0
Total Frames In                   : 159
Total Frames Received In Error : 0
Total Frames Discarded           : 0
Total TLVS Unrecognized          : 0
Total TLVs Discarded              : 0

SEFOS# show lldp traffic extreme-ethernet 0/1
Total Frames Out                  : 49
Total Entries Aged                : 0
Total Frames In                   : 42
Total Frames Received In Error : 0
Total Frames Discarded           : 0
Total TLVS Unrecognized          : 0
Total TLVs Discarded              : 0
```

Related Commands

- `set lldp` - Enables or disables LLDP on the system

15.1.17 show lldp local

Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces.

show lldp local {[*interface-type interface-id***] | [***mgmt-addr***]}**

Syntax Description

interface-type – Interface type.
interface-id – Interface identifier.
mgmt-addr – All the management addresses configured in the system and Tx enabled ports.

Mode

Privileged EXEC

Example

```
SEFOS# show lldp local extreme-ethernet 0/1
Port Id SubType                  : Interface Alias
Port Id                           : Slot0/1
Port Description                 : Ethernet Interface
Enabled Tx Tlvs                  : Port Description, System Name,
                                       System Description, System
Capability,
                                     Management Address, Port Vlan, Mac
Phy,
                                       Link Aggregation, Max Frame Size

Extended 802.3 TLV Info
-MAC PHY Configuration & Status
Auto-Neg Support & Status      : Supported, Disabled
Advertised Capability Bits     : 8000
Other
Operational MAU Type           : 0
-Link Aggregation
Capability & Status            : Not Capable, Not In Aggregation
Aggregated Port Id             : 1
-Maximum Frame Size            : 1500

Extended 802.1 TLV Info
-Port VLAN Id                   : 1
-Port & Protocol VLAN Id
Protocol VLAN Id      Support     Protocol VLAN Status      TxStatus
----------------      -------     --------------------      --------
1                        Supported   Enabled                     Enabled
2                        Supported   Enabled                     Enabled

30                       Supported   Enabled                     Enabled
-Vlan Name
Vlan Id          Vlan Name                                TxStatus
-------          ---------                                --------
1                 vlan1                                    Enabled
2                 vlan2                                    Enabled
30                vlan3                                    Enabled
-------------------------------------------------------------

SEFOS# show lldp local mgmt-addr
Management Address                TxEnabledPorts
------------------                --------------
13.0.0.1                            Ex0/1
15.0.0.1                            Ex0/1
```

Related Commands

- `lldp chassis-id-subtype` - Configures lldp chassis id subtype and chassis id value
- `lldp port-id-subtype` - Configures lldp port id subtype and port id value for a given port
- `lldp tlv-select basic-tlv` - Configures basic TLV types to be transmitted on a given port
- `lldp tlv-select dot1tlv` - Configures dot1 TLV types to be transmitted on a port
- `lldp tlv-select dot3tlv` - Configures dot3 TLV types to be transmitted on a port

15.1.18 show lldp errors

Displays the information about the errors such as memory allocation failures, queue overflows and table overflow.

```
show lldp errors
```

Mode Privileged EXEC

Example

```
SEFOS# show lldp errors
Total Memory Allocation Failures   : 0
Total Input Queue Overflows         : 0
Total Table Overflows                : 0
```

Related Commands

- `set lldp` - Enables or disables LLDP on the system
- `lldp tlv-select basic-tlv` - Configures basic TLV types to be transmitted on a given port
- `lldp tlv-select dot1tlv` - Configures dot1 TLV types to be transmitted on a port
- `lldp tlv-select dot3tlv` - Configures dot3 TLV types to be transmitted on a port

15.1.19 show lldp statistics

Displays the LLDP remote table statistics information.

```
show lldp statistics
```

Mode Privileged EXEC

Example

```
SEFOS# show lldp statistics
Remote Table Last Change Time : 100300
Remote Table Inserts          : 5
Remote Table Deletes          : 0
Remote Table Drops            : 0
Remote Table Ageouts          : 0
Remote Table Updates          : 4
```

Related Commands

- `set lldp` - Enables or disables LLDP on the system
- `lldp transmit | receive` - Sets LLDP admin status on an interface to transmit or receive

15.1.20 lldp transmit | receive

Sets LLDP admin status on an interface to transmit or receive and the `no` form of the command resets LLDP admin status on an interface.

```
lldp {transmit | receive}
```

```
no lldp {transmit | receive}
```

Syntax Description

transmit – Enables Transmission of LLDPDU.

receive – Enables Reception of LLDPDU.

Mode Interface Cofiguration

Defaults Transmission and reception are enabled.

Example

```
SEFOS(config-if)# lldp transmit

SEFOS(config-if)# lldp receive
```

Related Commands

- `show lldp interface` - Displays LLDP configuration details on a particular interface or all interfaces

15.1.21 lldp notification

Enables LLDP trap notification on an interface. The `no` form of the command disables LLDP trap notification on an interface.

```
lldp notification [remote-table-chg] [mis-configuration]
```

```
no lldp notification
```

Syntax Description	**remote-table-chg** – Trap notification for change in neighbor's table. **mis-configuration** – Trap notification for mis-configuration.
Mode	Interface Cofiguration
Defaults	**mis-configuration**
Example	`SEFOS(config-if)#` **lldp notification remote-table-chg**

Related Commands

- `show lldp interface` - Displays LLDP configuration details on a particular interface or all interfaces

15.1.22 lldp tlv-select basic-tlv

Enables the basic TLV transmission on a given port. The `no` form of the command disables the basic TLV transmission on a given port.

```
lldp tlv-select basic-tlv {[port-descr] [sys-name] [sys-descr]
[sys-capab] [mgmt-addr {all | ipv4 ucast-addr> | ipv6 ip6-addr}]}
```

```
no lldp tlv-select basic-tlv {[port-descr] [sys-name] [sys-descr]
[sys-capab] [mgmt-addr {all | ipv4 ucast-addr> | ipv6 ip6-addr}]}
```

Syntax Description

port-descr – Port description TLV.

sys-name – System name TLV.

sys-descr– System description TLV.

sys-capab – System capabilities TLV.

mgmt-addr all– Enables the transmission of all the available management address on the current interface. If no management address is present or configured in the system, switch mac-address will be taken for transmission.

mgmt-addr ipv4 *ucast-addr* – Enables the transmission of a particular ipv4 address on the current interface.

mgmt-addr ipv6 *ipv6-addr* – Enables the transmission of a particular ipv6 address on the current interface.

Mode Interface Configuration

Example

```
SEFOS(config-if)# lldp tlv-select basic-tlv port-descr
mgmt-addr all
```

Related Commands

- `show lldp local` *mgmt-addr* - Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces
- `show lldp neighbors` - Displays information about neighbors learnt on an interface or all interfaces

15.1.23 lldp tlv-select dot1tlv

Configures `dot1` TLV types to be transmitted on a port and the `no` form of the command disables the transmission of `dot1` TLV types on a port.

```
lldp tlv-select dot1tlv {[port-vlan-id] [protocol-vlan-id {all
|vlan-id}] [vlan-name {all | vlan-id}]}
```

```
no lldp tlv-select dot1tlv {[port-vlan-id] [protocol-vlan-id {all
|vlan-id}] [vlan-name {all | vlan-id}]}
```

Syntax Description

port-vlan-id – Port VLAN identifier TLV. The keyword `port-vlan-id` keyword is not supported.

protocol-vlan-id – Protocol VLAN identifier TLV. The keyword `protocol-vlan-id` is not supported.

vlan-name – Vlan-name TLV.

Mode Interface Cofiguration

Example

```
SEFOS(config)# vlan 8
SECOS(config-vlan)# ports ex 0/8 name vlan8
SEFOS(config-vlan)# exit
SEFOS(config)# int ex 0/8
SEFOS(config-if)# lldp tlv-select dot1tlv vlan-name 8
```

Related Commands

- `show lldp local` - Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces
- `show lldp neighbors` - Displays information about neighbors learnt on an interface or all interfaces

15.1.24 lldp tlv-select dot3tlv

Configures `dot3` TLV types to be transmitted on a port. The `no` form of the command disables the transmission of `dot3` TLV types on a port.

```
lldp tlv-select dot3tlv {[macphy-config] [link-aggregation]
[max-framesize]}
```

```
no lldp tlv-select dot3tlv {[macphy-config] [link-aggregation]
[max-framesize]}
```

Syntax Description

macphy-config – MAC or PHY TLV.
link-aggregation – Link aggregation TLV.
max-framesize – Maximum frame size TLV.

Mode Interface Cofiguration

Example

```
SEFOS(config-if)# lldp tlv-select dot3tlv macphy-config
```

Related Commands

- `show lldp local` - Displays the current switch information that will be used to populate outbound LLDP advertisements for a specific interface or all interfaces
- `show lldp neighbors` - Displays information about neighbors learned on an interface or all interfaces

CHAPTER 16

DCB

DCB is a term commonly used to describe Ethernet enhancements to improve Ethernet networking and management in the data center environments. The DCB framework defines these enhancements required for switches and endpoints and includes the following features:

- Priority Groups (PG)

  Also known as Enhancement Transmission Selection ETS (IEEE definition). The priority grouping specification provides bandwidth management and a scheduling algorithm for various traffic classes on a converged link.

- Priority-based Flow Control (PFC)

  PFC is an enhancement to the existing Ethernet pause protocol. This feature allows "no-drop" packet delivery for certain traffic classes.

The DCB features are discovered and exchanged using Data Center Exchange Protocol (DCBX). DCBX uses LLDP (Link Layer Discovery Protocol) to exchange parameters between two DCB enabled link peers. In addition to the type, length, and value (TLV) attributes described in the LLDP chapter, DCBX TLVs can also be advertised over an LLDP enabled link to the peer. The DCBX capabilities (PG and PFC) exchanged with a link partner become the operational configuration and are passed to the QoS management subsystem for configuring the hardware.

The SEFOS DCB for this release supports DCB version 1.0.1 which was specified by the DCB Task Group.

16.0.1 Priority Group Feature (PG)

The purpose of PG (ETS) is to allocate link bandwidth based on the priority group setting on a link. Different traffic types may have different network bandwidth requirements. For example, priority 7 can be assigned to a priority group that does not require a bandwidth limitation.

16.0.2 Priority Flow Control Feature (PFC)

This PFC feature is important to provide "no-drop" packet delivery for certain traffic classes while maintaining existing LAN behavior for other traffic classes on a converged link. Priority 3 is enabled by default for the flow control. To efficiently use the switch resources, the switch allows up to two priorities for Ethernet priority pause. The Ethernet pause is applied to the PFC packets only.

16.0.3 Application Protocol Feature

This application protocol feature allows the DCB node to advertise the upper layer protocols and associated priority mapping over a DCB link. Since SEFOS switch is only a DCB capable switch and it is not a FCoE capable switch, the only protocol supported is the EtherType for layer 2 protocols. Its main purpose is to advertise its capability to the link partner which is a CNA (converged network adapter) port and the host runs FCoE over this CNA link. The priority mapping is taken from what the PFC feature is configured.

The following table shows the default setting for PG, PFC and Application.

Priority	Priority Group	PG Bandwidth Allocation (%)	Priority Flow Control	Application Priority Mapping
0	0	50	disable	disable
1	0	50	disable	disable
2	0	50	disable	disable
3	1	30	disable	disable
4	2	20	disable	disable
5	2	20	disable	disable
6	2	20	disable	disable
7	15	unrestricted	disable	disable

16.1 DCB Commands

The list of DCB commands is as follows:

- `shutdown dcb`
- `set dcb {enable | disable}`

- set dcb priority-group {enable | disable}
- set dcb priority-group mode
- set dcb priority-group
- set dcb priority-flow-control {enable | disable}
- set dcb priority-flow-control mode
- set dcb priority-flow-control vlan-priority
- set dcb application-etype-fcoe
- lldp tlv-select dcb1tlv
- show dcb global info
- show interfaces dcb priority-group
- show interfaces dcb priority-flow-control
- show interfaces dcb application-etype-fcoe
- show interfaces dcb counters
- clear interfaces dcb counters

16.1.1 shutdown dcb

Shutdowns DCB in the switch. The no form of this command starts DCB in the switch.

```
shutdown dcb
```

```
no shutdown dcb
```

Mode	Global Configuration
Default	DCB is shutdown.
Example	SEFOS(config)# **no shutdown dcb** SEFOS(config)# **shutdown dcb**
Notes	For DCB features to be advertised, LLDP must be started and enabled.

Related Commands

- show dcb global info - Displays DCB global information
- show lldp- Displays LLDP Global Configuration details

16.1.2 set dcb {enable | disable}

Enables and disables the DCB feature on a specific interface.

```
set dcb {enable | disable}
```

Syntax Description	**enable** – Enables DCB on the port. **disable** – Disables DCB on the port.
Mode	Interface Configuration
Default	Disabled.

Example	`SEFOS(config)# interface extreme-ethernet 0/18`
	`SEFOS(config-if)# set dcb enable`
	`SEFOS(config-if)# set dcb disable`

Notes	DCB must be enabled before any of the DCB features can be advertised.

Related Commands

- `show interfaces dcb mode` - Displays the interface DCB parameters
- `show interfaces dcb priority-group` - Displays the PG parameters
- `show interfaces dcb priority-flow-control` - Displays the PFC parameters
- `show interfaces dcb application-etype-fcoe` - Displays the Application parameters

16.1.3 set dcb priority-group {enable | disable}

Enables and disables the priority group feature on the port.

```
set dcb priority-group {enable | disable}
```

Syntax Description	**enable** – Enables PG on the port. **disable** – Disables PG on the port.
Mode	Interface Configuration
Default	Enabled.

Example	SEFOS(config)# **interface extreme-ethernet 0/18** SEFOS(config-if)# **set dcb priority-group enable** SEFOS(config-if)# **set dcb priority-group disable**
Notes	PG must be enabled for using the priority group feature.

Related Commands

- shutdown dcb - Shuts down DCB capability
- set dcb priority-group mode - Configures PG mode for the port
- set dcb priority-group - Sets the priority grouping ID for vlan priorities
- show interfaces dcb mode - Displays the interface DCB parameters
- show interfaces dcb priority-group - Displays the PG parameters

16.1.4 set dcb priority-group mode

Configures the PG mode for the port.

```
set dcb priority-group mode {auto | on | off}
```

Syntax Description	**auto** – Feature on after PG DCBX protocols are exchanged. **on** – Force-enable the PG. **off** – PG feature is off.
Mode	Interface Configuration
Default	**auto**
Example	SEFOS(config)# **interface extreme-ethernet 0/18** SEFOS(config-if)# **set dcb priority-group mode auto**
Notes	In normal operation, this command is not required to run since its default is auto.

Related Commands

- set dcb priority-group - Configures the priority grouping ID for vlan priorities
- show interfaces dcb mode - Display the PG mode for the port
- show interfaces dcb priority-group - Display the PG parameters

16.1.5 set dcb priority-group

Sets the priority grouping identifier for eight priorities and priority group percentage of link bandwidth.

```
set dcb priority-group priority0-pgid_0-15 priority1-pgid_0-15
priority2-pgid_0-15 priority3-pgid_0-15 priority4-pgid_0-15
priority5-pgid_0-15 priority6-pgid_0-15 priority7-pgid_0-15
bandwidth prioritygroup0-bw_0-100 prioritygroup1-bw_0-100
prioritygroup2-bw_0-100 prioritygroup3-bw_0-100
prioritygroup4-bw_0-100 prioritygroup5-bw_0-100
prioritygroup6-bw_0-100 prioritygroup7-bw_0-100
```

Syntax Description

priority0-pgid_0-15 – Priority group ID of priority 0.
priority1-pgid_0-15 – Priority group ID of priority 1.
priority2-pgid_0-15 – Priority group ID of priority 2.
priority3-pgid_0-15 – Priority group ID of priority 3.
priority4-pgid_0-15 – Priority group ID of priority 4.
priority5-pgid_0-15 – Priority group ID of priority 5.
priority6-pgid_0-15 – Priority group ID of priority 6.
priority7-pgid_0-15 – Priority group ID of priority 7.
Bandwidth – Percentage of link bandwidth. Total bandwidth must be added up to 100%.
prioritygroup0-bw_0-100 – Percentage of link bandwidth allocated to PG 0.
prioritygroup1-bw_0-100 – Percentage of link bandwidth allocated to PG 1.
prioritygroup2-bw_0-100 – Percentage of link bandwidth allocated to PG 2.
prioritygroup3-bw_0-100 – Percentage of link bandwidth allocated to PG 3.
prioritygroup4-bw_0-100 – Percentage of link bandwidth allocated to PG 4.
prioritygroup5-bw_0-100 – Percentage of link bandwidth allocated to PG 5.
prioritygroup6-bw_0-100 – Percentage of link bandwidth allocated to PG 6.
prioritygroup7-bw_0-100 – Percentage of link bandwidth allocated to PG 7.

Mode

Interface Configuration

Default

Four priority groups are defined as default:
priority 0, 1, 2 – PG group 0.
priority 3 – PG group 1.
priority 4, 5, 6 – PG group 2.
priority 7 – PG group 15 (no limit on bandwidth).
Bandwidth:
priority group 0 – 50%.
priority group 1 – 30%.
priority group 2 – 20%.
priority group 15 – Unrestricted priority group.

Example

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb priority-group 0 0 0 1 2 2 2 2
```

Notes

- The priority group ID values from 0 to 7 can be used for groups which require bandwidth allocation. Priority group 15 is used for unrestricted group.
- The priority group ID assigned must be entered in sequence except group ID 15 which is an unrestricted group. For example, the assignment of "1 0 0 0 0 0 0 2" is not allowed.

Related Commands

- `show interfaces dcb priority-group` - Displays PG parameters
- `set dcb priority-group {enable | disable}` - Enables or disables PG feature
- `set dcb priority-group mode` - Configures PG mode
- `show interfaces dcb mode` - Displays PG mode

16.1.6 set dcb priority-flow-control {enable | disable}

Enables and disables the priority flow control feature on the port.

```
set dcb priority-flow-control {enable | disable}
```

Syntax Description

enable – Enables PFC on the port.
disable – Disables PFC on the port.

Mode

Interface Configuration

Default

Disabled.

Example

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb priority-flow-control enable
SEFOS(config-if)# set dcb priority-flow-control disable
```

Notes

PFC must be enabled for using the priority flow control feature.

Related Commands

- `shutdown dcb` - Shutdowns DCB capability
- `set dcb priority-flow-control mode` - Configures PFC mode
- `set dcb priority-flow-control vlan-priority` - Configures PFC parameters
- `show interfaces dcb mode` - Displays the interface DCB parameters
- `show interfaces dcb priority-flow-control` - Displays PFC parameters

16.1.7 set dcb priority-flow-control mode

Configures PFC mode for the port.

```
set dcb priority-flow-control mode {auto | on | off}
```

Syntax Description
auto – Feature on after PG DCBX protocols are exchanged.
on – Force-enable the PFC feature.
off – PFC feature is off.

Mode Interface Configuration

Default **auto**

Example
```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb priority-flow-control mode auto
```

Notes In normal operation, this command is not required to run because its default is auto.

Related Commands

- set dcb priority-flow-control vlan-priority - Configures the PFC parameters
- show interfaces dcb mode - Display the PFC mode
- show interfaces dcb priority-flow-control - Display the PFC parameters

16.1.8 set dcb priority-flow-control vlan-priority

Configures the priority flow control.

```
set dcb priority-flow-control vlan-priority priority_0-1
priority_0-1 priority_0-1 priority_0-1 priority_0-1 priority_0-1
priority_0-1 priority_0-1
```

Syntax Description
vlan-priority – VLAN priority to be priority flow control.
priority_0-1:
- 0 – No priority flow control.
- 1 – Enables the priority pause.

Default **vlan priority 3**

Example

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb priority-flow-control
vlan-priority 0 0 0 1 0 0 0 0
```

Notes In normal operation, this command is not required since the default is priority 3.

Related Commands

- `set dcb priority-flow-control {enable | disable}` - Enables or disables PFC feature
- `set dcb priority-flow-control mode` - Configures the PFC mode
- `show interfaces dcb mode` - Displays the PFC mode
- `show interfaces dcb priority-flow-control` - Displays PFC parameters

16.1.9 set dcb application-etype-fcoe

Enables and disables the layer 2 Ethertype for FcoE protocol.

```
set dcb application-etype-fcoe {enable | disable}
```

Mode Interface Configuration

Default Enabled.

Example

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# set dcb application-etype-fcoe enable
```

Notes This command is mainly used when the switch port is connected to a host CNA (Converged Network Adapter) port which is capable of running FCoE (Fiber channel over Ethernet) and the host interface is configured to run FCoE.

Related Commands

- `shutdown dcb` - Shutdowns DCB capability
- `set dcb application-etype-fcoe` - Displays application fcoe ethertype parameter
- `show interfaces dcb mode` - Displays DCB mode

16.1.10 lldp tlv-select dcb1tlv

Configures DCBX TLV (type, length, value) types to be transmitted on a port. The no form of the command disables the transmission of DCBX TLV types on a port.

```
lldp tlv-select dcb1tlv {[priority-group] [priority-flow-control]
[application-etype-fcoe]}
```

```
no lldp tlv-select dcb1tlv {[priority-group]
[priority-flow-control] [application-etype-fcoe]}
```

Syntax Description

priority-group – PG TLV.

priority-flow-control – PFC TLV.

application-etype-fcoe – Application TLV.

Mode

Interface Configuration

Default

All three TVLs are enabled.

Example

```
SEFOS(config)# interface extreme-ethernet 0/18
SEFOS(config-if)# lldp tlv-select dcb1tlv priority-group
priority-flow-control application-etype-fcoe
SEFOS(config-if)# no lldp tlv-select dcb1tlv
priority-group priority-flow-control
application-etype-fcoe
SEFOS(config-if)# no lldp tlv-select dcb1tlv
application-etype-fcoe
SEFOS(config-if)# lldp tlv-select dcb1tlv
priority-flow-control
```

Notes

Currently, all three DCB TLVs must be entered in order as shown in the above example. The first TLV is priority-group and followed by priority-flow-control and application-etype-fcoe.

Related Commands

- show lldp - Displays LLDP Global Configuration details
- show lldp neighbors - Displays information about neighbors learned on an interface or all interfaces

16.1.11 show dcb global info

Displays DCB Global Configuration.

```
show dcb global info
```

Mode Privileged EXEC

Example

```
SEFOS# show dcb global info
DCB Global Information
----------------------
System Control                  : Start
```

Related Commands

- `show interfaces dcb priority-group` - Displays the PG parameters
- `show interfaces dcb priority-flow-control` - Displays PFC parameters
- `show interfaces dcb application-etype-fcoe` - Displays application Ethertype parameters
- `shutdown dcb` - shutdowns the DCB

16.1.12 show interfaces dcb priority-group

Displays configuration and status of priority group feature on an interface or all interfaces.

show interfaces [*interface-type interface-id***] dcb priority-group [detail]**

Syntax Description

interface-type – Interface type.

interface-id – Interface identifier.

detail – Display the following configuration and status: Local configuration of PG, operational status of PG, and peer configuration of PG. Without the `detail` key word, this command displays the local PG configuration only.

Mode Privileged EXEC

Example

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb priority-group detail
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Priority Group
Enable              :       true
Advertise           :       false
Willing             :       false
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       2       2
2        15
Max Traffic Class:       8

Show Type           :       Oper Config
Feature             :       Priority Group
Oper Version        :       0
Max Version         :       0
Errors              :       0x0 - none
Operational Mode :       true
Syncd with Peer   :       true
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       2       2
2        15
Max Traffic Class:       8

Show Type           :       Peer Config
Feature             :       Priority Group
Local Interface   :       Ex0/18
Status              :       successful
Enable              :       true
Willing             :       true
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       1       2
2        15
Max Traffic Class:       8

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

Total Entries Displayed : 1
```

The operational and peer configurations will not be displayed if "detail" keyword is omitted as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb priority-group
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Priority Group
Enable              :       true
Advertise           :       true
Willing             :       false
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       1       2
2        15
Max Traffic Class:       8
```

The peer configuration will not be shown if the interface is connected to a non-DCB capable peer as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/19 dcb priority-group detail
Port                :       Ex0/19
Show Type           :       Admin Config
Feature             :       Priority Group
Enable              :       true
Advertise           :       true
Willing             :       false
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       2       2
2        15
Max Traffic Class:       8

Show Type           :       Oper Config
Feature             :       Priority Group
Oper Version        :       0
Max Version         :       0
Errors              :       0x0 - none
Operational Mode :       false
Syncd with Peer  :       false
Group Bandwidth  :      0%      0%      0%      0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       0       0       0
0        0
Max Traffic Class:       8
```

Related Commands

- `set dcb priority-group` - Configures the PG parameters
- `set dcb priority-flow-control vlan-priority` - Configures the PFC parameters
- `set dcb application-etype-fcoe` - Configured the Application parameters
- `show dcb global info` - Displays the DCB global information
- `show interfaces dcb priority-flow-control` - Displays PFC parameters

16.1.13 show interfaces dcb priority-flow-control

Displays configuration and status of priority flow control feature on an interface or all interfaces.

```
show interfaces [interface-type interface-id] dcb
priority-flow-control [detail]
```

Syntax Description

interface-type – Interface type.

interface-id – Interface identifier.

detail – Display the following configuration and status: Local configuration of PFC, operational status of PFC, and peer configuration of PFC. Without the `detail` key word, this command displays the local PFC configuration only.

Mode

Privileged EXEC

Example

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb priority-flow-control
detail
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Priority Flow Control
Enable              :       true
Advertise           :       false
Willing             :       false
Priority Mask    :      0       0       0       1       0       0
0        0
Max Traffic Class:       8

Show Type           :       Oper Config
Feature             :       Priority Flow Control
Oper Version      :       0
Max Version       :       0
Errors              :       0x0 - none
Operational Mode :       true
Syncd with Peer   :       true
Priority Mask    :      0       0       0       1       0       0
0        0
Max Traffic Class:       8

Show Type           :       Peer Config
Feature             :       Priority Flow Control
Local Interface   :       Ex0/18
Status              :       successful
Enable              :       true
Willing             :       true
Priority Mask    :      0       0       0       1       0       0
0        0
Max Traffic Class:       8

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

Total Entries Displayed : 1
```

The operational and peer configurations will not be displayed if "detail" keyword is omitted as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb priority-group
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Priority Group
Enable              :       true
Advertise           :       true
Willing             :       false
Group Bandwidth  :      50%     30%     20%     0%      0%      0%
0%       0%
Priority Group ID:      0       0       0       1       1       2
2        15
Max Traffic Class:       8
```

The peer configuration will not be shown if the interface is connected to a non-DCB capable peer as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/19 dcb priority-flow-control
detail
Port                :       Ex0/19
Show Type           :       Admin Config
Feature             :       Priority Flow Control
Enable              :       true
Advertise           :       true
Willing             :       false
Priority Mask    :      0       0       0       1       0       0
0        0
Max Traffic Class:       8

Show Type           :       Oper Config
Feature             :       Priority Flow Control
Oper Version      :       0
Max Version       :       0
Errors              :       0x0 - none
Operational Mode :       false
Syncd with Peer   :       false
Priority Mask    :      0       0       0       0       0       0
0        0
Max Traffic Class:       8
```

Related Commands

- `set dcb priority-group` - Configures the PG parameters

- `set dcb priority-flow-control vlan-priority` - Configures the PFC parameters
- `set dcb application-etype-fcoe` - Configures the Application parameters
- `show dcb global info` - Displays the DCB global information
- `show interfaces dcb priority-group` - Displays PG parameters

16.1.14 show interfaces dcb application-etype-fcoe

Displays configuration and status of priority flow control feature on an interface or all interfaces.

```
show interfaces [interface-type interface-id] dcb
application-etype-fcoe [detail]
```

Syntax Description

interface-type – Interface type.

interface-id – Interface identifier.

detail – Display the following configuration and status: Local configuration of application feature, and peer configuration of application feature. Without the `detail` key word, this command displays the local application configuration only.

Mode

Interface Configuration

Example

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb application-etype-fcoe
detail
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Application FCoE
Enable              :       true
Advertise           :       false
Willing             :       false
Priority Map        :           0         0         0         1          0
0         0         0

Show Type           :       Oper Config
Feature             :       Application FCoE
Oper Version        :       0
Max Version         :       0
Errors              :       0x0 - none
Operational Mode :       true
Syncd with Peer   :       true
Priority Map    :         0         0         0         1         0         0
0         0

Show Type           :       Peer Config
Feature             :       Application FCoE
Local Interface     :       Ex0/18
Status              :       successful
Enable              :       true
Willing             :       true
Priority Map    :         0         0         0         1         0         0
0         0

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

Total Entries Displayed : 1
```

The operational and peer configurations will not be displayed if "detail" keyword is omitted as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb application-etype-fcoe
Port                :       Ex0/18
Show Type           :       Admin Config
Feature             :       Application FCoE
Enable              :       true
Advertise           :       true
Willing             :       false
Priority Map    :       0       0       0       1       0       0
0       0
```

The peer configuration will not be shown if the interface is connected to a non-DCB capable peer as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/19 dcb application-etype-fcoe
detail
Port                :       Ex0/19
Show Type           :       Admin Config
Feature             :       Application FCoE
Enable              :       true
Advertise           :       true
Willing             :       false
Priority Map    :       0       0       0       1       0       0
0       0

Show Type           :       Oper Config
Feature             :       Application FCoE
Oper Version        :       0
Max Version         :       0
Errors              :       0x0 - none
Operational Mode :      false
Syncd with Peer  :      false
Priority Map    :       0       0       0       0       0       0
0       0

Total Entries Displayed : 0
```

Notes

If application feature is enabled, its priority mapping will be taken from the PFC setting since both PFC priority sets and the application priority mapping must have the same priority set. The default priority mapping is 0x08 (priority 3 is enabled for priority flow control).

Related Commands

- `set dcb priority-group` - Configures the PG parameters

- set dcb priority-flow-control vlan-priority - Configures the PFC parameters
- set dcb application-etype-fcoe - Configures the Application parameters
- show dcb global info - Displays the DCB global information
- show interfaces dcb priority-group - Displays PG parameters

16.1.15 show interfaces dcb mode

Displays the DCB state and feature mode on all interfaces or on a specific interface.

show interfaces [*interface-type interface-id***] dcb mode**

Syntax Description

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

Mode

Privileged EXEC

Example

```
SEFOS#  show interfaces extreme-ethernet 0/18 dcb mode
Port                       : Ex0/18
Show Type                  : Admin State
DCB Capable State      : on
Priority Group          : auto
Priority Flow Control : auto
```

Related Commands

- set dcb priority-group - Configures the PG parameters
- set dcb priority-flow-control vlan-priority - Configures the PFC parameters
- set dcb application-etype-fcoe - Configures the Application parameters
- show dcb global info - Displays the DCB global information
- show interfaces dcb priority-group - Displays PG parameters
- show lldp - Displays the local current LLDP switch information

16.1.16 show interfaces dcb counters

Displays the DCB control and counters on all interfaces or on a specific interface.

show interfaces [*interface-type interface-id***] dcb counters**

Syntax Description

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

Mode

Privileged EXEC

Example

```
SEFOS# show interfaces extreme-ethernet 0/18 dcb counters
Port                      :   Ex0/18
Show Type                 :   Control and Feature Stats
Control Info Stats    :
  SeqNo                   :   1
  AckNo                   :   1
  Frames Out              :   1
  Frames In               :   2

Priority Group          :
  Frames Out              :   1
  Frames In               :   2

Priority Flow Control:
  Frames Out              :   1
  Frames In               :   2

Application Proto     :
  Frames Out              :   1
  Frames In               :   2
```

If the interface is not yet connected to a DCB capable peer, no DCB packets will be received by the interface as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/19 dcb counters
Port                     :   Ex0/19
Show Type                :   Control and Feature Stats
Control Info Stats    :
   SeqNo                 :   1
   AckNo                 :   0
   Frames Out            :   1
   Frames In             :   0

Priority Group         :
   Frames Out            :   1
   Frames In             :   0

Priority Flow Control:
   Frames Out            :   1
   Frames In             :   0

Application Proto     :
   Frames Out            :   1
   Frames In             :   0
```

If the interface is down, no DCB will be transmitted and received by the interface as shown below.

```
SEFOS# show interfaces extreme-ethernet 0/20 dcb counters
Port                     :   Ex0/20
Show Type                :   Control and Feature Stats
Status                   :   Link Down
```

Related Commands

- `set dcb priority-group` - Configures the PG parameters
- `set dcb priority-flow-control vlan-priority` - Configures the PFC parameters
- `set dcb application-etype-fcoe` - Configures the application parameters
- `show dcb global info` - Displays the DCB global information
- `show interfaces dcb priority-group` - Displays PG parameters
- `show lldp local` - Displays the local current LLDP switch information

16.1.17 clear interfaces dcb counters

Clears the DCB control and counters on all interfaces or on a specific interface.

clear interfaces [*interface-type interface-id***] dcb counters**

Syntax Description	*interface-type* – Interface type. *interface-id* – Interface identifier.
Mode	Privileged EXEC
Example	SEFOS# **clear interfaces extreme-ethernet 0/18 dcb counters**

Related Commands

- set dcb priority-group - Configures the PG parameters
- set dcb priority-flow-control vlan-priority - Configures the PFC parameters
- set dcb application-etype-fcoe - Configures the application parameters
- show dcb global info - Displays the DCB global information
- show interfaces dcb priority-group - Displays PG parameters
- show interfaces dcb counters - Displays DCB control information and counters
- show lldp local - Displays the local current LLDP switch information

CHAPTER 17

RRD

RRD allows the exchange of routing information between different routing protocols running on the same router. It enables a routing protocol to advertise routes that are learned by other means, such as another routing protocol, static configuration, or direct connection. While running a single routing protocol throughout an entire IP internetwork may be desirable, multi-protocol routing is widespread for a number of reasons. For example, company mergers, multiple departments managed by different network administrators, and multi-vendor environments create situations where a single routing protocol cannot be used. Running different routing protocols is also often part of a network design. In any case, having a multi protocol environment makes redistribution a necessity.

When multiple routing protocols are used, routers in the same autonomous system (AS) run the same protocol to compute routes within the autonomous system. 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 other AS(s). Different routing protocols use different and sometimes incompatible algorithms and metrics. It is only possible to redistribute routing information for compatible metrics.

17.1 RRD Commands

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

- `as-num`
- `router-id`
- `export ospf`
- `redistribute-policy`
- `default redistribute-policy`
- `show ip protocols`

- show redistribute-policy
- show redistribute information

17.1.1 as-num

Sets the AS number for the router.

```
as-num 1-65535
```

Mode	Global Configuration
Default	0
Example	SEFOS(config)# **as-num 5**
Notes	The RRD Module must be enabled before any routing protocol module is configured.

Related Commands

- show redistribute information - Displays RTM (Route MAP) RRD status for registered protocols

17.1.2 router-id

Sets the router identifier's address for the router.

```
router-id addr
```

Mode	Global Configuration
Example	SEFOS(config)# **router-id 12.0.0.1**
Notes	The router-id must be one of the IP addresses of the IP interfaces configured in the switch.

Related Commands

- show redistribute information - Displays RTM RRD status for registered protocols

17.1.3 export ospf

Enables redistribution of OSPF area or external routes to the protocol. The no form of the command disables redistribution of OSPF area or external routes to the protocol.

```
export ospf {area-route | external-route} {rip}
```

```
no export ospf {area-route | external-route} {rip}
```

Mode Global Configuration

Example
```
SEFOS(config)# export ospf area-route rip
```

Related Commands

- show ip protocols - Displays information about the active routing protocol process

17.1.4 redistribute-policy

Adds the permit or deny redistribution policy. The no form of the command removes the permit or deny redistribution policy.

```
redistribute-policy {permit|deny} dest-ip dest-range {connected |
static | rip | ospf} {rip | ospf | all}
```

```
no redistribute-policy dest-ip dest-range
```

Syntax Description
- **permit** – Sets the default rule for all prefixes to permit.
- **deny** – Sets the default rule for all prefixes to deny.
- *dest-ip* – Destination IP address.
- *dest-range* – Destination range.
- **connected** – Connected routes.
- **static** – Static routes.
- **rip** – Routing information protocol.
- **ospf** – Open shortest path first.
- **all** – All.

Mode Global Configuration

Default Permit all.

Example
```
SEFOS(config)# redistribute-policy permit 10.0.0.0
0.0.0.255 connected ospf
```

Notes The addresses learnt 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.

Related Commands

- `show redistribute-policy` - Displays route redistribution filters

17.1.5 default redistribute-policy

Sets the default behavior of RRD control table.

```
default redistribute-policy {permit | deny}
```

Syntax Description
permit – Sets the default rule for all prefixes to `permit`
deny – Sets the default rule for all prefixes to `deny`

Mode Global Configuration

Example
```
SEFOS(config)# default redistribute-policy permit
```

Related Commands

- `show redistribute-policy` - Displays route redistribution filters

17.1.6 show ip protocols

Displays information about the active routing protocol process.

```
show ip protocols
```

Mode Privileged EXEC

Example

```
SEFOS# show ip protocols

Routing Protocol is rip
 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 :
   10.0.0.0
   30.2.0.0
 Routing Information Sources :
 Interface Specifi Address Summarisation :
 Interface vlan1
  Sending updates every 30 seconds
  Invalid after 180 seconds
  Flushed after 120 seconds
  Send version is 1 2, receive version is 1 2
  Authentication type is none
  Split Horizon with poissoned reverse is enabled
  Installs default route received
  Originate default route
 Interface vlan2
  Sending updates every 30 seconds
  Invalid after 180 seconds
  Flushed after 120 seconds
  Send version is 2, receive version is 2
  Authentication type is none
  Split Horizon with poissoned reverse is enabled
Restrcts default route installation
  Restricts default route origination

Routing Protocol is "ospf"  Router ID 0.0.0.0

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
IGP synchronization is disabled

Neighbor(s):
Address

Routing Information sources:
Gateway  Last Update
```

Notes The information displayed by this command is useful in debugging routing operations.

Related Commands

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

17.1.7 show redistribute-policy

Displays route redistribution filters.

```
show redistibute-policy
```

Mode Privileged EXEC

Example

```
SEFOS# show redistribute-policy

Destination   Range       SrcProto    DestProto     Flag
-----------   -----       --------    -----------   ---
   0.0.0.0   255.255.255.255   none    others        Deny
   10.0.0.0    255.0.0.0        rip       all         Allow
```

Related Commands

- `redistribute-policy` - Adds the permit or deny redistribution policy
- `default redistribute-policy` - Sets the default behavior of RRD control table

17.1.8 show redistribute information

Displays RTM RRD status for registered protocols.

```
show redistribute information
```

Mode Privileged EXEC

Example

```
SEFOS# show redistribute information

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
     rip            Disable             Disable
     bgp            Disable             Disable
```

Related Commands

- as-num - Sets the AS number for the router
- router-id - Sets the router identifier for the router

CHAPTER 18

Route Map

The route map feature provides a set of rules to control route redistribution. Before a route is redistributed from one routing domain to another, it is checked against a set of rules. If a rule matches, permit or deny access control is applited to the route. The route map feature also permits modification of route information during redistribution. Use this feature to set conditions with the match clause and set actions with the set clause.

Note – The CLI commands for the route map are applicable only for RIP.

Note – The `route-map` command enters the route map configuration mode.

18.1 Route Map Commands

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

- `route-map`
- `match interface`
- `match ip address`
- `match ip next-hop`
- `match metric`
- `match tag`
- `match route-type`
- `match metric-type`
- `match as-path tag`

- match community-list
- match origin
- match local-preference
- set interface
- set as-path tag
- set community
- set local-preference
- set origin
- set tag
- set ip next-hop
- set metric-type internal | external
- set metric-type type-1 | type-2
- set metric
- show route-map

18.1.1 route-map

Creates a route map with name, sequence number and associated access type. The command also enters the route map configuration mode. The no form of the command removes the specified sequence number from route-map.

route-map *name_1-20* **[{permit | deny}]** **[***seqnum_1-10***]**

no route-map *name_1-20* **[{permit | deny }]** **[***seqnum_1-10***]**

Syntax Description

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

permit – Allows the redistribution of the route. This parameter is currently not supported in the no form of the command.

deny – Denies the redistribution. This parameter is currently not supported in the no form of the command.

seqnum – Indicates the position of a new route map in the list of route maps already configured with the same name. The range of the sequence number is from 1 to 10.

Mode

Global Configuration

Default

permit | deny – **permit**

seqnum – 1

Example

```
SEFOS(config)# route-map rmap-test
```

Notes The `no route map` command deletes the complete route-map if the sequence number is not specified.

Related Commands

- `show route-map` - Displays the configured route maps

18.1.2 match interface

Matches the next hop interface of the route out of the specified interface. The `no` form of the command removes the match interface entry from the match entry list.

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

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

Syntax Description

vlan – VLAN Identifier. The range of the identifier is from 1 to 4094.

interface-type – Specifies the type of the interface.

interface-id – Interface identifier.

Mode Route Map Configuration

Example

```
SEFOS(config-rmap-rmap-test)# match interface vlan 1
```

Related Commands

- `show route-map` - Displays the configured route maps

18.1.3 match ip address

Matches the route that have a destination network address against the permitted range of addresses. The `no` form of the command removes the match IP address entry from the match entry list.

```
match ip address destination-ip-addr net mask
```

```
no match ip address destination-ip-addr net mask
```

Syntax Description

destination-ip-addr – Specifies the destination network number address.

netmask – Specifies the mask that provides the range of the network addresses.

Mode Route Map Configuration

Example `SEFOS(config-rmap-rmap-test)# match ip address 25.0.0.0 255.0.0.0`

Notes The destination IP address provides the range of addresses that matches the route-map when logically ANDed with the mask.

Related Commands

- `show route-map` - Displays the configured route maps

18.1.4 match ip next-hop

Matches the routes having the specified next-hop address. The `no` form of the command removes the match IP next-hop entry from the match entry list.

```
match ip next-hop next-hop_ip-addr
```

```
no  match ip next-hop next-hop_ip-addr
```

Mode Route Map Configuration

Example `SEFOS(config-rmap-rmap-test)# match ip next-hop 12.0.0.10`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.5 match metric

Matches the given metric with the metric specified in the route-map. The `no` form of the command removes the match metric entry from the match entry list.

```
match metric 1-0x7fffffff
```

```
no match metric 1-0x7fffffff
```

Mode Route Map Configuration

Example `SEFOS(config-rmap-rmap-test)# match metric 2000`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.6 match tag

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

```
match tag 1-0x7fffffff
```

```
no match tag 1-0x7fffffff
```

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# match tag 2020
```

Related Commands

- `show route-map` - Displays the configured route maps

18.1.7 match route-type

Matches the specified route-type with that of in route-map. The `no` form of the command removes match route-type entry from match entry list.

```
match route-type {local | internal | external {type-1 |type-2}}
```

```
no match route-type {local | internal |external {type-1 | type-2}}
```

Syntax Description

local – Matches the connected routes.

internal – Matches the static routes.

type-1 – OSPF external type 1 metric.

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.

external – Matches the external routes of the routing domain.

type-2 – OSPF external type 2 metric.

Cost from the router to ASBR is included when route calculation is done for a destination.

Mode Route Map Configuration

Example `SEFOS(config-rmap-rmap-test)# match route-type external type-1`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.8 match metric-type

Matches the metric type of a given route with the specified metric type. The `no` form of the command removes match metric-type entry from match entry list

```
match metric-type {internal | external {type-1 | type-2}}
```

```
no match metric-type {internal | external {type-1 | type-2}}
```

Syntax Description

internal – Matches the static or connected metric type.

type-1 – OSPF external type 1 metric.

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.

external – Matches the external metric type.

type-2 – OSPF external type 2 metric.

Cost from the router to ASBR is included when route calculation is done for a destination.

Mode Route Map Configuration

Example `SEFOS(config-rmap-rmap-test)# match metric-type internal`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.9 match as-path tag

Matches the AS path tag of the route with the existing AS-path in BGP. The `no` form of the command removes match AS-path entry from the match entry list.

```
match as-path tag 1-0x7fffffff
```

```
no match as-path tag 1-0x7fffffff
```

Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# match as-path tag 2828`
Notes	This command is applied only when redistributing routes into BGP.

Related Commands

- `show route-map` - Displays the configured route maps

18.1.10 match community-list

Matches the BGP communities attribute in the route with the specified community. The `no` form of the command removes the match community entry from the match entry list.

```
match community-list {internet | local-as | no-advt | no-export |
[comm-num] 1-0x7fffffff | none | string} [exact]
```

```
no match community-list {internet | local-as | no-advt | no-export
| [comm-num] 1-0x7fffffff | none}
```

Syntax Description	**internet** – Internet community. **local-as** – Local autonomous system community. **no-advt** – No-advertisement community. **no-export** – No export community. **comm-num** – Community number. **none** – No community. *string* – Name of the community list. **match** – Requires an exact match. That is, only the specified communities must be present.
Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# match community-list internet`
Notes	This command is applied only when redistributing routes into BGP.

Related Commands

- `show route-map` - Displays the configured route maps

18.1.11 match origin

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.

```
match origin {igp | egp | incomplete}
```

```
no match origin {igp | egp | incomplete}
```

Syntax Description	**igp** – Specifies that the route is originated through interior gateway protocol. **egp** – Specifies that the route is originated through exterior gateway protocol. **incomplete** – Specifies that the route is originated through unknown heritage.
Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# match origin igp`

Related Commands

- show route-map - Displays the configured route maps

18.1.12 match local-preference

Matches a preference value for the autonomous system path. The no form of the command removes the match local-preference entry from the match entry list.

```
match local-preference 1-0x7fffffff
```

```
no match local-preference 1-0x7fffffff
```

Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# match local-preference 2626`

Related Commands

- show route-map - Displays the configured route maps

18.1.13 set interface

Sets the next hop interface of the route. The no form of the command removes the set interface entry from the set entry list.

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

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

Syntax Description
vlan – VLAN identifier. The range of the identifier is from 1 to 4094
interface-type – Specifies the type of the interface.
interface-id – Interface identifier.

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set interface vlan 1
```

Related Commands

- show route-map - Displays the configured route maps

18.1.14 set as-path tag

Sets the tag to the existing AS-path in BGP. The no form of the command removes the set AS-path from the set entry list.

```
set as-path tag 1-0x7fffffff
```

```
no set as-path tag 1-0x7fffffff
```

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set as-path tag 2929
```

Related Commands

- show route-map - Displays the configured route maps

18.1.15 set community

Sets the BGP communities attribute in the route. The no form of the command removes the set community from the set entry list.

```
set community {internet | local-as | no-advt | no-export |
comm-num 1-0x7fffffff | none}
```

```
no set community {internet | local-as | no-advt | no-export |
comm-num 1-0x7fffffff | none}
```

Syntax Description

internet – Internet community.
local-as – Local autonomous system community.
no-advt – No advertisement community.
no-export – No export community.
comm-num – Community number.
none – No community.

Mode Route Map Configuration

Example

```
SEFOS(config-rmap-rmap-test)# set community no-export
```

Related Commands

- show route-map - Displays the configured route maps

18.1.16 set local-preference

Specifies a preference value for the autonomous system path in the route. The no form of the command removes the set local-preference from the set entry list.

```
set local-preference 1-0x7fffffff
```

```
no set local-preference 1-0x7fffffff
```

Mode Route Map Configuration

Example

```
SEFOS(config-rmap-rmap-test)# set local-preference 202020
```

Related Commands

- show route-map - Displays the configured route maps

18.1.17 set origin

Sets the origin of the route in BGP. The no form of the command removes the set origin from the set entry list.

```
set origin  {igp | egp as-value_1-65535 | incomplete}
```

```
no set origin {igp | egp as-value_1-65535 | incomplete}
```

Syntax Description	**igp** – Specifies that the route is originated through interior gateway protocol. **egp** – Specifies that the route is originated through exterior gateway protocol. **incomplete** – Specifies that the route is originated through unknown heritage.
Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# set origin incomplete`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.18 set tag

Sets the tag value for BGP, OSPF, or RIP routing protocols in the given route. The no form of the command removes the set tag from the set entry list.

```
set tag 1-0x7fffffff
```

```
no set tag 1-0x7fffffff
```

Mode	Route Map Configuration
Example	`SEFOS(config-rmap-rmap-test)# set tag 282828`

Related Commands

- `show route-map` - Displays the configured route maps

18.1.19 set ip next-hop

Sets the next hop IP address of the route. The no form of the command removes the set ip next-hop from the set entry list.

```
set ip next-hop next-hop_ip-addr
```

```
no set ip next-hop next-hop_ip-addr
```

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set ip next-hop 12.0.0.2
```

Related Commands

- show route-map - Displays the configured route maps

18.1.20 set metric-type internal | external

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.

```
set metric-type {internal | external {type-1 | type-2}}
```

```
no set metric-type {internal | external {type-1 | type-2}}
```

Syntax Description

internal – Sets the static or connected metric type.

external – Sets the external metric type. Options are as follows:

- **type-1** – OSPF external type 1 metric.
  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** – OSPF external type 2 metric.
  Cost from the router to ASBR is included when route calculation is done for a destination.

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set metric-type external
type-2
```

Related Commands

- show route-map - Displays the configured route maps

18.1.21 set metric-type type-1 | type-2

Sets the value of external metric type in the route. The no form of the command removes the set metric type from the set entry list.

This command operates similar to that of the command set metric-type internal | external. However, with this command only the external metric type can be set.

```
set metric-type {type-1 | type-2}
```

```
no set metric-type {type-1 | type-2}
```

Syntax Description

type-1 – OSPF external type 1 metric.
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 – OSPF external type 2 metric.
Cost from the router to ASBR is included when route calculation is done for a destination.

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set metric-type type-2
```

Related Commands

- show route-map - Displays the configured route maps

18.1.22 set metric

Sets the metric value in the route. The no form of the command removes the set metric entry from the set entry list.

```
set metric 1-0x7fffffff
```

```
no set metric 1-0x7fffffff
```

Mode Route Map Configuration

Example
```
SEFOS(config-rmap-rmap-test)# set metric 400
```

Related Commands

- show route-map - Displays the configured route maps

18.1.23 show route-map

Displays the configured route maps.

show route-map [name *1-20*]

Mode Privileged EXEC

Example

```
SEFOS# sh route-map

Route-map rmap-test, Permit, Sequence 1
Match Clauses:
--------------
LocalPreference 2626
Origin igp
Community internet
ASPath 2828
MetricType internal
RouteType external type-1
Tag 2020
Metric 2000
NextHop 12.0.0.10
Dest N/W 25.0.0.0
Interface vlan1
Set Clauses:
-----------
Interface vlan1
NextHop 12.0.0.2
Metric 400
As-Path 2929
Tag 282828
MetricType external type-2
Community no-export
Origin incomplete
Local Preference 202020
```

```
SEFOS# sh route-map rmap-test

Route-map rmap-test, Permit, Sequence 1
Match Clauses:
--------------
LocalPreference 2626
Origin igp
Community internet
ASPath 2828
MetricType internal
RouteType external type-1
Tag 2020
Metric 2000
NextHop 12.0.0.10
Dest N/W 25.0.0.0
```

Related Commands

- `route-map` - Creates a route-map with name, sequence number, and associated access type
- `match interface` - Matches next hop interface of the route out of the specified interface
- `match ip address` - Matches the route that have a destination network address against the permitted range of addresses
- `match ip next-hop` - Matches the routes having the specified next hop address
- `match metric` - Matches the given metric with the metric specified in the route-map
- `match tag` - Matches the given tag with the tag specified in the route-map
- `match route-type` - Matches the specified route-type with that of in route-map
- `match metric-type` - Matches the metric type of a given route with the specified metric type
- `match as-path tag` - Matches the AS path tag of the route with the existing AS-path in BGP
- `match community-list` - Matches the BGP communities attribute in the route with the specified community
- `match origin` - Matches the origin of the route in BGP with the specified origin
- `match local-preference` - Specifies a preference value for the autonomous system path in the route
- `set interface` - Sets the next hop interface of the route
- `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 tag` - Sets the tag value for BGP, OSPF, or RIP routing protocols in the given route
- `set ip next-hop` - Sets the next hop IP address of the route
- `set metric-type internal | external` - Sets the value of metric type in the route
- `set metric-type type-1 | type-2` - Sets the value of external metric type in the route
- `set metric` - Sets the metric value in the route

CHAPTER 19

TCP

TCP is a portable implementation of the industry-standard TCP based on RFC 793. The software consists of the core TCP protocol, a library that provides a SLI to support IPv4. Applications and TELNET Server and FTP server that support IPv4 based connections (optional). TCP interacts with the network layer protocols and uses their services for end-to-end communication.

19.1 TCP Commands

The list of TCP commands is as follows:

- `show tcp statistics`
- `show tcp connections`
- `show tcp listeners`
- `show tcp retransmission details`

19.1.1 show tcp statistics

Displays the `tcp` statistics.

```
show tcp statistics
```

Mode Privileged EXEC

Example

```
SEFOS# show tcp statistics

 Max Connections : 0
 Active Opens : 2282
 Passive Opens : 2155
 Attempts Fail : 1
 Estab Resets : 0
 Current Estab : 10
 Input Segments : 832803
 Output Segments : 648266
 Retransmitted Segments : 808
 Input Errors : 0
 TCP Segments with RST flag Set: 48
 Input Errors : 0
 HC Input Segments : 832803
 HC Output Segments : 648266
```

Related Commands

- `show tcp connections` - Displays the TCP connections
- `show tcp listeners` - Displays the TCP listeners
- `show tcp retransmission details` - Displays the TCP retransmission details

19.1.2 show tcp connections

Displays the tcp connections.

```
show tcp connections
```

Mode Privileged EXEC

Example

```
SEFOS# show tcp connections

 TCP Connections
 ===============

Local IP Address Type  : IPv4
Local IP                : 127.0.0.1
Local Port              : 35040
Remote IP Address Type : IPv4
Remote IP               : 127.0.0.1
Remote Port             : 631

TCP State               : FinWait1

Local IP Address Type  : IPv4
Local IP                : 127.0.0.1
Local Port              : 35041
Remote IP Address Type : IPv4
Remote IP               : 127.0.0.1
Remote Port             : 631
TCP State               : FinWait1

Local IP Address Type  : IPv4
Local IP                : 127.0.0.1
Local Port              : 35042
Remote IP Address Type : IPv4
Remote IP               : 127.0.0.1
Remote Port             : 631
TCP State               : FinWait1

Local IP Address Type  : IPv4
Local IP                : 127.0.0.1
Local Port              : 35041
Remote IP Address Type : IPv4
Remote IP               : 127.0.0.1
Remote Port             : 631
TCP State               : FinWait1
```

```
Local IP Address Type  : IPv4
Local IP                : 127.0.0.1
Local Port              : 35042
Remote IP Address Type : IPv4
Remote IP               : 127.0.0.1
Remote Port             : 631
TCP State               : FinWait1

Local IP Address Type  : IPv4
Local IP                : 172.30.4.110
Local Port              : 22
Remote IP Address Type : IPv4
Remote IP               : 10.203.113.47
Remote Port             : 4886
TCP State               : Closed

Local IP Address Type  : IPv4
Local IP                : 172.30.4.110
Local Port              : 22
Remote IP Address Type : IPv4
Remote IP               : 10.203.113.113
Remote Port             : 4391
TCP State               : Closed

Local IP Address Type  : IPv4
Local IP                : 172.30.4.110
Local Port              : 32911
Remote IP Address Type : IPv4
Remote IP               : 172.31.112.88
Remote Port             : 2003
TCP State               : Closed
```

Related Commands

- `show tcp statistics` - Displays the TCP statistics
- `show tcp listeners` - Displays the TCP listeners
- `show tcp retransmission details` - Displays the TCP retransmission details

19.1.3 show tcp listeners

Displays the tcp listeners.

```
show tcp listeners
```

Mode Privileged EXEC

Example

```
SEFOS# show tcp listeners

 TCP Listeners
 ===============

Local IP Address Type   : 0
Local IP                  : 0.0.0.0
Local Port                : 23

Local IP Address Type   : IPv4
Local IP                  : 0.0.0.0
Local Port                : 22

Local IP Address Type   : IPv4
Local IP                  : 0.0.0.0
Local Port                : 80
```

Related Commands

- show tcp statistics - Displays the TCP statistics
- show tcp connections - Displays the TCP connections
- show tcp retransmission details - Displays the TCP retransmission details

19.1.4 show tcp retransmission details

Displays the tcp retransmission details.

```
show tcp retransmission details
```

Mode Privileged EXEC

Example

```
SEFOS# sh tcp retransmission details

 RTO Algorithm Used : VAN JACOBSON
 Min Retransmission Timeout : 0 msec
 Max Retransmission Timeout : 0 msec
```

Related Commands

- `show tcp statistics` - Displays the TCP statistics
- `show tcp connections` - Displays the TCP connections
- `show tcp listeners` - Displays the TCP listeners

CHAPTER 20

UDP

UDP is a portable implementation of the industry-standard UDP. UDP is used in packet-switched computer communication networks and in interconnected systems of such networks. The software consists of the core UDP protocol and a library that provides a socket layer interface (similar to BSD sockets) for applications like SNMP. The SEFOS UDP module supports a number of standard features in addition to the core protocol.

20.1 UDP Commands

The following is the list of UDP commands:

- `show udp statistics`
- `show udp connections`

20.1.1 `show udp statistics`

Displays the `udp` statistics.

```
show udp statistics
```

Mode Privileged EXEC

Example

```
SEFOS# show udp statistics

 InDatagrams      = 81032
 OutDatagrams     = 83311
 HC InDatagrams   = 81032
 HC OutDatagrams  = 83311
 UDP No Ports     = 2263
 UDP In Errors    = 0
```

Related Commands

- `show udp connections` - Displays the UDP connections

20.1.2 show udp connections

Displays the `udp` connections.

```
show udp connections
```

Mode Privileged EXEC

Example

```
SEFOS# show udp connections
UDP Connections
===============
Local IP Address Type : IPv4
Local IP : 0.0.0.0
Local Port : 631
Remote IP Address Type : IPv4
Remote IP : 0.0.0.0
Remote Port : 0
Local IP Address Type : IPv4
Local IP : 0.0.0.0
Local Port : 1013
Remote IP Address Type : IPv4
Remote IP : 0.0.0.0
Remote Port : 0
Local IP Address Type : IPv4
Local IP : 30.0.0.40
Local Port : 8001
Remote IP Address Type : IPv4
Remote IP : 0.0.0.0
Remote Port : 0
```

Related Commands

- `show udp statistics` - Displays the UDP statistics

CHAPTER 21

ACL

ACLs filter network traffic by controlling routed packets from being forwarded or blocked at the router's interfaces. The router examines each packet to determine whether to forward or drop the packet, based on the criteria specified within the access lists.

Access list criteria can be the source address of the traffic, the destination address of the traffic, the upper-layer protocol, or other information.

There are several reasons to configure access lists. Access lists can be used to restrict contents of routing updates or to provide traffic flow control. But one of the most important reasons to configure access lists is to provide security for the network.

Access lists must be used to provide a basic level of security for accessing the network. If access lists are not configured on the router, all packets passing through the router will be allowed in all nodes of the network.

For example, access lists can allow one host to access a part of the network and prevent another host from accessing the same area.

Note – The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

21.1 ACL Commands

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

- `ip access-list`
- `mac access-list extended`
- `ipv6 access-list extended`

- permit – standard mode
- deny – standard mode
- permit – IPv4
- deny – IPv4
- permit tcp – IPv4
- deny tcp – IPv4
- permit udp – IPv4
- deny udp – IPv4
- permit icmp – IPv4
- deny icmp – IPv4
- ip access-group
- mac access-group
- ipv6 access-group
- permit – MAC ACL
- deny – MAC ACL
- permit – IPv6
- deny – IPv6
- permit tcp – IPv6
- deny tcp – IPv6
- permit udp – IPv6
- deny udp – IPv6
- permit icmp – IPv6
- deny icmp – IPv6
- show access-lists

21.1.1 ip access-list

Creates IP ACLs and enters the IP access list configuration mode. Standard access lists create filters based on IP address and `netip access-list`.

This command creates IP ACLs and enters the IP access-list configuration mode. Standard access lists create filters based on IP address and network mask only (L3 filters). Extended access lists enables specification of filters based on the type of protocol, range of TCP or UDP ports as well as the IP address, and network mask (Layer 4 filters).

Depending on the standard or extended option chosen by the user, this command returns a corresponding IP access list configuration mode.

The no form of the command deletes the IP access-list.

ip access-list {standard *access-list-number_1-10* **| extended** *access-list-number_11-512***}**

no ip access-list {standard *access-list-number_1-10* **| extended** *access-list-number_11-512***}**

Syntax Description	**standard** – Standard access list number. **extended** – Extended access list number.
Mode	Global Configuration
Example	`SEFOS(config)#` **`ip access-list standard 1`**
Notes	ACLs on the system perform both access control and layer 3 field classification. To define layer 3 field's access lists, the `ip access-list` command must be used.

Related Commands

- `permit - standard mode` – Specifies the packets to be forwarded depending upon the associated parameters
- `deny - standard mode` – Denies traffic if the conditions defined in the deny statement are matched
- `permit - IPv4` – Allows traffic for a particular protocol packet if the conditions defined in the permit statement are matched
- `deny - IPv4` – Denies traffic for a particular protocol packet if the conditions defined in the deny statement are matched
- `permit tcp - IPv4` – Specifies the TCP packets to be forwarded based on the associated parameters
- `deny tcp - IPv4` – Specifies the TCP packets to be rejected based on the associated parameters
- `permit udp - IPv4` – Specifies the UDP packets to be forwarded based on the associated parameters
- `deny udp - IPv4` – Specifies the UDP packets to be rejected based on the associated parameters
- `permit icmp - IPv4` – Specifies the ICMP packets to be forwarded based on the IP address and the associated parameters
- `deny icmp - IPv4` – Specifies the ICMP packets to be rejected based on the IP address and associated parameters
- `ip access-group` – Enables access control for the packets on the interface

- show access-lists – Displays the access list configuration

21.1.2 mac access-list extended

Creates Layer 2 MAC ACLs, that is, this command creates a MAC access-list and returns the MAC-Access list configuration mode to the user. The no form of the command deletes the MAC access-list.

mac access-list extended *access-list-number_1-512*

no mac access-list extended *short_1-512*

Mode	Global Configuration
Example	SEFOS(config)# **mac access-list extended 5**
Notes	ACLs on the system perform both access control and layer 2 field classifications. To define Layer 2 access lists, the mac access-list command must be used.

Related Commands

- show access-lists – Displays the access list configuration
- permit – MAC ACL – Specifies the packets to be forwarded based on the MAC address and the associated parameters
- deny – MAC ACL – Specifies the packets to be rejected based on the MAC address and the associated parameters

21.1.3 ipv6 access-list extended

Command creates an IPv6 extended access list, and the no form of the command deletes an IPv6 extended access list.

ACLs on the system perform both access control and layer 3 field classification. This command must be used to define layer 3 field's access-lists.

ipv6 access-list extended *access-list-number(11-512)*

no ipv6 access-list extended *access-list-number(11-512)*

Mode	Global Configuration
Example	SEFOS(config)# **ipv6 access-list extended 15**

Related Commands

- `ipv6 access-group` – Enables access control for the inbound IPv6 packets on the interface.
- `permit - IPv6` – Allows IPv6 packets to be forwarded based on protocol and associated parameters.
- `deny - IPv6` – Blocks IPv6 packets based on protocol and associated parameters.
- `permit tcp - IPv6` – Allows IPv6 TCP packets based on associated parameters.
- `deny tcp - IPv6` – Blocks IPv6 TCP packets based on associated parameters.
- `permit udp - IPv6` – Allows IPv6 UDP packets based on associated parameters.
- `deny udp - IPv6` – Blocks IPv6 UDP packets based on associated parameters.
- `permit icmp - IPv6` – Allows the ICMPv6 packets based on the associated parameters.
- `deny icmp - IPv6` – Blocks the ICMPv6 packets based on the associated parameters.
- `show access-lists` – Displays the access list configuration.

21.1.4 permit - standard mode

Specifies the packets to be forwarded depending upon the associated parameters. Standard IP access lists use source addresses for matching operations.

permit {any | host *src-ip-addr* | *src-ip-addr mask*} **{any | host** *dest-ip-addr* | *dest-ip-addr mask*}

Syntax Description

any | host

src-ip-addr | *src-ip-addr mask* – Source IP address can be `any` or the word `host` and the dotted decimal address or the host that the packet is from and the network mask to use with the source IP address.

any | host

dest-ip-addr | *dest-ip-addr mask* – Destination IP address can be `any` or the word `host` and the dotted decimal address or the host that the packet is destined for and the network mask to use with the destination IP address.

Mode IP ACL Standard Configuration

Example

```
SEFOS(config-std-nacl)# permit host 100.0.0.10 host
10.0.0.1
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP Access-list configuration mode
- `deny - standard mode` – Denies traffic if the conditions defined in the deny statement are matched
- `show access-lists` – Displays the access list configuration

21.1.5 deny - standard mode

Denies traffic if the conditions defined in the deny statement are matched.

```
deny {any | host src-ip-addr | src-ip-addr mask} {any | host
dest-ip-addr | dest-ip-addr mask}
```

Syntax Description

any | host

src-ip-add | *src-ip-addr mask* – Source IP address can be any or the word host and the dotted decimal address or number of the network or the host that the packet is from and the network mask to use with the source IP address.

any | host

dest-ip-addr | *dest-ip-add mask* – Destination IP address can be any or the word host and the dotted decimal address or number of the network or the host that the packet is destined for and the network mask to use with the destination IP address.

Mode IP ACL Standard Configuration

Example

```
SEFOS(config-std-nacl)# deny host 100.0.0.10 any
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP Access-list configuration mode
- `permit - standard mode` – Specifies the packets to be forwarded depending upon the associated parameters
- `show access-lists` – Displays the access list configuration

21.1.6 permit - IPv4

Allows traffic for a particular protocol packet if the conditions defined in the permit statement are matched.

Note – The priority of ACL filters applied to the interface is based on the ACL numbers. The priority flag has no effect.

```
permit {ip | ospf | pim | protocol-type_1-255} {any | host
src-ip-addr | src-ip-addr mask} {any | host dest-ip-addr |
dest-ip-address mask} [{tos {max-reliability | max-throughput |
min-delay | normal | 0-7} | dscp {0-63 | af11 | af12 | af13 | af21
| af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 |
cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | ef}} ] [priority
1-7] {[loadbalance lbg-id(1-16)] [redirectport interface-type
interface-id] | [redirectslb slb_group_id]}
```

Syntax Description

ip | ospf | pim |

protocol-type_1-255 – Type of protocol for the packet. It can also be a protocol number.

any | host

src-ip-address | *src-ip-address mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or host that the packet is from followed by the network mask to use with the source address.

any | host

dest-ip-addr | *dest-ip-addr mask* – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or host that the packet is destined for followed by the network mask to use with the destination address.

tos – Type of service can be the following:

- **max-reliability**
- **max throughput**
- **min-delay**
- **normal** or a range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are as follows:

- **0-63** – Differentiated services code point value.
- **af11** – Matches packets with AF11 DSCP (001010).
- **af12** – Matches packets with AF12 DSCP (001100).
- **af13** – Matches packets with AF13 DSCP (001110).
- **af21** – Matches packets with AF21 DSCP (010010).
- **af22** – Matches packets with AF22 DSCP (010100).
- **af23** – Matches packets with AF23 DSCP (010110).
- **af31** – Matches packets with AF31 DSCP (011010).
- **af32** – Matches packets with AF32 DSCP (011100).
- **af33** – Matches packets with AF33 DSCP (011110).
- **af41** – Matches packets with AF41 DSCP (100010).
- **af42** – Matches packets with AF42 DSCP (100100).
- **af43** – Matches packets with AF43 DSCP (100110).
- **cs1** – Matches packets with CS1 (precedence 1) DSCP (001000).
- **cs2** – Matches packets with CS2 (precedence 2) DSCP (010000).
- **cs3** – Matches packets with CS3 (precedence 3) DSCP (011000).
- **cs4** – Matches packets with CS4 (precedence 4) DSCP (100000).
- **cs5** – Matches packets with CS5 (precedence 5) DSCP (101000).
- **cs6** – Matches packets with CS6 (precedence 6) DSCP (110000).
- **cs7** – Matches packets with CS7 (precedence 7) DSCP (111000).
- **default** – Default DSCP (000000).
- **ef** – Matches packets with EF DSCP (101110).

priority – Priority of the L3 filter used to decide which filter rule is applicable when the packet matches with more than one filter rule. A higher value of filter priority implies a higher priority.

This value ranges from 1 to 7.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode IP ACL Extended Configuration

Default **protocol-type** – 255

priority – 1

dscp – 1

Example SEFOS(config-ext-nacl)# **permit 200 host 100.0.0.10 any tos 6**

Notes Protocol type with the value 255 indicates that protocol can be anything and it will not be checked against the action to be performed.

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `deny - IPv4` – Denies traffic for a particular protocol packet if the conditions defined in the deny statement are matched

21.1.7 deny - IPv4

Denies traffic for a particular protocol packet if the conditions defined in the deny statement are matched.

deny {ip | ospf | pim | *protocol-type_1-255*} **{any | host** *src-ip-addr* | *src-ip-address mask*} **{any | host** *dest-ip-addr* | *dest-ip-addr mask*}**[{tos {max-reliability | max-throughput | min-delay | normal |** *0-7*} **| dscp** *0-63* **| af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 | default | ef}}] [priority** *1-7*]

Syntax Description

ip | ospf | pim | *protocol-type_1-255* – Type of protocol for the packet. You can also enter the protocol number.

any | host *src-ip-address* **|** *src-ip-addr mask* – Source IP address can be the following:

- **any**
- **host** and the dotted decimal address.
- number of the network or the host that the packet is from followed by the network mask to use with the source address.

any | host *dest-ip-add* **|** *dest-ip-add mask* – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or host that the packet is destined for and the network mask to use with the destination address.

tos – Type of service. Can be max-reliability, max throughput, min-delay, normal or a range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are:

- *0-63* – Differentiated services code point value.
- **af11** – Matches packets with AF11 DSCP (001010).
- **af12** – Matches packets with AF12 DSCP (001100).
- **af13** – Matches packets with AF13 DSCP (001110).
- **af21** – Matches packets with AF21 DSCP (010010).
- **af22** – Matches packets with AF22 DSCP (010100).
- **af23** – Matches packets with AF23 DSCP (010110).
- **af31** – Matches packets with AF31 DSCP (011010).
- **af32** – Matches packets with AF32 DSCP (011100).
- **af33** – Matches packets with AF33 DSCP (011110).
- **af41** – Matches packets with AF41 DSCP (100010).
- **af42** – Matches packets with AF42 DSCP (100100).
- **af43** – Matches packets with AF43 DSCP (100110).
- **cs1** – Matches packets with CS1 (precedence 1) DSCP (001000).
- **cs2** – Matches packets with CS2 (precedence 2) DSCP (010000).
- **cs3** – Matches packets with CS3 (precedence 3) DSCP (011000).
- **cs4** – Matches packets with CS4 (precedence 4) DSCP (100000).
- **cs5** – Matches packets with CS5 (precedence 5) DSCP (101000).
- **cs6** – Matches packets with CS6 (precedence 6) DSCP (110000).
- **cs7** – Matches packets with CS7 (precedence 7) DSCP (111000).
- **default** – Default DSCP (000000).
- **ef** – Matches packets with EF DSCP (101110).

priority – Priority of the L3 filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between one and seven.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The priority flag has no effect.

Mode IP ACL Extended Configuration

Default
protocol type – 255
priority – 1
dscp – 1

Example
```
SEFOS(config-ext-nacl)# deny ospf any host 10.0.0.1 tos
max-throughput
```

Notes
- Protocol type with the value 255 indicates that protocol can be anything and it will not be checked against the action to be performed.
- The priority of ACL filters applied to the interface is based on the ACL numbers. The priority flag has no effect.

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP Access-list configuration mode
- `permit - IPv4` – Allows traffic for a particular protocol packet if the conditions defined in the permit statement are matched
- `show access-lists` – Displays the access list configuration

21.1.8 permit tcp - IPv4

Specifies the IPv4 TCP packets to be forwarded based on the associated parameters.

```
permit tcp {any | host src-ip-address | src-ip-address src-mask}
[{gt port-number_1-65535 | lt port-number_1-65535 | eq
port-number_1-65535 | range port-number_1-65535
port-number_1-65535}] {any | host dest-ip-address |
dest-ip-address dest-mask} {gt port-number_1-65535 | lt
port-number_1-65535 | eq port-number_1-65535 | range
port-number_1-65535 port-number_1-65535}] [{ack | rst}] [{tos
{max-reliability | max-throughput | min-delay | normal |
tos-value_0-7} | dscp 0-63 | af11 | af12 | af13 | af21 | af22 |
af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3
| cs4 | cs5 | cs6 | cs7 | default | ef}}] [priority 1-7]
{[loadbalance lbg-id(1-16)] [redirectport interface-type
interface-id] | [redirectslb slb_group_id]}
```

Syntax Description

tcp – Transport control protocol.

any | **host** *src-ip-address* | *src-ip-address src-mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is from followed by the network mask to use with the source address.

port-number_1-65535 – Port Number. The input for the source and the destination port-number is prefixed with one of the following operators:

- **eq**=equal.
- **lt**=less than.
- **gt**=greater than.
- **range**=a range of ports; two different port numbers must be specified

any | **host** *dest-ip-address* | *dest-ip-address dest-mask* – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is destined for followed by the network mask to use with the destination address.

ack – TCP ACK bit to be checked against the packet. It can be `establish (1)`, `non-establish (2)` or `any (3)`.

rst – TCP RST bit to be checked against the packet. It can be `set (1)`, `notset (2)` or `any (3)`.

tos – Type of service. Can be the following:

- **max-reliability**
- **max-throughput**
- **min-delay**
- **normal** range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are:

- *0-63* – Differentiated services code point value.
- **af11** – Matches packets with AF11 DSCP (001010).
- **af12** – Matches packets with AF12 DSCP (001100).
- **af13** – Matches packets with AF13 DSCP (001110).
- **af21** – Matches packets with AF21 DSCP (010010).
- **af22** – Matches packets with AF22 DSCP (010100).
- **af23** – Matches packets with AF23 DSCP (010110).
- **af31** – Matches packets with AF31 DSCP (011010).
- **af32** – Matches packets with AF32 DSCP (011100).
- **af33** – Matches packets with AF33 DSCP (011110).
- **af41** – Matches packets with AF41 DSCP (100010).
- **af42** – Matches packets with AF42 DSCP (100100).
- **af43** – Matches packets with AF43 DSCP (100110).
- **cs1** – Matches packets with CS1 (precedence 1) DSCP (001000).
- **cs2** – Matches packets with CS2 (precedence 2) DSCP (010000).
- **cs3** – Matches packets with CS3 (precedence 3) DSCP (011000).
- **cs4** – Matches packets with CS4 (precedence 4) DSCP (100000).
- **cs5** – Matches packets with CS5 (precedence 5) DSCP (101000).
- **cs6** – Matches packets with CS6 (precedence 6) DSCP (110000).
- **cs7** – Matches packets with CS7 (precedence 7) DSCP (111000).
- **default** – Default DSCP (000000).
- **ef** – Matches packets with EF DSCP (101110).

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode IP ACL Extended Configuration

Default **tos-value** – 0

ack – any (3) Indicates that the TCP ACK bit will not be checked to decide the action.

rst – any (3) Indicates that the TCP RST bit will not be checked to decide the action.

dscp – 1

Example

```
SEFOS(config-ext-nacl)# permit tcp any 10.0.0.1
255.255.255.255
```

Related Commands

- ip access-list – Creates IP ACLs and enters the IP access-list configuration mode
- show access-lists – Displays the access list configuration
- deny tcp - IPv4 – Specifies the TCP packets to be rejected based on the associated parameters

21.1.9 deny tcp - IPv4

Specifies the IPv4 TCP packets to be rejected based on the associated parameters.

```
deny tcp {any | host src-ip-address | src-ip-address src-mask}
[{gt port-number_1-65535 | lt port-number_1-65535 | eq
port-number_1-65535 | range port-number_1-65535
port-number_1-65535}] {any | host dest-ip-address |
dest-ip-address dest-mask} [{gt port-number_1-65535 | lt
port-number_1-65535 | eq port-number_1-65535 | range
port-number_1-65535 port-number_1-65535}] [{ack | rst}] [{tos
{max-reliability | max-throughput | min-delay | normal |
tos-value_0-7} | dscp {0-63 | af11 | af12 | af13 | af21 | af22 |
af23 | af31 | af32 | af33 | af41 | af42 | af43 | cs1 | cs2 | cs3
| cs4 | cs5 | cs6 | cs7 | default | ef}}] [priority 1-7]
```

Syntax Description

tcp – Transmission control protocol.

any | host *src-ip-address* **|** *src-ip-address src-mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is from and the network mask to use with the source address.

port-number_1-65535 – Port Number. The input for the source and the destination port-number is prefixed with one of the following operators:

- **eq**=equal.
- **lt**=less than.
- **gt**=greater than.
- **range**=a range of ports; two different port numbers must be specified.

any | host *dest-ip-address* **| dest-ip-address dest-mask** – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or the host that the packet is destined for and the network mask to use with the destination address.

ack – TCP ACK bit to be checked against the packet. It can be `establish (1)`, `non-establish (2)`, or `any (3)`.

rst – TCP RST bit to be checked against the packet. It can be `set (1)`, `notset (2)` or `any (3)`.

tos – Type of service. Options are as follows:

- **max-reliability**
- **max-throughput**
- **min-delay**
- **normal**
- range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are:

- *0-63* – Differentiated services code point value.
- **af11** – Matches packets with AF11 DSCP (001010).
- **af12** – Matches packets with AF12 DSCP (001100).
- **af13** – Matches packets with AF13 DSCP (001110).
- **af21** – Matches packets with AF21 DSCP (010010).
- **af22** – Matches packets with AF22 DSCP (010100).
- **af23** – Matches packets with AF23 DSCP (010110).
- **af31** – Matches packets with AF31 DSCP (011010).
- **af32** – Matches packets with AF32 DSCP (011100).
- **af33** – Matches packets with AF33 DSCP (011110).
- **af41** – Matches packets with AF41 DSCP (100010).
- **af42** – Matches packets with AF42 DSCP (100100).
- **af43** – Matches packets with AF43 DSCP (100110).
- **cs1** – Matches packets with CS1 (precedence 1) DSCP (001000).
- **cs2** – Matches packets with CS2 (precedence 2) DSCP (010000).
- **cs3** – Matches packets with CS3 (precedence 3) DSCP (011000).
- **cs4** – Matches packets with CS4 (precedence 4) DSCP (100000).
- **cs5** – Matches packets with CS5 (precedence 5) DSCP (101000).
- **cs6** – Matches packets with CS6 (precedence 6) DSCP (110000).
- **cs7** – Matches packets with CS7 (precedence 7) DSCP (111000).
- default – Default DSCP (000000).
- **ef** – Matches packets with EF DSCP (101110).

priority – Priority of the filter. This option is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The priority flag has no effect.

Mode IP ACL Extended Configuration

Default *tos-value_0-7* – 0

ack – any (3) Indicates that TCP ACK bit will not be checked to decide the action.

rst – any (3) Indicates that TCP RST bit will not be checked to decide the action.

dscp – 1

Example

```
SEFOS(config-ext-nacl)# deny tcp 100.0.0.10 255.255.255.0
eq 20 any
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP Access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `permit tcp - IPv4` – Specifies the TCP packets to be forwarded based on the associated parameters

21.1.10 permit udp - IPv4

Specifies the IPv4 UDP packets to be forwarded based on the associated parameters.

```
permit udp {any | host src-ip-address | src-ip-address src-mask}
[{gt port-number_1-65535 | lt port-number_1-65535 | eq
port-number_1-65535 | range port-number_1-65535
port-number_1-65535}] {any | host dest-ip-address |
dest-ip-address dest-mask} [{gt port-number_1-65535 | lt
port-number_1-65535 | eq port-number_1-65535 | range
port-number_1-65535 port-number_1-65535}] [{tos {max-reliability
| max-throughput | min-delay | normal | tos-value_0-7} | dscp
{0-63 | af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 |
af33 | af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 |
cs7 | default | ef} }] [priority_1-7] {[loadbalance lbg-id(1-16)]
[redirectport interface-type interface-id] | [redirectslb
slb_group_id]}
```

Syntax Description

udp – User datagram protocol.

`any | host src-ip-address | src-ip-address src-mask` – Source IP address can be the following:

- **any**
- **host** and the dotted decimal address.
- Number of the network or the host that the packet is from and the network mask to use with the source address.

port-number_1-65535 – Port Number. The input for the source and the destination port-number is prefixed with one of the following operators.

- **eq**=equal.
- **lt**=less than.
- **gt**=greater than.
- **range**=a range of ports; two different port numbers must be specified.

any | host *dest-ip-address* **|** *dest-ip-address dest-mask* – Destination IP address. Options are as follows:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or the host that the packet is destined for and the network mask to use with the destination address.

tos – Type of service. Options are as follows:

- **max-reliability**
- **max-throughput**
- **min-delay**
- **normal**
- range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are:

0-63 – Differentiated services code point value.

af11 – Matches packets with AF11 DSCP (001010).

af12 – Matches packets with AF12 DSCP (001100).

af13 – Matches packets with AF13 DSCP (001110).

af21 – Matches packets with AF21 DSCP (010010).

af22 – Matches packets with AF22 DSCP (010100).

af23 – Matches packets with AF23 DSCP (010110).

af31 – Matches packets with AF31 DSCP (011010).

af32 – Matches packets with AF32 DSCP (011100).

af33 – Matches packets with AF33 DSCP (011110).

af41 – Matches packets with AF41 DSCP (100010).

af42 – Matches packets with AF42 DSCP (100100).

af43 – Matches packets with AF43 DSCP (100110).

cs1 – Matches packets with CS1 (precedence 1) DSCP (001000).

cs2 – Matches packets with CS2 (precedence 2) DSCP (010000).

cs3 – Matches packets with CS3 (precedence 3) DSCP (011000).

cs4 – Matches packets with CS4 (precedence 4) DSCP (100000).

cs5 – Matches packets with CS5 (precedence 5) DSCP (101000).

cs6 – Matches packets with CS6 (precedence 6) DSCP (110000).

cs7 – Matches packets with CS7 (precedence 7) DSCP (111000).

default – Default DSCP (000000).

ef – Matches packets with EF DSCP (101110).

priority – Priority of the filter. Decides which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between one and seven.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode IP ACL Extended Configuration

Default **dscp** – 1

Example

```
SEFOS(config-ext-nacl)# permit udp any gt 65000 any dcsp
1
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `deny udp - IPv4` – Specifies the UDP packets to be rejected based on the associated parameters

21.1.11 deny udp – IPv4

Specifies the IPv4 UDP packets to be rejected based on the associated parameters.

```
deny udp {any | host src-ip-address | src-ip-address src-mask}
[{gt port-number_1-65535 | lt port-number_1-65535 | eq
port-number_1-65535 | range port-number_1-65535
port-number_1-65535}] {any | host dest-ip-address |
dest-ip-address dest-mask} [{gt port-number_1-65535 | lt
port-number_1-65535 | eq port-number_1-65535 | range
port-number_1-65535 port-number_1-65535}] [{tos {max-reliability
| max-throughput | min-delay | normal|tos-value_0-7} | dscp {0-63
| af11 | af12 | af13 | af21 | af22 | af23 | af31 | af32 | af33 |
af41 | af42 | af43 | cs1 | cs2 | cs3 | cs4 | cs5 | cs6 | cs7 |
default | ef}] [priority_1-7]
```

Syntax Description

udp – User datagram protocol

any | host *src-ip-address | src-ip-address src-mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is from and the network mask to use with the source address.

port-number_1-65535 – Port number. The input for the source and the destination port-number is prefixed with one of the following operators.

- **eq**=equal.
- **lt**=less than.
- **gt**=greater than.
- **range**=a range of ports; two different port numbers must be specified.

any | host *dest-ip-address | dest-ip-address dest-mask* – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is destined for and the network mask to use with the destination address.

tos – Type of service. Can be as follows:

- **max-reliability**
- **max throughput**
- **min-delay**
- **normal**
- range of values from 0 to 7.

dscp – Differentiated services code point provides the quality of service control. The various options available are as follows:

- *0-63* – Differentiated services code point value.
- **af11** – Matches packets with AF11 DSCP (001010).
- **af12** – Matches packets with AF12 DSCP (001100).
- **af13** – Matches packets with AF13 DSCP (001110).
- **af21** – Matches packets with AF21 DSCP (010010).
- **af22** – Matches packets with AF22 DSCP (010100).
- **af23** – Matches packets with AF23 DSCP (010110).
- **af31** – Matches packets with AF31 DSCP (011010).
- **af32** – Matches packets with AF32 DSCP (011100).
- **af33** – Matches packets with AF33 DSCP (011110).
- **af41** – Matches packets with AF41 DSCP (100010).
- **af42** – Matches packets with AF42 DSCP (100100).
- **af43** – Matches packets with AF43 DSCP (100110).
- **cs1** – Matches packets with CS1 (precedence 1) DSCP (001000).
- **cs2** – Matches packets with CS2 (precedence 2) DSCP (010000).
- **cs3** – Matches packets with CS3 (precedence 3) DSCP (011000).
- **cs4** – Matches packets with CS4 (precedence 4) DSCP (100000).
- **cs5** – Matches packets with CS5 (precedence 5) DSCP (101000).
- **cs6** – Matches packets with CS6 (precedence 6) DSCP (110000).
- **cs7** – Matches packets with CS7 (precedence 7) DSCP (111000).
- **default** – Default DSCP (000000).
- **ef** – Matches packets with EF DSCP (101110).

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

Mode IP ACL Extended Configuration

Default **dscp** – 1

Example
```
SEFOS(config-ext-nacl)# deny udp host 10.0.0.1 any eq 20
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `permit udp - IPv4` – Specifies the UDP packets to be forwarded based on the associated parameters

21.1.12 permit icmp – IPv4

Specifies the ICMPv4 packets to be forwarded based on the IP address and the associated parameters.

```
permit icmp {any | host src-ip-address | src-ip-address mask}{any
| host dest-ip-address | dest-ip-address mask}
[message-type_0-255] [message-code_0-255] [priority_1-7]
```

Syntax Description

icmp – Internet control message protocol

any | host *src-ip-address* **|** *src-ip-address mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- number of the network or the host that the packet is from and the network mask to use with the source address.

any | host *dest-ip-address* **|** *dest-ip-address mask* – Destination IP address can be the following:

- **any**
- **host** followed by the the dotted decimal address.
- Number of the network or the host that the packet is destined for and the network mask to use with the destination address.

message-type – Message type. The ICMP message type can be one of the following:

Value	ICMP type
0	Echo reply.
3	Destination unreachable.
4	Source quench.
5	Redirect.
8	Echo request.
11	Time exceeded.
12	Parameter problem.
13	Timestamp request.
14	Timestamp reply.
15	Information request.
16	Information reply.
17	Address mask request.
18	Address mask reply.
155	No ICMP type.

The keyword `message-type` is not supported.

Mode IP ACL Extended Configuration

Default **message-type** – 255
message code – 255

Example `SEFOS(config-ext-nacl)# permit icmp any any`

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `deny icmp - IPv4` – Specifies the ICMP packets to be rejected based on the IP address and associated parameters

21.1.13 deny icmp - IPv4

Specifies the ICMP v4 packets to be rejected based on the IP address and associated parameters.

```
deny icmp {any | host src-ip-address | src-ip-address mask} {any
| host dest-ip-address | dest-ip-address mask}
[message-type_0-255] [message-code_0-255] [priority_1-7]
```

Syntax Description

icmp – Internet control message protocol.

any | host *src-ip-address | src-ip-address mask* – Source IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or the host that the packet is from and the network mask to use with the source address.

any | host *dest-ip-address | dest-ip-address mask* – Destination IP address can be the following:

- **any**
- **host** followed by the dotted decimal address.
- Number of the network or the host that the packet is destined for and the network mask to use with the destination address.

message-type – Message type. The ICMP message type can be one of the following:

Value	ICMP type.
0	Echo reply.
3	Destination unreachable.
4	Source quench.
5	Redirect.
8	Echo request.
11	Time exceeded.
12	Parameter problem.
13	Timestamp request.
14	Timestamp reply.
15	Information request.
16	Information reply.
17	Address mask request.
18	Address mask reply.
155	No ICMP type.

The keyword `message-type` is not supported.

`message-code_0-255` – ICMP message code. The ICMP code can be any of the following:

Value	ICMP code
0	Network unreachable.
1	Host unreachable.
2	Protocol unreachable.
3	Port unreachable.
4	Fragment need.
5	Source route fail.
6	Destination network unknown.
7	Destination host unknown.
8	Source host isolated.
9	Destination network administratively prohibited.
10	Destination host administratively prohibited.
11	Network unreachable TOS.
12	Host unreachable TOS.
255	No ICMP code.

The keyword `message-code` is not supported.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority.

This value ranges between one and seven.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

Mode IP ACL Extended Configuration

Default **message-type** – 255

message code – 255

Example

```
SEFOS(config-ext-nacl)# deny icmp host 100.0.0.10
10.0.0.1 255.255.255.255
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration
- `permit icmp - IPv4` – Specifies the ICMP packets to be forwarded based on the IP address and the associated parameters

21.1.14 ip access-group

Enables access control for the packets on the interface. It controls access to a Layer 2 or Layer 3 interface. The `no` form of the command removes all access groups or the specified access group from the interface.

```
ip access-group access-list-number_1-512 [in | out]
```

```
no ip access-group [access-list-number_1-512] [in | out]
```

Syntax Description *access-list-number_1-512* – IP access control list number.

in – Inbound packets.

out – Outbound packets.

Note - The keyword out can be used only with the Sun Network 10GbE Switch 72p.

Mode Interface Configuration

Example

```
SEFOS(config-if)# ip access-group 1 in
```

Notes

- IP access list must have been created.
- An IP ACL applied to a Layer 2 interface filters only the IP packets. MAC access-group interface configuration command with MAC extended ACLs must be used to filter non-IP packets.

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP access-list configuration mode
- `show access-lists` – Displays the access list configuration

21.1.15 mac access-group

Applies a MAC ACL to a Layer 2 interface. The `no` form of this command can be used to remove the MAC ACLs from the interface.

```
mac access-group access-list-number_1-512 in
```

```
no mac access-group access-list-number_1-512 in
```

Syntax Description

access-list-number_1-512 – IP access control list number.

in – Inbound packets.

Mode

Interface Configuration

Example

```
SEFOS(config-if)# mac access-group 5 in
```

Notes

MAC access list must have been created.

Related Commands

- `mac access-list extended` – Creates Layer 2 MAC ACLs, and returns the MAC-Access list configuration mode to the user
- `show access-lists` – Displays the access list statistics

21.1.16 ipv6 access-group

Enables access control for the inbound IPv6 packets on the interface. The `no` form of the command disables access control for the inbound IPv6 packets on the interface.

```
ipv6 access-group [access-list-number(11-512)] (in | out)
```

```
no ipv6 access-group [access-list-number(11-512)] (in | out)
```

Syntax Description	*access-list-number* – IPv6 access list number. This value ranges between 11 and 512. **in** – Inbound packets. **out** – Outbound packets.
Mode	Interface Configuration
Example	`SEFOS(config-if)#` **ipv6 access-group 15 in**
Notes	• IPv6 access list must have been created before enabling the access list for the inbound IPv6 packets. • Following is the limitation for this command to be applicable to Layer 2 interfaces: • An IP ACL applied to a Layer 2 interface filters only the IPv6 packets. MAC access-group interface configuration command with MAC extended ACLs must be used to filter non-IP packets.

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `show access-lists` – Displays the access list statistics

21.1.17 permit – MAC ACL

Specifies the packets to be forwarded based on the MAC address and the associated parameters. That is, this command allows non-IP traffic to be forwarded if the conditions are matched.

```
permit {any | host src-mac-address} {any | host dest-mac-address}
[aarp | amber | dec-spanning | decnet-iv | diagnostic | dsm |
etype-6000 | etype-8042 | lat | lavc-sca | mop-console | mop-dump
| msdos | mumps | netbios | vines-echo | vines-ip | xns-id |
protocol_0-65535] [Vlan vlan-id_1-4094] [user-priority 0-7]
[priority 1-7] {[loadbalance lbg-id(1-16)] [redirectport
interface-type interface-id] | [redirectslb slb_group_id]}
```

Syntax Description

any | host *src-mac-address* – Source MAC address to be matched with the packet.

any | host *dest-mac-address* – Destination MAC address to be matched with the packet.

aarp – Ethertype AppleTalk address resolution protocol that maps a data-link address to a network address.

amber – EtherType DEC-amber.

dec-spanning – Etheryype digital equipment corporation spanning tree.

decent-iv – Ethertype DECnet phase IV protocol.

diagnostic – Ethertype DEC-diagnostic.

dsm – Ethertype DEC-DSM or DDP.

etype-6000 – Ethertype 0x6000.

etype-8042 – Ethertype 0x8042.

lat – Ethertype DEC-LAT.

lavc-sca – Ethertype DEC-LAVC-SCA.

mop-console – Ethertype DEC-MOP remote console.

mop-dump – Ethertype DEC-MOP dump.

msdos – Ethertype DEC-MSDOS.

mumps – Ethertype DEC-MUMPS.

netbios – Ethertype DEC – system NETBIOS.

vines-echo – Ethertype VINES echo from Banyan Systems.

vines-ip – EtherType VINES IP.

xns-id – EtherType Xerox Network Systems protocol suite.

vlan – VLAN ID to be filtered. This value ranges between 1 and 4094.

user-priority – User priority or P-bit value to be matched with the packet. This value ranges between zero and seven.

priority – Priority of the L2 filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode

MAC ACL Configuration

Default	**vlan-id** – 0 **priority** – 1 **user-priority** – 0
Example	`SEFOS(config-ext-macl)# permit host 00:11:22:33:44:55 any aarp priority 10`
Notes	MAC access list must have been created.

Related Commands

- `mac access-list extended` – Creates Layer 2 MAC ACLs, and returns the MAC-Access list configuration mode to the user
- `mac access-group` – Applies a MAC ACL to a Layer 2 interface
- `deny - MAC ACL` – Specifies the packets to be rejected based on the MAC address and the associated parameters
- `show access-lists` – Displays the access list statistics

21.1.18 deny - MAC ACL

Specifies the packets to be rejected based on the MAC address and the associated parameters.

```
deny {any | host src-mac-address}{any | host dest-mac-address}
[aarp | amber | dec-spanning | decnet-iv | diagnostic | dsm |
etype-6000 | etype-8042 | lat | lavc-sca | mop-console | mop-dump
| msdos | mumps | netbios | vines-echo | vines-ip | xns-id |
protocol_0-65535] [Vlan vlan-id_1-4094] [user-priority 0-7]
[priority 1-7]
```

Syntax Description

any | host *src-mac-address* – Source MAC address to be matched with the packet.

any | host *dest-mac-address* – Destination MAC address to be matched with the packet.

aarp – Ethertype AppleTalk Address Resolution Protocol that maps a data-link address to a network address.

amber – EtherType DEC-Amber.

dec-spanning – EtherType Digital Equipment Corporation (DEC) spanning tree.

decent-iv – EtherType DECnet Phase IV protocol.

diagnostic – EtherType DEC-Diagnostic.

dsm – EtherType DEC-DSM/DDP.

etype-6000 – EtherType 0x6000.

etype-8042 – EtherType 0x8042.

lat – EtherType DEC-LAT.

lavc-sca – EtherType DEC-LAVC-SCA.

mop-console – EtherType DEC-MOP Remote Console.

mop-dump – EtherType DEC-MOP Dump.

msdos – EtherType DEC-MSDOS.

mumps – EtherType DEC-MUMPS.

netbios – EtherType DEC- Network Basic Input/Output System (NETBIOS).

vines-echo – EtherType Virtual Integrated Network Service (VINES) Echo from Banyan Systems.

vines-ip – EtherType VINES IP.

xns-id – EtherType Xerox Network Systems (XNS) protocol suite.

vlan – VLAN ID to be filtered. This value ranges between 1 and 4094.

user-priority – User priority or P-bit value to be matched with the packet. This value ranges between 0 and 7.

priority – Priority of the L2 filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Note - The priority of ACL filters applied to the interface is based on the ACL numbers. The `priority` flag has no effect.

Mode

MAC ACL Configuration

Default

vlan-id – 0

priority – 1

user-priority – 0

Example

```
SEFOS(config-ext-macl)# deny any host 00:11:22:33:44:55
priority 200
```

Notes

MAC access list must have been created.

Related Commands

- `mac access-list extended` – Creates Layer 2 MAC ACLs, and returns the MAC-Access list configuration mode to the user
- `mac access-group` – Applies a MAC access control list (ACL) to a Layer 2 interface
- `permit - MAC ACL` – Specifies the packets to be forwarded based on the MAC address and the associated parameters
- `show access-lists` – Displays the access list statistics

21.1.19 permit - IPv6

Allows IPv6 packets to be forwarded based on protocol and associated parameters.

```
permit [{ospf | pim | protocol-type(0-255)}] {any | host
src-ipv6-addr} [src-prefix-len(0-128)] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [dscp value(0-63)] [flow-label
value(0-1048575)] [priority value(1-7)] {[loadbalance
lbg-id(1-16)] [redirectport interface-type interface-id] |
[redirectslb slb_group_id]}
```

Syntax Description

ospf | pim | *protocol-type(0-255)* – Type of protocol for the IPv6 packet. The value can also be a protocol number. The protocol number ranges between 0 and 255.

any – Permits packets sent from or to all network or host.

host *src-ipv6-addr* – Permits only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Permits only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

host *dst-ipv6-addr* – Permits only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Permits only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the L3 filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between one and seven.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode

IPv6 ACL Extended Configuration

Default

protocol-type – 255

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# permit host 1111::2222 host
FE80:0000:0000:0000:0202:B3FF:FE1E:8329
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `deny - IPv6` – Blocks IPv6 packets based on protocol and associated parameters

- `show access-lists` – Displays the access list statistics

21.1.20 deny – IPv6

Blocks IPv6 packets based on protocol and associated parameters.

```
deny [{ospf | pim | protocol-type(0-255)}] {any | host
src-ipv6-addr} [src-prefix-len(0-128)] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [dscp value(0-63)] [flow-label
value(0-1048575)] [priority value(1-7)]
```

Syntax Description

ospf | pim | *protocol-type(0-255)* – Type of protocol for the IPv6 packet. It can also be a protocol number. The protocol number ranges between 0 and 255.

any – Blocks packets sent from or to all network or host.

host *src-ipv6-addr* – Blocks only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Blocks only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

host *dst-ipv6-addr* – Blocks only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Blocks only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the L3 filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Mode

IPv6 ACL Extended Configuration

Default

protocol-type – 255

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# deny host 1111::2222 host
FE80:0000:0000:0000:0202:B3FF:FE1E:8329
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit - IPv6` – Allows IPv6 packets to be forwarded based on protocol and associated parameters
- `show access-lists` – Displays the access list statistics

21.1.21 permit tcp - IPv6

Allows IPv6 TCP packets based on associated parameters.

```
permit tcp {any | host src-ipv6-addr} [src-prefix-len(0-128)] [{gt
port-number(1-65535) | lt port-number(1-65535) | eq
port-number(1-65535) | range start-port-range(1-65535)
end-port-range(1-65535)}] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [{gt port-number(1-65535) | lt
port-number(1-65535) | eq port-number(1-65535) | range
start-port-range(1-65535) end-port-range(1-65535)}] [{ack | rst}]
[{tos {max-reliability | max-throughput | min-delay | normal
|value(0-7)} | dscp value(0-63)}] [flow-label value(0-1048575)]
[priority value(1-7)] {[loadbalance lbg-id(1-16)] [redirectport
interface-type interface-id] | [redirectslb slb_group_id]}
```

Syntax Description

any – Permits packets sent from or to all network or host.

host *src-ipv6-addr* – Permits only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Permits only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

gt *port-number(1-65535)* – Matches the source or destination ports that are greater than the specified port. This value ranges between 1 and 65535.

lt *port-number(1-65535)* – Matches the source or destination ports that are lesser than the specified port. This value ranges between 1 and 65535.

eq *port-number(1-65535)* – Matches the specified source or destination port. This value ranges between 1 and 65535.

range *start-port-range(1-65535) end-port-range(1-65535)* – Matches the source or destination ports in the specified range. That is, inclusive of start and end ports). This value ranges between 1 and 65535.

host *dst-ipv6-addr* – Permits only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Permits only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

ack – TCP ACK bit to be checked against the packet. It can be `establish (1)`, `non-establish (2)` or `any (3)`.

rst – TCP RST bit to be checked against the packet. It can be `set (1)`, `notset (2)` or `any (3)`.

tos – Type of service. Can be max-reliability, max throughput, min-delay, normal or a range of values from 0 to 7.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode IPv6 ACL Extended Configuration

Default

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# permit tcp host 1111::2222 any
range 400 500
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit tcp - IPv6` – Allows IPv6 TCP packets based on associated
- `show access-lists` – Displays the access list statistics

21.1.22 deny tcp – IPv6

Blocks IPv6 TCP packets based on associated parameters.

```
deny tcp {any | host src-ipv6-addr} [src-prefix-len(0-128)] [{gt
port-number(1-65535) | lt port-number(1-65535) | eq
port-number(1-65535) | range start-port-range(1-65535)
end-port-range(1-65535)}] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [{gt port-number(1-65535) | lt
port-number(1-65535) | eq port-number(1-65535) | range
start-port-range(1-65535) end-port-range(1-65535)}] [{ ack | rst}]
[{tos {max-reliability | max-throughput | min-delay | normal |
value(0-7)} | dscp value(0-63)} ] [flow-label value(0-1048575)]
[priority value(1-7)]
```

Syntax Description

any – Blocks packets sent from or to all network or host.

host *src-ipv6-addr* – Blocks only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Blocks only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

gt *port-number(1-65535)* – Matches the source or destination ports that are greater than the specified port. This value ranges between 1 and 65535.

lt *port-number(1-65535)* – Matches the source or destination ports that are lesser than the specified port. This value ranges between 1 and 65535.

eq *port-number(1-65535)* – Matches the specified source or destination port. This value ranges between 1 and 65535.

range *start-port-range(1-65535) end-port-range(1-65535)* – Matches the source or destination ports in the specified range. That is, inclusive of start and end ports). This value ranges between 1 and 65535.

host *dst-ipv6-addr* – Blocks only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Blocks only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

ack – TCP ACK bit to be checked against the packet. It can be `establish (1)`, `non-establish (2)` or `any (3)`.

rst – TCP RST bit to be checked against the packet. It can be `set (1)`, `notset (2)` or `any (3)`.

tos – Type of service. Can be max-reliability, max throughput, min-delay, normal or a range of values from 0 to 7.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between one and seven. This value ranges between 1 and 7.

Mode IPv6 ACL Extended Configuration

Default

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# deny tcp host 1111::2222 any
range 400 500
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit tcp - IPv6` – Allows IPv6 TCP packets based on associated
- `show access-lists` – Displays the access list statistics

21.1.23 permit udp – IPv6

Allows IPv6 UDP packets based on associated parameters.

```
permit udp {any | host src-ipv6-addr} [src-prefix-len(0-128)] [{gt
port-number(1-65535) | lt port-number(1-65535) | eq
port-number(1-65535) | range start-port-range(1-65535)
end-port-range(1-65535)}] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [{gt port-number(1-65535) | lt
port-number(1-65535) | eq port-number(1-65535) | range
start-port-range(1-65535) end-port-range(1-65535)}] [dscp
value(0-63)] [flow-label value(0-1048575)] [priority value(1-7)]
{[loadbalance lbg-id(1-16)] [redirectport interface-type
interface-id] | [redirectslb slb_group_id]}
```

Syntax Description

any – Permits packets sent from or to all network or host.

host *src-ipv6-addr* – Permits only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Permits only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

gt *port-number(1-65535)* – Matches the source or destination ports that are greater than the specified port. This value ranges between 1 and 65535.

lt *port-number(1-65535)* – Matches the source or destination ports that are lesser than the specified port. This value ranges between 1 and 65535.

eq *port-number(1-65535)* – Matches the specified source or destination port. This value ranges between 1 and 65535.

range *start-port-range(1-65535)* end-port-range(1-65535) – Matches the source or destination ports in the specified range(that is, inclusive of start and end ports). This value ranges between 1 and 65535.

host *dst-ipv6-addr* – Permits only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Permits only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

loadbalance – If permitted, the next action is to forward packets to an LBG specified by the LBG group number. LBG number has a range of values from 1 to 16.

redirectport – If permitted, the next action is to forward packets to a switch port specified by the *interface-type* and the *interface-id*.

redirectslb – If permitted, the next action is to route packets to an SLB group specified by the SLB group number. SLB group number has a range of values from 1 to 16.

Mode IPv6 ACL Extended Configuration

Default
dscp – 1
flow-label – 0
priority – 1

Example
```
SEFOS(config-ipv6-acl)# permit udp host 1111::2222 any
range 400 500
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `deny udp - IPv6` – Blocks IPv6 UDP packets based on associated parameters.
- `show access-lists` – Displays the access list statistics

21.1.24 deny udp - IPv6

Blocks IPv6 UDP packets based on associated parameters.

```
deny udp {any | host src-ipv6-addr} [src-prefix-len(0-128)] [{gt
port-number(1-65535) | lt port-number(1-65535) | eq
port-number(1-65535) | range start-port-range(1-65535)
end-port-range(1-65535)}] {any | host dst-ipv6-addr}
[dst-prefix-len(0-128)] [{gt port-number(1-65535) | lt
port-number(1-65535) | eq port-number(1-65535) | range
start-port-range(1-65535) end-port-range(1-65535)}] [dscp
value(0-63)] [flow-label value(0-1048575)] [priority value(1-7)]
```

Syntax Description

any – Blocks packets sent from or to all network or host.

host *src-ipv6-addr* – Blocks only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Blocks only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

gt *port-number(1-65535)* – Matches the source or destination ports that are greater than the specified port. This value ranges between 1 and 65535.

lt *port-number(1-65535)* – Matches the source or destination ports that are lesser than the specified port. This value ranges between 1 and 65535.

eq *port-number(1-65535)* – Matches the specified source or destination port. This value ranges between 1 and 65535.

range *start-port-range(1-65535) end-port-range(1-65535)* – Matches the source or destination ports in the specified range. That is, inclusive of start and end ports). This value ranges between 1 and 65535.

host *dst-ipv6-addr* – Blocks only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Blocks only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Mode

IPv6 ACL Extended Configuration

Default

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# deny udp host 1111::2222 any
range 400 500
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit udp - IPv6` – Allows IPv6 UDP packets based on associated parameters.
- `show access-lists` – Displays the access list configuration.

21.1.25 permit icmp – IPv6

Allows the ICMPv6 packets based on the associated parameters.

```
permit icmp {any | host src-ipv6-addr} [src-prefix-len(0-128)]
{any | host dst-ipv6-addr} [dst-prefix-len(0-128)]
[message-type(0-255)] [message-code(0-255)] [dscp value(0-63)]
[flow-label value(0-1048575)] [priority value(1-7)]
```

Syntax Description

any – Permits packets sent from or to all network or host.

host *src-ipv6-addr* – Permits only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Permits only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

host *dst-ipv6-addr* – Permits only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Permits only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

message-type – Message type. The ICMP message type can be one of the following:

Value	ICMP type
0	Echo reply
3	Destination unreachable
4	Source quench
5	Redirect
8	Echo request
11	Time exceeded
12	Parameter problem
13	Timestamp request
14	Timestamp reply
15	Information request
16	Information reply
17	Address mask request
18	Address mask reply
155	No ICMP type

message-code – ICMP Message code. The ICMP code can be any of the following:

Value	ICMP code
0	Network unreachable
1	Host unreachable
2	Protocol unreachable
3	Port unreachable
4	Fragment need
5	Source route fail
6	Destination network unknown
7	Destination host unknown
8	Source host isolated
9	Destination network administratively prohibited
10	Destination host administratively prohibited
11	Network unreachable TOS
12	Host unreachable TOS
255	No ICMP code

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Mode IPv6 ACL Extended Configuration

Default

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# permit icmp host 1111::2222 host
FE80:0000:0000:0000:0202:B3FF:FE1E:8329
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `deny icmp - IPv6` – Blocks the ICMPv6 packets based on the associated parameters.
- `show access-lists` – Displays the access list statistics

21.1.26 deny icmp – IPv6

Blocks the ICMPv6 packets based on the associated parameters.

```
deny icmp {any | host src-ipv6-addr} [src-prefix-len(0-128)] {any
| host dst-ipv6-addr} [dst-prefix-len(0-128)]
[message-type(0-255)] [message-code(0-255)] [dscp value(0-63)]
[flow-label value(0-1048575)] [priority value(1-7)]
```

Syntax Description

any – Blocks packets sent from or to all network or host.

host *src-ipv6-addr* – Blocks only the packets sent from the network or host having the specified IPv6 address.

src-prefix-len – Prefix length to be combined with the IPv6 source address. Blocks only the packets sent from the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

host *dst-ipv6-addr* – Blocks only the packets sent to the network or host having the specified IPv6 address.

dst-prefix-len – Prefix length to be combined with the IPv6 destination address. Blocks only the packets sent to the network or host having the specified IPv6 address and prefix length. This value ranges between 0 and 128.

message-type – Message type. The ICMP message type can be one of the following:

Value	ICMP type
0	Echo reply.
3	Destination unreachable.
4	Source quench.
5	Redirect.
8	Echo request.
11	Time exceeded.
12	Parameter problem.
13	Timestamp request.
14	Timestamp reply.
15	Information request.
16	Information reply.
17	Address mask request.
18	Address mask reply.
155	No ICMP type.

message-code – ICMP Message code. The ICMP code can be any of the following:

Value	ICMP code
0	Network unreachable.
1	Host unreachable.
2	Protocol unreachable.
3	Port unreachable.
4	Fragment need.
5	Source route fail.
6	Destination network unknown.
7	Destination host unknown.
8	Source host isolated.
9	Destination network administratively prohibited.
10	Destination host administratively prohibited.
11	Network unreachable TOS.
12	Host unreachable TOS.
255	No ICMP code.

dscp – Differentiated services code point value that provides the quality of service control. This value ranges between 0 and 63.

flow-label – Flow label value to be matched with the packet. This value ranges between 0 and 1048575.

priority – Priority of the filter. This is used to decide which filter rule is applicable, when the packet matches with more than one filter rules. Higher value of filter priority implies a higher priority. This value ranges between 1 and 7.

Mode IPv6 ACL Extended Configuration

Default

dscp – 1

flow-label – 0

priority – 1

Example

```
SEFOS(config-ipv6-acl)# deny icmp host 1111::2222 host
FE80:0000:0000:0000:0202:B3FF:FE1E:8329
```

Related Commands

- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit icmp - IPv6` – Allows the ICMPv6 – packets based on the associated parameters.
- `show access-lists` – Displays the access list configuration.

21.1.27 show access-lists

Displays the access lists configuration.

show access-lists [[{ip | mac}] *access-list-number(1-512)***]**

Syntax Description

ip – IP access list
mac – MAC access list

Mode

Privileged/User EXEC

Example

```
SEFOS# show access-lists

EIP ACCESS LISTS
-----------------

Standard IP Access List 34
---------------------------
 IP address Type                  : IPV4
 Source IP address                : 172.30.3.134
 Source IP address mask           : 255.255.255.255
 Source IP Prefix Length          : 32
 Destination IP address           : 0.0.0.0
 Destination IP address mask      : 0.0.0.0
 Destination IP Prefix Length     : 0
 Flow Identifier                  : 0
 In Port List                     : NIL
 Out Port List                    : NIL
 Filter Action                    : Deny
 Status                           : InActive
```

```
Extended IP Access List 1002
----------------------------
 Filter Priority                    : 1
 Filter Protocol Type               : ANY
 IP address Type                    : IPV4
 Source IP address                  : 0.0.0.0
 Source IP address mask             : 0.0.0.0
 Source IP Prefix Length            : 0
 Destination IP address             : 0.0.0.0
 Destination IP address mask        : 0.0.0.0
 Destination IP Prefix Length       : 0
 Flow Identifier                    : 0
 In Port List                       : NIL
 Out Port List                      : NIL
 Filter TOS                         : NIL
 Filter DSCP                        : NIL
 Filter Action                      : Permit
 Status                             : InActive

Extended IP Access List 10022
-----------------------------
 Filter Priority                    : 1
 Filter Protocol Type               : ANY
 IP address Type                    : IPV4
 Source IP address                  : 0.0.0.0
 Source IP address mask             : 0.0.0.0
 Source IP Prefix Length            : 0
 Destination IP address             : 0.0.0.0
 Destination IP address mask        : 0.0.0.0
 Destination IP Prefix Length       : 0
 Flow Identifier                    : 0
 In Port List                       : NIL
 Out Port List                      : NIL
 Filter TOS                         : NIL
 Filter DSCP                        : NIL
 Filter Action                      : Permit
 Status                             : InActive

MAC ACCESS LISTS
----------------

 No MAC Access Lists have been configured
```

Related Commands

- `ip access-list` – Creates IP ACLs and enters the IP Access-list configuration mode
- `mac access-list extended` – Creates Layer 2 MAC ACLs, and returns the MAC-Access list configuration mode to the user
- `permit - standard mode` – Specifies the packets to be forwarded depending upon the associated parameters
- `deny - standard mode` – Denies traffic if the conditions defined in the deny statement are matched
- `permit - IPv4` – Allows traffic for a particular protocol packet if the conditions defined in the permit statement are matched
- `deny - IPv4` – Denies traffic for a particular protocol packet if the conditions defined in the deny statement are matched
- `permit tcp - IPv4` – Specifies the TCP packets to be forwarded based on the associated parameters
- `deny tcp - IPv4` – Specifies the TCP packets to be rejected based on the associated parameters
- `permit udp - IPv4` – Specifies the UDP packets to be forwarded based on the associated parameters
- `deny udp - IPv4` – Specifies the UDP packets to be rejected based on the associated parameters
- `permit icmp - IPv4` – Specifies the ICMP packets to be forwarded based on the IP address and the associated parameters
- `deny icmp - IPv4` – Specifies the ICMP packets to be rejected based on the IP address and associated parameters
- `ip access-group` – Enables access control for the packets on the interface
- `mac access-group` – Applies a MAC access control list (ACL) to a Layer 2 interface
- `ipv6 access-group` – Enables access control for the inbound IPv6 (Internet Protocol version6) packets on the interface
- `permit - MAC ACL` – Specifies the packets to be forwarded based on the MAC address and the associated parameters
- `deny - MAC ACL` – specifies the packets to be rejected based on the MAC address and the associated parameters
- `ipv6 access-list extended` – Creates an IPv6 extended access list
- `permit - IPv6` – Allows IPv6 packets to be forwarded based on protocol and associated parameters.
- `deny - IPv6` – Blocks IPv6 packets based on protocol and associated parameters.

- `permit tcp - IPv6` – Allows IPv6 TCP packets based on associated parameters.
- `deny tcp - IPv6` – Blocks IPv6 TCP packets based on associated parameters.
- `permit udp - IPv6` – Allows IPv6 UDP packets based on associated parameters.
- `deny udp - IPv6` – Blocks IPv6 UDP packets based on associated parameters.
- `permit icmp - IPv6` – Allows the ICMPv6 – packets based on the associated parameters.
- `deny icmp - IPv6` – Blocks the ICMPv6 – packets based on the associated parameters.

CHAPTER 22

QoS

QoS defines the ability to provide different priority to different applications, users or data flows or the ability to guarantee a certain level of performance to a data flow. QoS refers to resource reservation control mechanisms rather than the achieved service quality and specifies a guaranteed throughput level.

The SEFOS QoS module provides a complete Quality of Service solution and helps in implementing service provisioning policies for application or customers, who desire to have an enhanced performance for their traffic on the Internet.

22.1 QoS Commands

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

- `shutdown qos`
- `qos`
- `mls qos`
- `priority-map`
- `class-map`
- `meter`
- `policy-map`
- `shape-template`
- `scheduler`
- `queue`
- `queue-map`
- `qos interface`
- `map`

- match access-group
- set class
- meter-type
- set policy
- set meter
- show qos global info
- show priority-map
- show class-map
- show meter
- show policy-map
- show shape-template
- show scheduler
- show queue
- show queue-map
- show qos def-user-priority
- show qos meter-stats

22.1.1 shutdown qos

Shuts down the QoS subsystem. The no form of the command starts the QoS subsystem.

```
shutdown qos
```

```
no shutdown qos
```

Mode	Global Configuration
Default	QoS subsystem is started and enabled by default.
Example	SEFOS(config)# **shutdown qos**
Notes	• Resources required by QoS subsystem are allocated and QoS subsystem starts running, when started. • All the memory resources used by the QoS subsystem will be released, when shutdown.

Related Commands

- show qos global info - Displays QoS related global configurations

22.1.2 qos

Enables or disables the QoS subsystem.

```
qos {enable | disable}
```

Syntax Description	**enable** – Enables QoS subsystem **disable** – Disables Qos subsystem
Mode	Global Configuration
Default	Enabled
Example	`SEFOS(config)# qos enable`
Notes	• QoS module programs the hardware and starts protocol operation, when set as enable. • QoS module stops protocol operation by deleting the hardware configuration, when set as disable.

Related Commands

- `show qos global info` - Displays QoS related global configurations

22.1.3 mls qos

Enables the QoS subsystem. The `no` form of the command disables the QoS subsystem. Operates similar to that of the command `qos`.

```
mls qos
```

```
no mls qos
```

Mode	Global Configuration
Default	Enabled
Example	`SEFOS(config)# mls qos`
Notes	• When enabled, QoS module programs the hardware and starts protocol operation. • When disabled, QoS module stops protocol operation by deleting the hardware configuration.

Related Commands

- `show qos global info` - Displays QoS related global configurations

22.1.4 priority-map

Adds a priority map entry. The no form of the command deletes a priority map entry.

```
priority-map priority-map-Id_1-65535
```

```
no priority-map priority-map-Id_1-65535
```

Syntax Description

priority-map-id – Priority map index for the incoming packet received over ingress Port/VLAN with specified incoming priority. This value ranges between 1 and 65535.

The value one to eight is reserved, and cannot be configured.

A priority-map command by itself will not change the system setting. It has to be referenced in the class-map mode and subsequently used in a policy-map.

Mode Global Configuration

Example

```
SEFOS(config)# priority-map 10
SEFOS(config-pri-map)# map interface extreme-ethernet
0/10 in-priority-type vlanPri in-priority 0
regen-priority 7
```

Notes QoS subsystem should have been started.

Related Commands

- show priority-map - Displays the priority map entry

22.1.5 class-map

Adds a class map entry. The no form of the command deletes a class map entry.

```
class-map class-map-id_1-65535
```

```
no class-map class-map-id_1-65535
```

Syntax Description

class-map-id_1-65535 – Index that enumerates the MultiField Classifier table entries. This value ranges between 1 and 65535. The value one to eight is reserved, and cannot be configured.

Mode Global Configuration

Example

```
SEFOS(config)# class-map 10
```

Notes QoS subsystem should have been started.

Related Commands

- `set meter` - Sets policy parameters such as meter and meter actions
- `show class-map` - Displays the class map entry

22.1.6 meter

Creates a meter. The `no` form of the command deletes a meter.

```
meter meter-id_1-65535
```

```
no meter meter-id_1-65535
```

Syntax Description	*meter-id_1-65535* – Index that enumerates the meter entries. This value ranges between 1 and 65535.
Mode	Global Configuration
Example	`SEFOS(config)# meter 50` `SEFOS(config-meter)# meter-type trTCM cir 1000 cbs 1000 eir 5000`
Notes	QoS subsystem must have been started.

Related Commands

- `meter-type` - Sets meter parameters CIR, CBS, EIR, EBS, interval, meter type, and color awareness
- `show meter` - Displays the meter entry

22.1.7 policy-map

Creates a policy map. The `no` form of the command deletes a policy map.

```
policy-map policy-map-id_1-65535
```

```
no policy-map policy-map-id_1-65535
```

Syntax Description	*policy-map-id_1-65535* – Index that enumerates the policy-map table entries. This value ranges between 1 and 65535.
Mode	Global Configuration

Example

```
SEFOS(config-cls-map)# set class 10
SEFOS(config-cls-map)# match access-group ip-access-list
11
SEFOS(config-cls-map)# exit
SEFOS(config)# policy-map 11
SEFOS(config-ply-map)# set policy class 10 interface
extreme-ethernet 0/10 default-priority-type none
```

Notes QoS subsystem should have been started.

Related Commands

- `set meter` - Sets Policy parameters such as meter and meter actions
- `show policy-map` - Displays the policy map entry

22.1.8 shape-template

Creates a shape template. The `no` form of the command deletes a shape template.

```
shape-template 1-65535 [cir 1-65535] [cbs 0-65535]
```

```
no shape-template shape-template-id_1-65535
```

Syntax Description

shape-template-id_1-65535 – Shape template table index
cir – Committed information rate for packets through the queue
cbs – Committed burst size for packets through the queue

Mode Global Configuration

Example

```
SEFOS(config)# shape-template 1 cir 20 cbs 40
```

Related Commands

- `show shape-template` - Displays the shape template configurations.

22.1.9 scheduler

Creates a scheduler and configures the scheduler parameters. The `no` form of the command deletes a scheduler.

```
scheduler 1-65535 interface iftype ifnum [sched-algo
{strict-priority | rr | wrr | wfq | strict-rr | strict-wrr |
strict-wfq | deficit-rr}] [shaper 0-65535] [hierarchy-level 0-10]
```

```
no scheduler scheduler-id_1-65535 interface iftype ifnum
```

Syntax Description

scheduler-id – Scheduler identifier that uniquely identifies the scheduler in the system/egress interface.

iftype – Interface type.

ifnum – Interface number.

sched-algo – Packet scheduling algorithm for the port. The algorithms are:

- **strict-priority** – strictPriority
- **rr** – roundRobin
- **wrr** – weightedRoundRobin
- **wfg** – weightedFairQueing
- **strict-rr** – strictRoundRobin
- **strict-wrr** – strictWeightedRoundRobin
- **strict-wfg** – strictWeightedFairQueing
- **deficit-rr** – deficitRoundRobin

shaper – Shaper identifier that specifies the bandwidth requirements for the scheduler.

hierarchy-level – Depth of the queue/scheduler hierarchy.

The following keywords are not supported:

- wfq
- strict-rr
- strict-wrr
- strict-wfq
- hiearchy-level
- shaper

Mode Global Configuration

Default

sched-algo – strict-priority

hierarchy-level – 0

Example

```
SEFOS(config)# scheduler 1 interface extreme-ethernet
0/10 sched-algo rr
```

Notes Shaper identifier is not mandatory for the creation of the conceptual row.

Related Commands

- show scheduler - Displays the configured scheduler

22.1.10 queue

Creates a queue and configures the queue parameters. The no form of the command deletes a queue.

```
queue 1-65535 interface iftype ifnum [weight 0-1000] [shaper
0-65535]
```

```
no queue 1-65535 interface iftype ifnum
```

Syntax Description

queue – The keyword queue is used to identify one of eight physical queues per interface. The supported queue ranges are 1 - 8. The switch hardware has 8 queues for each port. Each queue is mapped to the specific user-priority / VLAN-priority. This mapping can be configured by the user.

iftype – Interface type.

ifnum – Interface number.

weight – User assigned weight to the CoS queue.

shaper – Shaper identifier that specifies the bandwidth requirements for the queue.

Mode

Global Configuration

Default

weight – 0

priority – 0

Example

```
SEFOS(config)# queue 1 interface extreme-ethernet 0/1
weight 20 priority 10
```

Notes

- Scheduler identifier is unique relative to an egress interface.
- User assigned weights are used only when scheduling algorithm is a weighted scheduling algorithm.
- User assigned priority is used only when the scheduler uses a priority based scheduling algorithm.
- Shaper identifier is not mandatory for the creation of the row.

Related Commands

- scheduler - Creates a scheduler and configures the scheduler parameters
- shape-template - Creates a shape template
- show queue - Displays the configured queues

22.1.11 queue-map

Creates a map for a queue with class or regenerated priority. The no form of the command deletes a queue map entry.

```
queue-map {CLASS 1-65535 | regn-priority {vlanPri | ipTos | ipDscp
| vlanDEI} 0-63} [interface iftype ifnum] queue-id 1-65535
```

```
no queue-map {CLASS 1-65535 | regn-priority {vlanPri | ipTos |
ipDscp | vlanDEI} 0-63} [interface iftype ifnum]
```

Syntax Description

CLASS – Input CLASS that needs to be mapped to an outbound queue.

regn-priority – Regenerated-priority type and regenerated-priority that needs to be mapped to an outbound queue. The type options are as follows:

vlanPri - VLAN priority.

ipTos - IP Type of Service.

ipDscp - IP differentiated services code point.

vlanDEI - VLAN drop eligibility indicator.

iftype – Egress interface type.

ifnum – Egress interface number.

queue-id – Queue identifier that uniquely identifies a queue relative to an interface. The only supported queue identifiers are from 1 to 8.

Mode Global Configuration

Example

```
SEFOS(config)# queue-map CLASS 1 interface
extreme-ethernet 0/1 queue-id 1
```

Notes

CLASS should be zero while configuring RegenPriority specific Q.

Regenerated-priority should be zero while configuring CLASS specific queue.

Related Commands

- show queue-map - Displays the configured queue map

22.1.12 qos interface

Sets the default ingress user priority for the port.

```
qos interface iftype ifnum def-user-priority 0-7
```

Syntax Description	*iftype* – Interface type *ifnum* – Interface number **def-user-priority** – Default ingress user priority for the port
Mode	Global Configuration
Example	`SEFOS(config)#` **qos interface giga 0/1 def-user-priority 3**
Notes	The default ingress user priority will be used to set priority for untagged packets.

Related Commands

- `show qos def-user-priority` - Displays the configured default ingress user priority for a port

22.1.13 map

Adds a priority map entry for mapping an incoming priority to a regenerated priority. The `no` form of the command sets default value to the Interface, VLAN, and regenerated inner priority.

```
map [interface iftype ifnum] [vlan 1-4094] in-priority-type
{vlanPri | ipTos | ipDscp | vlanDEI} [in-priority 0-63]
regen-priority 0-63]
```

```
no map {interface | vlan | regen-inner-priority}
```

Syntax Description	*iftype* – Interface type. *ifnum* – Interface number. **vlan** – VLAN identifier. This value ranges between 1 and 4094. **in-priority-type** – Type of the incoming priority. The types are: • **vlanPri** - VLAN priority. • **ipTos** - IP type of service. • **ipDscp** - IP differentiated services code point. • **vlanDEI** - VLAN drop eligibility indicator. **in-priority** – Incoming priority value determined for the received frame. This value ranges between 0 and 63. **regen-priority** – Regenerated priority value determined for the received frame. This value ranges between 0 and 63.
Mode	Priority Map Configuration

Default

vlan – 0

in-priority-type – vlanPri

in-priority – -1

regen-priority – 0

Example

```
SEFOS(config)# priority-map 12
SEFOS(config-pri-map)# map interface extreme-ethernet
0/12 in-priority-type ipDscp in-priority 0 regen-priority
8
```

Notes

Priority map entry should have been created.

Related Commands

- priority-map - Adds a priority map entry
- show priority-map - Displays the priority map entry

22.1.14 match access-group

Sets class map parameters using L2 or L3 ACL, or priority map identifier.

```
match access-group {[mac-access-list 0-65535] | [ip-access-list
0-65535]  | priority-map 0-65535}
```

Syntax Description

mac-access-list – Identifier of the MAC filter. This value ranges between 0 and 65535.

ip-access-list – Identifier of the IP filter. This value ranges between 0 and 65535.

priority-map – Priority Map identifier for mapping incoming priority against received packet. This value ranges between 0 and 65535.

Mode

QoS Class Map Configuration

Default

mac-access-list – 0

ip-access-list – 0

priority-map – 0

Example

```
SEFOS(config)# interface extreme-ethernet 0/10
SEFOS(config-if)# ip access-group 11 in
SEFOS(config-if)# exit
SEFOS(config)# class-map 10
SEFOS(config-cls-map)# match access-group ip-access-list
11
```

Notes

- Priority map ID should have been created.
- L2 and/or L3 ACL should have been created.
- The last match access-group command entered will overwrite previous ones.
- Either mac-access-list or ip-access-list must first be applied to some interfaces to enable ip-access-list or mac-access-list to be matched.

Related Commands

- `priority-map` - Adds a priority map entry
- `show class-map` - Displays the class map entry

22.1.15 set class

Sets CLASS for L2 or L3 filters, or priority map identifier and adds a CLASS to priority map entry with regenerated priority. The `no` form of the command deletes a CLASS to priority map table entry.

```
set class 1-65535 [pre-color {green | yellow | red | none}]
[regen-priority 0-7 group-name string_31]
```

```
no set class 1-65535
```

Syntax Description

class – Traffic CLASS to which an incoming frame pattern is classified. This number is used for referencing traffic class `set policy` command.

pre-color – Color of the packet prior to metering. This can be any one of the following:

- **none** - Traffic is not pre-colored.
- **green** - Traffic conforms to SLAs.
- **yellow** - Traffic exceeds the SLAs.
- **red** - Traffic violates the SLAs.

The pre-color keyword is not supported.

regen-priority – Regenerated priority value determined for the input CLASS. This value ranges between zero and seven. The `regen-priority` keyword is not supported.

group-name – Unique identification of the group to which an input CLASS belongs.

Mode QoS Class Map Configuration

Default **class** – 0

Example

```
SEFOS(config-cls-map)# set class 1000
```

Notes

- Class map should have created.
- The default value zero provided for the class is not configurable.

Related Commands

- `show class-map` - Displays the class map entry

22.1.16 meter-type

Sets meter parameters CIR, CBS, EIR, EBS, Interval, meter type, and color awareness.

```
meter-type {simpleTokenBucket | avgRate | srTCM | trTCM | tswTCM
| mefCoupled | mefDeCoupled} [color-mode {aware | blind}]
[interval 1-10000] [cir 0-65535] [cbs 0-65535] [eir 0-65535] [ebs
0-65535] [next-meter 0-65535]
```

Syntax Description

simpleTokenBucket – Two parameter token bucket meter. This keyword is not supported.

avgRate – Average rate meter. This keyword is not supported.

srTCM – Single rate three color marker metering as defined by RFC 2697.

trTCM – Two rate three color marker metering as defined by RFC 2698

tswTCM – Time Sliding Window Three Color Marker Metering as defined by RFC 2859. This keyword is not supported.

mefCoupled – Dual bucket meter as defined by RFC 4115. This keyword is not supported.

mefDeCoupled – Dual bucket meter as defined by RFC 2697 and MEF coupling flag. This keyword is not supported.

color-mode – Indicates the color mode of the Meter. The color modes are:

aware - The Meter considers the pre-color of the packet.

blind - The meter ignores the pre-color of the packet. Only the blind option is supported.

interval – Time interval used with the token bucket. This value ranges between 1 and 10000. This keyword is not supported.

cir – Committed information rate (in Mbps). This value ranges between 0 and 65535.

cbs – Committed burst size (in KB). This value ranges between 0 and 65535.

eir – Excess information rate (in Mbps). This value ranges between 0 and 65535.

ebs – Excess burst size (in KB). This value ranges between 0 and 65535.

next-meter – Meter entry identifier used for applying the second/next level of conformance on the incoming packet. This value ranges between 0 and 65535. This keyword is not supported.

Mode

Meter Configuration

Default **color-mode** – **blind**
interval – 0
next-meter – 0

Example `SEFOS(config-meter)#` **meter-type trTCM cir 300 cbs 1 eir 500 ebs 1**

Notes Meter must have been created.

Related Commands

- `meter` - Creates a meter
- `set meter` - Sets policy parameters such as meter and meter actions
- `show meter` - Displays the meter entry

22.1.17 set policy

Sets CLASS for policy. The `no` form of the command sets the default value for interface in this policy.

```
set policy [class 0-65535] [interface iftype ifnum]
default-priority-type {none | {vlanPri | ipTos | ipDscp} 0-63}
```

```
no set policy interface
```

Syntax Description

class – Traffic CLASS for which the policy-map needs to be applied. The number has to be defined by the set class command.

interface – If class has a prior interface assignment, then the interface keyword is ignored.

iftype – Interface type.

ifnum – Interface number.

default-priority-type – Per-Hop Behavior (PHB) type to be used for filling the default PHB for the policy-map entry. The types are:

- **none** - No specific PHB type is set.
- **vlanPri** - VLAN priority.
- **ipTos** - IP Type of Service.
- **ipDscp** - IP Differentiated Services Code Point.

The following keywords are not supported:

- `ipTos`
- `mplsExp`

Mode QoS PolicyMap Configuration

Default **class** – 0

Example `SEFOS(config-ply-map)# set policy class 1 interface extreme-ethernet 0/1 default-priority-type none`

Notes CLASS must have been created.

Related Commands

- `class-map` - Adds a class map entry
- `policy-map` - Creates a policy map
- `show policy-map` - Displays the policy map entry
- `show class-map` - Displays the class map entry

22.1.18 set meter

Sets policy parameters such as meter and meter actions. The `no` form of the command removes the meter from the policy and the meter actions.

```
set meter 1-65535 [conform-action {drop | set-cos-transmit 0-7
set-de-transmit 0-1 | set-port iftype ifnum | set-inner-vlan-pri
0-7 | set-ip-prec-transmit 0-7 | set-ip-dscp-transmit 0-63}]
[exceed-action {drop | set-cos-transmit 0-7 set-de-transmit 0-1 |
set-inner-vlan-pri 0-7 | | set-ip-prec-transmit 0-7 |
set-ip-dscp-transmit 0-63}] [violate-action {drop |
set-cos-transmit 0-7 set-de-transmit 0-1 | set-inner-vlan-pri 0-7
| set-ip-prec-transmit 0-7 | set-ip-dscp-transmit 0-63 }]
[set-conform-newclass 0-65535] [set-exceed-newclass 0-65535]
[set-violate-newclass 0-65535]
```

```
no set meter
```

Syntax Description

meter – Meter table identifier which is the index for the meter table.

conform-action – Action to be performed on the packet, when the packets are found to be In profile (conform). Options are:

- **drop** - Drops the packet.
- **set-cos-transmit** - Sets the VLAN priority of the outgoing packet.
- **set-de-transmit** - Sets the VLAN Drop Eligible indicator of the outgoing packet.
- **set-port** - Sets the new port value.
- **set-inner-vlan-pri** - Sets the inner VLAN priority of the outgoing packet.
- **set-ip-prec-transmit** - Sets the new IP TOS value.
- **set-ip-dscp-transmit** - Sets the new DSCP value.

No action will be performed on the packet even when the packets are found to be In profile (conform), if the conform action is not set.

The following keywords are not supported:

- set-cos-transmit
- set-de-transmit
- set-port
- set-inner-vlan-pri
- set-ip-prec-transmit

exceed-action – Action to be performed on the packet, when the packets are found to be In profile (exceed). Options are:

drop - Drops the packet.

set-cos-transmit - Sets the VLAN priority of the outgoing packet.

set-de-transmit - Sets the VLAN Drop Eligible indicator of the outgoing packet.

set-inner-vlan-pri - Sets the inner VLAN priority of the outgoing packet.

set-ip-prec-transmit - Sets the new IP TOS value.

set-ip-dscp-transmit - Sets the new DSCP value.

Target will drop the packets, if the exceed action is not set.

The following keywords are not supported: set-cos-transmit, set-de-transmit, set-inner-vlan-pri, set-ip-prec-transmit.

violate-action – Action to be performed on the packet, when the packets are found to be out of profile. Options are:

- **drop** - Drops the packet.
- **set-cos-transmit** - Sets the VLAN priority of the outgoing packet.
- **set-de-transmit** - Sets the VLAN Drop Eligible indicator of the outgoing packet.
- **set-inner-vlan-pri** - Sets the inner VLAN priority of the outgoing packet.
- **set-ip-prec-transmit** - Sets the new IP TOS value.
- **set-ip-dscp-transmit** - Sets the new DSCP value.

Target will drop the packets, if the violate action is not set.

The following keywords are not supported:

- `set-cos-transmit`
- `set-de-transmit`
- `set-inner-vlan-pri`
- `set-ip-prec-transmit`

`set-conform-newclass` – Represents the traffic CLASS to which an incoming frame pattern is classified after metering. This keyword is not supported.

`set-exceed-newclass` – Represents the Traffic CLASS to which an incoming frame pattern is classified after metering. This keyword is not supported.

`set-violate-newclass` – Represents the Traffic CLASS to which an incoming frame pattern is classified after metering. This keyword is not supported.

Mode QoS PolicyMap Configuration

Default **`set-cos-transmit`** – 0

`set-de-transmit` – 0

`set-inner-vlan-pri` – 0

Example

```
SEFOS(config-ply-map)# set meter 1 exceed-action drop
violate-action drop
```

Related Commands

- `class-map` - Adds a class map entry
- `policy-map` - Creates a policy map
- `meter-type` - Sets meter parameters CIR, CBS, EIR, EBS, Interval, meter type, and color awareness
- `show class-map` - Displays the class map entry
- `show policy-map` - Displays the policy map entry
- `show meter` - Displays the meter entry

22.1.19 show qos global info

Displays QoS related global configurations.

```
show qos global info
```

Mode Privileged EXEC

Example

```
SEFOS# show qos global info

QoS Global Information
----------------------
System Control                  : Start
System Status                  : Enable
Rate Unit                       : kbps
Rate Granularity               : 64
Trace Flag                      : 0
```

Related Commands

- `shutdown qos` - Shuts down the QoS subsystem
- `qos` - Enables or disables the QoS subsystem
- `mls qos` - Enables the QoS subsystem

22.1.20 show priority-map

Displays the priority map entry.

show priority-map [*priority-map-id_1-65535***]**

Syntax Description

priority-map-id_1-65535 – Output priority map index for the incoming packet received over ingress Port or VLAN with specified incoming priority.

Mode

Privileged EXEC

Example

```
SEFOS# show priority-map

QoS Priority Map Entries
========================
PriorityMapId                          : 1
IfIndex                                : 1
VlanId                                 : 4094
InPriorityType                         : VlanPriority
InPriority                             : 0
RegenPriority                          : 7
InnerRegenPriority                     : 1
SEFOS# show  priority-map 9

QoS Priority Map Entries
------------------------
PriorityMapId                          : 9
IfIndex                                : Ex 0/5
VlanId                                 : 2
InPriorityType                         : IP Protocol
InPriority                             : -1
RegenPriority                          : 5
InnerRegenPriority                     : 7
```

Notes

If executed without the optional parameters, this command displays all the available Priority Map information.

Related Commands

- priority-map - Adds a priority map entry
- map - Adds a priority map entry for mapping an incoming priority to a regenerated priority

22.1.21 show class-map

Displays the class map entry.

show class-map [*class-map-id_1-65535***]**

Syntax Description

class-map-id_1-65535 – Index that enumerates the multifield classifier table entries.

Mode

Privileged EXEC

Example

```
SEFOS# show class-map

QoS Class Map Entries
=====================
ClassMapId                      : 1
L2FilterId                      : None
L3FilterId                      : None
PriorityMapId                   : 1
CLASS                           : 1000
PolicyMapId                     : 1
PreColor                        : None
Status                          : Active
```

Notes If executed without the optional parameters, this command displays all the available Class Map information.

Related Commands

- `class-map` - Adds a class map entry
- `priority-map` - Adds a priority map entry
- `set class` - Sets CLASS for L2 or L3 filters or priority map identifier and adds a CLASS to priority map entry with regenerated priority
- `set policy` - Sets CLASS for policy
- `set meter` - Sets policy parameters such as meter and meter actions

22.1.22 show meter

Displays the meter entry.

show meter [*meter-id_1-65535*]

Syntax Description *meter-id_1-65535* – Index that enumerates the meter entries.

Mode Privileged EXEC

Example

```
SEFOS# show meter

QoS Meter Entries
=================
MeterId                          : 1
Type                             : Simple Token Bucket
Color Mode                       : Color Aware
Interval                         : 10
CIR                              : 1000
CBS                              : None
EIR                              : None
EBS                              : None
NextMeter                        : None
Status                           : Active
```

Notes

If executed without the optional parameters, this command displays all the available Meter information.

Related Commands

- `meter-type` - Sets meter parameters CIR, CBS, EIR, EBS, interval, meter type and color awareness
- `set meter` - Sets policy parameters such as meter and meter actions

22.1.23 show policy-map

Displays the policy map entry.

show policy-map [*meter-id_1-65535*]

Syntax Description

meter-id_1-65535 – Index that enumerates the Meter entries.

Mode

Privileged EXEC

Example

```
SEFOS# show policy-map

QoS Policy Map Entries
======================
PolicyMapId   : 1
IfIndex       : 0
Class         : 0
DefaultPHB    : None.
MeterId       : 1
ConNClass     : 0
ExcNClass     : 0
VioNClass     : 0
ConfAct       : Port 1
ExcAct        : Drop.
VioAct        : Drop.
```

Notes If executed without the optional parameter, this command displays all the available policy map information.

Related Commands

- `set policy` - Sets CLASS for policy
- `set meter` - Sets policy parameters such as meter and meter actions

22.1.24 show shape-template

Displays the shape template configurations.

show shape-template [*shape-template-id_1-65535***]**

Syntax Description *shape-template-id_1-65535* – Shape template table index.

Mode Privileged EXEC

Example

```
SEFOS# show shape-template

QoS Shape Template Entries
--------------------------
ShapeTemplate Id           CIR     CBS      EIR       EBS
----------------           ---     ---      ---       ---
1                           1      1        1          1
```

Notes If executed without the optional parameter, this command displays all the available shape template information

Related Commands

- shape-template - Creates a shape template

22.1.25 show scheduler

Displays the configured scheduler.

```
show scheduler [interface iftype ifnum]
```

Syntax *iftype* – Interface type.
ifnum – Interface number.

Mode Privileged EXEC

Example

```
SEFOS# show scheduler

QoS Scheduler Entries
---------------------
IfIndex Scheduler Index Scheduler Algo Shape Index Scheduler HL
GlobalId
------- --------------- -------------- ----------- ------------  --------
Ex0/1     1                strictPriority      0             0              1
```

Notes If executed without the optional parameter, this command displays all the available scheduler entries.

Related Commands

- scheduler - Creates a scheduler and configures the scheduler parameters

22.1.26 show queue

Displays the configured queues.

```
show queue [interface iftype ifnum]
```

Syntax **iftype** – Interface type.
ifnum – Interface number.

Mode Privileged EXEC

Example

```
SEFOS# show queue

QoS Queue Entries
-----------------
IfIndex Queue Idx Queue Type Scheduler Idx Weight Priority Shape Idx  Global Id
------- --------- ---------- ------------- ------ -------- ---------  ---------
Ex0/1     1         1            1             1      1        1           1
```

Notes If executed without the optional parameter, this command displays all the available queue entries.

Related Commands

- queue - Creates a Queue and configures the Queue parameters

22.1.27 show queue-map

Displays the configured queue map.

show queue-map [interface *iftype ifnum*]

Syntax Description
iftype – Interface type.
ifnum – Interface number.

Mode Privileged EXEC

Example

```
SEFOS# show queue-map

QoS Queue Map Entries
---------------------
IfIndex    CLASS    PriorityType    Priority Value    Mapped Queue
-------    -----    ------------    --------------    ------------
Ex0/1        1          none               0                 1
```

Notes If executed without the optional parameter, this command displays all the available queue map entries.

Related Commands

- queue-map - Creates a map for a queue with class or regenerated priority

22.1.28 show qos def-user-priority

Displays the configured default ingress user priority for a port.

```
show qos def-user-priority [interface iftype ifnum]
```

Syntax Description

iftype – Interface type.
ifnum – Interface number.

Mode

Privileged EXEC

Example

```
SEFOS# show qos def-user-priority

QoS Default User Priority Entries
---------------------------------
IfIndex   Default User Priority
--------  ---------------------
Ex0/10
Ex0/20
Ex0/30
Ex0/40
Ex0/50
Ex0/60
Ex0/70
Ex0/80
...
```

Notes

If executed without the optional parameter, this command displays the available default ingress user priority entries for all the interface.

Related Commands

- `qos interface` - Sets the default ingress user priority for the port

22.1.29 show qos meter-stats

Displays the meters statistics for conform, exceed, violate packets, and octets count.

```
show qos meter-stats [meter-id_1-65535]
```

Syntax Description

meter-id_1-65535 – Index that enumerates the meter entries.

Mode

Privileged EXEC

Example

```
SEFOS# show qos meter-stats

QoS Meter (Policer) Stats
-------------------------
Meter Index                      : 1
Conform Packets                  : 00
Conform Octects                  : 00
Exceed Packets                   : 00
Exceed Octects                   : 00
Violate Packets                  : 00
Violate Octects                  : 0
```

Notes

If executed without the optional parameter, this command displays the meter statistics for all the available meters.

Related Commands

- `show meter` - Displays the meter entry
- `set meter` - Sets Policy parameters such as meter and meter actions

CHAPTER 23

SLB

SLB provides traffic load distribution functions on the switch. With this feature, traffic entering the switch is distributed to switch attached servers in accordance with a hash traffic distribution policy.

There are two forms of SLB, regular SLB and SLB level 2.

23.1 Regular SLB

In regular SLB, load balancing groups consist of server members identified by level 3 protocol (IP) addresses. Server members are next hop targets of a targeted ECMP route. The load balancing group is identified by a VIP which is used to represent a virtual server. For the client, the virtual server is one single highly available server with expandable resources. Load distribution is performed with the routing hash function of the switch.

Load distribution policies are based on the contents of the L3/4 packet header. Failover is supported at the server members level. A failed member within a load balancing group is replaced by another server member that is part of the same group. Health check is performed by the switch with ICMP ping. Regular SLB provides the following benefits:

- Virtualize multiple servers as one highly available and expandable server.
- Perform all functions on existing switch hardware.
- Form multiple load balancing groups to provide flexibility on how server resources are managed.
- Enable SLB with no performance degradation.

23.2 SLB L2

Note – SLB L2 is supported in the Oracle Switch ES1-24 and Sun Blade 6000 Ethernet Switched NEM 24p 10GbE. SLB L2 is not supported in the Sun Network 10GbE Switch 72p.

In SLB L2, load balancing groups consist of switch port members. Load distribution is performed with the LAG hash function of the switch. Load distribution policies are based on the contents of the L2/3/4 packet header. Failover is supported at the switch port members level. Depending on the fail-over method chosen, a failed member within a load balancing group is replaced by another switch port or by a group of switch ports within the group.

Connectivity between the switch port and the server is monitored by a health check mechanism. The ACL capability is extended such that a load balancing group can be set as a target when a switch port accepts a packet. SLB L2 provides the following benefits:

- Load balance a group of servers connected to switch ports.
- Provide port level failover with multiple options for high availability configurations.
- Enable bump-in-the-wire load balancing.

23.3 Regular SLB Commands

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

- `slb`
- `slb standby`
- `slb policy`
- `show slb`
- `show slb policy`
- `debug slb`
- `show slb trace-options`
- Output for `show slb`

23.3.1 slb

Forms an SLB group with active members or adds active members to an existing load balancing group. The no form of the command removes any members from the existing load balancing group.

```
slb virtual-ip-address virtual-ip-address-mask real-ip-address1,
real-ip-address2...
```

```
no slb virtual-ip-address virtual-ip-address-mask
real-ip-address1,real-ip-address2...
```

Syntax Description

virtual-ip-address – Virtual IP address prefix of the load balanced server group.

virtual-ip-address-mask – Virtual IP address mask of the load balanced server group.

real-ip-address1,real-ip-address2 – List of real IP addresses of individual servers within the load balanced server group.

Mode Global Configuration

Default None.

Example

```
SEFOS(config)# slb 10.10.10.0 255.255.255.0
20.5.1.1,20.5.1.2
```

Notes Active members denote members that participate in traffic distribution.

Related Commands

- show slb – Displays the server load balancing group formed and entries added.
- slb standby – Adds standby members to the load balancing group.

23.3.2 slb standby

Forms a server load balancing group with standby members or adds standby members to existing load balancing group.

```
slb standby virtual-ip-address virtual-ip-address-mask
real-ip-address1,real-ip-address2...
```

Syntax Description	*virtual-ip-address* – Virtual IP address prefix of the load balanced server group. *virtual-ip-address-mask* – Virtual IP address mask of the load balanced server group. *real-ip-address1,real-ip-address2* – List of real IP addresses of individual servers within the load balanced server group.
Mode	Global Configuration
Default	No SLB group is formed
Example	`SEFOS(config)# slb standby 10.10.10.0 255.255.255.0 20.5.1.1,20.5.1.2`
Notes	Standby members denote members that participate in traffic distribution only when a failover situation occurs.

Related Commands

- `show slb` – Displays the server load balancing group formed and entries added.
- `slb` – Adds active members to the load balancing group.

23.3.3 slb policy

Sets L3/4 load distribution hash policy.

```
slb policy [{default | [src-ip] [dest-ip] [proto] [src-port]
[dest-port] [tcp] [udp] [sym] [user-prot1 protocol1-val(0-0xff)]
[user-port2 protocol2-val(0-0xff)] [rotation rotation-val(0-2)]
[diffserv-mask diffserv-mask-val(0-0x3f)] [user-mask
user-mask-val(0-0xff)] [flow-label-mask
flow-label-mask-val(0-0xfffff)}]
```

Syntax Description

default – Sets to default policy.

src-ip – Source IP address in hashing.

dest-ip – Destination IP address in hashing.

proto – Protocol field in hashing.

src-port – Source port number in hashing.

dest-port – Destination port number in hashing.

tcp – Enables *src-port* and *dest-port* in hashing when packet's protocol field is TCP.

udp – Enables *src-port* and *dest-port* in hashing when packet's protocol field is UDP.

sym – Enables symmetry hash.

user-prot1 – Enables *src-port* and *dest-port* in hashing when packet's protocol field matches this user defined protocol1.

protocol1-val – Value of protocol1.

user-prot2 – Enables *src-port* and *dest-port* in hashing when packet's protocol field matches this user defined protocol2.

protocol2-val – Value of protocol2.

diffserv-mask – Masks the IPv4 diffserv field in the hash function.

diffserv-mask-val – Value of diffserv-mask.

user-mask – Masks the ISL tag's user field in the hash function.

user-mask-value – Value of user-mask.

flow-label-mask – Masks the IPv6 flow label field in the hash function.

flow-label-mask-val – Value of flow-label-mask.

Mode Global Configuration

Default **src-ip**, **dest-ip**, **proto**, **src-port**, **dest-port**, **tcp**, and **udp** options are set.

Example

```
SEFOS(config)# slb policy src-ip
```

Notes Hash policy is a global setting. Once set, all SLB groups use the same policy.

Related Commands

- show slb policy – Displays the server load balancing policy.

23.3.4 show slb

Displays detailed SLB groups and members information.

```
show slb
```

Mode Privileged EXEC

Example

```
SEFOS# show slb

SLB Group #1 Virtual IP: 172.1.1.0/24
Server Members:
IP Address       Vlan MacAddress          Port   State      Comments
================ ==== =================  ====   =========  =============
20.5.1.1          1   00:14:4f:3e:e0:10    3     ACTIVE
20.5.1.2          1   00:14:4f:3e:e0:11    4     ACTIVE
20.5.1.3          1   00:14:4f:3e:e0:12    5     ACTIVE
20.5.1.4          1   00:14:4f:3e:e0:13    6     FAILED     failover to
20.5.1.9
20.5.1.5          1   00:14:4f:3e:e0:14     7    ACTIVE
20.5.1.5          1   00:14:4f:3e:e0:15     8    ACTIVE
20.5.1.7          ----  --:--:--:--:--:-- ---- IDLE
20.5.1.8          1   00:14:4f:3e:e0:17    10    ACTIVE
20.5.1.9          1   00:14:4f:3e:e0:18    11    FAILOVER   replacing
20.5.1.4
20.5.1.10         1  00:14:4f:3e:e0:19    12    STANDBY    (up)
20.5.1.11         ----  --:--:--:--:--:-- ---- STANDBY    (down)
```

23.3.5 show slb policy

Displays SLB hash policy currently in use.

show slb policy

Mode Privileged EXEC

Example

```
SEFOS# show slb policy

L3/4 Hash Fields:
     src-ip
Rotation: 0
DiffservMask: 0x0
UserMask: 0x0
FlowLabelMask: 0x0
```

23.3.6 debug slb

Sets the trace-options used for debugging.

```
debug slb [{all | default | [all-fail] [group] [node] [route]
[task] [policy] [snmp-mibs]}]
```

Syntax Description

all – Sets all debug options.
default – Sets default options.
all-fail – Sets display all failure messages.
group – Sets display SLB Group debug messages.
node – Sets display SLB Server Node debug messages.
route – Sets display route debug messages.
task – Sets display task debug messages.
policy – Sets display hash policy debug messages.
snmp-mibs – Sets display SNMP Mibs debug messages.

Mode Priviledge EXEC

Default `all-fail` option is set.

Example

```
SEFOS# debug slb
```

Related Commands

- `show slb trace-options` – Displays the trace-options in use for debugging.

23.3.7 show slb trace-options

Displays the trace-options in use for debugging.

```
show slb trace-options
```

Mode Priviledge EXEC

Example

```
SEFOS# show slb trace-options

Trace Options:
  all-fail
```

23.3.8 Output for `show slb`

This is an example to show that the `show slb` command displays both the SLB v4 and v6 groups configured.

```
SLB Group ID: 2  Virtual IP: 9001:411:0:1::/64
Server Members:
IP Address         Vlan  MacAddress        Port   State     Comments
================== ====  ================= ====== ========= ======
2001:411:0:1::11      1  00:14:4f:9d:18:c7 Ex0/5  ACTIVE
2001:411:0:1::12      1  00:14:4f:9d:18:c8 Ex0/6  ACTIVE
2001:411:0:1::13    1  00:14:4f:9d:18:c9 Ex0/7  FAILED    failover
to 2001:411:0:1::15
2001:411:0:1::14   ----  --:--:--:--:--:-- ------ IDLE
2001:411:0:1::15      1  00:14:4f:9d:18:10 Ex0/8  FAILOVER
replacing 2001:411:0:1::13
2001:411:0:1::16      1  00:14:4f:9d:18:11 Ex0/9  STANDBY
```

23.4 SLB L2 Commands

Note – SLB L2 is supported in the Sun Blade 6000 Ethernet Switched NEM 24p 10GbE and not the Sun Network 10GbE Switch 72p.

The list of CLI commands for the configuration of SLB L2 is as follows:

- `slb l2`
- `slb l2 standby`
- `slb l2 failover-method`
- `slb l2 policy`
- `slb l2 policy default`
- `show slb l2`
- `show slb l2 policy`
- `show slb l2 debug`

23.4.1 slb l2

Forms an L2 server load balancing group with active members or adds active members to an existing L2 load balancing group. The no form of the command removes any members from the existing L2 load balancing group.

```
slb l2 group-id interface-type 0/a-b, 0/c, ...
```

```
no slb l2 group-id interface-type 0/a-b, 0/c, ...
```

Syntax Description	*group-id* – User specified group ID. *interface-type* – Interface type of the switch port member. 0/a-b, 0/c, ... – Switch port members to be added.
Mode	Global Configuration
Default	No SLB L2 group is formed.
Example	`SEFOS(config)# slb l2 1 extreme-ethernet 0/15-18,0/20`

Related Commands

- `show slb l2` – Displays L2 server load balancing groups and members.

23.4.2 slb l2 standby

Forms an L2 server load balancing group with standby members, or adds standby members to an existing L2 load balancing group.

```
slb l2 standby group-id interface-type 0/a-b, 0/c, ...
```

Syntax Description	*group-id* – User specified group ID. *interface-type* – Interface type of the switch port member. *0/a-b, 0/c, ...* – Switch port members to be added.
Mode	Global Configuration
Default	No SLB L2 Group is formed.
Example	`SEFOS(config)# slb l2 standby 1 extreme-ethernet 0/21`

Related Commands

- `show slb l2` – Displays L2 server load balancing groups and members.

23.4.3 slb l2 failover-method

Sets the failover method used when a failover event occurs.

```
slb l2 failover-method group-id {standby | all-standby | all-ports
| prefer-standby}
```

Syntax Description

group-id – Group ID of the SLB L2 group.

standby – Traffic is redirected to an available standby port (NPlus1).

all-standby – Traffic destined to a failed port is hashed across all standby ports.

all-ports – Traffic destined to a failed port is hashed to all ports (active and standby ports).

prefer-standby – Traffic destined to a failed port is first redirected directly to a standby port if it has not already been used. Once all standby ports are in use, traffic is hashed across all ports.

Mode Global Configuration

Default **all-ports**

Example

```
SEFOS(config)# slb l2 failover-method 1 standby
```

23.4.4 slb l2 policy

Sets L2/3/4 load distribution hash policy.

```
slb l2 policy [src-mac] [dest-mac] [type] [vlan-id] [vlan-pri]
[l2-sym] [src-ip] [dest-ip] [proto] [src-port] [dest-port] [tcp]
[udp] [sym] [user-prot1 protocol1-val(0-0xff)] [user-prot2
protocol2-val(0-0xff)] [rotation rotation-val(0-2)]
[diffserv-mask diffserv-mask-val(0-0x3f)] [user-mask
user-mask-val(0-0xff] [flow-label-mask
flow-label-mask-val(0-0xfffff)]
```

Syntax Description

src-mac – Source MAC address in hashing.

dest-mac – Destination MAC address in hashing.

type – L2 type field in hashing.

vlan-id – VLAN ID field in hashing.

vlan-pri – VLAN PRI field in hashing.

l2-sym – Source and destination MAC ID in symmetry form.

src-ip – Source IP address in hashing.

dest-ip – Destination IP address in hashing.

proto – Protocol field in hashing.

src-port – Source port number in hashing.

dest-port – Destination port number in hashing.

tcp – Enables *src-port* and *dest-port* in hashing when packet's protocol field is TCP.

udp – Enables *src-port* and *dest-port* in hashing when packet's protocol field is UDP.

sym – Enable symmetry hash.

user-prot1 – Enables *src-port* and *dest-port* in hashing when packet's protocol field matches this user defined **protocol1**.

protocol1-val – Value of **protocol1**.

user-prot2 – Enables *src-port* and *dest-port* in hashing when packet's protocol field matches this user defined **protocol2**.

protocol2-val – Value of **protocol2**.

diffserv-mask – Masks the IPv4 diffserv field in the hash function.

diffserv-mask-val – Value of **diffserv-mask**.

user-mask – Masks the ISL tag's user field in the hash function.

user-mask-value – Value of **user-mask**.

flow-label-mask – Masks the IPv6 flow label field in the hash function.

flow-label-mask-val – Value of **flow-label-mask**.

Mode Global Configuration

Default **src-ip**, **dest-ip**, **proto**, **src-port**, **dest-port**, **tcp**, and **udp** options are set.

Example

```
SEFOS(config)# slb policy src-ip
```

Notes Hash policy is a global setting. Once set, all SLB groups use the same policy.

Related Commands

- `show slb l2 policy` – Displays the L2 server load balancing policy.

23.4.5 slb l2 policy default

Sets default L2/3/4 load distribution hash policy.

```
slb l2 policy default
```

Mode Global Configuration

Example

```
SEFOS(config)# slb l2 policy default
```

23.4.6 show slb l2

Shows the L2 load balancing entries added and the hash algorithm used.

```
show slb l2
```

Mode Privileged EXEC

Example

```
SEFOS# show slb l2

L2 SLB Group #1:
          Failover Method: Failover to All Ports
Port Members:
Port     State      Comments
====     =====      ==================
1         ACTIVE
2         ACTIVE
3         FAILED     failover to all ports
4         IDLE
5         ACTIVE
6         STANDBY
```

23.4.7 show slb l2 policy

Displays SLB L2 Hash Policy currently in use.

```
show slb l2 policy
```

Mode Privileged EXEC

Example

```
SEFOS# show slb l2 policy

SEFOS# show slb l2 policy
L2 Hash Fields:
     src-mac vlan-id
L3/4 Hash Fields:
     src-ip
Rotation: 0
DiffservMask: 0x0
UserMask: 0x0
FlowLabelMask: 0x0
```

23.4.8 show slb l2 debug

Displays the SLB L2 groups and members along with debugging information.

show slb l2 debug

Mode Privileged EXEC

Example

```
SEFOS# show slb l2 debug

L2 SLB Group #1:
          Failover Method: Failover to All Ports
Port Members:
Port  State       PortMode    STP          Comments
====  =====       ========    =====        ==========
1     ACTIVE      Active      Forward
2     ACTIVE      Active      Forward
3    FAILED     Failover    Forward   failover to all ports
4     IDLE       Unknown      Block
5     ACTIVE     Active       Forward
6     STANDBY    Standby      Forward
```

CHAPTER **24**

Reflective Relay and Loopback Suppression

Reflective relay allows the packet from a device to be returned back from the same downstream port that delivered the packets. The most common use case is when the same interface is used to transmit and receive packets. This can be seen while using Virtual Ethernet Packet Aggregation (VEPA).

In the Virtual Ethernet Bridging (VEB) model, the hypervisor has a virtual switch or vswitch which acts as Layer2 switch in software. This allows intra-VM communication in software and packets do not have to leave the server. This requires a highly complex and expensive server and accounts for high overhead to accomplish network processing.

VEPA can be installed on the server to aggregate virtyal machine packets and pass them to the physical switch. The physical switch thus offloads the switching activities from the servers vswitch.

When aggregated packets are received on the switch, reflective relay and disabling loopback suppression must be configured on the switch, as some of the packets may have to be sent back to the same server, destined to another virtual machine residing on the same server. This will return those packets to the original device using the same port that delivered the packet to the switch.

Note – By default Reflective Relay is disabled in every VLAN created and Loopback Suppression is enabled on each interface.

24.1 VLAN Commands for Reflective Relay

Display the current VLAN settings.

```
SEFOS# show vlan

Vlan database
-------------
Vlan ID             : 1
Member Ports        : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6
                    Ex0/13, Ex0/14, Ex0/15, Ex0/16, Ex0/17, Ex0/18
                    Ex0/19, Ex0/20, Ex0/21, Ex0/22, Ex0/23, Ex0/24
Untagged Ports      : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6
                      Ex0/7, Ex0/8, Ex0/9, Ex0/10, Ex0/11, Ex0/12
                    Ex0/13, Ex0/14, Ex0/15, Ex0/16, Ex0/17, Ex0/18
                    Ex0/19, Ex0/20, Ex0/21, Ex0/22, Ex0/23, Ex0/24
Forbidden Ports     : None
Reflective-Relay    : Disabled
Name                :
Status              : Other
```

Enable Reflective Relay and verify the VLAN settings.

```
SEFOS# c t
SEFOS(config)# vlan 100
SEFOS(config-vlan)# vlan active
SEFOS(config-vlan)# ports add extreme-ethernet 0/21
SEFOS(config-vlan)# set reflective-relay enable
SEFOS(config-vlan)# end
SEFOS#
SEFOS# show vlan

Vlan database
-------------
Vlan ID             : 1
Member Ports        : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6
                      Ex0/7, Ex0/8, Ex0/9, Ex0/10, Ex0/11, Ex0/12
                    Ex0/13, Ex0/14, Ex0/15, Ex0/16, Ex0/17, Ex0/18
                    Ex0/19, Ex0/20, Ex0/21, Ex0/22, Ex0/23, Ex0/24
Untagged Ports      : Ex0/1, Ex0/2, Ex0/3, Ex0/4, Ex0/5, Ex0/6
                      Ex0/7, Ex0/8, Ex0/9, Ex0/10, Ex0/11, Ex0/12
                    Ex0/13, Ex0/14, Ex0/15, Ex0/16, Ex0/17, Ex0/18
                    Ex0/19, Ex0/20, Ex0/21, Ex0/22, Ex0/23, Ex0/24
Forbidden Ports     : None
Reflective-Relay    : Disabled
```

```
Name                :
Status              : Other
-----------------------------------------------------
Vlan ID             : 100
Member Ports        : Ex 0/21
Untagged Ports      : None
Forbidden Ports     : None
Reflective-Relay    : Enabled
Name                :
Status              : Other
```

24.2 Interface Commands for Loopback Suppression

Disable Loopback Suppression.

```
SEFOS(config)# interface extreme-ethernet 0/21
SEFOS(config-if)# set loopback-suppress disable
SEFOS(config-if)# end
SEFOS#
SEFOS# show interface extreme-ethernet 0/21

Ex0/21 up, line protocol is up (connected)
Bridge Port Type: Customer Bridge Port

Hardware Address is 00:10:e0:1e:20:25
MTU  9216 bytes, Full duplex, 10 Gbps,  No-Negotiation
HOL Block Prevention enabled.
Input flow-control is off,output flow-control is on

Link Up/Down Trap is enabled

Loopback Suppression is disabled

Reception Counters
   Octets                    : 53011
   Unicast Packets           : 0
   Discarded Packets         : 120
   Error Packets             : 0
   Unknown Protocol          : 0
   CRC Errors                : 0
   Symbol Errors             : 0
   Good CRC Frame Size Errors: 0
   Oversized w/ Bad CRC      : 0
```

```
Transmission Counters
   Octets                    : 72031
   Unicast Packets           : 0
   Discarded Packets         : 0
   Error Packets             : 0
   Bad CRC                   : 0
   Error Drops               : 0
   Timeout Drops             : 0
```

CHAPTER 25

Target Based Commands

This chapter describes the SEFOS target based commands.

25.1 SEFOS Target Based Commands

The list of SEFOS target based commands are as follows:

- monitor session
- speed (Sun Network 10Gbe Switch 72p and Sun Blade 6000 Ethernet Switched Network Express Module 24p 10GbE)
- storm-control
- rate-limit-output
- show port-monitoring
- show monitor
- mac-address-table aging-time

25.1.1 monitor session

Enables port-mirroring in the switch. The no form of the command disables port mirroring in the switch.

```
monitor session [session_number 1-1] {destination interface
interface-type interface-id | source interface interface-type
interface-id [{rx | tx | both}]}
```

```
no monitor session [session_number:1] [{source interface
interface-type interface-id |destination interface interface-type
interface-id}]
```

Syntax Description

session_number 1-1 – Specifies the session number identified with the session.

destination interface – Specifies the destination interface or the mirror-to port. Valid interfaces are physical ports. There can only be one mirror-to port per switch.

source interface – Specifies the interface for the traffic that is to be mirrored. Valid interfaces include physical ports.

rx – Received traffic is mirrored.

tx – Transmitted traffic is mirrored.

both – Specifies the traffic direction to monitor. If the traffic direction is not specified, both transmitted and received traffic is mirrored.

Mode Global Configuration

Defaults Port mirroring is disabled.

Example

```
SEFOS(config)# monitor session source interface
extreme-ethernet 0/1
SEFOS(config)# monitor session 1 destination interface
ex 0/4
```

Notes A port that is a member of a port-channel cannot be a mirror-to port.

Related Commands

- `show port-monitoring` / `show monitor` - Displays port-monitoring information

25.1.2 speed (Oracle Switch ES1-24 Only)

Sets the speed of the interface. The `no` form of the command sets the speed of the interface to its default value.

```
speed {100 | 1000 | 10000}
```

```
no speed
```

Syntax Description	**100 –** Port runs at 100 Mbps. **1000** – Port runs at 1000 Mbps. **10000** – Port runs at 10000 Mbps.
Mode	Interface Configuration
Defaults	10000 Mbps.
Example	`SEFOS(config-if)#` **`speed 1000`**
Notes	The Ethernet port speed can be configured to 100Mbps, 1000 Mbps, or 10000 Mbps, depending on the port type. 10GbaseT Physical ports support Auto Negotiation mode only. 10GbaseT Physical ports support 100 Mbps, 1000 Mbps, and 10000 Mbps, in Auto Negotiation mode. For 10GBaseT ports, the configured speed is the maximum speed advertised for Auto Negotiation. SFP+ Ports support Forced mode Speed Configuration. The Link partner should also be in Forced mode. SFP+ Ports support 1000 Mbps and 10000 Mbps speeds. If the Ethernet port can not be configured to the desired speed, an information message is displayed similar to the following: `This speed is not supported by hardware.`

Related Commands

- `show interfaces` - Displays the interface status and configuration

25.1.3 `speed` (Sun Network 10Gbe Switch 72p and Sun Blade 6000 Ethernet Switched Network Express Module 24p 10GbE)

Sets the speed of the interface. The `no` form of the command sets the speed of the interface to its default value.

```
speed {1000 | 10000}
```

```
no speed
```

Syntax Description	**1000** – Port runs at 1000 Mbps, **10000** – Port runs at 10000 Mbps,
Mode	Interface Configuration
Defaults	Automatic.
Example	`SEFOS(config-if)# speed 1000`
Notes	The Ethernet port speed can be configured to 1000 Mbps or 10000 Mbps. If the Ethernet port can not be configured to the desired speed, an information mesage is displayed similar to the following: `This speed is not supported by hardware.`

Related Commands

- `show interfaces` - Displays the interface status and configuration

25.1.4 storm-control

Sets the storm control rate for broadcast, multicast and DLF packets. The `no` form of the command sets storm control rate for broadcast, multicast, and DLF packets to the default value.

```
storm-control {broadcast | multicast | dlf} level Mbps_1-10000
```

```
no storm-control {broadcast | multicast | dlf} level}
```

Syntax Description	**broadcast** – Broadcast packets. **multicast** – Multicast packets. **dlf** – Unicast packets. **level** – Storm-control suppression level as a total number of bits per second. This value ranges between 1 and 10000 Megabits per second.
Mode	Interface Configuration
Defaults	Broadcast, multicast, and DLF storm control are disabled.
Example	`SEFOS(config-if)# storm-control broadcast level 1000`
Notes	Storm control is supported only on physical interfaces.

Related Commands

- `show interfaces` - Displays the interface status and configuration

25.1.5 rate-limit-output

Enables the rate limiting and burst size rate limiting by configuring the egress packet rate of an interface. The no form of the command disables the rate limiting and burst size rate limiting on an egress port.

```
rate-limit-output [packet-rate Mbps_1-10000] [burst-size
KB_1-128]
```

```
no rate-limit-output
```

Syntax Description

packet-rate – Packet rate Megabits per second. This value ranges between 1 and 10000 Megabits per second.

burst-size – Burst size in Kilobits per second. This value ranges between 1 and 128 Kilobits per second.

Mode

Interface Configuration

Defaults

packet-rate – 0

burst-size – 0

Example

```
SEFOS(config-if)# rate-limit output packet-rate 64
burst-size 32
```

25.1.6 show port-monitoring

Displays port-monitoring information.

```
show port-monitoring
```

Mode Privileged EXEC

Example

```
SEFOS# show port-monitoring
Port Monitoring  is enabled
Monitor Port : Ex0/4
Port         Ingress-Monitoring      Egress-Monitoring
Ex0/1              Enabled                  Enabled
Ex0/2              Enabled                  Enabled
Ex0/3              Disabled                 Disabled
Ex0/4              Disabled                 Disabled
Ex0/5              Disabled                 Disabled
Ex0/6              Disabled                 Disabled
Ex0/7              Disabled                 Disabled
Ex0/8              Disabled                 Disabled
Ex0/9              Disabled                 Disabled
Ex0/10             Disabled                 Disabled
Ex0/11             Disabled                 Disabled
Ex0/12             Disabled                 Disabled
Ex0/13             Disabled                 Disabled
Ex0/14             Disabled                 Disabled
Ex0/15             Disabled                 Disabled
Ex0/16             Disabled                 Disabled
Ex0/17             Disabled                 Disabled
```

Related Commands

- `monitor session` - Enables port-mirroring in the switch

25.1.7 show monitor

Displays port-monitoring information. This command operates similar to that of the command `show port-monitoring`.

```
show monitor [session 1-10] [detail]
```

Syntax Description

session – Session number. This value ranges between 1 and 10.

detail – Detailed information regarding the session.

Mode

Privileged EXEC

Example

```
SEFOS# show monitor
Port Monitoring  is enabled
Monitor Port : Ex0/2
Port         Ingress-Monitoring      Egress-Monitoring
Ex0/1              Disabled                  Disabled
Ex0/2              Enabled                   Enabled
Ex0/3              Disabled                  Disabled
Ex0/4              Disabled                  Disabled
Ex0/5              Disabled                  Disabled
Ex0/6              Disabled                  Disabled
```

Related Commands

- `monitor session` - Enables port-mirroring in the switch

25.1.8 mac-address-table aging-time

Sets the maximum age of a dynamically learned entry in the MAC address table. The `no` form of the command sets the maximum age of an entry in the MAC address table to its default value.

```
mac-address-table aging-time seconds_10-1000000
```

```
no mac-address-table aging-time
```

Mode

Global Configuration

Defaults

300

Example

```
SEFOS(config)# mac-address-table aging-time 100
```

Notes

If traffic on an interface is not very frequent, the aging time must be increased to record the dynamic entries for a longer time. Increasing the time can reduce the possibility of flooding.

Related Commands

- `show mac-address-table aging-time` - Displays the MAC address-table aging time