

SIEMENS

SIMATIC NET

Industrial Ethernet switches SCALANCE XM-400/XR-500 Command Line Interface (CLI)




Configuration Manual

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Introduction

1.1 Information on the configuration manual (CLI)

Validity of the configuration manual

This Configuration Manual covers the following products:

- SCALANCE XR-500
 - SCALANCE XR524-8C
 - SCALANCE XR526-8C
 - SCALANCE XR528-6M
 - SCALANCE XR552-12M

The devices are available with or without routing functions. For the devices without routing functions, you can enable the functions with a KEY-PLUG.

- SCALANCE XM-400
 - SCALANCE XM408-4C
 - SCALANCE XM408-8C
 - SCALANCE XM416-4C

The devices are available with or without routing functions. For the devices without routing functions, you can enable the functions with a KEY-PLUG.

This Configuration Manual applies to the following software versions:

- SCALANCE XR-500 firmware as of version 6.0
- SCALANCE XM-400 firmware as of version 6.0

Purpose of the Configuration Manual

This Configuration Manual is intended to provide you with the information you require to install, commission and operate IE switches. It provides you with the information you require to configure the IE switches.

Orientation in the documentation

Apart from this configuration manual, the products also have the following documentation:

- Configuration Manual:

- SCALANCE XM-400/XR-500 Web Based Mangement

This document is intended to provide you with the information you require to commission and configure IE switches using Web Based Management.

- Operating instructions:

- SCALANCE XR-500
- MM900 media modules for SCALANCE XR-500M
- Fan unit FAN597-1 for SCALANCE XR-500M
- Power supply PS598-1 for SCALANCE XR-500M
- SCALANCE XM-400
- Extender for SCALANCE XM-400
- Pluggable transceiver SFP/SFP+/SCP/STP
- PoE power supply SCALANCE PS9230 PoE/SCALANCE PS924 PoE

These documents contain information on installing and connecting up and approvals for the products.

The following documentation is also available from SIMATIC NET on the topic of Industrial Ethernet:

- System manual "Industrial Ethernet / PROFINET"
- System manual "Industrial Ethernet / PROFINET - Passive network components"

Note

All these documents are available on the SCALANCE X DVD.

Terms used

The designation . . .	stands for . . .
IE switch	Industrial Ethernet switch
IPv4 address	IPv4 address
IPv6 address	IPv6 address
IP address	IPv4/IPv6 address
IPv4 interface	Interface that supports IPv4.
IPv6 interface	Interface that supports IPv6. The interface can have more than one IPv6 address The IPv6 addresses have different ranges (scope), e.g. link local
IP interface	Interface that supports both IPv4 and IPv6. As default the IPv4 support is already activated. The IPv6 support needs to be activated extra.

What's new as of version 6.0?

Below, you will find an overview of the most important function expansions:

- Information in the configuration limits
- Reset and Defaults > Profile
- Network structures > private VLANs
- Network protocols > DHCP server
- Layer 3 functions
 - NAT (IPv4)
 - PIM (IPv4)
 - VRID tracking
 - Interface tracking (VRRP)
- Configuration of IPv6 functionalities
 - System Time > SNTP
 - System Time > NTP

Note

Default user "user" set in the factory

As of firmware version 6.0 the default user set in the factory "user" is no longer available when the product ships.

If you update a device to the firmware V6.0 the default user set in the factory "user" is initially still available. If you reset the device to the factory settings ("Restore Factory Defaults and Restart") the default user set in the factory "user" is deleted.

You can create new users with the role "user".

SIMATIC NET glossary

Explanations of many of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection or product DVD
 - The DVD ships with certain SIMATIC NET products.
- On the Internet under the following address:
50305045 (<http://support.automation.siemens.com/WW/view/en/50305045>)

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To stay informed about product updates as they occur, sign up for a product-specific newsletter. For more information, visit <http://support.automation.siemens.com>.

License conditions

Note

Open source software

Read the license conditions for open source software carefully before using the product.

You will find license conditions in the following documents on the supplied data medium:

- DOC_OSS-SCALANCE-X_74.pdf
- DC_LicenseSummaryScalanceXM400_76.pdf
- DC_LicenseSummaryScalanceXR500_76.pdf

You will find these documents on the product DVD in the following directory: /Open Source Information

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SIMATIC NET, SCALANCE, C-PLUG, OLM

Description

2.1 Working with the Command Line Interface (CLI)

Introduction

All the configuration settings for the device can be made using the Command Line Interface (CLI). The CLI therefore provides the same options as Web Based Management (WBM). You should read the detailed explanations of the parameters in the relevant configuration manual "Web Based Management". The CLI allows remote configuration over Telnet.

Note**Use with Windows 7**

If you want to access the Command Line Interface in Windows 7, make sure that the functions required for this are enabled in Windows 7.

Starting the CLI in a Windows console

Follow the steps outlined below to start the Command Line Interface in a Windows console:

1. Open a Windows console and type in the command "telnet" followed by the IP address of the device you are configuring:

```
C:\>telnet <IP address>
```

2. Enter your login and password.

As an alternative, you can also enter the command "telnet" followed by the IP address of the device you are configuring in the Start > Run menu.

Note**Requirement for use of the CLI**

You should only use the command line interface if you are an experienced user.

Even commands that bring about fundamental changes to the configuration are executed without a prompt for confirmation.

Errors in the configuration can mean that no further operation is possible in the entire network.

Note

Command sets depend on the logged-on user. Changing configuration data is possible only with the "admin" role.

Starting the CLI via a serial connection

Follow the steps outlined below to start the Command Line Interface via a serial interface:

1. Open a serial terminal (program of your choice)
2. Connect to the serial port of the device (baud rate 115200,data/parity/stop 8N1)
3. Enter your login and password.

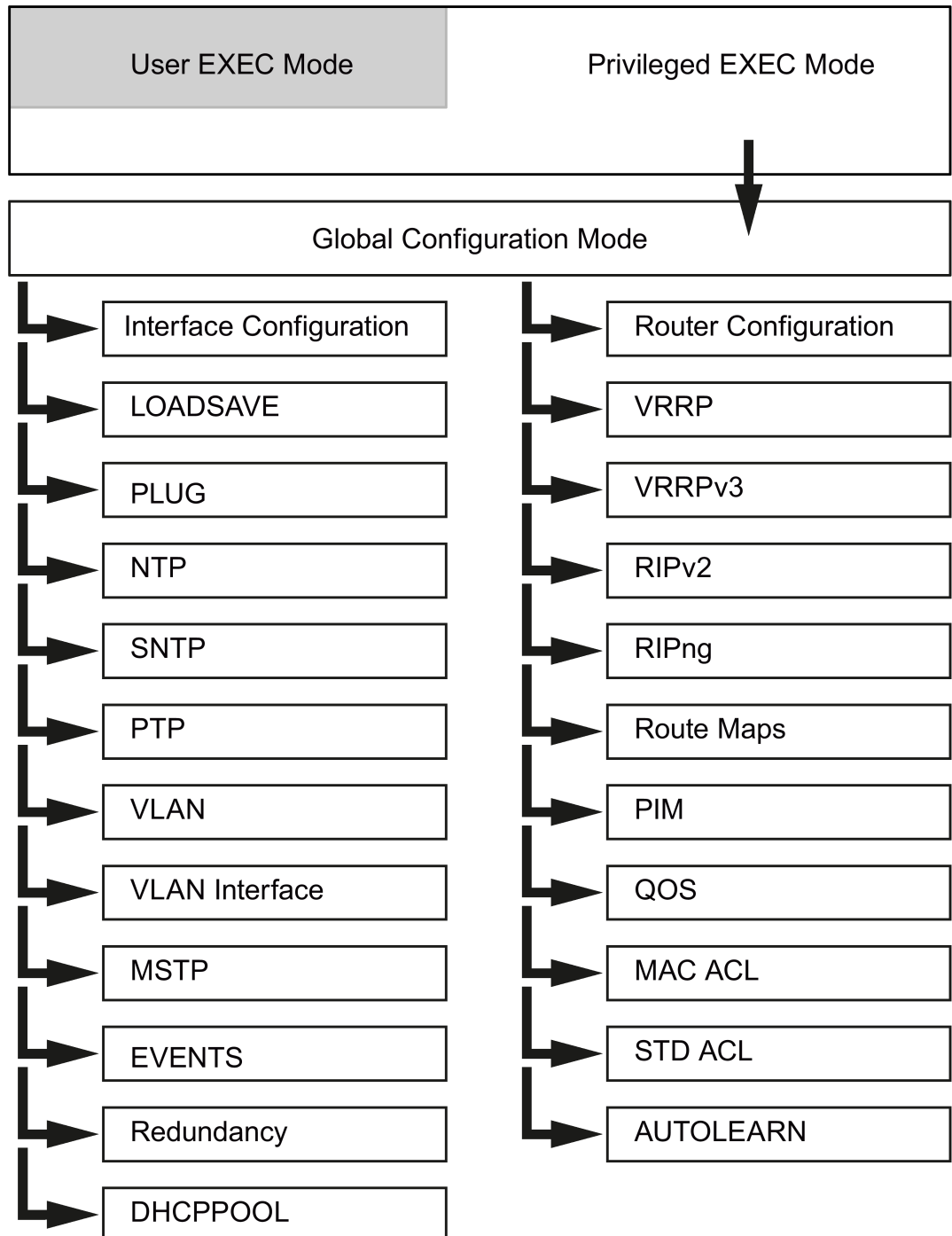
Note

When you log in via a serial interface you can only log in with a local user account.

2.2 Structure of the Command Line Interface

Grouping of the commands in the various modes

The commands of the Command Line Interface are grouped according to various modes. Apart from a few exceptions (`help`, `exit`), commands can only be called up in the mode to which they are assigned. This grouping allows different levels of access rights for each individual group of commands. The following graphic is an overview of the available modes.



User EXEC mode

This mode is active after you log in with the role "user" in a console window. In this mode, you can use `show` commands to display the current values of configuration parameters. It is not possible to modify parameters in this mode.

To be able to modify configuration parameters, you need to change to the Privileged EXEC mode.

Privileged EXEC mode

You change to this mode if you log in with the role "admin" or in User EXEC mode you enter the command `enable`. There are two ways of exiting the Privileged EXEC mode:

1. The `exit` command logs you out; the Login Prompt prompt appears.
2. The `disable` command brings you back one level from the Privileged EXEC mode to the User EXEC mode. (The `disable` command is not available in the User EXEC mode.)

Global configuration mode

In this mode, you can make basic configuration settings. In addition to this, you can also call up modes for the configuration of special interfaces or functions, for example to configure a VLAN or a C-PLUG. You change to this mode by entering `configure terminal` in the Privileged EXEC mode. To exit this mode, enter `end`.

Other configuration modes

From the Global configuration mode, you can change to other configuration modes for special tasks. These are either general configuration modes (for example line configuration, interface configuration) or protocol-specific configuration modes (SNTP, NTP).

2.3 Configuration limits

Configuration limits of the device

The following table lists the configuration limits for Web Based Management and the Command Line Interface of the device.

The usability of various functions depends on the device type you are using and whether or not a KEY-PLUG is inserted.

	Configurable function	Maximum number
System	DNS server	3
	Syslog server	3
	E-mail server	3
	SNMPv1 trap recipient	10
	SNTP server	2
	NTP server	3
	DHCP pools	24
	IPv4 addresses managed by the DHCP server (dynamic + static)	575
	Relay agent information for DHCP	5
	DHCP static assignments per DHCP pool	24
Layer 2	Virtual LANs (port-based; including VLAN 1)	257
	Protocol-based VLAN groups	12
	Protocol-based VLAN groups per port	12
	IPv4 subnet-based VLANs	150
	Private VLAN	1
	Primary PVLANS	1
	Secondary isolated PVLANS	24
	Secondary community PVLANS	256
	Multiple Spanning Tree instances	16
	Link aggregations or Etherchannels each with a maximum of 8 ports per aggregation	8
	Ports in a link aggregation	8
	Static MAC addresses in the Forward Database (FDB)	256
	Multicast addresses without active GMRP	512
	Multicast addresses with active GMRP	50
	VLANs whose data traffic can be mirrored to a monitor port	255
	RSPAN sessions	1
	Layer 3	IP interfaces
Entries in the hardware routing table		4096
Static routes		100
Possible routes to the same destination		8
DHCP Relay Agent interfaces		127
DHCP Relay Agent server		4

2.3 Configuration limits

	Configurable function	Maximum number
	NAT interfaces	5
	VRRP router interfaces (only VLAN interfaces)	52
	OSPF areas per device	5
	OSPFv2 area range entries per OSPF area (intra-area summary)	3
	OSPFv3 area range entries per OSPF area (intra-area summary)	10
	OSPF interfaces	40
	OSPF interfaces per OSPF area	40
	OSPF virtual links (within an autonomous system)	8
	OSPFv3 neighbors	300
	OSPFv3 neighbors per interface	8
	OSPFv3 routes	1500
	OSPFv2 interfaces authentication keys	200 (40 interfaces each with 5 keys)
	OSPFv2 virtual links authentication keys	40 (8 virtual links each with 5 keys)
	PIM components	1
	Rendezvous points	3
	Candidates for rendezvous points	3
	Static rendezvous points	3
Security	Roles	29
	Users	30 (incl. user preset in the factory "admin")
	Groups	32
	RADIUS Server	4
	Management ACLs (access rules for management)	10
	Rules for port ACL MAC	128
	Ingress and egress rules for port ACL MAC (total)	364
	Rules for port ACL IP	128
	Ingress and egress rules for port ACL IP (total)	364
	Rules for VLAN ACL IP	128

Note**Restriction of the number of rules**

If you change the following parameters for commands, port-linked comparators are necessary:

- `gt` (greater than)
- `lt` (less than)
- `range`

Per port, you can use 8 comparators for a transmission direction (ingress/egress).

The `range` parameter requires 2 comparators the parameters `gt` and `lt` each require one comparator.

The operator `eq` (equal) does not require any comparators.

2.4 The CLI command prompt

Overview

The Command Line Interface prompt shows the following information:

- The mode in which the CLI is currently operating.
Most commands can only be called in a particular mode. You should therefore check the CLI mode based on the command prompt.
 - User Exec mode: `CLI>`
 - Privileged Exec mode and configuration modes: `CLI(...)#`
- The selected interface when the CLI is in an Interface Configuration mode.
In the Interface Configuration mode, the parameters are configured for one specific interface. The command prompt is displayed in the form `CLI(config-if-$$$)#` where the placeholder `$$$` is replaced by the identifier of the Interface. You select the Interface by setting suitable parameters for the `interface` command.
- An identifier when the Trial mode is enabled.
If you first test changes to the configuration and then want to discard them, disable the Auto save function with the `no auto-save` command. You are then in Trial mode. Changes to the configuration that you have not saved are indicated by an asterisk in front of the command prompt: `*CLI(...)#`.
You save the changes to the configuration with the command `write startup-config`. With the `auto-save` command, you enable the Auto save function again.

Note

Upper and lower case

The Command Line Interface does not distinguish between upper case and lower case letters.

Make sure, however, that names used by the operating system or other programs are correctly written.

Blank

To use blanks in a text, enter the text in quotes, for example "H e l l o"

2.5 Symbols of the CLI commands

Symbols for representing CLI commands

When setting parameters for CLI commands, the following characters are used:

Character	Meaning	
< ... >	mandatory parameter	Instead of the expression in parenthesis, you must enter a value
[...]	optional parameter	Instead of the expression in parenthesis, you can enter a value
(...)	Value or range of values	Enter a value to replace the expression in parenthesis
(... - ...)	Range of values	Enter a value from this range
{ ... }	Selection list	Select one more elements from the list
{ }	exclusive selection	Select exactly one element from this list

These characters are used in combinations to describe mandatory and optional entries.

There is a general description of some of these combinations below:

Character combinations	Meaning
< variable >	Instead of the expression in parentheses<>, enter a permitted value
< variable (a - b) >	Instead of the expression in parentheses <>, enter a value from the range "a" to "b"
[< variable 1 >< variable 2 >]	The parameter pair is optional. If you use the parameter assignment, you need to enter a permitted value to replace both expressions in parenthesis <>
[keyword < variable (a - b)>]	The parameter assignment is optional. If you use the keyword, you need to enter a value from the range "a" to "b" to replace the expression in parenthesis <>
[keyword < variable (a - b) unit >]	The parameter assignment is optional. If you use the keyword, you need to enter a value from the range "a" to "b" to replace the expression in parenthesis <>. "Unit" is one of the variables and is also replaced by the entry.
[keyword { A B C }]	The parameter assignment is optional. If you use the keyword, you need to specify exactly one of the values "A", "B" or "C"
keyword { [A] [B] [C] }	After the keyword, enter one or more of the values "A", "B" or "C"

2.6 Interface identifiers and addresses

2.6.1 Naming interfaces

Addressing interfaces

The devices have several types of interface that are addressed in different ways.

Addressing physical interfaces

The following notation applies to all commands that address a physical interface:

- Enter the command "interface".
- Specify the interface type <interface-type>.
- After a space, enter the interface identifier, <interface-id>.

The interface identifier is made up of the module number and the port number separated by a slash.

You call a Gigabit Ethernet interface on the second port of module 1 with the following command: `interface gigabitethernet 1/2`

Addressing logical interfaces

The following notation applies to all commands that address a logical interface:

- Enter the command "interface".
- Enter the keyword for the logical interface.
 - port-channel (abbreviation: po)
 - vlan
- After a space, enter the number of the interface you assigned when you created it.
 - <port-channel-id(1-8)>
 - <vlan-id(1-4094)>

You call port channels as follows: `interface po 2`

You call VLAN ports as follows: `interface vlan 1`

Available physical interfaces

Available interface types

SCALANCE XM-400 and SCALANCE XR-500 support the following interface types:

interface-type	Abbreviation/acronym
<code>gigabitethernet</code>	<code>gi</code>
<code>extreme-ethernet</code>	<code>ex</code>

Note

If you use an MM900 media module with an optical interface, use `gigabitethernet` for the `interface-type` parameter. For further information on the media modules, refer to the compact operating instructions of the MM900 media modules for SCALANCE XR-500.

Available interface identifiers with SCALANCE XM-400

- Interfaces of the basic device

The interfaces of the basic device SCALANCE XM-400 are called module 1.

- Interfaces of extenders

The port extenders are called module 2 and module 3 starting from the basic device. The number of port extenders depends on the number of ports of the basic device.

Function extenders are module 0.

Available interface identifiers with SCALANCE XR-500

- Fixed interfaces

The interfaces permanently installed in the SCALANCE XR-500 are identified with module 0.

`cpu0`: Out of band interface

- Interfaces of modules

The slots for modules are called module 1 and the following numbers. The numbering range depends on the hardware configuration. The numbering is fixed and does not depend on the number of modules being used.

Each module has 4 ports numbered 1 to 4.

Available logical interfaces

- VLAN

The device supports up to 127 VLAN ports.

To be able to use a VLAN, create it with the `vlan` command.

- Aggregated links, aggregated ports, port channel, Etherchannel

These terms are used for the same function:

Several ports or connections between two devices are logically bundled together (aggregated) to achieve a higher data transmission rate and a lower failure risk.

The device supports 8 link aggregations or Etherchannels each with a maximum of 8 ports per aggregation.

To add an interface to an Etherchannel, use the `"channel-group"` command.

Combo ports

Combo port is the name for two communication ports. A combo port has the two following jacks:

- a fixed RJ-45 port
- an SFP transceiver slot that can be equipped individually

Of these two ports, only one can ever be active.

You can set the active port with the command `media-type`.

Identification of the interfaces in the command prompt of the Interface configuration mode

To configure the interface use the command `interface` in the global configuration mode.

Since you configure precisely one of the existing interfaces in the Interface configuration mode, the command prompt shows not only the mode but also the name of this interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

The placeholder `$$$` is replaced by the following name of the interface:

Type of interface	Command prompt
<code>cpu0</code>	<code>cli(config-if-cpu0)#</code>
<code>vlan</code>	<code>cli(config-if-vlan-\$)#</code>
<code>port-channel</code>	<code>cli(config-if-po-\$)#</code>
<code>gigabitethernet</code>	<code>cli(config-if-Gi\$-\$)#</code>
<code>extreme-ethernet</code>	<code>cli(config-if-Ex\$-\$)#</code>
<code>Router-Port</code>	<code>cli(config-RPort-Gi\$-\$)#</code>

The placeholders `$` or `-$` denote the numbering of the interface.

2.6.2 Address types, address ranges and address masks

Overview

Since the various types of addresses can be represented by different notations, the notations used in the Command Line Interface are shown below:

- IPv4 addresses

An IPv4 address consists of 4 bytes. Each byte is represented in decimal, with a dot separating it from the previous one, refer to the section "Structure of an IPv4 address (Page 48)"

Note

With leading zeros, the numbers are interpreted as octal numbers, e.g.: 192.168.070.071 → 192.168.56.57.

- IPv6 addresses

IPv6 addresses consist of 8 fields each with four-character hexadecimal numbers (128 bits in total). The fields are separated by a colon, refer to the section "Structure of an IPv6 address (Page 51)".
- Network masks

A network mask is a series of bits that describes the network part of an IPv4 address. The notation is normally decimal in keeping with the IPv4 address.
- Alternative notation for network masks

In contrast to the notation described above, network masks can also be represented as a number of 1 bits. The mask of the decimal representation 255.255.0.0 is then written as /16.
The syntax is then for example: <ipaddress> / 16
Note that there must be a space before and after the "/".
- MAC addresses
- In the syntax of the Command Line Interface, a MAC address is represented as a sequence of 6 bytes in hexadecimal format, in each case separated by a colon. The syntax is then, for example: aa:aa:aa:aa:aa:aa
- Multicast addresses

Layer 2 multicast addresses as used on this device use the notation of MAC addresses. For permitted address ranges, check the rules or ask your network administrator.

2.6.3 IPv4 / IPv6

What are the essential differences?

	IPv4	IPv6
IP configuration	<ul style="list-style-type: none"> • DHCP server • Manual 	<ul style="list-style-type: none"> • Automatic: <ul style="list-style-type: none"> – Creates a link local address for every interface on which IPv6 is activated. – Stateless Address Autoconfiguration (SLAAC): Stateless autoconfiguration using NDP (Neighbor Discovery Protocol) • Manual • Stateful DHCPv6
Available IP addresses	32-bit: $4, 29 * 10^9$ addresses	128-bit: $3, 4 * 10^{38}$ addresses
Address format	Decimal: 192.168.1.1 with port: 192.168.1.1:20	Hexadecimal: 2a00:ad80::0123 with port: [2a00:ad80::0123]:20
Loopback	127.0.0.1	::1

2.6 Interface identifiers and addresses

	IPv4	IPv6
IP addresses of the interface	4 IP addresses	Multiple IP addresses <ul style="list-style-type: none"> • LLA: A link local address (formed automatically) fe80::/128 per interface • ULA: Several unique local unicast addresses per interface • GUA: Several global unicast addresses per interface
Header	<ul style="list-style-type: none"> • Checksum • Variable length • Fragmentation in the header • No security 	<ul style="list-style-type: none"> • Checking at a higher layer • Fixed size • Fragmentation in the extension header
Fragmentation	Host and router	Only endpoint of the communication
Quality of service	Type of Service (ToS) for prioritization	The prioritization is specified in the header field "Traffic Class".
Types of frame	Broadcast, multicast, unicast	Multicast, unicast, anycast
Identification of DHCP clients/server	Client ID: MAC address	DUID + IAID(s) = exactly one interface of the host DUID = DHCP unique identifier Identifies server and clients uniquely and should not change, not even when replacing network components! IAID = Identity Association Identifier At least one per interface is generated by the client and remains unchanged when the DHCP client restarts Three methods of obtaining the DUID <ul style="list-style-type: none"> • DUID-LLT • DUID-EN • DUID-LL

	IPv4	IPv6
DHCP	via UDP with broadcast	<p>via UDP with unicast RFC 3315, RFC 3363</p> <p>Stateful DHCPv6 Status-dependent configuration in which the IPv6 address and the configuration settings are transferred. Four DHCPv6 messages are exchanged between client and server:</p> <ol style="list-style-type: none"> 1. SOLICIT: Sent by the DHCPv6 client to localize DHCPv6 servers. 2. ADVERTISE The available DHCPv6 servers reply to this. 3. REQUEST The DHCPv6 client requests an IPv6 address and the configuration settings from the DHCPv6 server. 4. REPLY The DHCPv6 server sends the IPv6 address and the configuration settings. <p>If the client and server support the function "Rapid commit" the procedure is shortened to two DHCPv6 messages SOLICIT and REPLY .</p> <p>Stateless autoconfiguration In stateless DHCPv6, only the configuration settings are transferred.</p> <p>Prefix delegation The DHCPv6 server delegates the distribution of IPv6 prefixes to the DHCPv6 client. The DHCPv6 client is also known as PD router.</p>
Resolution of IP addresses in hardware addresses	ARP (Address Resolution Protocol)	NDP (Neighbor Discovery Protocol)

2.6.4 Structure of an IPv4 address

Address classes

IPv4 address range	Max. number of networks	Max. number of hosts/network	Class	CIDR
1.x.x.x to 126.x.x.x	126	16777214	A	/8
128.0.x.x to 191.255.x.x	16383	65534	B	/16
192.0.0.x to 223.255.255.x	2097151	254	C	/24
224.0.0.0 - 239.255.255.255	Multicast applications		D	
240.0.0.0 - 255.255.255.255	Reserved for future applications		E	

IPv4 address format - notation

An IPv4 address consists of 4 bytes. Each byte is represented in decimal, with a dot separating it from the previous one.

XXX.XXX.XXX.XXX

XXX stands for a number between 0 and 255

The IPv4 address consists of two parts:

- The address of the (sub) network
- The address of the node (generally also called end node, host or network node)

Subnet mask

The subnet mask separates these two addresses. It decides which part of the IPv4 address addresses the network and which part of the IPv4 address addresses the node.

The set bits in the subnet mask decide the network part of the IPv4 address.

Example:

IPv4 address: 140.80.0.2

Subnet mask: 255.255.0.0 = 11111111.11111111.00000000.00000000

The first 2 bytes of the IPv4 address decide the subnet - therefore 140.80. The last two bytes address the node - therefore 0.2.

The following applies in general:

- The network address is obtained from ANDing the IPv4 address and subnet mask.
- The node address is obtained from AND NOT logic operation on the IPv4 address and subnet mask.

Outside the local area network, the distinction between network ID and host ID is of no significance, in this case packets are delivered based on the entire IPv4 address.

Relationship between the IPv4 address and default subnet mask

There is agreement in terms of the assignment of IP address ranges and so-called "default subnet masks".

The first decimal number of the IPv4 address (from the left) determines the structure of the default subnet mask with regard to the number of "1" values (binary) as follows:

IP address range	Class	Default subnet mask
1.x.x.x to 126.x.x.x	A	255.0.0.0
128.0.x.x to 191.255.x.x	B	255.255.0.0
192.0.0.x to 223.255.255.x	C	255.255.255.0

Note

In the bit representation of the subnet mask, the "ones" must be set left-justified; in other words, there must be no "zeros" between the "ones".

2.6.5 IPv6 terms

Network node

A network node is a device that is connected to one or more networks via one or more interfaces.

Router

A network node that forwards IPv6 packets.

Host

A network node that represents an end point for IPv6 communication relations.

Link

A link is, according to IPv6 terminology, a direct layer 3 connection within an IPv6 network.

Neighbor

A network node located on the same link as the network node.

IPv6 interface

Physical or logical interface on which IPv6 is activated.

Path MTU

Maximum permitted packet size on a path from a sender to a recipient.

Path MTU discovery

Mechanism for determining the maximum permitted packet size along the entire path from a sender to a recipient.

2.6 Interface identifiers and addresses

LLA

Link local address FE80::/10

As soon as IPv6 is activated on the interface, a link local address is formed automatically. Can only be reached by accounts located on the same link.

ULA

Unique Local Address

Defined in RFC 4193. Via this address, the IPv6 interface can be reached in the LAN.

GUA

Global Unicast Address Via this address, the IPv6 interface can be reached, e.g. via the Internet.

Interface ID

The interface ID is formed with the EUI-64 method or manually.

EUI-64

Extended Unique Identifier (RFC 4291); method for forming the interface ID. In Ethernet, the interface ID is formed from the MAC address of the interface. Divides the MAC address into the manufacturer-specific part (OUI) and the network-specific part (NIC) and inserts FFFE between the two parts.

Example:

MAC address = AA:BB:CC:DD:EE:FF

OUI = AA:BB:CC

NIC = DD:EE:FF

EUI-64 = OUI + FFFE + NIC = AA:BB:CC:FF:FE:DD:EE:FF

Scope

Defines the range of the IPv6 address.

2.6.6 Structure of an IPv6 address

IPv6 address format - notation

IPv6 addresses consist of 8 fields each with four-character hexadecimal numbers (128 bits in total). The fields are separated by a colon.

Example:

```
fd00:0000:0000:ffff:02d1:7d01:0000:8f21
```

Rules / simplifications:

- If one or more fields have the value 0, a shortened notation is possible.

The address `fd00:0000:0000:ffff:02d1:7d01:0000:8f21` can also be shortened and written as follows:

```
fd00::ffff:02d1:7d01:0000:8f21
```

To ensure uniqueness, this shortened form can only be used once within the entire address.

- Leading zeros within a field can be omitted.

The address `fd00:0000:0000:ffff:02d1:7d01:0000:8f21` can also be shortened and written as follows:

```
fd00::ffff:2d1:7d01:0000:8f21
```

- Decimal notation with periods

The last 2 fields or 4 bytes can be written in the normal decimal notation with periods.

Example: The IPv6 address `fd00::ffff.125.1.0.1` is equivalent to `fd00::ffff:7d01:1`

Structure of the IPv6 address

The IPv6 protocol distinguishes three types of address: Unicast, anycast and multicast. The following section describes the structure of the global unicast addresses.

IPv6 prefix		Suffix
Global prefix: n bits	Subnet ID m bits	Interface ID 128 - n - m bits
Assigned address range	Description of the location, also subnet prefix or subnet	Unique assignment of the host in the network. The ID is generated from the MAC address.

The prefix for the link local address is always `fe80:0000:0000:0000`. The prefix is shortened and noted as follows: `fe80::`

IPv6 prefix

Specified in: RFC 4291

The IPv6 prefix represents the subnet identifier.

Prefixes and IPv6 addresses are specified in the same way as with the CIDR notation (Classless Inter-Domain Routing) for IPv4.

Design

IPv6 address / prefix length

Example

IPv6 address: 2001:0db8:1234::1111/48

Prefix: 2001:0db8:1234::/48

Interface ID: ::1111

Entry and appearance

The entry of IPv6 addresses is possible in the notations described above. IPv6 addresses are always shown in the hexadecimal notation.

2.7 General CLI commands

This section describes commands that you can call up in any mode.

2.7.1 clear screen

Description

With this command, you clear the screen.

The command prompt is displayed.

Syntax

Call the command without parameters:

```
clear screen
```

Result

The screen is cleared.

The command prompt is displayed.

2.7.2 end

Description

With this command, you exit the configuration mode and are then in the Privileged EXEC mode.

Requirement

You are in a configuration mode.

Syntax

Call the command without parameters:

```
end
```

Result

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

2.7.3 exit

Description

With this command, you close the current mode.

Syntax

Call the command without parameters:

```
exit
```

Result

The current mode was exited. You are then at the next higher level.

If you are in Privileged EXEC Modus or in User EXEC Modus mode, you will be logged out.

2.7.4 do

Description

With this command, you can execute the commands from the Privileged EXEC mode in any configuration mode.

Syntax

Call up the command with the following parameters:

```
do [command ]
```

To do this, you replace [command] with the command from the Privileged EXEC mode that you want to execute.

Example

You are in the Interface configuration mode and you want to execute the `write startup-config` command from the Privileged EXEC mode.

```
cli(config-if-$$)# do write startup-config
```

Result

The command from the Privileged EXEC mode will be executed.

2.7.5 Help functions and supported input

The Command Line Interface provides various functions that are helpful when making entries in the command line:

- `help`
- `?`
- Command completion with the tab key
- Automatic completion of incomplete commands
- Paging in the list of most recently used commands
- Display of the list of most recently used commands (`show history`)

2.7.5.1 help

Description

With this command, you display the help entry for a command or the command list.

Syntax

Call up help with the following parameters:

```
help [command]
```

Here, you replace `[command]` with the command for which you require help.

If the command for which you require help consists of several words, enter these words without spaces.

Result

The syntax of the command is displayed.

Syntax

If you call up help without parameters, you will obtain a list of all permitted commands in the current mode:

```
help
```

Result

The mode-specific as well as the global commands are displayed.

Note

Incomplete command names

If you have specified an incomplete command when calling help, a list of all commands that start with the term you have entered is created.

2.7.5.2 The command "?"

Description

With this command, you call up the command list.

Syntax

Enter a question mark to obtain a list of all permitted commands in the current mode:

?

For this command, you do not need to press the enter key. The command executes immediately after you type the character.

Result

The mode-specific as well as the global commands are displayed.

Note

Incomplete command names

If you have specified an incomplete command when calling the help function, a list of all commands that start with the term you have entered is created.

Note

Output in pages

With long lists, the results are displayed as pages. If `-- more --` appears at the lower edge of the display, you can move to the next page with the spacebar. If the display is in pages, you cannot page back. You exit the page display with the `q` key.

2.7.5.3 Completion of command entries

Description

The command interpreter of the Command Line Interface supports you when you enter commands.

As soon as the first characters of the command have been entered in the input line, the system can complete the entry as long as the character string is unambiguous.

This can be repeated after entering further characters.

Procedure

Enter the first characters of the command.

Press the tab key.

Result

The command interpreter completes the input as long as the command is unambiguous.

If you enter a character string that cannot be completed to form a command, an error message is displayed.

- The command is not unique: % Ambiguous Command
- The command is unknown: % Invalid Command
- The command is incomplete: % Incomplete command

If the entry is not yet complete, enter further characters.

With `?`, you obtain a list of the possible commands.

Repeat this if necessary until the command is complete and can execute.

2.7.5.4 Abbreviated notation of commands

Description

The command interpreter of the Command Line Interface also detects commands if only the first character of the command or its parts is entered.

This is only possible if all the parts of the abbreviated input can be assigned to exactly one command or to the parts of the command.

Example

The `show event config` command can be replaced by the expression `sh e c`.

2.7.5.5 Reusing the last used commands

Description

The Command Line Interface saves the last 14 commands used in a list assigned to the particular mode. This can then only be called up in the relevant mode.

Example:

In the Global Configuration mode, all entered commands are saved. If you entered commands earlier in the Interface Configuration mode, these commands are not included in the list of the Global Configuration mode. You can only call up and reuse these commands in the Interface Configuration mode.

Procedure

You can page through the list of the commands most recently used using the arrow up and arrow down keys.

If the command you are looking for is displayed, you can edit the command line as required and execute the command with the enter key.

Further notes

You display the list of commands last used with the `show history` command. This function is available in every mode.

2.7.5.6 Working through a command sequence

Separators for multiple commands in one line

You can call up several commands one after the other in one line in the CLI.

Separate the commands with a semicolon (;).

After completing your input, start the processing of this command sequence with the enter key.

Example

The command sequence

```
CLI#conf t; int vlan 1; no ip address dhcp; ip address 192.168.1.1 255.255.255.0;
end; write startup
```

has the same effect as:

```
CLI#conf t
CLI(config)#int vlan 1
CLI(config-if-vlan-1)#no ip address dhcp
CLI(config-if-vlan-1)#ip address 192.168.1.1 255.255.255.0
CLI(config-if-vlan-1)#end
CLI#write startup
```

2.7.5.7 show history

Description

This command shows the last 14 commands you entered.

The commands are listed in the order in which they were called up. The `show history` command is listed as the last command to be entered.

The list depends on the mode. In the Global configuration mode, the last 14 commands entered in this mode are displayed. These commands are not included in the list of the Interface configuration mode.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show history
```

Result

The list of used commands is displayed.

2.7.5.8 clear history**Description**

This command deletes the last commands you entered.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
clear history
```

Result

The last commands to be input are deleted.

You display a list of the last 14 commands entered with the `show history` command.

Description

2.7 General CLI commands

Configuration

The following is described in this section:

- System settings
- Saving and loading configurations and firmware

3.1 System

This section describes commands with which general system properties can be displayed and configured.

3.1.1 The "show" commands

This section describes commands with which you display various settings.

3.1.1.1 show broadcast-block config

Description

This command shows the broadcast blocking settings for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show broadcast-block config [port <interface-type> <interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The broadcast blocking settings for ports are displayed.

3.1.1.2 **show cli-console-timeout**

Description

This command shows the global configuration for the timeout of the CLI console.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show cli-console-timeout
```

Result

The configuration for the timeout is displayed.

3.1.1.3 **show coordinates**

Description

This command shows the system coordinates.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show coordinates
```

Result

The system coordinates are displayed.

3.1.1.4 show device information**Description**

This command shows information about the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show device information
```

Result

The information about the device is displayed.

3.1.1.5 show environmental temperature**Description**

This command shows the temperature values of internal and external modules of the device. The modules are only shown if they make temperature information available.

If the temperature value falls below or exceeds the displayed threshold values, the status changes accordingly. With the `event config` command, you can configure that you are informed of the status change by a message.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
show environmental temperature
```

Result

The temperature values are displayed.

3.1.1.6 show ethernetip

Description

This command shows the current EtherNet/IP configuration.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ethernetip
```

Result

The current EtherNet/IP configuration is displayed.

3.1.1.7 show hardware

Description

This command shows the type and number as well as the position of the installed interface cards of the system.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show hardware
```


Result

The table of interface cards is displayed.

The slot ID, the status and the type or name of the card is listed.

3.1.1.8 show interface mtu

Description

With this command, you show the setting for the Maximum Transmission Unit (MTU) of the outgoing management frames (egress).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show interface mtu [{vlan<vlan-id(1-4094)>|
                    port-channel<port-channel-id(1-8)>|
                    <interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
interface-type	Type of interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all interfaces are displayed.

Result

The settings for the MTU of the outgoing management frames are displayed.

3.1.1.9 show interfaces

Description

This command shows the status and the configuration of one, several or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show interfaces
  [(
    [<interface-type><interface-id>]
    [{description|stormcontrol|flowcontrol|status}]
    |
    {vlan<vlan-id(1-4094)>}
    |
    port-channel<port-channel-id(1-8)>}
  |
  private-vlan mapping
  ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
description	Shows the description of the interface	-
stormcontrol	Shows the storm control settings	-
flowcontrol	Shows the flow control settings	-
status	Shows the status of the interface.	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
private-vlan mapping	Shows from which secondary PVLANS the IP interface of the primary PVLAN is reachable.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the status and configuration of all available interfaces will be displayed.

Result

The status and the configuration of the selected interfaces are displayed.

3.1.1.10 show interfaces ... counters

Description

This command shows the counters of one, several or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show interfaces
    [{<interface-type><interface-id>|{vlan<vlan-id(1-4094)>}}]counters
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available counters.

Result

The counters of the selected interfaces are displayed.

3.1.1.11 show ip interface

Description

This command shows the configuration of one, several or all IPv4 interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

cli> or cli#

Syntax

Call up the command with the following parameters:

```
show ip interface [Vlan<vlan-id(1-4094)>]
                  [<interface-type><interface-id>]
                  [loopback<loopback-id(0)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
loopback	Keyword for a loopback	-
loopback-id	Number of the addressed loopback	0

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the configuration is displayed for all available IPv4 interfaces.

Result

The configuration of the selected IPv4 interface is displayed.

3.1.1.12 show ipv6 interface

Description

This command shows the configuration of one, several or all IPv6 interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

cli> or cli#

Syntax

Call up the command with the following parameters:

```
show ipv6 interface [{vlan <id> | <interface-type> <interface-id>} [prefix]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	
prefix	shows the prefix information of the IPv6 interface	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the configuration is displayed for all available IPv6 interfaces.

Result

The configuration is displayed.

Further notes

You enable IPv6 on the VLAN interface or on the router port with the `ipv6 enable` command.

You configure an IPv6 address with the `ipv6 address` command.

3.1.1.13 show multicast-block config

Description

This command shows the multicast blocking settings for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show multicast-block config [port <interface-type> <interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port description	-
interface-type	Type of interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all ports are displayed.

Result

The multicast blocking settings for ports are displayed.

3.1.1.14 show pnio

Description

This command shows the current PROFINET configuration.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

This `cli>` or `cli#`

Syntax

Call the command without parameters:

```
show pnio
```

Result

The current PROFINET configuration is displayed.

3.1.1.15 show traceroute

Description

This command shows the route via which the packet comes to the requested IP address-

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show traceroute {ip | ipv6 }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	The destination is an IPv4 address	-
ipv6	The destination is an IPv6 address	-

Result

The route is displayed.

Further notes

You enable the following of the route with the `traceroute` command.

3.1.1.16 show unicast-block config

Description

This command shows the unicast blocking settings for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show unicast-block config [port <interface-type> <interface-id>]
```

3.1 System

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of interfaces and addresses, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The unicast blocking settings for ports are displayed.

3.1.1.17 show usage

Description

With this command, you display the CPU and RAM usage as a percentage.

If the usage falls below or exceeds the displayed threshold values, the status changes accordingly. With the `event config` command, you can configure that you are informed of the status change by a message.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show usage [{cpu|ram}]
```

The parameters have the following meaning:

Parameter	Description	Range of values/note
cpu	Display of the CPU usage and threshold values	-
ram	Display of the RAM usage and threshold values	-

If you do not specify any parameters, the usage of CPU and RAM is displayed.

Result

The information is displayed.

3.1.1.18 show versions

Description

This command shows the version information of the entire system.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show versions
```

Result

The version information of the entire system is displayed.

3.1.2 clear counters

Description

With this command, you reset the counters of an interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
clear counters [<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the counters for all interfaces are reset.

Result

The counters of the interface are reset.

Further notes

You can display the statistical information of the interfaces with the `show interfaces - counters` command.

3.1.3 clear line vty

Description

With this command, you close a console session on the device.

With the `forceful-clear` option, you close a session and that is not reacting.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
clear line vty {<line-number(2-9)>|all}[forceful-clear]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
line-number	Number of the connection that will be terminated	2 ... 9
all	terminates all connections	-
forceful-clear	closes a session that is not reacting	-

Result

The console session is closed.

Further notes

You show the logged-on users with the `show users` command.

3.1.4 **configure terminal**

Description

With this command, you change to the Global configuration mode.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
configure terminal
```

Result

You are now in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Further notes

You exit the Global configuration mode with the `end` command.

3.1.5 **disable**

With the commands `enable` and `disable` you temporarily change the function rights of the logged in user, the login data remains unchanged.

Description

With this command, you close the Privileged EXEC mode.

You are then in the User EXEC mode.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
disable
```

Result

You are in the User EXEC mode.

The command prompt is as follows:

```
cli>
```

3.1.6 enable

With the commands `enable` and `disable` you temporarily change the function rights of the logged in user, the login data remains unchanged.

Description

With this command, you change to the Privileged EXEC mode.

Requirement

You are in the User EXEC mode.

The command prompt is as follows:

```
cli>
```

Syntax

Call the command without parameters:

```
enable
```

Result

You are prompted to enter the administrator password. After logging in successfully, you are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

3.1.7 lock

Description

With this command, you lock the console.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
lock
```

Result

The console is locked. The system expects the entry of the password.

Further notes

You cancel the lock by entering the Login password.

3.1.8 logout

Description

With this command, you exit the Command Line Interface.

If you are connected to the device via telnet, the session is closed.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
logout
```

Result

The CLI session is ended and the Windows Login prompt is displayed.

3.1.9 ping

Description

With this command, you request a response from a device in the network.

This allows you to check whether or not another node is reachable.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

cli> or cli#

Syntax

Call up the command with the following parameters:

```
ping [ip]<destination-address>
      [size<byte (0-2080)>]
      [count<packet_count (1-10)>]
      [timeout<seconds (1-100)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Uses an IPv4 address	-
destination-address	Address of the called node	Enter a valid IPv4 address or a valid host name.
size	Keyword for the size of the packets to be transferred	-
byte	Keyword for the size of the packets in bytes	0 ... 2080 Default: 32
count	Keyword for the number of packets to be requested	-
packet_count	Number of packets	1 ... 10 Default: 3
timeout	Response wait time If this time expires, the request is reported as "timed out".	-
seconds	Time to the timeout in seconds	1 ... 100 Default: 1

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default values are used.

Result

The messages relating to the response of the called node are displayed.

3.1.10 ping ipv6

Description

With this command, you request a response from a device in the network. This allows you to check whether or not another node is reachable.

Requirement

- IPv6 is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
ping ipv6 <prefix%interface>
  [repeat <count>]
  [size <value>]
  [anycast]
  [source {vlan <id> | <source_prefix>}]
  [timeout <value (1-100)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
prefix	IPv6 address of the destination	Enter a valid IPv6 address.
%interface	optional parameter Only necessary when the IPv6 address of the destination is a link-local address.	Specify the interface via which the packet will be sent.
repeat	Keyword for the number of packets to be requested	-
count	Number of packets	1 ... 10 Default: 5

Parameter	Description	Range of values / note
size	Keyword for the size of the packets to be transferred	-
value	Packet size	0 ... 2080 bytes Default: 100
anycast	Addressing mode anycast	-
source	Keyword for the sender interface <ul style="list-style-type: none"> • VLAN • source_prefix 	-
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
source_prefix	Prefix of the sender	-
timeout	Response wait time If this time expires, the request is reported as "timed out".	-
value	Time until timeout	1 ... 100 s Default: 5

Result

The messages relating to the response of the called node are displayed.

3.1.11 traceroute

Description

With this command you enable the following of the route via which the packet comes to the requested IP address.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
traceroute {ip <ip-address> | ipv6 <ip6-address>}
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Keyword for an IPv4 address	-
ip-address	IPv4 address of the destination	Enter a valid IPv4 address.
ipv6	Keyword for an IPv6 address	-
ip6-address	IPv6 address of the destination	Enter a valid IPv6 address.

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The tracing of the route is activated.

Further notes

You display the route with the `show traceroute` command.

3.1.12 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

3.1.12.1 cli-console-timeout

Description

With this command, you enable the automatic logout and you configure the timeout setting for the CLI.

Note

No automatic logout from the CLI

If the connection is not terminated after the set time, check the setting of the "keepalive" function on the Telnet client. If the set interval is shorter than the configured time, the lower value applies. You have set, for example, 300 seconds for the automatic logout and 120 seconds for the "keepalive" function. In this case, a packet is sent every 120 seconds that keeps the connection up.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
cli-console-timeout [seconds(60-600)]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
seconds	Time in seconds until automatic logout after the last entry	60 ... 600 Default: 300

Result

The time is configured and automatic logout is enabled.

Further notes

You disable automatic logout with the `no cli-console-timeout` command.

You display the current timeout setting with the `show cli-console-timeout` command.

3.1.12.2 no cli-console-timeout

Description

With this command, you disable the automatic logout.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no cli-console-timeout
```

Result

Automatic logout is disabled.

Further notes

You enable automatic logout with the `cli-console-timeout` command.

You display the current timeout setting with the `show cli-console-timeout` command.

3.1.12.3 coordinates height

Description

With this command, you enter a height coordinate.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
coordinates height <meter>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
meter	Input box for the height coordinate	max. 32 characters To use spaces in the entry, enter the height coordinate in quotes: <code>coordinates height "123 456"</code>

Result

The height coordinate is created.

3.1.12.4 coordinates latitude

Description

With this command, you enter a latitude coordinate.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
coordinates latitude <latitude>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
latitude	Input box for the latitude coordinate	max. 32 characters To use spaces in the entry, enter the latitude coordinate in quotes: coordinates latitude "123 456"

Result

The latitude coordinate is created.

3.1.12.5 coordinates longitude

Description

With this command, you enter a longitude coordinate.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
coordinates longitude <longitude>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
longitude	Input box for the longitude coordinate	max. 32 characters To use spaces in the entry, enter the longitude coordinate in quotes: <code>coordinates longitude "123 456"</code>

Result

The longitude coordinate is created.

3.1.12.6 ethernetip

Description

With this command, you set whether EtherNet/IP will be enabled or disabled after the next device restart.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
ethernetip {off|on}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
off	EtherNet/IP will be disabled after the next restart.	-
on	EtherNet/IP will be enabled after the next restart.	<ul style="list-style-type: none"> When EtherNet/IP is turned on, PROFINET is turned off. The switchover from EtherNet/IP and PROFINET has no effect on DCP. If a PROFINET connection is established; in other words the PROFINET AR status is "Online", you cannot enable EtherNet/IP.

Result

EtherNet/IP is enabled or disabled after the next restart.

Further notes

You can display the current Ethernet/IP configuration with the `show ethernetip` command.

You restore the default settings of the Ethernet/IP profile with the `restart` command.

3.1.12.7 interface

Description

With this command, you change to the Interface configuration mode.

There you can edit the settings for one interface. You select the interface with the parameters of this command. If you specify a logical interface that does not exist, it will be created. The name of the selected interface is displayed in the command prompt.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
interface(cpu0|vlan<vlan-id(1-4094)>|port-channel<port-channel-id(1-8)>|
<interface-type><interface-id>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
cpu0	The configuration mode for the "Out of Band Management interface" is called up	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

The placeholder \$\$\$ is replaced by the following name of the interface:

Type of interface	Command prompt
cpu0	cli(config-if-cpu0)#
vlan	cli(config-if-vlan-\$)#
port-channel	cli(config-if-po-\$)#
gigabitethernet	cli(config-if-Gi\$-\$)#
extreme-ethernet	cli(config-if-Ex\$-\$)#

The placeholders \$ or \$-\$ denote the numbering of the interface.

The ranges of values for the logical interfaces VLAN and port channel can be found in the table above. You can only call up interfaces that you created with the `vlan` or `channel-group` command.

The ranges of values from the physical interfaces depend on the hardware configuration.

Further notes

You exit the Interface configuration mode with the `end` or `exit` command.

You delete a logical interface with the `no interface` command.

You display the status and the configuration of the interfaces with the `show interfaces` command.

3.1.12.8 no interface

Description

With this command, you delete a logical interface.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no interface{vlan<vlan-id(1-4094)>|port-channel<port-channel-id(1-8)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

Result

The logical interface is deleted.

Further notes

You configure an interface with the `interface` command.

You display the status and the configuration of the interfaces with the `show interfaces` command.

3.1.12.9 pno

Description

With this command, you configure the setting for PROFINET after the next restart of the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
pno {off|on}
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>off</code>	PROFINET is disabled.	If a PROFINET connection is established; in other words the PROFINET AR status is "Online", you cannot disable PROFINET.
<code>on</code>	PROFINET is activated.	When PROFINET is turned on, EtherNet/IP is turned off. The switchover from PROFINET and EtherNet/IP has no effect on DCP.

Result

PROFINET is enabled or disabled after the next restart.

Further notes

You display the current PROFINET configuration with the `show pnie` command.

You restore the default settings of the PROFINET profile with the `restart` command.

3.1.12.10 system contact

Description

With this command, you enter contact information for the system.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
system contact <contact info>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<code>contact info</code>	Input box for contact information	max. 255 characters

Result

The contact information is created in the system.

3.1.12.11 system location

Description

With this command, you enter the location information for the system.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
system location <location name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
location name	Input box for the location information	max. 255 characters

Result

The location information is created in the system.

3.1.12.12 system name

Description

This command, you enter a name for the system.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
system name <system name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
system name	Input box for the name	max. 255 characters

Result

The name is created in the system.

3.1.12.13 username

Description

With this command, you change the password of the factory set default user "admin".

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
username {admin} password <passwd>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
admin	User name of the default user with read and write access to the configuration data.	-
password	Keyword for a password	-
passwd	Value for the password	Enter the password. The strength of the password depends on the set password policy: <ul style="list-style-type: none"> • low: Password length: at least 6 characters • high: The password must meet the following conditions: <ul style="list-style-type: none"> – Password length: at least 8 characters – at least 1 uppercase letter – at least 1 special character – at least 1 number

Result

The password is changed.

Note

Changing the password in Trial mode

Even if you change the password in Trial mode, this change is saved immediately.

Further notes

You show the created users with the `show user-accounts` command.

You can also change the passwords with the `user-account` command.

You display the currently valid password policy with the `show password-policy` command.

3.1.13 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

3.1.13.1 alias

Description

With this command, you assign a name to an interface. The name only provides information and has no effect on the configuration.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
alias <interface-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
interface-name	Name of the interface	max. 63 characters

Result

The interface was assigned a name.

Further notes

You delete the name of the interface with the `no alias` command.

3.1.13.2 no alias

Description

With this command, you delete the name of the interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no alias
```

Result

The name of the interface is removed.

Further notes

You configure the name of the interface with the `alias` command.

3.1.13.3 broadcast-block

Description

With this command, you enable the blocking of broadcast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
broadcast-block
```

Result

Broadcast frames are blocked.

Further notes

You disable the blocking of broadcast frames with the `no broadcast-block` command.

3.1.13.4 no broadcast-block

Description

With this command, you disable the blocking of broadcast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no broadcast-block
```

Result

The blocking of broadcast frames is disabled.

Further notes

You enable the blocking of broadcast frames with the `broadcast-block` command.

3.1.13.5 duplex

Description

Electrical interfaces can be operated in full duplex mode or half duplex mode. The options here depend on the connected device.

Optical connections are always operated in full duplex mode since they have a fiber for each transmission direction.

With this command, you configure the duplex mode of an interface. The same mode must be set for connected interfaces.

Requirement

- Autonegotiation is disabled.
- You are in the Interface configuration mode of an electrical interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
duplex {full|half}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
full	The Interface will be operated in full duplex mode.	Default: full
half	The Interface will be operated in half duplex mode	-

Result

The duplex mode of the interface is configured.

Further notes

You can reset the duplex mode of the Interface to the default value with the `no duplex` command.

You disable autonegotiation with the `no negotiation` command.

3.1.13.6 no duplex

Description

With this command, you reset the duplex mode of an interface to the default value.

The default value is `full`.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no duplex
```

Result

The duplex mode of the Interface is reset to the default value.

Further notes

You configure the duplex mode of the interface with the `duplex` command.

3.1.13.7 lldp

Description

With this command, you enable the sending and receipt of LLDP packets on the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```


Syntax

Call up the command with the following parameters:

```
lldp{transmit|receive}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
transmit	The sending of LLDP packets is enabled.	Default: enabled
receive	The receipt of LLDP packets is enabled.	Default: enabled

Note

Enabling both options

When you call this command, you can only select one option.

If you want to enable both options, call up the command again.

Result

Sending or receipt of LLDP packets is enabled.

Further notes

You disable the sending or receipt of LLDP packets with the `no lldp` command.

3.1.13.8 no lldp

Description

With this command, you disable the sending or receipt of LLDP packets on the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no lldp{transmit|receive}
```

The parameters have the following meaning:

Parameter	Description
transmit	the sending of LLDP packets is disabled
receive	the receipt of LLDP packets is disabled

Note

Disabling both options

When you call this command, you can only select one option.

If you want to disable both options, call up the command again.

Result

Sending or receipt of LLDP packets is disabled.

Further notes

You enable the sending or receipt of LLDP packets with the `lldp` command.

3.1.13.9 media type

Description

With this command, you configure the mode of a combo port.

Note

This command only influences combo ports.

If you attempt to configure a different port with this command, an error message will be displayed.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
media-type {auto|rj45|sfp}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>auto</code>	The <code>auto</code> mode is enabled for the combo port. In this mode, the SFP transceiver port has priority. As soon as an SFP transceiver is plugged in, an existing connection at the fixed RJ-45 port is terminated. If no SFP transceiver is plugged in, a connection can be established via the fixed RJ-45 port.	Default: <code>auto</code>
<code>rj45</code>	The <code>rj45</code> mode is enabled for the combo port. In this mode, the fixed RJ-45 port is used independent of the SFP transceiver port. If an SFP transceiver is plugged in, it is disabled and the power turned off.	-
<code>sfp</code>	The <code>sfp</code> mode is enabled for the combo port. In this mode, the SFP transceiver port is used independent of the fixed RJ-45 port. If an RJ-45 connection is established, it is terminated because the power of the RJ-45 port is turned off.	-

Result

The mode of the combo port is configured.

Further notes

You display the mode of a combo port with the command `show interface` and the parameter `description`.

3.1.13.10 `mtu`

Description

With this command, you configure the size of the Maximum Transmission Unit (MTU) for an interface.

Requirement

- The Interface must be shut down.
- You are in the Interface configuration mode.
- The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
mtu <frame-size(64-9216)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
frame-size	Size of the MTU in bytes	64 ... 9216 Default: 1514

Result

The setting for the size of the MTU is configured.

Further notes

You can shut down the interface with the `shutdown` command.

You display this setting with the `show interface mtu` command.

You display this setting and other information with the `show interfaces` command.

3.1.13.11 multicast-block

Description

With this command, you enable the blocking of multicast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
multicast-block
```

Result

Multicast frames are blocked.

Further notes

You disable the blocking of multicast frames with the `no multicast-block` command.

3.1.13.12 `no multicast-block`

Description

With this command, you disable the blocking of multicast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no multicast-block
```

Result

The blocking of multicast frames is disabled.

Further notes

You enable the blocking of multicast frames with the `multicast-block` command.

3.1.13.13 `negotiation`

Description

With this command, you enable autonegotiation of connection parameters on an interface. Autonegotiation must be set for every interface of connected interfaces.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
negotiation
```

Result

The automatic negotiation of connection parameters on an interface is activated.

Further notes

You disable the autonegotiation of connection parameters with the `no negotiation` command.

3.1.13.14 no negotiation

Description

With this command, you disable autonegotiation of connection parameters on an interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no negotiation
```

Result

The automatic negotiation of connection parameters on an interface is deactivated.

Further notes

You enable the autonegotiation of connection parameters with the `negotiation` command.

3.1.13.15 router-advertisement-block

Description

With this command, you prevent Router Advertisements (RA) being received at a port.

Requirement

- The interface is an IPv6 interface.
 - You are in the Interface configuration mode.
- The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
router-advertisement-block
```

Result

The port discards RAs.

Further notes

Can you allow reception of RAs with the `no router-advertisement-block` command.

3.1.13.16 no router-advertisement-block

Description

With this command, you allow Router Advertisements (RA) being received at a port.

Requirement

- The interface is an IPv6 interface.
 - You are in the Interface configuration mode.
- The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no router-advertisement-block
```

Result

The port receives RAs.

Further notes

Can you prevent reception of RAs with the `router-advertisement-block` command.

3.1.13.17 shutdown

Description

With this command, you shut down the interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
shutdown
```

Result

The Interface is shut down. A connection continues to be indicated if a switch port is turned off. The LED for the port status flashes 3 times cyclically. However no data is sent or received.

Further notes

You activate the interface with the `no shutdown` command.

You can display the status of this function and other information with the `show interfaces` command.

3.1.13.18 no shutdown

Description

With this command, you shut down an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```


Syntax

Call the command without parameters:

```
no shutdown
```

Result

The Interface is activated.

Further notes

You deactivate the interface with the `shutdown` command.

You can display the status of this function and other information with the `show interfaces` command.

3.1.13.19 speed

Description

With this command, you configure the transmission speed of an interface.

The transmission speed can only be configured for electrical data transfer. On optical connections, the transmission speed is fixed.

Requirement

- Autonegotiation is disabled.
- You are in the Interface configuration mode of an electrical interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
speed {10|100|1000}
```

The parameters have the following meaning:

Parameter	Description
10	Transmission speed 10 Mbps
100	Transmission speed 100 Mbps
1000	Transmission speed 1000 Mbps

Result

The transmission speed of the interface is configured.

Further notes

You disable autonegotiation with the `no negotiation` command.

3.1.13.20 switchport

Description

With this command, you configure the interface as a switch port.

Requirement

- The Interface is shut down.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
switchport
```

Result

The interface is configured as a switch port. Activate the interface again.

Further notes

You shut down the interface with the `shutdown` command.

You activate the interface with the `no shutdown` command.

You configure the interface with the `no switchport` command.

You can display the status of this function and other information with the `show ip interface` command.

3.1.13.21 no switchport

Description

With this command, you configure the interface as a router port. This disables all switching and layer 2 functions. The router port is also called an IP interface.

Requirement

- The interface is disabled with the `shutdown` command.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport
```

Result

The interface is configured as a router port.

The command prompt is as follows:

```
cli(config-if_RPort-Gi$$$)#
```

Activate the interface again with the `no shutdown` command.

Further notes

You shut down the interface with the `shutdown` command.

You activate the interface with the `no shutdown` command.

You configure the interface as a switch port with the `switchport` command.

You can display the status of this function and other information with the `show ip interface` command.

3.1.13.22 unicast-block

Description

With this command, you enable the blocking of unknown unicast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
unicast-block
```

Result

Unicast frames are blocked.

Further notes

You disable the blocking of unicast frames with the `no unicast-block` command.

You display the status of this function with `show unicast-block config`.

3.1.13.23 no unicast-block

Description

With this command, you disable the blocking of unknown unicast frames on an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no unicast-block
```

Result

The blocking of unicast frames is disabled.

Further notes

You enable the blocking of unicast frames with the `unicast-block` command.

You display the status of this function with `show unicast-block config`.

3.2 Load and Save

This section describes commands for displaying, copying, saving and downloading files for the device.

Note

Note that during the installation of a previous version, the configuration data can be lost. In this case, the device starts up with the factory configuration settings after the firmware has been installed.

Overview of the file types

File type	Description
Config	This file contains the start configuration. Among other things, this device contains the definitions of the users, roles, groups and function rights. The passwords are stored the file "Users".
ConfigPack	Detailed configuration information. for example, start configuration, users, certificates ZIP file consisting of the Config, Users and LSYS file.
Debug	This file contains information for Siemens Support. It is encrypted and can be sent by e-mail to Siemens Support without any security risk.
EDS	Electronic Data Sheet (EDS) Electronic data sheets for describing devices in the EtherNet/IP mode
Firmware	The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.
GSDML	PROFINET information on the device properties
HTTPSCert	Default HTTPS certificates including key The preset and automatically created HTTPS certificates are self-signed. We strongly recommend that you create your own HTTPS certificates and make them available. We recommend that you use HTTPS certificates signed either by a reliable external or by an internal certification authority. The HTTPS certificate checks the identity of the device and controls the encrypted data exchange. Certificates with a different format cannot be copied in.
LogFile	File with entries from the event log table
MIB	Private MSPS MIB file
RunningCLI	Text file with CLI commands This file contains an overview of the current configuration in the form of CLI commands. You can download the text file. The file is not intended to be uploaded again unchanged.
Script	Text file with CLI commands You can upload a script file in a device. The CLI commands it contains are executed appropriately.

File type	Description
StartupInfo	Startup log file This file contains the messages that were entered in the log during the last startup.
Users	This file contains the assignment of the user names to the corresponding passwords.
WBMFav	WBM favorite pages This file contains the favorites that you created in the WBM.. You can download this file and upload it in other devices.

3.2.1 The "show" commands

This section describes commands with which you display various settings.

3.2.1.1 show loadsave files

Description

This command shows the current Load&Save file information.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show loadsave files
```

Result

The current Load&Save file information is displayed.

3.2.1.2 show loadsave tftp

Description

This command shows the current configuration of the TFTP server for Load&Save.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show loadsave tftp
```

Result

The current configuration of the TFTP server for Load&Save is displayed.

3.2.2 load tftp

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Description

With this command, you load the files from a TFTP server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
load tftp {ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr>} [port <tcp port (1-65535)>] file <filename> filetype <filetype>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	
ucast_addr	IPv4 unicast address of the TFTP server	Enter a valid unicast IPv4 address.

Parameter	Description	Range of values / note
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name) of the TFTP server	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the TFTP server	Enter a valid unicast IPv6 address.
port	Keyword for the port of the server via which the TFTP connection runs	-
tcp port	Number of the port	1 ... 65535
file	Keyword for a file name to be assigned	-
filename	Name of the file	Maximum of 100 characters
filetype	Keyword for the file type to be loaded	-
filetype	Name of the file type	Maximum of 100 characters

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

For information on the file types , refer to this list (Page 109).

Result

The file is loaded on the device from the TFTP server.

3.2.3 save filetype

Description

With this command, you save files on a TFTP server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
save filetype <filetype> tftp {ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr>} [port <tcpport (1-65535)>] file <filename>
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
filetype	Keyword for a file type to be loaded	-
filetype	Name of the file type	Maximum of 100 characters
tftp	Keyword for a TFTP server	-
ipv4	Keyword for an IPv4 address	-
ucast_addr	IPv4 unicast address of the TFTP server	Enter a valid unicast IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name) of the TFTP server	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the TFTP server	Enter a valid unicast IPv6 address.
port	Keyword for the port of the server via which the TFTP connection runs	-
tcpport	Number of the port	1 ... 65535
file	Keyword for a file name to be assigned	-
filename	Name of the file	Maximum of 100 characters

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

For information on the file types , refer to this list (Page 109).

Result

The file is saved on the TFTP server.

3.2.4 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

3.2.4.1 loadsave

Description

With this command, you change to the LOADSAVE configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
loadsave
```

Result

You are now in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli(config-loadsave)#
```

Further notes

You exit the LOADSAVE configuration mode with the `exit` command.

3.2.5 Commands in the LOADSAVE configuration mode

This section describes commands that you can call up in the LOADSAVE configuration mode.

In the Global Configuration mode, enter the `loadsave` command to change to this mode.

You display the valid file types for the commands in the LOADSAVE Configuration mode with the global command `show loadsave tftp`.

- If you exit the LOADSAVE configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the LOADSAVE configuration mode with the `end` command, you return to the Privileged EXEC mode.

For information on the file types , refer to this list (Page 109).

3.2.5.1 delete

Description

With this command, you call up the possible files or delete a specific file.

Requirement

You are in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli (config-loadsave) #
```

Syntax

Call up the command with the following parameters:

```
delete {showfiles | filetype <filetype>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
showfiles	Shows the available files	-
filetype	Keyword for the file type to be deleted	-
filetype	Name of the file type	max. 100 characters

Result

The files are displayed or the file is deleted.

Further notes

With the "show loadsave files" command, you can display the file types.

3.2.5.2 password

Description

With this command, you activate and configure the password for a file.

Requirement

You are in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli (config-loadsave) #
```

Syntax

Call up the command with the following parameters:

```
password {showfiles | filetype <filetype> [pw <password>]}
```

The parameters have the following meaning:

Parameter	Description	Values
showfiles	Shows the available files	-
filetype	Shows that the file type follows that will be loaded	-
filetype	Name of the file type	max. 100 characters
pw	Keyword for the password	-
password	Password	Enter the password for the file.

Result

The password for the file is configured and activated.

Further notes

You disable the password with the `no password` command.

3.2.5.3 no password

Description

With this command, you disable the password for a file.

Requirement

You are in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli(config-loadsave) #
```

Syntax

Call up the command with the following parameters:

```
no password {showfiles|filetype<filetype>}
```

The parameters have the following meaning:

Parameter	Description	Values
showfiles	Shows the available files	-
filetype	Shows that the file type follows that will be loaded	-
filetype	Name of the file type	max. 100 characters

Result

The password for the file is disabled.

Further notes

You enable the password for the user certificate with the `password` command.

3.2.5.4 tftp filename

Description

With this command, you assign a name to a file type.

The file type decides the type that is affected by the `tftp load` or `tftp save` action. The name decides the file to be copied to or from the TFTP server.

Requirement

You are in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli(config-loadsave)#
```

Syntax

Call up the command with the following parameters:

```
tftp filename {showfiles|filetype< filetype >name<filename>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
showfiles	Shows the available files	-
filetype	Keyword for a file type to be assigned a name	-
filetype	Name of the file type	max. 100 characters
name	Keyword for a file name to be assigned to the file type	-
filename	Name of the file	max. 100 characters

Result

The file types are displayed or the file type is assigned a name.

Further notes

With the "`show loadsave files`" command, you can display the file types.

3.2.5.5 tftp load

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Description

With this command, you load a file from a TFTP server into the file system of the device. The TFTP protocol is used for the transfer. You can also display a list of available files.

Requirement

- The name of the file is specified
- You are in the LOADSAVE configuration mode.

The command prompt is:
`cli (config-loadsave) #`

Syntax

Call up the command with the following parameters:

```
tftp load{showfiles|filetype<filetype>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
showfiles	Shows the available files	-
filetype	Keyword for a file type to be loaded	-
filetype	Name of the file type	max. 100 characters

Result

The file types are displayed or the file is downloaded to the device.

Further notes

You configure the name of the file with the `tftp filename` command.

With the "`show loadsave files`" command, you can display the file types.

3.2.5.6 tftp save

Description

With this command, you copy a file from the file system of the device to a TFTP server. The TFTP protocol is used for the transfer. You can also display a list of available files.

Requirement

- The name of the file is specified
- You are in the LOADSAVE configuration mode.
The command prompt is:

```
cli(config-loadsave)#
```

Syntax

Call up the command with the following parameters:

```
tftp save {showfiles|filetype<filetype>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
showfiles	Shows the available files	-
filetype	Keyword for a file type to be loaded	-
filetype	Name of the file type	max. 100 characters

Result

The file types are displayed or the file is copied.

Further notes

You configure the name of the file with the `tftp filename` command.

With the "`show loadsave files`" command, you can display the file types.

3.2.5.7 tftp server

Description

With this command, you configure the access to a TFTP server.

Requirement

You are in the LOADSAVE configuration mode.

The command prompt is as follows:

```
cli(config-loadsave)#
```

Syntax

Call up the command with the following parameters:

```
tftp server {ipv4 <ucast-addr> | fqdn-name <FQDN> | ipv6 <ip6_addr>} [port <tcp port (1-65535)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
ipv4-address	Value for an IPv4 unicast address	Enter a valid IPv4 unicast address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	Value for an IPv6 unicast address	Enter a valid IPv6 unicast address.
port	Keyword for the port of the server via which the TFTP connection runs	-
tcp port	Number of the port	1 ... 65535

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings for the access to the selected TFTP server are configured.

3.3 Reset and Defaults

This section describes commands for restarting the device and for restoring the original configuration.

3.3.1 restart

Description

With this command, you restart the device.

Select one of the following configuration settings:

- Device restart with the current configuration
- Device restart with the factory configuration settings.
- Device restart with the default settings of the PROFINET IO profile.
- Device restart with the default settings of the EtherNet/IP profile.
- Device restart with the default settings of the Industrial Ethernet profile.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
restart [{factory | pnio | ethernetip | ie}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
without parameters	The system restarts with the current configuration	<ul style="list-style-type: none"> You can only restart the device with administrator privileges. A device should only be restarted by this CLI command or the corresponding buttons in the WBM and not by a poer cycle on the device.
factory	Restores the factory settings of the device and restarts the device. The factory settings depend on the device.	<ul style="list-style-type: none"> By resetting all the settings to the factory settings, the IP address and the passwords are also lost. Following this, the device can only be accessed via the serial interface, using the Primary Setup Tool or using DHCP. With the appropriate attachment, a previously correctly configured device can cause circulating frames and therefore the failure of the data traffic.
pnio	Restores the default settings of the PROFINET IO profile and restarts the device.	<ul style="list-style-type: none"> The profiles provide a preconfiguration for various use cases of the devices. When you start a device with the default settings of a profile, the settings are reset to the factory settings and some parameters are set so that they are designed for a use case. In contrast to resetting to the factory settings. the users and passwords are retained after the restart. The configured IP address is lost so that device can then only be accessed via the serial interface, using the Primary Setup Tool or using DHCP. With the appropriate attachment, a previously correctly configured device can cause circulating frames and therefore the failure of the data traffic.
ethernetip	Restores the default settings of the EtherNet/IP profile and restarts the device.	
ie	Restores the default settings of the Industrial Ethernet profile and restarts the device.	

Result

The device is restarted with the selected settings.

3.4 Configuration Save & Restore

This section describes commands for displaying, saving and restoring configuration settings.

3.4.1 write startup-config

Description

With this command, you save the changes to the configuration in the configuration file.

The use of this command is required in the Trial mode. It can also be used in "auto save mode".

Requirement

- The Trial mode is activated.
- You are in the Privileged EXEC mode.

The command prompt is:

```
*cli(...)#
```

Syntax

Call the command without parameter assignment:

```
write startup-config
```

Result

The changes are saved in the configuration file.

Use the `restart` command without parameters to restart the system with this configuration.

Further notes

You enable the auto save function or disable the Trial mode with the `auto-save` command.

You disable the auto save function or enable the Trial mode with the `no auto-save` command.

3.4.2 The "show" commands

This section describes commands with which you display various settings.

3.4.2.1 show running-config

Description

This command shows configuration settings of the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show running-config
[ {
  syslog|dhcp|qos|stp|la|dot1x|vlan<vlan-id(1-4094)>|
  interface
    {port-channel<port-channel-id(1-8)>|
    <interface-type><interface-list>|
    vlan<vlan-id(1-4094)>
    } |
  ssh|ssl|acl|ip|snmp|radius|rmon|igmp|snmp|http|
  broadcast-blocking|multicast-blocking|locked-port|auto-logout|
  time|ntp|auto-save|panel-button|cos-map|dscp-map|
  output-rate-limit|unicast-blocking|ospf|vrrp|loopd|events|
  redundancy|passive|umac|nat|fmp|pim|router-advertisement-blocking} ]
[all]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
syslog	Shows the configuration settings of the Syslog function	-
dhcp	shows the configuration settings of the Dynamic Host Configuration Protocol	-
qos	shows the configuration settings of QoS (Quality of Service)	-
stp	Shows the configuration settings of the Spanning Tree protocol	-
la	Shows the configuration settings of the Link Aggregation function	-

Parameter	Description	Range of values / note
dot1x	shows the configuration settings of the port-based network access control	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface	Keyword for a an interface description	-
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
interface-type	Type of interface	Enter a valid interface.
interface-list	Module no. and port no. of the interface	
ssh	Shows the configuration settings of the Secure Shell protocol	-
ssl	Shows the configuration settings of the Secure Sockets Layer protocol	-
acl	Shows the configuration settings of the access control lists	-
ip	Shows the configuration settings of the Internet Protocol	-
snmp	Shows the configuration settings of the Simple Network Management Protocol	-
radius	shows the configuration settings of the Remote Authentication Dial-In User service	-
rmon	Shows the configuration settings of the Remote Monitoring function	-
igmp	Shows the configuration settings of the Internet Group Management Protocol	-
sntp	Shows the configuration settings of the Simple Network Time Protocol	-
http	Shows the configuration settings of the Hypertext Transfer Protocol	-
broadcast-blocking	Shows the configuration settings of the broadcast blocking	-
multicast-blocking	Shows the configuration settings of the multicast blocking	-
locked-port	Shows the configuration settings of the locked port function	-
auto-logout	Shows the configuration settings of the auto logout function	-
time	Shows the configuration settings of the system time	-
ntp	Shows the configuration settings of the Network Time Protocol	-
auto-save	Shows the configuration settings of the auto save function	-
panel-button	Shows the configuration settings of the Panel Button function	-

Parameter	Description	Range of values / note
cos-map	Shows the configuration settings of the COS function	-
dscp-map	Shows the configuration settings of the DSCP map function	-
output-rate-limit	Shows the configuration settings of the output rate limit function	-
unicast-blocking	Shows the configuration settings of the unicast blocking	-
ospf	Shows the configuration settings of the Open Shortest Path First	-
vrrp	Shows the configuration settings of the Virtual Router Redundancy Protocol	-
loopd	Shows the configuration settings of loop detection	-
events	Shows the configuration settings of the events	-
redundancy	Shows the configuration settings of the redundancy	-
passive	Shows the configuration settings of passive listening	-
umac	Shows the configuration settings of the user configuration	-
nat	Shows the configuration settings of the Network Address Translation	-
fmp	Shows the configuration settings of the Fiber Monitoring protocol	-
pim	Shows the configuration settings of the Independent Multicast protocol	-
router-advertisement-blocking	Shows the configuration settings of the router advertisement blocking.	-
all	shows all configuration settings and all default parameters. Some parameters cannot be changed.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The selected configuration settings of the device are displayed.

3.4.3 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

3.4.3.1 auto-save

Description

The CLI can save changes to the configuration automatically.

If you first want to test changes made to the configuration so that you can discard them afterwards if necessary, you can disable the auto save function.

You are then in the Trial mode.

Changes to the configuration that you have not saved, are indicated by an asterisk in front of the command prompt: `*cli(...)#`.

You save the changes to the configuration with the `write startup-config` command.

With the `auto-save` command, you enable the auto save function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
auto-save
```

As default the function is "enabled".

Result

The auto save function is enabled.

Further notes

You save changes to the configuration in the Trial mode with the `write startup-config` command.

You disable the function with the `no auto-save` command.

You can display the status of this function and other information with the `show device information` command.

3.4.3.2 no auto-save

Description

With this command, you disable the auto save function.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no auto-save
```

Result

The auto save function is disabled. The Trial mode is activated.

Further notes

You enable the function with the `auto-save` command.

You can display the status of this function and other information with the `show device information` command.

You save changes to the configuration in the Trial mode with the `write startupconfig` command.

3.5 PoE

3.5.1 The "show" commands

This section describes commands with which you display various settings.

Note

The interface is a Gigabit Ethernet interface.

3.5.1.1 show poe status

Description

This command shows specific information for all or for a selected PoE interface (PoE: Power over Ethernet).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show poe status [interface <interface-type> <interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

If you use the command without setting parameters, information about all PoE interfaces is displayed.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information for the selected PoE interface is displayed.

3.5.1.2 show pse status

Description

This command shows the current settings of the PoE power supply of the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show pse status [<integer>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
integer	Number of the PSE	-

If you do not select any parameter, the entries are displayed for all available PSEs.

Result

The current settings of the PoE power supply of the device are displayed.

3.5.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

3.5.2.1 poe pse MaximumPower

Description

With this command you can set a value for the parameter "Maximum Power". This sets the maximum power that a PSE provides to supply PoE devices.

The user-defined power is compared to the range of values of the class indicated by the connected device.

- If the user-defined power is within the class of the connected device, the user-defined value is used.
- If the user-defined power is above the class of the connected device, the highest value of the class is used.
- If the user-defined power is below the class of the connected device, the lowest value of the class is used.

If the value used is exceeded, the device is turned off.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
poe pse <integer(1-4)> MaximumPower <integer(1-90)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
integer	Number of the PSE	1 ... 4
integer	Value for the maximum power in watts	1 ... 90

Result

The value for the maximum power is configured.

Further notes

You delete the value for the parameter "Maximum Power" with the `no poe pse MaximumPower` command.

3.5.2.2 no poe pse MaximumPower

Description

With this command, you delete the value for the "Maximum Power" parameter.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no poe pse <integer(1-4)> MaximumPower
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
integer	Number of the PSE	1 ... 4

Result

The value for the maximum power is deleted.

Further notes

You configure the value for the parameter "Maximum Power" with the `poe pse MaximumPower` command.

3.5.2.3 poe pse usage

Description

With this command, you set a value (as a percentage) for the "Usage Threshold" parameter. This specifies how many percent of the maximum power the connected devices will use. As soon as the power being used by the end devices exceeds this percentage, an event is triggered. An event is also entered in the log. You display the entries of the log with the command `show logbook`. You will find more information on this command in the section "show logbook (Page 888)".

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
po e pse <integer (1-4)> usage <integer (1-100)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
integer	Number of the PSE	1 ... 4
integer	Value for "Usage Threshold" as a percentage.	1 ... 100 Default: 80%

Result

The value for "Usage Threshold" is configured.

3.5.2.4 no po e pse usage

Description

With this command, you reset the parameter "Usage Threshold" to the default value.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no po e pse <integer (1-4)> usage
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
integer	Number of the PSE	1 ... 4

Result

The parameter "Usage Threshold" is reset to the default value.

3.5.3 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

Note

The interface is a Gigabit Ethernet interface.

3.5.3.1 poe active

Description

With this command, you activate PoE for the interface in whose interface configuration mode you are currently working.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
poe active
```

Result

PoE is activated for the corresponding interface.

3.5.3.2 no poe active

Description

With this command, you deactivate PoE for the interface in whose interface configuration mode you are currently working.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no poe active
```

Result

PoE is deactivated for the corresponding interface.

3.5.3.3 poe custom maxpwr

Description

With this command you set the maximum power that a port makes available to supply a connected device.

This value is taken into account when the function is enabled with the `poe custom maxpwr active` command.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameter:

```
poe custom maxpwr <integer(0-30)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<code>integer</code>	Value for the user-defined maximum power in watts	0 ... 30

Result

The maximum power is set.

Further notes

You enable the user-defined maximum power for the interface with the `poe custom maxpwr active` command.

You disable the user-defined maximum power for the interface with the `no poe custom maxpwr active` command.

You delete the user-defined maximum power for the interface with the `no poe custom maxpwr` command.

3.5.3.4 `no poe custom maxpwr`

Description

With this command, you delete the user-defined maximum power for a port.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no poe custom maxpwr
```

Result

The user-defined maximum power is deleted.

Further notes

You configure the user-defined maximum power for the interface with the `poe custom maxpwr` command.

You enable the user-defined maximum power for the interface with the `poe custom maxpwr active` command.

You disable the user-defined maximum power for the interface with the `no poe custom maxpwr active` command.

3.5.3.5 poe custom maxpwr active

Description

With this command, you enable use of the user-defined maximum power for the interface.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
poe custom maxpwr active
```

Result

The user-defined maximum power is enabled for the relevant interface.

Further notes

You configure the user-defined maximum power for an interface with the `poe custom maxpwr` command.

You disable the use of the user-defined maximum power with the `no poe custom maxpwr active` command.

3.5.3.6 no poe custom maxpwr active

Description

With this command, you disable use of the user-defined maximum power for the interface.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no poe custom maxpwr active
```

Result

The user-defined maximum power is disabled for the relevant interface.

Further notes

You configure the user-defined maximum power for an interface with the `poe custom maxpwr` command.

You enable the use of the user-defined maximum power with the `poe custom maxpwr active` command.

3.5.3.7 poe type

Description

This command specifies a character string that describes a connected device in greater detail.

Requirement

You are in the Interface configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
poe type <string>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
string	Description of a connected device	max. 255 characters

Result

The description of the connected device has been specified.

3.5.3.8 no poe type

Description

With this command, you delete the description for a connected device.

Requirement

You are in the Interface Configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no poe type
```

Result

The description of the corresponding device is deleted.

3.5.3.9 poe prio

Description

With this command, you specify the priority of the power supply for an interface.

Requirement

You are in the Interface configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
poe prio {low|high|critical}
```

The parameters have the following meaning:

Parameter	Description
low	low priority
high	medium priority
critical	high priority

If the power of the connected power supply is inadequate to supply all connected devices, devices with a higher priority are given preference.

If the same priority is set for two ports, the port with the lower number will be preferred when necessary.

Result

The priority of the corresponding interface has been specified.

3.5.3.10 no poe prio

Description

With this command, you set the priority of an interface to the default value "low".

Requirement

You are in the Interface configuration mode of a PoE interface.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no poe prio
```

Result

The priority of the corresponding interface has been set to "low".

3.6 NFC (SCALANCE XM-400 only)

3.6.1 The "show" commands

This section describes commands with which you display various settings.

Note

You will find further information on NFC in the operating instructions "SCALANCE XM-400".

3.6.1.1 show nfc active status

Description

This command shows whether or not the NFC function (Near Field Communication) is activated or deactivated.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show nfc active status
```

Result

The status of the NFC function is displayed.

3.6.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

3.6.2.1 nfc active

Description

With this command, you activate NFC.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
nfc active
```

Result

NFC is activated.

Further notes

You deactivate NFC with the `no nfc active` command.

You display the status, i.e. whether the NFC function is activated or deactivated with the command `show nfc active status`.

3.6.2.2 no nfc active

Description

With this command, you deactivate NFC.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no nfc active
```

Result

NFC is deactivated.

Further notes

You activate NFC with the `nfc active` command.

You display the status, i.e. whether the NFC function is activated or deactivated with the command `show nfc active status`.

Functions specific to SCALANCE

This part contains the sections that describe functions specific to SCALANCE.

4.1 PLUG

The C-PLUG or KEY-PLUG stores the configuration of a device and can therefore transfer the configuration of the old device to the new device when a device is replaced.

In addition to the configuration, the KEY-PLUG also contains a license that enables the use of certain functions.

This section describes commands relevant for working with the C-PLUG or KEY-PLUG.

4.1.1 The "show" commands

This section describes commands with which you display various settings.

4.1.1.1 show plug

Description

This command shows the current information of the PLUG.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show plug
```

Result

The current information of the PLUG is displayed.

4.1 PLUG

4.1.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

4.1.2.1 plug

Description

With this command, you change to the Plug Configuration mode.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
plug
```

Result

You are now in the Plug Configuration mode.

The command prompt is as follows:

```
cli(config-plug)#
```

Further notes

You exit the Plug Configuration mode with the `end` or `exit` command.

4.1.3 Commands in the Plug configuration mode

This section describes commands that you can call up in the Plug Configuration mode.

In the Global Configuration mode, enter the `plug` command to change to this mode.

- If you exit the Plug Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the Plug Configuration mode with the `end` command, you return to the Privileged EXEC mode.

4.1.3.1 `factoryclean`

Description

With this command, you delete the device configuration stored on the PLUG.

Requirement

- There is a device configuration on the PLUG.
- You are in the Plug Configuration mode.
The command prompt is:

```
cli(config-plug)#
```

Syntax

Call the command without parameters:

```
factoryclean
```

Result

The device configuration on the PLUG is deleted.

4.1.3.2 `write`

Description

With this command, you format the PLUG and copy the current device configuration to it.

Requirement

- The PLUG is formatted.
- You are in the Plug Configuration mode.
The command prompt is:

```
cli(config-plug)#
```

4.2 WBM

Syntax

Call the command without parameter assignment:

```
write
```

Result

The current device configuration has been copied to the formatted PLUG.

4.2 WBM

On the device, you can limit the time available for access with Web Based Management. If no entry is made for a specific time, the WBM session is closed.

This section describes commands relevant for the configuration of this feature.

4.2.1 The "show" commands

This section describes commands with which you display various settings.

4.2.1.1 show web-session-timeout

Description

This command shows the timeout setting for the WBM.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show web-session-timeout
```

Result

The timeout setting for the WBM is displayed.

4.2.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

4.2.2.1 web-session-timeout

Description

With this command, you enable the automatic logoff and you configure the timeout setting for the WBM.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
web-session-timeout [seconds (60-3600) ]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Time in seconds until automatic logout after the last entry	60 ... 3600 Default: 900

Result

The time is configured and automatic logout is enabled.

Further notes

You disable automatic logoff with the `no web-session-timeout` command.

You display the current timeout setting with the `show web-session-timeout` command.

4.3 Panel button

4.2.2.2 no web-session-timeout

Description

With this command, you disable the automatic logoff.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no web-session-timeout
```

Result

Automatic logoff is disabled.

Further notes

You enable automatic logoff with the `web-session-timeout` command.

You display the current timeout setting with the `show web-session-timeout` command.

4.3 Panel button

This section describes the commands relevant for working with the Panel Button function.

4.3.1 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

4.3.1.1 panel-button control-factory-defaults

Description

With this command, you enable the following function of the "SELECT/SET" button:

- When display mode A "port status" is displayed, and the button is pressed for more than 12 seconds, there is a restart with the factory settings.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameter assignment:

```
panel-button control-factory-defaults
```

Result

The function of the "SELECT/SET" button for restarting with factory settings is enabled.

Further notes

You disable this function with the `no panel-button control-factory-defaults` command.

4.3.1.2 no panel-button control-factory-defaults

Description

With this command, you disable the following function of the "SELECT/SET" button:

- When display mode A "port status" is displayed, and the button is pressed for more than 12 seconds, there is a restart with the factory settings.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

4.3 Panel button

Syntax

Call the command without parameter assignment:

```
no panel-button control-factory-defaults
```

Result

The function of the "SELECT/SET" button for restarting with factory settings is enabled or disabled.

Further notes

You enable this function with the `panel-button control-factory-defaults` command.

4.3.1.3 set panel-button control-faultmask

Description

With this command, you enable or disable the following function of the "SELECT/SET" button:

- If display mode D "fault mask" is displayed and the button is pressed for 5 - 12 seconds, the fault mask is set.

This function corresponds to calling the `power` and `link down` commands.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
set panel-button control-faultmask{enable|disable}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
enable	enables the function for setting the fault mask	Default: enabled
disable	disables the function for setting the fault mask	-

Result

The function of the "SELECT/SET" button for setting the fault mask is enabled or disabled.

4.4 Signaling contact

This section describes the commands relevant for working with the signaling contact.

4.4.1 The "show" commands

This section describes commands with which you display various settings.

4.4.1.1 show signaling contact

Description

This command shows the current configuration of the signaling contact.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show signaling-contact
```

Result

The current configuration of the signaling contact is displayed.

4.4.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

4.4 Signaling contact

4.4.2.1 signaling contact mode

Description

With this command, you specify the reaction of the signaling contact.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
signaling-contact mode {conventional | aligned}
```

The parameters have the following meaning:

Parameter	Description
conventional	An error/fault is displayed by the fault LED and the signaling contact is opened. When the error/fault state no longer exists, the fault LED goes off and the signaling contact is closed.
aligned	The way the signaling contact works does not depend on the error/fault that has occurred. The signaling contact can be opened or closed as required by user actions.

Result

The reaction of the signaling contact is specified.

Further notes

You display the setting with the `show signaling contact` command.

4.4.2.2 signaling-contact status

Description

With this command, you close or open the signaling contact.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
signaling-contact status {open|close}
```

The parameters have the following meaning:

Parameter	Description
open	Signaling contact is opened.
close	Signaling contact is closed.

Result

The signaling contact is opened or closed.

Further notes

You display the setting with the `show signaling contact` command.

System time

5.1 System time setting

This section describes commands relevant for the configuration of the system time.

5.1.1 The "show" commands

This section describes commands with which you display various settings.

5.1.1.1 show time

Description

This command shows the settings of the system clock.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show time
```

Result

The settings for the system clock are displayed.

5.1.1.2 show dst info

Description

This command shows all the entries for daylight saving time stored on the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show dst info
```

Result

The entries for daylight saving time are displayed.

5.1.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

5.1.2.1 time

Description

With this command, you configure the way in which the system time is obtained.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
time{manual | ntp | sntp | SINEC | ptp_tc_client}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
manual	The system time is entered by the user.	-
ntp	The system time is obtained from an NTP server.	-
sntp	The system time is obtained from an SNTP server.	-
SINEC	The system time is obtained using the SIMATIC time protocol .	-
ptp_tc_client	The system time is obtained with the Precision Time Protocol (PTP) from a grandmaster clock.	The following devices support time-of-day synchronization using PTP: <ul style="list-style-type: none"> • SCALANCE XR528-6M • SCALANCE XR552-12M

Result

The method of obtaining the system time is configured.

Further notes

You display the settings for the system clock with the `show time` command.

5.1.2.2 time set

Description

With this command, you set the system clock.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
time set hh:mm:ss <day (1-31)>
{january|february|march|april|may|june|july|august|september|october|november|december}
<year (2000 - 2035)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
hh:mm:ss	Time of day	Hour, minute, second each separated by ":" no link
day	Day of the month	1 ... 31
-	Month	january, february, march, april, may, june, july, august, september, october, november, december
year	Year	2000 ... 2035

Result

The system time is set.

Further notes

You display the settings for the system clock with the `show time` command.

5.1.2.3 time dst date

Description

With this command, you configure the start and end of daylight saving time.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
time dst date <name(16)> <year (1900-2099)> begin <MMDDhh> end <MMDDhh>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the entry	maximum 16 characters
year	Year	1900 ... 2099
begin	Keyword for the start of daylight saving time.	-
MMDDhh	Time for the start of daylight saving time.	Time in the format MM Month DD Day hh Hour
end	Keyword for the end of daylight saving time.	-
MMDDhh	Time for the end of daylight saving time.	Time in the format MM Month DD Day hh Hour

Result

The entry for the start and end of daylight saving time was created.

Further notes

You display the settings for the daylight saving time changeover with the `show dst info` command.

5.1.2.4 time dst recurring

Description

With this command, you configure the start and end of daylight saving time with a generic description.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
time dst recurring <name(16)> begin {<week(1-5)> | last} <weekday> <month> <hour> end
{<week(1-5)> | last} <weekday> <month> <hour>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the entry	maximum 16 characters
begin	Keyword for the start of daylight saving time.	-
week	Calendar week in a month	1 ... 5
last	Keyword for the last calendar week in a month	-
weekday	Weekday	monday, tuesday, wednesday, thursday, friday, saturday, sunday
month	Month	january, february, march, april, may, june, july, august, september, october, november, december
hour	Hour	0 ... 23
end	Keyword for the end of daylight saving time.	-

Result

The entry for the start and end of daylight saving time was created.

Further notes

You display the settings for the daylight saving time changeover with the `show dst info` command.

5.1.2.5 no time dst

Description

With this command you delete the entry for the start and end of daylight saving time with the specified name. If you do not specify a name as the parameter, all entries are deleted.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
no time dst [<name(16)>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
name	Name of the entry	maximum 16 characters

Result

An entry or the entries for the start and end of daylight saving time was/were deleted.

Further notes

You display the settings for the daylight saving time changeover with the `show dst info` command.

5.2 NTP Client

This section describes commands relevant for configuration of the NTP client.

5.2.1 The "show" commands

This section describes commands with which you display various settings.

5.2.1.1 show ntp info

Description

This command shows the current settings for the Network Time Protocol (NTP).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ntp info
```

Result

The current NTP settings are displayed.

5.2.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

5.2.2.1 ntp

Description

With this command, you change to the Network Time Protocol (NTP).

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ntp
```

Result

You are now in the NTP configuration mode.

The command prompt is as follows:

```
cli(config-ntp)#
```

Further notes

You exit the NTP configuration mode with the `end` or `exit` command.

5.2.3 Commands in the NTP configuration mode

This section describes commands that you can call up in the NTP configuration mode.

In the Global configuration mode, enter the `ntp` command to change to this mode.

- If you exit the NTP configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the NTP configuration mode with the `end` command, you return to the Privileged EXEC mode.

5.2.3.1 ntp server

Description

With this command, you configure the connection to a server on the NTP client.

Requirement

You are in the NTP configuration mode.

The command prompt is as follows:

```
cli(config-ntp)#
```

Syntax

Call up the command with the following parameters:

```
ntp server id <integer(1-3)> { ipv4 <ip_addr> | fqdn-name <Fully Qualified Domain Name> | ipv6 <ip6_addr>} [port { <1025-36564> | default}] [poll <seconds(64-1024)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
integer	Number of the NTP server.	1 ... 3
ipv4	Keyword for an IPv4 address	-
ip_addr	Value for the IPv4 address of the time server	Enter a valid IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	Value for the IPv6 address of the time server	Enter a valid IPv6 address.
port	UDP port of the time server	1025 ... 36564
default	Default value for the UDP port	123
poll	Keyword for the time after which the time of day is requested again	-
seconds	Value for the time in seconds	64 ... 1024

For information on identifiers of addresses and interfaces, refer to the section "Addresses and interface identifiers".

Result

The connection to a server is configured on the NTP client.

Further notes

You delete the connection to a server with the `no ntp server` command.

5.2.3.2 no ntp server

Description

With this command, you delete the connection to a server on the NTP client.

Requirement

You are in the NTP configuration mode.

The command prompt is as follows:

```
cli(config-ntp)#
```

Syntax

Call up the command with the following parameters:

```
no ntp server <integer (1-3)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
integer	Number of the NTP server.	1 ... 3

Result

The connection to a server is deleted on the NTP client.

Further notes

You configure the connection to a server with the `ntp server` command.

5.2.3.3 ntp time diff

Description

With this command, you configure the time difference between the device and the NTP server.

Requirement

You are in the NTP configuration mode.

The command prompt is as follows:

```
cli(config-ntp)#
```

Syntax

Call up the command with the following parameters:

```
ntp time diff <(+/-hh:mm)>
```

The parameter has the following meaning:

Parameter	Description
+	Time zones to the west of the NTP server time zone
-	Time zones to the east of the NTP server time zone
hh	Number of hours difference
mm	Number of minutes difference

Enter the number of hours and number of minutes with two digits each.

Default: No time difference.

Result

The time difference between the device and the NTP server is configured.

5.3 SNTP Client

This section describes commands relevant for configuration of the SNTP client.

5.3.1 The "show" commands

This section describes commands with which you display various settings.

5.3.1.1 show sntp status

Description

This command shows the settings of the Simple Network Time Protocol.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show sntp status
```

Result

The settings of SNTP are displayed.

5.3.1.2 show sntp broadcast-mode status

Description

This command shows the current configuration of the broadcast mode of SNTP.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show sntp broadcast-mode status
```

Result

The current SNTP broadcast configuration is displayed.

5.3.1.3 show sntp unicast-mode status

Description

This command shows the current configuration of the unicast mode of SNTP.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show sntp unicast-mode status
```

Result

The current SNTP unicast configuration is displayed.

5.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

5.3.2.1 **sntp**

Description

With this command, you change to the SNTP configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
sntp
```

Result

You are now in the SNTP configuration mode.

The command prompt is as follows:

```
cli(config-sntp)#
```

Further notes

You exit the SNTP configuration mode with the `end` or `exit` command.

5.3.3 Commands in the SNTP configuration mode

This section describes commands that you can call up in the SNTP configuration mode.

In the Global configuration mode, enter the `sntp` command to change to this mode.

- If you exit the SNTP configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the SNTP configuration mode with the `end` command, you return to the Privileged EXEC mode.

5.3.3.1 sntp client addressing-mode

Description

With this command, you configure the addressing mode of the SNTP client as unicast or broadcast.

Requirement

- The SNTP client is activated.
- You are in the SNTP Configuration mode.

The command prompt is:

```
cli(config-sntp)#
```

Syntax

Call up the command with the following parameters:

```
sntp client addressing-mode{unicast|broadcast}
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
unicast	configures the SNTP client in unicast mode	Default: unicast enabled
broadcast	configures the SNTP client in broadcast mode	Supports only IPv4 addresses

Result

The addressing mode of the SNTP client is configured.

Further notes

You display this setting and other information with the `show sntp status` command.

You display the settings for the unicast mode with the `show sntp unicast-mode status` command.

You display the settings for the broadcast mode with the `show sntp broadcast-mode status` command.

5.3.3.2 sntp time diff

Description

With this command, you configure the time difference of the system time relative to the UTC time.

Requirement

- The SNTP server must have started up.
- You are in the SNTP Configuration mode.

The command prompt is:

```
cli(config-sntp)#
```

Syntax

Call up the command with the following parameters:

```
sntp time diff <(+/-hh:mm)>
```

The parameter has the following meaning:

Parameter	Description
+	Time zones to the west of the SNTP server time zone
-	Time zones to the east of the SNTP server time zone

Parameter	Description
hh	Number of hours difference
mm	Number of minutes difference

Enter the time difference as follows:

- with sign
- without spaces
- Hours and minutes both two digits (with leading zero)

Default: no time difference

Result

The time zone of the system time is configured.

Further notes

You can display the settings of this function and other information with the `show sntp status` command.

5.3.3.3 sntp unicast-server

Description

With this command, you configure an SNTP unicast server.

Requirement

- The addressing mode of the SNTP client is configured as "unicast".
- You are in the SNTP Configuration mode.
The command prompt is:

```
cli(config-sntp)#
```

Syntax

Call up the command with the following parameters:

```
sntp unicast-server {ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr>}
[port<1025-36564>] [poll<seconds (16-16284)>] [secondary]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IP address	-
ucast_addr	Value for an IPv4 unicast address	Enter a valid IPv4 unicast address.
fqdn-name	Keyword for a domain name	-

Parameter	Description	Range of values / note
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	Value for the IPv6 address of the time server	Enter a valid IPv6 address.
port	UDP port of the time server	1025 ... 36564 Default: 123
poll	Keyword for the time after which the time of day is requested again	-
seconds	Value for the time in seconds	16 ... 16284
secondary	Keyword to store the second SNTP server	If you do not specify this parameter, the first SNTP server is stored.

Result

The SNTP unicast server is configured.

Further notes

You can reset the setting to the default with the `no sntp unicast-server` command.

You display this setting and other information with the `show sntp unicast-mode status` command.

5.3.3.4 no sntp unicast-server

Description

With this command, you delete the attributes for an SNTP unicast server and reset the address.

Requirement

You are in the SNTP configuration mode.

The command prompt is as follows:

```
cli(config-sntp)#
```

Syntax

Call up the command with the following parameters:

```
no sntp unicast-server {ipv4 <ucast_addr> | fqdn-name <Fully Qualified Domain Name(100)> | ipv6 <ip6_addr>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IP address	-
ucast_addr	Value for an IPv4 unicast address	Enter a valid IPv4 unicast address
fqdn-name	Keyword for a domain name	-
Fully Qualified Domain Name (100)	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	Value for the IPv6 address of the time server	Enter a valid IPv6 address.

Result

The SNTP unicast server is reset to the default value.

Further notes

You configure the setting with the `sntp unicast-server` command.

You display this setting and other information with the `show sntp unicast-mode status` command.

5.4 PTP Client

The following devices support time-of-day synchronization using PTP:

- SCALANCE XR528-6M
- SCALANCE XR552-12M

This section describes commands relevant for configuration of the Precision Time Protocol according to IEEE 1588.

5.4.1 The "show" commands

This section describes commands with which you display various settings.

5.4.1.1 show ptp info

Description

This command shows the current settings for the Precision Time Protocol (PTP).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ptp info [ interfaces <interface-type> <interface-id> ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interfaces	Keyword for a an interface name.	-
interface-type	Type or speed of the interface.	Enter a valid interface name.
interface-id	Slot no. and port no. of the interface.	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The current settings for the Precision Time Protocol (PTP) are displayed.

5.4.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

5.4.2.1 ptp

Description

With this command, you enable the Precision Time Protocol for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ptp
```

Result

The Precision Time Protocol is enabled.

5.4.2.2 no ptp

Description

With this command, you disable the Precision Time Protocol for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ptp
```

Result

The Precision Time Protocol is disabled.

5.4.2.3 ptp time diff

Description

With this command, you set the time zone for the Precision Time Protocol.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ptp time diff <(+/-hh:mm)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
+/-hh:mm	The value for the time difference.	Hours and minutes specified in the format +/-HH:MM

Result

The time zone for the Precision Time Protocol is specified.

5.4.2.4 ptp transparent-clock configuration

Description

With this command you change to the PT Transparent Clock configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ptp transparent-clock configuration
```

Result

You are in the PTP Transparent Clock configuration mode.

The command prompt is as follows:

```
cli(config-ptp-tc)#
```

5.4.3 Commands in the PTP Transparent Clock configuration mode

This section describes commands that you can call up in the PTP Transparent Clock configuration mode.

In the Global configuration mode, enter the `ptp transparent-clock configuration` command to change to this mode.

- If you exit the PTP Transparent Clock configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the PTP Transparent Clock configuration mode with the `end` command, you return to the Privileged EXEC mode.

5.4.3.1 delay-mechanism

Description

With this command, you specify which correction mechanism the Precision Time Protocol uses.

Requirement

You are in the PTP Transparent Clock configuration mode.

The command prompt is as follows:

```
cli(config-ptp-tc)#
```

Syntax

Call up the command with the following parameters:

```
delay-mechanism { end-to-end | peer-to-peer }
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<code>end-to-end</code>	The device operates as an end-to-end transparent clock.	With end-to-end synchronization with more than 2 slaves, freak values > 100 ns can occur in the offset.
<code>peer-to-peer</code>	The device operates as a peer-to-peer transparent clock.	-

Result

The correction mechanism for the Precision Time Protocol is specified.

5.4.3.2 primary-domain

Description

With this command, you specify the primary domain.

Requirement

You are in the PTP Transparent Clock configuration mode.

The command prompt is as follows:

```
cli(config-ptp-tc)#
```

Syntax

Call up the command with the following parameters:

```
primary-domain <domain-id(0-255)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
domain-id	The identifier of the primary domain.	0 ... 255

Result

The primary domain is specified.

Network structures

This part contains the sections that describe the commands for configuring and managing various network structures.

The following technologies are available:

- The establishment of independent structures even across the boundaries of subnets using virtual networks (VLANs)
This can result in the following advantages:
 - Administration:
Devices can be grouped together to form a logical units regardless of their physical location
 - Performance:
By prioritizing, time-critical data (process data, streams) can be given priority for transfer
 - Security:
The transition between VLANs can only be controlled by an administrator
- Aggregation of interfaces or connections between devices to increase the data transmission rate and reliability (link aggregation, port aggregation)
- Detection and monitoring of parallel connections or loops in an Ethernet network by setting up a tree structure (loop detection)
- Improved reliability by adapting the tree structure if transmission is disrupted (Spanning Tree)
- Splitting up of the network into smaller units that are connected together via managed connection pairs (standby connection)

6.1 VLAN

This section describes commands for configuring and managing virtual networks (VLANs). Commands for configuring and managing private VLANs are also described.

With a private VLAN (PVLAN) you can divide up the layer 2 broadcast domains of a VLAN.

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A private VLAN consists of the following units:

- A primary private VLAN (primary PVLAN)

The VLAN that is divided up is called primary private VLAN.

- secondary private VLANs (secondary PVLAN)

Secondary PVLANS exist only within a primary PVLAN. Every secondary PVLAN has a specific VLAN ID and is connected to the primary PVLAN.

Secondary PVLANS are divided into the following types:

- Isolated Secondary PVLAN

Devices within an isolated secondary PVLAN cannot communicate with each other via layer 2.

- Community Secondary PVLAN

Devices within a community secondary PVLAN can communicate with each other directly via layer 2. The devices cannot communicate with devices in other communities of the PVLAN via layer 2.

6.1.1 The "show" commands

This section describes commands with which you display various settings.

6.1.1.1 show mac-address-table

Description

This command shows the table with the static and dynamic unicast MAC addresses and multicast MAC addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table [vlan<vlan-range>][address<aa:aa:aa:aa:aa:aa>]  
[interface <interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN or VLAN range	-
vlan-range	Number of the addressed VLAN or VLAN range	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The entries of the MAC addresses table are displayed.

6.1.1.2 show mac-address-table dynamic multicast

Description

This command shows the table with the dynamic multicast MAC addresses assigned by the device.

Note

The device does not learn any reserved multicast addresses, see also RFC 5771.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table dynamic multicast[vlan<vlan-range>]
[address<aa:aa:aa:aa:aa:aa>]
[interface<interface-type><interface-id>]
```

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The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for an interface description	-
interface-type	Type of interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The dynamic multicast MAC addresses are displayed.

6.1.1.3 show mac-address-table dynamic unicast

Description

This command shows the table with the dynamic unicast MAC addresses assigned by the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table dynamic unicast [vlan<vlan-range>]
    [address<aa:aa:aa:aa:aa:aa>] [{interface<interface-type>
    <interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094

Parameter	Description	Range of values / note
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The dynamic unicast MAC addresses are displayed.

6.1.1.4 show mac-address-table static multicast

Description

This command shows the table with the static multicast MAC addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table static multicast[vlan<vlan-range>]
    [address<aa:aa:aa:aa:aa:aa>][{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

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For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The static multicast MAC addresses are displayed.

6.1.1.5 show mac-address-table static unicast

Description

This command shows the table with the static unicast MAC addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

cli> or cli#

Syntax

Call up the command with the following parameters:

```
show mac-address-table static unicast[vlan<vlan-range>]
    [address<aa:aa:aa:aa:aa:aa>] [{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The static unicast MAC addresses are displayed.

6.1.1.6 show mac-address-table count**Description**

With this command, you show the number of MAC addresses for all or a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table count[vlan<vlan-id(1-4094)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

If you do not select any parameter from the parameter list, the total number of entries is displayed for all VLANs.

Result

The number of MAC addresses for the selected VLAN is displayed.

6.1.1.7 show subnet-vlan mapping**Description**

This command shows the entries of a subnet VLAN table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show subnet-vlan mapping
    [{interface<interface-type><interface-id>|switch<string(32)>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
switch	Keyword for a switch	-
string	Name of the switch	max. 32 characters

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, all entries are displayed.

Result

The entries of the subnet VLAN table are displayed.

6.1.1.8 show vlan

Description

This command shows the specific information for all or a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show vlan[brief|id<vlan-range>|summary]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
brief	Shows brief information about all VLANs	-
id	Keyword for a VLAN or VLAN range	-

Parameter	Description	Range of values / note
vlan-range	Number of the addressed VLAN or VLAN range	1 ... 4094
summary	Shows a summary of the VLANs	

If you do not select any parameter from the parameter list, the entries of all available interfaces are displayed.

Result

The information for the selected VLAN is displayed.

6.1.1.9 show vlan device info

Description

This command shows all the global information that is valid for all VLANs.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show vlan device info
```

Result

The global information is displayed.

6.1.1.10 show vlan learning params

Description

This command shows the parameters for the automatic learning of addresses for selected or all VLANs (active and inactive VLANs).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

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Syntax

Call up the command with the following parameters:

```
show vlan learning params[vlan<vlan-range>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN or VLAN range	-
vlan-range	Number of the addressed VLAN or VLAN range	1 ... 4094

If you do not select any parameter from the parameter list, the entries of all available interfaces are displayed.

Result

The settings for the automatic learning of addresses are displayed.

6.1.1.11 show vlan port config

Description

This command shows the VLAN-specific information for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show vlan port config[{port<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port	-
interface-type	Type of interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries of all available interfaces are displayed.

Result

The information about the ports is displayed.

6.1.1.12 show vlan private-vlan**Description**

This command shows the specific information for all or for a selected private VLAN type.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show vlan private-vlan [pvlan-type]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
pvlan-type	Shows brief information about all VLANs	primary isolated community

If you do not select any parameter from the parameter list, the entries of all available types are displayed.

Result

The information for the selected private VLAN type is displayed.

Further notes

You define a private VLAN type `private-vlan` command.

6.1.1.13 show vlan protocols-group**Description**

This command displays the table with the protocol group entries.

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Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show vlan protocols-group
```

Result

The table of protocol groups is displayed.

6.1.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

6.1.2.1 interface range

Description

With this command, you can put several interfaces or the interfaces of VLANs together and configure them together. The configurations are valid for all interfaces of the specified range.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
interface range
(
  {<interface-type> <0/a-b,0/c,...>}
  {vlan <vlan-id(1-4094)> - <vlan-id(2-4094)>}
)
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Keyword for an interface	Enter a valid interface.
0/a-b, 0/c,...	Module no. and port no. of the interface	
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
vlan-id	Number of the addressed VLAN	2 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you want to address several VLANs with this command, you must insert a blank before and after the hyphen, for example `interface range vlan 5 - 10`.

Result

The interfaces or interfaces of VLANs were put together to form an interface range.

The command prompt is as follows:

```
cli(config-if-vlan-range)#
```

The configuration commands you enter in a mode apply to all interfaces of this area.

Further notes

With the `no interface range` command, you remove VLANs from this range or break it up.

6.1.2.2 no interface range

Description

With this command, you remove the interfaces or interfaces of VLANs from the interface range or break it up if you first remove all previously added interfaces.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no interface range vlan <vlan-id(1-4094)> - <vlan-id(2-4094)>
```

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The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
vlan-id	Number of the addressed VLAN	2 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you address several VLANs, you must insert a blank before and after the hyphen, for example `no interface range vlan 5 - 10.`

Result

The VLANs have been removed from the specified interface area.

Further notes

With the `interface range` command, you can put several interfaces or VLANs together to be able to configure them together.

6.1.2.3 map protocol

Description

With this command, you assign a protocol to a protocol group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
map protocol
    {ip | novell | netbios | appletalk | other <aa:aa>}
    enet-v2 protocols-group <Group id integer(1-100)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Internet Protocol v4	HEX 08:00
novell	Novell Netware protocol	HEX 81:38
netbios	Netbios via TCP/IP	HEX f0:f0

Parameter	Description	Range of values / note
appletalk	Appletalk	HEX 80:9b
other	Other protocol.	enter the hexadecimal protocol value. <ul style="list-style-type: none"> • other: aa:aa • IPV6: 86:DD • LLDP: 88:CC • PTP IEEE1588: 88:F7 • EAP (802.1X): 88:8E
enet-v2	Frame structure is Ethernet II	-
protocols-group	Keyword for a protocol group	-
Group id integer	Number of the group	decimal 1 ... 100

Result

The protocol group is created.

Further notes

You delete the protocol group with the `no map protocol` command.

You can display the status of this function and other information with the `show vlan protocols-group` command.

6.1.2.4 no map protocol

Description

With this command, you delete a protocol from all protocol groups.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no map protocol
    {ip | novell | netbios | appletalk | other <aa:aa>}
    enet-v2
```

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The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Internet Protocol v4	HEX 08:00
novell	Novell Netware protocol	HEX 81:38
netbios	Netbios via TCP/IP	HEX f0:f0
appletalk	Appletalk	HEX 80:9b
other	Other protocol.	enter the hexadecimal protocol value. <ul style="list-style-type: none"> • other: aa:aa • IPV6: 86:DD • LLDP: 88:CC • PTP IEEE1588: 88:F7 • EAP (802.1X): 88:8E
enet-v2	Frame structure is Ethernet II	-

Result

The protocol is removed from all protocol groups.

Further notes

You create the protocol group with the `map protocol` command.

You can display the status of this function and other information with the `show vlan protocols-group` command.

6.1.2.5 protocol-vlan

Description

With this command, you enable the protocol-based classification on all interfaces.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
protocol-vlan
```

Result

The classification is enabled.

Further notes

You disable the setting with the `no protocol-vlan` command.

You can display the status of this function and other information with the `show vlan device info` command.

6.1.2.6 no protocol-vlan**Description**

With this command, you disable the protocol-based classification on all interfaces.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no protocol-vlan
```

Result

The classification is disabled.

Further notes

You enable the setting with the `protocol-vlan` command.

You can display the status of this function and other information with the `show vlan device info` command.

6.1.2.7 subnet-vlan**Description**

With this command, you enable IPv4 subnet-based VLAN on all interfaces.

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Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
subnet-vlan
```

Result

The classification is enabled.

Further notes

You disable the setting with the `no subnet-vlan` command.

You can display the status of this function and other information with the `show vlan device info` command.

You configure IPv4 subnet-based VLAN with the `map subnet` command.

6.1.2.8 no subnet-vlan

Description

With this command, you disable IPv4 subnet-based VLAN on all interfaces.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no subnet-vlan
```

Result

The setting is disabled.

Further notes

You enable the setting with the `subnet-vlan` command.

You can display the status of this function and other information with the `show vlan device info` command.

6.1.2.9 vlan

Description

With this command, you create a VLAN on the device and change to the VLAN configuration mode.

In the provider backbone bridge mode, this command is used to create user, service and backbone VLANs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
vlan <vlan-id(1-4094)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094

Do not enter any leading zeros with the number of the VLAN.

Result

The VLAN is created.

You are now in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Further notes

You delete the VLAN with the `no vlan` command.

You can display information about the VLAN with the `show vlan` command.

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6.1.2.10 no vlan

Description

With this command, you delete a VLAN on the device.

Requirement

- The VLAN must not be assigned to a physical port.
- You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameter:

```
no vlan <vlan-id(1-4094)>
```

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094

The VLAN with number 1 cannot be deleted.

Result

The VLAN is deleted

Further notes

With the `vlan` command, you create a VLAN on the device.

You can display information about the VLAN with the `show vlan` command.

6.1.2.11 vlan range

Description

With this command, you can select several VLANs and configure them together. The configurations are valid for all selected VLANs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
vlan range <vlan-id(1-4094)> - <vlan-id(2-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094
vlan-id	Number of the addressed VLAN	2 ... 4094

Enter a space before and after the hyphen, e.g. `vlan range 5 - 10`.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The command prompt is as follows:

```
CLI(config-vlan-range)#
```

Configuration commands you enter with this command prompt apply to all selected VLANs.

Further notes

With the command `exit`, you return to the Global configuration mode.

6.1.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

6.1.3.1 map subnet

Description

With this command, you configure IPv4 subnet-based VLAN.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
map subnet <ip-subnet-address> vlan <vlan-id(1-4094)>
<mask> [arp {suppress | allow}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip-subnet-address	IPv4 subnet address	Enter a valid subnet address.
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
mask	Subnet mask	aaa.bbb.ccc.ddd
arp	Keyword ARP protocol	-
suppress	Suppress the ARP protocol	-
allow	Allow the ARP protocol	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The subnet with subnet mask and subnet address is assigned to a VLAN.

Further notes

You cancel the setting with the `no map subnet` command.

You can display the status of this function and other information with the `show subnet-vlan mapping` command.

6.1.3.2 no map subnet

Description

With this command, you remove an IPv4 subnet from a VLAN.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no map subnet <ip-subnet-address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip-subnet-address	IPv4 subnet address	Enter a valid subnet address

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 subnet was removed.

Further notes

You configure the setting with the `map subnet` command.

You can display the status of this function and other information with the `show subnet-vlan mapping` command.

6.1.3.3 private-vlan mapping

Description

With this command you specify from which secondary PVLANS the IP interface of the primary PVLAN will be reachable.

Requirement

- The interface is configured as an IP interface.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
private-vlan mapping [{add | remove}] <vlan-list>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
add	Adds secondary PVLANS.	-
remove	Removes secondary PVLANS.	-
vlan-list	VLAN ID of the secondary PVLAN	Separate the PVLANS with commas if you specify several PVLANS.

Result

The IP interface of the primary PVLAN can be reached from the selected secondary PVLANS.

Further notes

You delete the link between secondary PVLANS and the IP interface of the primary PVLAN with the command `no private-vlan mapping`.

You display this setting with the `show interfaces` command with the `private-vlan mapping` parameter.

6.1.3.4 no private-vlan mapping

Description

With this command you delete the link between secondary PVLANS and the IP interface of the primary PVLAN with the command `.`

Requirement

- The interface is configured as an IP interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no private-vlan mapping
```

Result

The IP interface of the primary PVLAN cannot be reached from the selected secondary PVLANS.

Further notes

You configure a link between secondary PVLANS and the IP interface of the primary PVLAN with the command `private-vlan mapping`.

You display this setting with the `show interfaces` command with the `private-vlan mapping` parameter.

6.1.3.5 switchport acceptable-frame-type

Description

With this command, you configure which types of frames are accepted.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport acceptable-frame-type{all|tagged}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
all	All frames are accepted. Note: On a ring port only the parameter "all" is supported.	Default: all
tagged	Untagged frames are discarded.	-

Result

The setting is enabled.

Further notes

You can reset the setting to the default with the `no switchport acceptable-frame-type` command.

You can display the status of this function and other information with the `show vlan port config` command.

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6.1.3.6 no switchport acceptable-frame-type

Description

With this command, you reset the setting for the types of frames accepted by the interface to the default value.

The default value is `all`.

The interface accepts tagged and untagged frames.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport acceptable-frame-type
```

Result

The setting is reset to the default value.

Further notes

You configure the setting with the `switchport acceptable-frame-type` command.

You can display the status of this function and other information with the `show vlan port config` command.

6.1.3.7 switchport access vlan

Description

With this command, you assign an VLAN to an interface and configure the port VLAN identifier (PVID) for it.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport access vlan <vlan-id(1-4094)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094

Result

The Interface is added to the VLAN as an untagged port and the corresponding VLAN ID is set.

Further notes

You can reset the setting to the default with the `no switchport access vlan` command.

You display the setting and other information with the `show vlan port config` command.

6.1.3.8 no switchport access vlan

Description

With this command, you reset the setting for the port VLAN identifier (PVID) for an interface to the default value.

The default value is 1.

Requirement

You are in the interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport access vlan
```

Result

The setting is reset to the default value.

Further notes

You configure the setting with the `switchport access vlan` command.

You can display the status of this function and other information with the `show vlan port config` command.

6.1.3.9 switchport map protocols-group

Description

With this command, you assign the protocol group and a VLAN to an interface.

Requirement

- The protocol group is configured.
- You are in the Interface configuration mode
.The command prompt is:
`cli(config-if-$$$)#`

Syntax

Call up the command with the following parameters:

```
switchport map protocols-group  
    <group id(0-2147483647)>vlan<vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group id	Number of the group	0 ... 2147483647
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

Result

The group is assigned to the port and the VLAN.

Further notes

You delete the setting with the `no switchport map protocols-group` command.

You can display the status of this function and other information with the `show vlan protocols-group` command.

6.1.3.10 no switchport map protocols-group

Description

With this command, you delete the assignment of a configured protocol group to a specific VLAN.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no switchport map protocols-group <group id(0-2147483647)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
group id	Number of the group	0 ... 2147483647

Result

The assignment is deleted.

Further notes

You assign a protocol group and a VLAN to an interface with the `switchport map protocols-group` command.

You can display the status of this function and other information with the `show vlan protocols-group` command.

6.1.3.11 switchport mode

Description

With this command, you specify the operating mode for the switch port.

Requirement

- The interface is configured as a switch port.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport mode { trunk | hybrid }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
trunk	Configures the port as a trunk port that only forwards tagged frames. The port can then only be configured as the trunk port if the port is not entered in any VLAN that exchanges untagged frames. For the trunk port to forward tagged frames, all VLAN IDs to which the trunk port forwards frames must be stored. If a new VLAN is created, the VLAN ID is automatically entered at the trunk port. With a trunk port, the VLAN assignment is dynamic. Static configurations can only be created if, in addition to the trunk port property, the port is also entered statically as a member in the VLANs involved. An example of a static configuration is the assignment of the multicast groups in certain VLANs. If you execute the "acceptable frame-type all" command at the trunk port, the port also receives untagged frames.	-
hybrid	Configures the port as a hybrid port that accepts tagged and untagged frames.	Default: hybrid

Result

The operating mode is configured.

Further notes

You reset the operating mode to the default with the `no switchport mode` command.

You display this setting and other information with the `show vlan port config` command.

You configure the interface as a switch port with the `switchport` command.

6.1.3.12 no switchport mode

Description

With this command, you reset the operating mode for the switch port to the default.

The default value is Hybrid.

Requirement

- The interface is configured as a switch port.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport mode
```

Result

The setting is reset to the default value.

Further notes

You configure the operating mode with the `switchport mode` command.

You display this setting and other information with the `show vlan port config` command.

You configure the interface as a switch port with the `switchport` command.

6.1.3.13 `switchport mode private vlan`

Description

With this command, you specify the operating mode for the private VLAN port.

Requirement

- The interface is configured as a switch port.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport mode private-vlan {promiscuous | host}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
promiscuous	Configures the port as a promiscuous port. Promiscuous ports belong to a primary PVLAN. Connect devices to promiscuous ports that are intended to communicate with all other devices of the PVLAN.	GVRP must be disabled on the port.
host	Configures the port as a host port. Host ports belong to a secondary PVLAN. Connect devices to host ports that are only intended to communicate with certain devices of the PVLAN.	

Result

The operating mode for the private VLAN port is configured.

Further notes

You display this setting and other information with the `show vlan port config` command.

You configure the interface as a switch port with the `switchport` command.

You configure a host port with the `switchport private-vlan host-association` command.

You configure a promiscuous port with the `switchport private-vlan mapping` command.

6.1.3.14 switchport priority default

Description

With this command, you configure the priority default for the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport priority default <(0-7)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
-	Value for the priority default	0 ... 7 Default: 0

Result

The setting for the default priority of the interface is configured.

Further notes

You reset the priority default to the original default with the `no switchport priority default` command.

You display this setting and other information with the `show vlan port config` command.

6.1.3.15 no switchport priority default**Description**

With this command, you reset the priority default for the interface to the default value.

The default value is 0.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport priority default
```

Result

The setting is reset to the default value.

Further notes

You configure the priority default with the `switchport priority default` command.

You display this setting and other information with the `show vlan port config` command.

6.1.3.16 switchport private-vlan host-association

Description

With this command, you configure a host port.

The following settings are made:

- The interface becomes an untagged member of the primary PVLAN and its secondary PVLANS.
- With incoming untagged frames, the port VLAN-ID of the secondary VLAN is set.
- Ingress filtering is enabled.

Requirement

- The interface is configured as a host port.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport private-vlan host-association <primary-vlanId(1-4094)> <secondary-  
vlanId(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
primary-vlanId	VLAN ID of the primary PVLAN	1 ... 4094
secondary-vlanId	VLAN ID of the secondary PVLAN	1 ... 4094

Result

The interface is configured.

Further notes

You delete the configuration with the command.

You display this setting and other information with the commands `show vlan port config`, `show vlan` and `show vlan private-vlan`.

You configure the interface as a host port with the command.

6.1.3.17 no switchport private-vlan host-association

Description

With this command, you delete the configuration of a host port.

Requirement

- The interface is configured as a host port.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no switchport private-vlan host-association
```

Result

The configuration is deleted.

Further notes

You configure a host port with the `switchport private-vlan host-association` command.

You display this setting and other information with the commands `show vlan port config`, `show vlan` and `show vlan private-vlan`.

You configure the interface as a host port with the command.

6.1.3.18 switchport private-vlan mapping

Description

With this command, you configure a promiscuous port.

The following settings are made:

- The interface becomes an untagged member of the primary PVLAN and all secondary PVLANS.
- With incoming untagged frames, the port VLAN-ID of the primary VLAN is set.
- Ingress filtering is enabled.

Requirement

- The interface is configured as a promiscuous port.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport private-vlan mapping <primary_vlan_id(1-4094)> [{add | remove}]
[<secondary_vlan_list>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
primary_vlan_id	VLAN ID of the primary PVLAN	1 ... 4094
add	Adds secondary PVLANS.	-
remove	Removes secondary PVLANS.	-
secondary_vlan_list	VLAN ID of the secondary PVLAN	1 ... 4094 Separate the PVLANS with commas if you specify several PVLANS.

Result

The interface is configured.

Further notes

You delete the configuration with the `no switchport private-vlan mapping` command.

You display this setting and other information with the commands `show vlan port config`, `show vlan` and `show vlan private-vlan`.

You configure the interface as a promiscuous port with the `switchport mode` command.

6.1.3.19 no switchport private-vlan mapping

Description

With this command, you delete the configuration of a promiscuous port.

Requirement

- The interface is configured as a promiscuous port.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no switchport private-vlan mapping
```

Result

The configuration is deleted.

Further notes

You configure a promiscuous port with the `switchport private-vlan mapping` command.

You display this setting and other information with the commands `show vlan port config`, `show vlan` and `show vlan private-vlan`.

You configure the interface as a promiscuous port with the `switchport mode` command.

6.1.3.20 switchport pvid

Description

With this command, you assign an interface to a VLAN and configure the port VLAN identifier (PVID) for it. If a received frame has no VLAN tag, it has a tag added with the VLAN ID specified here and is sent according to the switch rules for the port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
switchport pvid <vlan-id(1-4094)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094

Result

The PVID is configured

Further notes

You can reset the setting to the default with the `no switchport pvid` command.

You configure the VLAN ID with the `switchport access vlan` command.

You display the setting and other information with the `show vlan port config` command.

6.1.3.21 no switchport pvid

Description

With this command, you reset the setting for the port VLAN identifier (PVID) for an interface to the default value.

The default value is 1.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport pvid
```

Result

The setting is reset to the default value.

Further notes

You configure the setting with the `switchport pvid` command.

You configure the VLAN ID with the `switchport access vlan` command.

You can display the status of this function and other information with the `show vlan port config` command.

6.1.3.22 tia interface

Description

With this command, you enable or disable the property TIA interface. The interface can be used for PROFINET.

Requirement

- The interface is enabled.
- You are in the Interface configuration mode of the VLAN interface.
The command prompt is:

```
cli (config-if-vlan-$$$) #
```


\$\$\$ stands for the numbering of the interface.

Syntax

Call the command without parameters:

```
tia-interface
```

Result

The TIA interface property is enabled exclusively for the specified VLAN. The function was disabled on the other interfaces.

Further notes

Note that only one VLAN interface can become the TIA interface.

6.1.4 Commands in the VLAN configuration mode

This section describes commands that you can call up in the VLAN Configuration mode.

In the Global Configuration mode, enter the `vlan $$$` command to change to this mode. When doing this, you need to replace the `$$$` placeholders with the relevant VLAN ID.

Commands relating to other topics that can be called in the VLAN Configuration mode can be found in the relevant sections.

- If you exit the VLAN Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the VLAN Configuration mode with the `end` command, you return to the Privileged EXEC mode.

6.1 VLAN

6.1.4.1 name

Description

With this command, you assign a name to the VLAN.

Requirement

You are in the VLAN Configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
name <vlan-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vlan-name	Name that will be assigned to the VLAN	max. 32 characters

Result

The VLAN is assigned a name.

Further notes

You delete name assignment for a VLAN with the `no name` command.

6.1.4.2 no name

Description

With this command, you delete the name assignment for a VLAN.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameters:

```
no name
```

Result

The name of the VLAN is deleted.

Further notes

You assign the VLAN a name with the command `name`.

6.1.4.3 ports

Description

With this command, you generate a list that specifies the behavior of the interfaces and replaces the existing VLAN configuration.

- Member Port (tagged port)
The interface is added permanently to the list of incoming and outgoing connections. Tagged and untagged frames are transferred.
- Untagged Port
The interface transfers untagged frames. If the VLAN ID (PVID) is set, incoming untagged frames are given a tag with the VLAN ID specified there. Received frames with a VLAN ID are forwarded according to the VLAN ID. With outgoing frames, the tag with the VLAN ID is removed.
- Forbidden Ports
This interface is not used for communication in a VLAN.

The "tagged port" and "untagged port" you specify with this command are used for outgoing data traffic.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```

ports
(
  [<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,...>]
  [portchannel<a,b,c-d>]
]
[name<vlan-name>] [add]
    
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
/a-b,0/c,...	Port no. of the interface	
port-channel	Keyword for a port channel	-
a,b,c-d	Port no. of the interface	Enter a valid interface name
untagged	Keyword for interfaces or ports that transfer data packets without VLAN marking	-
all	Specifies that all interfaces or ports are set to "untagged"	-
forbidden	Keyword for forbidden interfaces or ports	-
name	Keyword for the name assignment	-
vlan-name	Name of the VLAN	max. 32 characters
add	Adds and interface to an existing configuration.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The existing VLAN configuration is replaced. To add individual interfaces, you need to recreate the full list.

Further notes

You display details of the function with the `show vlan` command.

You reset the settings with the `no ports` command.

6.1.4.4 no ports

Description

With this command, you remove ports from a VLAN.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli (config-vlan-$$$) #
```

Syntax

Call up the command with the following parameters:

```
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,...>]
    [portchannel<a,b,c-d>]
    [all]
  )
]
[name<vlan-name>]
```

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The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type of interface	Enter a valid interface.
/a-b,0/c,...	Port no. of the interface	
port-channel	Keyword for a port channel	-
a,b,c-d	Port no. of the interface	Enter a valid interface.
untagged	Keyword for interfaces or ports that transfer data packets without VLAN marking	-
all	Specifies that all interfaces or ports are set to "untagged"	-
forbidden	Keyword for forbidden interfaces or ports	-
name	Keyword for the name assignment	-
vlan-name	Name of the VLAN	max. 32 characters

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The ports are removed from the VLAN configuration.

Further notes

It is possible to remove individual ports from a VLAN configuration without needing to rewrite the entire configuration (in contrast to creating ports because it is not possible to add individual ports later).

You display details of the function with the `show vlan` command.

You configure the setting with the `ports` command.

6.1.4.5 private-vlan

Description

With this command you define a VLAN as a private VLAN and specify the PVLAN type.

Requirement

You are in the VLAN Configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
private-vlan { primary | isolated | community }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
primary	With this type, you define a primary PVLAN. The primary PVLAN uses the VLAN ID of the VLAN.	-
isolated	With this type, you define a secondary PVLAN. Only one device can exist in this secondary PVLAN. The secondary PVLAN has a specific VLAN ID.	-
community	With this type, you define a secondary PVLAN. The devices in this secondary PVLAN can communicate with each other via layer 2. The secondary PVLAN has a specific VLAN ID.	-

Result

The PVLAN is defined and the PVLAN type specified.

Further notes

You delete the configuration as a private VLAN with the `no private-vlan` command.

You display this setting with the `show vlan private-vlan` command.

6.1.4.6 no private-vlan

Description

With this command, you delete the configuration as a private VLAN.

Requirement

You are in the VLAN Configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no private-vlan
```

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Result

The VLAN is not a private VLAN.

Further notes

You define a VLAN as a private VLAN and specify the PVLAN type with the command `private-vlan`.

You display this setting with the `show vlan private-vlan` command.

6.1.4.7 private-vlan association

Description

With this command, you assign secondary PVLANS to a primary PVLAN.

Requirement

- The interface is configured as a primary PVLAN.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
private-vlan association [{add|remove}] <secondary_vlan_list>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
add	Adds a secondary PVLAN..	-
remove	Removes a secondary PVLAN..	-
second-ary_vlan_list	Number of the secondary PVLAN	Separate the PVLANS with commas if you specify several PVLANS.

Result

The secondary PVLANS are assigned to the primary PVLAN.

Further notes

You delete the link between secondary PVLANS and a primary PVLAN with the command `no private-vlan association`.

You display this setting with the `show interfaces` command.

You configure a an interface as a primary PVLAN with the `private-vlan` command.

6.1.4.8 no private-vlan association

Description

With this command you delete the link between secondary PVLANS and a primary PVLAN.

Requirement

- The interface is configured as a primary PVLAN.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no private-vlan association
```

Result

The secondary PVLANS are not assigned to the primary PVLAN.

Further notes

You assign secondary PVLANS to a primary PVLAN with the command `private-vlan association`.

You display this setting with the command.

You configure a an interface as a primary PVLAN with the `private-vlan` command.

6.1.4.9 transparent-vlan

Description

With this command, you change a VLAN to the transparent mode.

Ports that were assigned to this VLAN as members or untagged members now become transparent ports.

This means the following:

- The port VLAN ID of the transparent ports is set to the ID of this VLAN.
- Untagged frames that are received at these ports are forwarded to all other transparent ports once again without tag as long as they are not forwarded to a standard VLAN by a protocol or subnet rule.
- Frames tagged with VLAN ID "0" and that are received at these ports are forwarded to all other transparent ports once again tagged with VLAN ID "0" as long as they are not forwarded to a standard VLAN by a protocol or subnet rule.

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- Frames tagged with the VLAN ID of the transparent VLAN and that are received at these ports are forwarded to all transparent ports once again tagged with the VLAN ID of the transparent VLAN.
- Other frames are forwarded according to the normal VLAN rules and a transparent port behaves like an untagged member in this VLAN.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameters:

```
transparent-vlan
```

Result

The VLAN is changed to transparent mode.

Further notes

- All ports that were not members or untagged members in the relevant VLAN are automatically set to the Forbidden status after the command executes.
- As long as a VLAN is configured as a transparent VLAN, the ports belonging to this VLAN cannot be modified.
- Note that only one VLAN can be configured as a transparent VLAN.

You disable the setting with the `no transparent-vlan` command.

6.1.4.10 no transparent-vlan

Description

With this command, you return a VLAN from the transparent mode to the mode conforming with the standard.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameters:

```
no transparent-vlan
```

Result

If the VLAN was configured as a transparent VLAN, this function is deactivated.

This means the following:

- All transparent ports become untagged members in this VLAN
- The port VLAN ID of the previous transparent ports remains set to the ID of this VLAN.
- All other ports remain marked as forbidden in this VLAN.

Further notes

You enable the setting with the `transparent-vlan` command.

6.2 Link aggregation

This section describes commands that configure or manage the bundling of interfaces or connections between devices.

6.2.1 The "show" commands

This section describes commands with which you display various settings.

6.2.1.1 show etherchannel

Description

This command shows the settings of the Etherchannel.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show etherchannel [[channel-group-number]
                  {detail|load-balance|port|port-channel|summary|protocol}]
```

The parameters have the following meaning:

Parameter	Description
channel-group-number	Number of the Channel-Group
detail	Detailed display of the settings
load-balance	Shows which load balancing method is enabled
port	Information on the Etherchannel port
port-channel	Information on the Port-Channel
summary	Brief overview of the settings of a Channel-Group
protocol	Specification of the protocol set for a Channel-Group

If you do not select any parameters from the parameter list, the settings of all channels will be displayed in detail.

Result

The Etherchannel settings are displayed.

6.2.1.2 show interfaces etherchannel

Description

This command shows the interface-specific information for a port channel.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show interfaces[<interface-type><interface-id>]etherchannel
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select an interface, information for all interfaces is displayed.

Result

The interface-specific information for a port channel is displayed.

Note

When a port is assigned to a link aggregation but is not active (e.g. link down), the values displayed may differ from the values configured for the link aggregation.

If the port in the link aggregation becomes active, individual port configurations such as DCP forwarding are overwritten with the configured values of the link aggregation.

6.2.1.3 show lacp

Description

This command shows the information about the settings and information about the ports involved in the link aggregation. The number of sent and received packets is also displayed.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show lacp [<port-channel (1-8)>] {counters|neighbor[detail]}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port-channel	Number of the Channel-Group	1 ... 8
counters	Shows the values of the counters	-
neighbor	Displays information on neighbor ports	-
detail	Displays detailed information on neighbor ports	-

If you do not select a port channel, information for all available interfaces is displayed.

Result

The information is displayed.

6.2.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

6.2.2.1 port-channel load-balance

Description

With this command, you configure the load balancing policy for the interconnected ports of the previously defined port channels.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
port-channel load-balance
    {mac-src-dst | ip-mac-src-dst}
    [<port-channel-index(1-8)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mac-src-dst	Load balancing is based on the MAC addresses of the sources and destinations.	Default: enabled
ip-mac-src-dst	Load balancing is based on the IP and MAC addresses of the sources and destinations.	-
port-channel-index	Number of the port channel	1 ... 8

If you do not enter a value for `port-channel-index`, the setting is used for all port channels.

Result

The load balancing policy is set.

Further notes

You can reset the setting for the load balancing policy to the default with the `no port-channel load-balance` command.

You can display the status of this function and other settings with the `show etherchannel` command.

6.2.2.2 no port-channel load-balance

Description

With this command, you reset the load balancing policy for the interconnected ports of the previously defined port channels to the default.

The default value is `src-dest-mac`.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no port-channel load-balance [<port-channel-index(1-8)>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<code>port-channel-index</code>	Number of the port channel	1 ... 8

If you do not enter a value for `port-channel-index`, the setting is used for all port channels.

Result

The load balancing policy is reset to the default value.

Further notes

You can change the setting for the load balancing policy with the `port-channel load-balance` command.

You can display the status of this function and other settings with the `show etherchannel` command.

6.2.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

6.2.3.1 channel-group

Description

With this command, you add an interface to an Etherchannel.

Requirement

With the `interface po <channel-group-id(1-8)>` command, you have already generated a logical interface for an Etherchannel.

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
channel-group <channel-group-number(1-8)> mode{on|active|passive}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
channel-group-number	Number of the Channel-Group	1 ... 8
on	Adds the interface without LACP to a Channel-Group. This corresponds to manual bundling.	If you add a configured port to a link aggregation, the port adopts the configuration of the link aggregation. If you take the port out of the link aggregation, the settings of the port are reset to the factory settings.

Parameter	Description	Range of values / note
active	The negotiation of a connection via LACP is started unconditionally	-
passive	The negotiation of a connection via LACP is started when an LACP packet arrives from the connection partner	-

Result

The Etherchannel is configured.

6.2.3.2 no channel-group

Description

With this command, you remove the interface from an Etherchannel.

Requirement

You are in the interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no channel-group
```

Result

The interface is deleted from the Etherchannel.

6.3 Spanning Tree

The Spanning Tree Protocol is used to monitor a LAN for redundant connections. These are blocked and reactivated when necessary if there are changes to the network topology.

This section describes the commands of the Spanning Tree Protocol (STP), the Rapid Spanning Tree Protocol (RSTP) and the Multiple Spanning Tree Protocol (MSTP).

Note

Avoiding bad configurations

When using the commands in this section, you should take particular care because a bad configuration of this function can have serious negative affects on the network.

6.3.1 The "show" commands

This section describes commands with which you display various settings.

6.3.1.1 show spanning-tree

Description

This command shows the settings of the spanning tree function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description
summary	Shows a summary
blockedports	Shows the blocked ports
pathcost method	Shows whether 16-bit (short) or 32 bit (long) values are used in the calculation

Result

The settings for the spanning tree function are displayed.

Further notes

You can show further settings for special aspects of the Spanning Tree Protocol with the following commands:

- `show spanning-tree active`
- `show spanning-tree bridge`
- `show spanning-tree detail`
- `show spanning-tree interface`
- `show spanning-tree root`
- `show spanning-tree mst`

6.3.1.2 show spanning-tree active

Description

This command shows the settings for the active ports of the spanning tree function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show spanning-tree active [detail]
```

The parameter has the following meaning:

Parameter	Description
detail	Shows settings in detail

Result

The settings for the active ports of the spanning tree function are displayed.

6.3.1.3 show spanning-tree bridge

Description

This command shows the settings of the spanning tree function of the bridge.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description
address	Shows the MAC address of the bridge
forward-time	Shows the time that the bridge is in the listening mode when changing from the blocking mode to the learning mode
hello-time	Shows the time after which the bridge sends configuration frames (BPDUs)
id	Shows the ID of the bridge
max-age	Shows the maximum age of the data packet after which it is deleted
protocol	Shows the protocol used
priority	Shows the priority of the bridge
detail	Shows detailed information about the spanning tree settings of the interface

Result

The settings for the spanning tree function of the bridge are displayed.

6.3.1.4 show spanning-tree detail

Description

This command shows the detailed settings of the spanning tree function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show spanning-tree detail
```

Result

The detailed settings for the spanning tree function are displayed.

6.3.1.5 show spanning-tree interface

Description

This command shows the settings of the ports for the spanning tree function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
cost	Shows the port costs used to calculate the lowest-cost path.	-
priority	Shows the priority of the port.	-
portfast	Shows whether spanning-tree port-fast is enabled.	-
rootcost	Shows the costs of the path to the root bridge.	-
restricted-role	Shows whether spanning-tree restricted-role is enabled.	-
restricted-tcn	Shows whether spanning-tree restricted-tcn is enabled.	-
state	Shows the status of the interface.	-

Parameter	Description	Range of values / note
stats	Shows the counters of the various BPDU transmissions.	-
detail	Shows detailed information about the spanning tree settings of the interface.	-

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings of the ports for the spanning tree function are displayed.

6.3.1.6 show spanning-tree interface layer2-gateway-port

Description

This command shows the settings of Layer 2 Gateway Port (L2GP). For example the priority, the MAC address and the status of L2GP are displayed.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show spanning-tree interface
[<interface-type><interface-id>]
layer2-gateway-port
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings for Layer 2 Gateway Port (L2GP) are displayed.

6.3.1.7 show spanning-tree mst

Description

This command shows various settings of the spanning tree configuration specific to a Common Internal Spanning Tree (CIST) instance or a selected instance of the Multiple Spanning Tree Protocol.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with one of the following parameter assignments:

```
show spanning-tree mst[<instance-id(1-64|4094)>][detail]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Number of the instance or range of instances whose settings are displayed	<ul style="list-style-type: none"> • 1 ... 64 • 4094
detail	Shows detailed information about the selected interface	-

Result

The settings for the spanning tree configuration are displayed.

Further notes

You display the general settings for the Spanning Tree Protocol with the `show spanning-tree` command.

6.3.1.8 show spanning-tree mst configuration

Description

This command shows various settings for an instance of the Multiple Spanning Tree Protocol.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show spanning-tree mst configuration
```

Result

The settings of an instance of the Multiple Spanning Tree protocol are displayed.

Further notes

You display the general settings for the Spanning Tree Protocol with the `show spanning-tree` command.

6.3.1.9 show spanning-tree mst interface

Description

This command shows port-specific settings of a Multiple Spanning Tree configuration.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with one of the following parameter assignments:

```
show spanning-tree mst  
  [<instance-id(1-64|4094)>] interface <interface-type><interface-id>  
  [{stats|hello-time|detail}]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Number of the instance or range of instances whose settings are displayed	<ul style="list-style-type: none"> • 1 ... 64 • 4094
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	
stats	Shows the number of incoming and outgoing packets for each path of the interface	-
hello-time	Shows the intervals at which the root switch sends its "Hello" message to the other switches	-
detail	Shows detailed information about the selected interface	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The port-specific settings are displayed.

Further notes

You display the general settings for the Spanning Tree Protocol with the `show spanning-tree` command.

6.3.1.10 show spanning-tree passive-listening-compatibility

Description

This command shows whether or not the "Enhanced Passive Listening Compatibility" function is enabled or disabled.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with one of the following parameter assignments:

```
show spanning-tree passive-listening-compatibility [interface [<interface-
type><interface-id>]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The setting for the "Enhanced Passive Listening Compatibility" function is displayed.

Further notes

You enable the "Enhanced Passive Listening Compatibility" function with the `spanning-tree passive-listening-compatibility` command.

You disable the "Enhanced Passive Listening Compatibility" function with the `no spanning-tree passive-listening-compatibility` command.

6.3.1.11 show spanning-tree root

Description

This command shows the settings of the root bridge for the spanning tree function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description
address	Shows the MAC address of the root bridge
cost	Shows the costs of the connection to the root bridge.
forward-time	Shows the time that the bridge is in the listening mode when changing from the blocking mode to the learning mode
id	Shows the ID of the root bridge
max-age	Shows the maximum age of the data packet after which it is deleted
port	Shows the interface via which the spanning tree is set up
priority	Shows the priority of the bridge
detail	Shows detailed information about the root bridge

Result

The settings of the root bridge for the spanning tree function are displayed.

6.3.2 clear spanning-tree detected protocols

Description

With this command, you restart the protocol transmission process on a specific or on all interfaces and force renegotiation of the connection settings with the neighboring devices.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
clear spanning-tree detected protocols
    [{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the process is restarted for all interfaces.

Result

The connection settings for spanning tree are renegotiated.

6.3.3 clear spanning-tree counters

Description

With this command, you reset all the statistical counters of the spanning tree function at the device and port level.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
clear spanning-tree counters
```

Result

The spanning tree counters are reset.

6.3.4 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

6.3.4.1 **spanning-tree**

Description

The Spanning Tree Protocol is used to monitor a LAN for redundant connections. These are blocked and reactivated when necessary if there are changes to the network topology.

With this command, you enable the spanning tree function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
spanning-tree
```

Result

The spanning tree function is enabled.

Further notes

As default the function is "enabled".

You disable the spanning tree function with the `no spanning tree` command.

You can display the status of this function and other information with the `show spanning tree detail` command.

You can display information about active ports with the `show spanning tree active` command.

6.3.4.2 **no spanning-tree**

Description

With this command, you disable the spanning tree function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
no spanning-tree
```

Result

The spanning tree function is disabled.

Further notes

You enable the spanning tree function with the `spanning-tree` command.

You can display the status of this function and other information with the `show spanning-tree detail` command.

You can display information about active ports with the `show spanning-tree active` command.

6.3.4.3 spanning-tree compatibility

Description

With this command, you configure the compatibility version of the protocol that will be used by the spanning tree function.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
stp	The version is compatible with the Spanning Tree protocol	-
rst	The version is compatible with the Rapid Spanning Tree protocol	Default: enabled
mst	The version is compatible with the Multiple Spanning Tree protocol	-

Result

The compatibility version of the protocol is selected.

Further notes

You can reset the setting to the default `mst` with the `no spanning-tree compatibility` command.

You can display the status of this function and other information with the `show spanning tree detail` command.

You can display information about active ports with the `show spanning tree active` command.

6.3.4.4 no spanning-tree compatibility

Description

With this command, you reset the compatibility version of the protocol of the spanning tree function to the default value.

The default value is MST.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no spanning-tree compatibility
```

Result

The compatibility version is reset to the default value.

Further notes

You configure the setting with the `spanning-tree compatibility` command.

You can display the status of this function and other information with the `show spanning tree detail` command.

6.3.4.5 spanning-tree mst configuration

Description

With this command, you change to the MSTP configuration mode.

Requirement

- MSTP is enabled
- Compatibility mode: MSTP

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
spanning-tree mst configuration
```

Result

You are now in the MSTP configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Further notes

You exit the MSTP configuration mode with the `end` or `exit` command.

6.3.4.6 spanning-tree mst max-hops

Description

With this command, you configure the maximum number of nodes (hops) that a path can run through in an MST.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
spanning-tree mst max-hops <value(6-40)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Maximum number of hops that a path can run through in an MST	6 ... 40 Default: 20

Result

The setting for the maximum number of hops is configured.

Further notes

You can reset the setting for the maximum number of nodes to the default with the `no spanning-tree mst max-hops` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.3.4.7 no spanning-tree mst max-hops

Description

With this command, you reset the maximum number of hops that a path in an MST can run through to the default value.

The default value is 20.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

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

Result

The setting for the maximum number of nodes is reset to the default value.

Further notes

You can configure the setting for the maximum number of nodes with the `spanning-tree mst max-hops` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.3.4.8 spanning-tree mst instance-id root

Description

With this command you specify whether the device is a root bridge (primary) or a substitute root bridge (secondary).

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree mst{instance-id<instance-id(1-64)>}root{primary|secondary}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Keyword for the instance	-
instance-id	Number of the instance	1 ... 64
primary	The priority of the device is set to a low value so that the device can become the root bridge (primary) of the Spanning Tree instance. The lower the value, the higher the priority.	The priority is set to the value 24576.
secondary	The priority of the device is set to a low value so that the device becomes the substitute root bridge (secondary) of the Spanning Tree instance. If the root bridge (primary) fails, the substitute root bridge (secondary) takes over the task of the root bridge without delay.	The priority is set to the value 28672.

Result

The function of the device is specified.

Further notes

You disable the root bridge with the `no spanning-tree mst instance-id root` command.

You display this setting and other information with the commands that start with `show spanning tree ...`

6.3.4.9 no spanning-tree mst instance-id root

Description

With this command, you disable the "root bridge" function on the device.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no spanning-tree mst{instance-id<instance-id(1-64)>}root
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Keyword for the instance	-
instance-id	Number of the instance	1 ... 64

Result

The "root bridge" function is disabled.

Further notes

You enable the root bridge function with the `spanning-tree mst instance-id root` command.

You display this setting and other information with the commands that start with `show spanning tree`

6.3.4.10 spanning-tree passive-listening-compatibility

Description

With this command you enable the "Enhanced Passive Listening Compatibility" function.

If you enable the "Enhanced Passive Listening Compatibility" function, the IE switch sends topology change frames via the (R)STP edge port that caused the topology change.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
spanning-tree passive-listening-compatibility
```

Result

The "Enhanced Passive Listening Compatibility" function is enabled.

Further notes

You disable the function with the `no spanning-tree passive-listening-compatibility` command.

You can display the status of this function with the `show spanning-tree passive-listening-compatibility` command.

6.3.4.11 no spanning-tree passive-listening-compatibility

Description

With this command you disable the "Enhanced Passive Listening Compatibility" function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no spanning-tree passive-listening-compatibility
```

Result

The "Enhanced Passive Listening Compatibility" function is disabled.

Further notes

You enable the function with the `spanning-tree passive-listening-compatibility` command.

You can display the status of this function with the `show spanning-tree passive-listening-compatibility` command.

6.3.4.12 spanning-tree priority

Description

With this command, you configure the priority of the device. Which device becomes the root bridge is decided based on the priority. The bridge with the highest priority becomes the root bridge. The lower the value, the higher the priority.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree[mst <instance-id(1-64)>] priority <value(0-61440)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mst	Keyword for a Multiple Spanning Tree instance	-
instance-id	Number of the instance	1 ... 64
priority	Keyword for the priority	-
value	Value for the priority	0 ... 61440 Default: 32768

You can only change the value for the priority in the steps of 4096.

Result

The priority of the device is configured.

Further notes

You can reset the setting to the default with the `no spanning-tree priority` command.

You display this setting and other information with the commands that start with `show spanning-tree`

6.3.4.13 no spanning-tree priority

Description

With this command, you reset the priority of the device back to the default value.

The default value is 32768.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no spanning-tree[mst <instance-id(1-64)>]priority
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mst	Keyword for a Multiple Spanning Tree instance	-
instance-id	Number of the instance	1 ... 64

Result

The priority of the device is reset to the default value.

Further notes

You configure the setting with the `spanning-tree priority` command.

You display this setting and other information with the commands that start with `show spanning-tree ...`

6.3.4.14 Time settings for the Spanning Tree protocol

spanning-tree (time settings)

Description

With this command, you configure the various time settings of the spanning tree function:

- With the `forward-time` option, you configure the time after which a port changes its spanning tree status from "Blocking" to "Forwarding".
- With the `hello-time` option, you configure the time after which the bridge sends its configuration frames (BPDUs).
- With the `max-age` option, you configure the time after which the information of the BPDUs becomes invalid.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
spanning-tree{forward-time<seconds (4-30)>|hello-time<seconds (1-2)>|
max-age<seconds (6-40)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
forward-time	Keyword for the time after which a port changes its spanning tree status from "Blocking" to "Forwarding"	-
seconds	Time after which the changeover takes place	4 ... 30 Default: 15
hello-time	Keyword for the time after which the bridge sends its configuration BPDUs	-
seconds	Time after which they are sent	1 ... 2 Default: 2
max-age	Keyword for the time after which the information of the BPDUs becomes invalid	-
seconds	Maximum age of the BPDUs in seconds	6 ... 40 Default: 20

Note

Dependencies when setting the timing

If you specify the time settings for spanning tree, you need to keep to the following two rules:

- $2 * (\text{forward-time} - 1) \geq \text{max-age}$
- $\text{max-age} \geq 2 * (\text{hello-time} + 1)$

Result

The selected setting for the time is configured.

Further notes

You reset the time settings to the default values with the `no spanning-tree forward-time`, `no spanning-tree hello-time` or `no spanning-tree max-age`.

If you call the `no spanning-tree` command without parameters, you disable the spanning tree function. The configured time settings are retained.

If you call the `restart factory` command, the system restarts with the factory configuration settings. All time settings are reset.

You display these settings and other information with the commands that start with `show spanning-tree ...`

no spanning-tree (time settings)

Description

With this command in conjunction with the relevant parameter you reset the time settings of the spanning tree function to the default values.

If you call the command without parameters, you disable the spanning tree function. The configured time settings are retained.

If you call the `restart factory` command, the system restarts with the factory configuration settings. All time settings are reset.

The default values are as follows:

Parameter	Default value
<code>forward-time</code>	15 seconds
<code>hello-time</code>	2 seconds
<code>max-age</code>	20 seconds

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description
<code>forward-time</code>	Time after which a port changes its spanning tree status from "Blocking" to "Forwarding"
<code>hello-time</code>	Time after which the bridge sends its configuration frames (BPDUs)
<code>max-age</code>	Time after which the information of the BPDUs becomes invalid

Result

The selected setting for the time is reset to the default value.

Further notes

You configure the time with the `spanning-tree` command (time settings).

You display these settings and other information with the commands that start with `show spanning-tree`

6.3.5 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

6.3.5.1 spanning-tree

Description

With this command, you configure the various properties of the spanning tree function:

- With the `cost` option, you configure the port costs used to calculate the lowest-cost path.
- With the `disable` option, you disable the interface for the spanning tree function.
- With the `link-type` option, you configure the connection status of the following network segment. The following settings are possible:
 - `point-to-point` – the interface communicates with precisely one network component
 - `shared` – the interface is connected to more than one network component
- With the `portfast` option, you enable the PortFast function on the interface. The interface is connected to an end device and can therefore ignore the waiting time before changing to Forwarding mode.
- With the `port-priority` option, you configure the priority of the interface for negotiating a spanning tree configuration.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
cost	Keyword Describes the costs of the port for calculating the lowest cost path.	0 ... 200000000 Default: if dynamic calculation of the path costs is not enabled: <ul style="list-style-type: none"> • 200000 for physical interfaces • 199999 for port channels
disable	disables the interface for spanning tree	- Default: The spanning tree function is enabled on the interface
link-type	Connection status of the following network segment	<ul style="list-style-type: none"> • point-to-point • shared Default: <ul style="list-style-type: none"> • point-to-point The connection is configured as full-duplex <ul style="list-style-type: none"> • shared in all other cases
portfast	Enables the PortFast function	- Default: disabled
port-priority	Priority of the interface	0 ... 240 in steps of 16 Default: 128

Note

Configure multiple properties

With each call of the command, you can configure precisely one property. If you want to configure several properties, call the command several times.

Result

The selected property is configured.

Further notes

You can reset the setting to the default with the `no spanning-tree (properties)` command.

You display these settings and other information with the commands that start with `show spanning tree ...`

6.3.5.2 no spanning-tree

Description

With this command, you reset the various properties of the spanning tree function to the default value:

The default values are as follows:

Parameter	Default value
<code>cost</code>	if dynamic calculation of the path costs is not enabled: <ul style="list-style-type: none"> • 200000 for physical interfaces • 199999 for port channels
<code>disable</code>	The spanning tree function is enabled on the interface
<code>link-type</code>	<ul style="list-style-type: none"> • <code>point-to-point</code> <p>The connection is configured as <code>full-duplex</code></p> <ul style="list-style-type: none"> • <code>shared</code> <p>in all other cases</p>
<code>portfast</code>	disabled
<code>port-priority</code>	128

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description
<code>cost</code>	Keyword for the costs of the port for calculating the lowest-cost path.
<code>disable</code>	Enables the interface for spanning tree.
<code>link-type</code>	Connection status of the following network segment
<code>portfast</code>	Disables the PortFast function.
<code>port-priority</code>	Keyword for the priority of the interface

Note

Configure multiple properties

With each call of the command, you can configure precisely one property.
If you want to configure several properties, call the command several times.

Result

The selected setting was reset to the default value.

Further notes

You configure the setting with the `spanning-tree` command (properties).

You display these settings and other information with the commands that start with `show spanning tree`

6.3.5.3 `spanning-tree mst`

Description

With this command, you configure the various properties of the Multiple Spanning Tree function:

- With the `cost` option, you configure the port costs used to calculate the lowest-cost path.
- With the `port-priority` option, you configure the priority of the interface for negotiating a Multiple Spanning Tree configuration.
- With the `disable` option, you disable the interface for the Multiple Spanning Tree function.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree mst<instance-id(1-64)>
    {cost(0-200000000)|port-priority (0-240)|disable}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Number of the addressed instance	1 ... 64
cost	Costs of the port for calculating the lowest cost path.	0 ... 200000000 Default: <ul style="list-style-type: none"> • 200000 for physical interfaces • 199999 for port channels
port-priority	Priority of the interface	0 ... 240 in steps of 16 Default: 128
disable	disables the interface for multiple spanning tree	- Default: The Multiple Spanning Tree function is enabled on the interface

Note

Configure multiple properties

With each call of the command, you can configure precisely one property.
If you want to configure several properties, call the command several times.

Result

The selected property is configured.

Further notes

You can reset the setting to the default with the `no spanning-tree mst (properties)` command.

You display these settings and other information with the commands that start with `show spanning tree`

6.3.5.4 no spanning-tree mst

Description

With this command, you reset the various properties of the Multiple Spanning Tree function to the default value.

The default values are as follows:

Parameter	Default value
cost	<ul style="list-style-type: none"> • 200000 for physical interfaces • 199999 for port channels
port-priority	128
disable	The Multiple Spanning Tree function is enabled on the interface

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no spanning-tree mst<instance-id(1-64)>{cost|port-priority|disable}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Number of the addressed instance	1 ... 64
cost	Keyword for the costs of the port for calculating the lowest-cost path.	-
port-priority	Keyword for the priority of the interface	-
disable	Enables the interface for multiple spanning tree.	-

Note

Configure multiple properties

With each call of the command, you can configure precisely one property.
If you want to configure several properties, call the command several times.

Result

The selected setting is reset to the default value.

Further notes

You configure the setting with the `spanning-tree mst` command (properties).

You display these settings and other information with the commands that start with `show spanning tree ...`

6.3.5.5 spanning-tree auto-edge

Description

With this command, you enable automatic discovery of a bridge connected to the interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The automatic discovery of a bridge on the interface is enabled.

Further notes

The automatic discovery of a bridge on the interface is disabled with the `no spanning-tree auto-edge` command.

6.3.5.6 no spanning-tree auto-edge

Description

With this command, you disable automatic discovery of a bridge connected to the interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The automatic discovery of a bridge on the interface is disabled.

Further notes

The automatic discovery of a bridge on the interface is enabled with the `spanning-tree auto-edge` command.

6.3.5.7 spanning-tree bpdutransmit

Description

With this command, you enable or disable the BPDU transmit status at the port.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree bpdutransmit{enabled|disabled}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
enabled	BPDU packets are transmitted at the port	Default: enabled
disabled	BPDU packets are not transmitted at the port	-

Result

The BPDU transmit status has switched over.

Further notes

You can display the status of this function and other information with the `show spanning-tree interface` command with the `detail` option.

6.3.5.8 spanning-tree bpdu-receive

Description

With this command, you enable or disable the BPDU receive status at the port.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
enabled	BPDU packets are received at the port	Default: enabled
disabled	BPDU packets are ignored at the port	-

Result

The BPDU receive status is enabled or disabled.

Further notes

You can display the status of this function and other information with the `show spanning-tree interface` command with the `detail` option.

6.3.5.9 spanning-tree bpdudfilter

Description

With this command, you configure the BPDU transmit status for a port.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
disable	The transfer of BPDU packets is disabled for the port	Default: disabled
enable	The transfer of BPDU packets is enabled for the port	-

Result

The BPDU transmit status is configured.

6.3.5.10 spanning-tree layer2-gateway-port

Description

With this command, you configure a port as a layer 2 gateway port.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The port is configured as a layer 2 gateway port.

Further notes

You delete the configuration of a port as a layer 2 gateway port with the command `no spanning-tree layer2-gateway-port`.

You can display other information with the `show spanning-tree interface` command with the `detail` option.

6.3.5.11 no spanning-tree layer2-gateway-port

Description

With this command, you delete the configuration of the port as a layer 2 gateway port.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The configuration of the port as a layer 2 gateway port is deleted.

Further notes

You configure a port as a layer 2 gateway port with the command `spanning-tree layer2-gateway-port`.

You can display other information with the `show spanning-tree interface` command with the `detail` option.

6.3.5.12 spanning-tree loop-guard

Description

This function prevents alternative ports or root ports becoming designated ports if there is a disruption of a one-way link.

With this command, you enable the function.

Requirement

- Spanning tree is enabled.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The "Spanning Tree Loop Guard" function is enabled.

Further notes

You disable the setting with the `no spanning-tree loop-guard` command.

You can display the status of this function and other information with the following commands:

- `show spanning-tree detail`
- `show spanning-tree active detail`
- `show spanning-tree interface`

6.3.5.13 no spanning-tree loop-guard

Description

This function prevents alternative ports or root ports becoming designated ports if there is a disruption of a one-way link.

With this command, you disable the function.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The "Spanning Tree Loop Guard" function is disabled.

Further notes

You enable the setting with the `spanning-tree loop-guard` command.

You can display the status of this function and other information with the following commands:

- `show spanning-tree detail`
- `show spanning-tree active detail`
- `show spanning-tree interface`

6.3.5.14 `spanning-tree restricted-role`

Description

With this command, you prevent the port adopting the role of root port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

As default the function is "disabled".

Result

The port is prevented from adopting the role of root port.

Further notes

You cancel the lock with the `no spanning-tree restricted-role` command.

You can display the status of this function and other information with the `show spanning-tree detail` command.

6.3.5.15 `no spanning-tree restricted-role`

Description

With this command, you release the port for the role as root port.

Requirement

You are in the interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The port is released for the role of root port.

Further notes

You prevent the port adopting the role of the root port with the `spanning-tree restricted-role` command.

6.3.5.16 `spanning-tree restricted-tcn`

Description

With this command, you restrict the port for the Topology Change Notification (TCN) function. The port cannot initiate any modifications to the network topology.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The port is prevented from using the TCN function.

Further notes

You cancel the lock with the `no spanning-tree restricted-tcn` command.

You can display the status of this function and other information with the `show spanning-tree detail` command.

6.3.5.17 `no spanning-tree restricted-tcn`

Description

With this command, you release the port for the TCN function.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The port is released for the TCN function.

Further notes

You restrict the port for the TCN function with the `spanning-tree restricted-tcn` command.

6.3.5.18 `spanning-tree mst hello-time`

Description

With this command, you configure the Hello time after which the bridge sends its configuration frames (BPDUs).

A change to this value applies to all MST instances active on this interface.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree mst hello-time <seconds(1-2)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Time after which the bridge sends its configuration frames (BPDUs)	1 ... 2 Default: 2

Result

The setting for the hello time is configured.

Further notes

You can reset the setting for the hello time to the default with the `no spanning-tree mst hello-time` command.

You display this setting and other information with the commands that start with `show spanning tree ...`

6.3.5.19 no spanning-tree mst hello-time

Description

With this command, you reset the hello time after which the bridge sends its configuration BPDUs to the default value.

The default value is 2 seconds.

Requirement

You are in the interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

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

Result

The setting for the hello time is reset to the default value.

Further notes

You can configure the setting for the hello time with the `spanning-tree mst hello-time` command.

You display this setting and other information with the commands that start with `show spanning tree ...`

6.3.5.20 `spanning-tree mst PseudoRootId`

Description

With this command, you configure a pseudoroot MAC address and the priority for a spanning tree configuration. The command is used in conjunction with the layer 2 gateway port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
spanning-tree[mst<instance-id>]pseudoRootId
    priority<value(0-61440)>mac-address<ucast_mac>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mst	Keyword for a spanning tree instance	-
instance-id	Number of the instance	1 ... 64
priority	Keyword for the priority	-
value	Value for the priority	0 ... 61440 Default: Priority of the device
mac-address	Keyword for the pseudoroot unicast MAC address	-
ucast_mac	MAC address of the interface	aa:aa:aa:aa:aa:aa Default: MAC address of the device

You can only change the value for the priority in the steps of 4096.

Result

The pseudoroot MAC address and the priority are configured.

Further notes

You can reset the settings to the default values with the `no spanning-tree mst pseudoRootId` command.

You display this setting and other information with the commands that start with `show spanning tree`

6.3.5.21 no spanning-tree mst PseudoRootId**Description**

With this command, you reset a pseudoroot MAC address and the priority of the spanning tree configuration to the default values.

The default values are as follows:

- The priority is configured to the priority of the device.
- The MAC address is configured to the MAC address of the device.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no spanning-tree[mst<instance-id(1-64)>]pseudoRootId
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mst	Keyword for a spanning tree instance	-
instance-id	Number of the instance	1 ... 64

Result

The pseudoroot MAC address and the priority are reset to the defaults.

Further notes

You configure the settings with the `spanning-tree mst pseudoRootId` command.

You display this setting and other information with the commands that start with `show spanning tree`

6.3.6 Commands in the MSTP configuration mode

This section describes commands that you can call up in the MSTP configuration mode.

In the Global configuration mode, enter the `spanning-tree mst configuration` command to change to this mode.

- If you exit the MSTP configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the MSTP configuration mode with the `end` command, you return to the Privileged EXEC mode.

6.3.6.1 instance

Description

With this command, you assign a range of VLANs to an MST instance.

Requirement

You are in the MSTP configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call up the command with the following parameters:

```
instance <instance-id(1-64)> vlan <vlan-range>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
instance-id	Number of the instance	1 ... 64 You can define up to 16 MSTP instances. Default: The VLANs 1 – 4094 are assigned to instance "0"
vlan	Keyword for a VLAN connection	-
vlan-range	Range of VLANs assigned to an instance	enter the range limits with a hyphen or blank

Result

The range of VLANs is assigned to the MST instance.

Further notes

You cancel the assignment of the VLAN to an MST instance with the `no instance` command.

You delete the MST instance with the `no instance` command.

You display this setting and other information with the `show spanning-tree mst configuration` command.

6.3.6.2 no instance

Description

With this command, you cancel the assignment of a VLAN to an MST instance or delete the MST instance.

Requirement

You are in the MSTP Configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call up the command with the following parameters:

```
no instance <instance-id (1-64)> [vlan <vlan-range>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>instance-id</code>	Number of the MST instance	1 ... 64
<code>vlan</code>	Keyword for a VLAN connection	-
<code>vlan-range</code>	Range of VLANs that will be deleted from the instance	enter the range limits with a hyphen or blank

If you specify a VLAN or a VLAN range, the assignment to an MST instance is canceled.

If you do not specify a VLAN, the MST instance is deleted.

Result

The assignment of a VLAN to an MST instance is canceled or the MST instance is deleted.

Further notes

You assign a VLAN to an MST instance with the `instance` command.

You display this setting and other information with the `show spanning-tree mst configuration` command.

6.3.6.3 name

Description

With this command, you configure a name for the MST region.

Requirement

You are in the MSTP Configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call up the command with the following parameters:

```
name <region-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
region-name	Name of the MST region	max. 32 characters

The default value of the name is the MAC address of the device.

Result

The name is configured.

Further notes

You delete the name of the MST region with the `no name` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.3.6.4 no name

Description

With this command, you reset the name for the MST region to the default value.

The default value is:

- The MAC address of the device is configured as name.

Requirement

You are in the MSTP Configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call the command without parameters:

```
no name
```

Result

The name is reset to the default value.

Further notes

You configure the name of the MST region with the `name` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.3.6.5 revision

Description

With this command, you assign a revision number to the MST region.

Requirement

You are in the MSTP Configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call up the command with the following parameters:

```
revision <revision-no(0-65535)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>revision-no</code>	Value of the revision number	0 ... 65535 Default: 0

Result

The MST region is assigned a revision number.

Further notes

You delete a revision number with the `no revision` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.3.6.6 no revision

Description

With this command, you reset the revision number of the MST region to the default value. The default value is 0.

Requirement

You are in the MSTP Configuration mode.

The command prompt is as follows:

```
cli(config-mst)#
```

Syntax

Call the command without parameters:

```
no revision
```

Result

The revision number of the MST region is reset to the default value.

Further notes

You assign a revision number to the MST region with the `revision` command.

You display this setting and other information with the `show spanning tree mst configuration` command.

6.4 Passive Listening

6.4.1 The "show" commands

This section describes commands with which you display various settings.

6.4.1.1 show passive-listening

Description

This command shows whether or not "passive listening" is enabled.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show passive-listening
```

Result

`disabled` is displayed if "passive listening" is disabled. If "passive listening" is enabled, `enabled` is displayed.

6.4.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

6.4.2.1 passive-listening bpdu-vlan-flood

Description

With this command you enable forwarding of BPDUs for specific VLANs; in other words to all ports that are members of a VLAN.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
passive-listening bpdu-vlan-flood
```

As default the function is "enabled".

Result

BPDUs for specific VLANs.

Further notes

You disable this function with the `no passive-listening bpdu-vlan-flood` command.

You display the status of "passive listening" with the `show passive-listening` command.

6.4.2.2 no passive-listening bpdu-vlan-flood

Description

With this command you enable the flooding of BPDUs to all available ports of the device regardless of the configured VLANs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
no passive-listening bpdu-vlan-flood
```

Result

BPDU's are flooded to all available ports.

Further notes

You enable this function with the `passive-listening bpdu-vlan-flood` command.

You display the status of "passive listening" with the `show passive-listening` command.

6.4.2.3 passive-listening

Description

This command enables "passive listening".

Requirement

Note

No simultaneous operation with spanning tree

"Passive listening" can only be enabled when spanning tree is disabled.

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
passive-listening
```

Result

The "passive listening" function is enabled.

Further notes

You disable "passive listening" with the `no passive-listening` command.

You display the status of "passive listening" with the `show passive-listening` command.

6.4.2.4 no passive-listening

Description

This command disables "passive listening".

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
no passive-listening
```

Result

The "passive listening" function is disabled.

Further notes

You enable "passive listening" with the `passive-listening` command.

You display the status of "passive listening" with the `show passive-listening` command.

Network protocols

This part contains the sections that describe the commands for working with the various network protocols.

7.1 IPv4 protocol

This section describes commands of the Internet Protocol (IP) version 4.

7.1.1 The "show" commands

This section describes commands with which you display various settings.

7.1.1.1 show ip route

Description

This command shows the routes currently being used.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip route [{<ip-address> [<mask>] | connected | ospf | static | summary}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip-address	The destination address of the route.	Enter a valid IPv4 address
mask	Defines an address range using the subnet mask.	/8, /16 or /24
connected	Shows the network routes with a direct connection.	-
ospf	Shows the OSPF entries in the routing table.	-

Parameter	Description	Range of values / note
rip	Shows the RIP entries in the routing table.	
static	Shows the static routes in the table.	-
summary	Shows a summary.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 routing table is displayed.

7.1.1.2 show ip static route

Description

This command shows the routes that were generated statically.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip static route
```

Result

The static routes are displayed.

7.1.1.3 show ip gateway

Description

This command shows the default gateway configured for the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip gateway
```

Result

The default gateway is displayed.

7.1.1.4 show ip telnet**Description**

This command shows the admin status and the port number of the Telnet server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ip telnet
```

Result

The admin status and the port number of the Telnet server are displayed.

7.1.1.5 show dcp server**Description**

This command shows whether or not the DCP function is enabled on the device.

If the DCP function is enabled, the read and write permissions are displayed.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show dcp server
```

Result

The overview of the status of the DCP function and access rights is displayed.

7.1.1.6 show dcp forwarding**Description**

This command shows an overview of the DCP forwarding behavior on one or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show dcp forwarding [port<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The overview of the DCP forwarding behavior is displayed.

7.1.1.7 show ip dns

Description

This command shows information about the DNS client, for example the status of the DNS client and parameters for querying the DNS server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ip dns
```

Result

Information on the DNS client is displayed.

7.1.1.8 show ip dns cache

Description

This command shows the content of the DNS cache. The DNS cache buffers replies of the DNS server for a brief time. This allows other queries for the same name to be replied to directly without sending another query to the DNS server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ip dns cache
```

Result

The content of the DNS cache is displayed.

7.1.1.9 show ip dns name-server

Description

This command shows information about the DNS servers configured on the device. The table contains the index, the address type (e.g. IPv4) as well as the IP address and the origin.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip dns name-server
```

Result

The table with the information about the DNS servers is displayed.

7.1.1.10 show ip dns statistics

Description

This command shows DNS statistics. It provides information about the type and number of queries to the DNS server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip dns statistics
```

Result

Information about the communication with the DNS server is displayed.

7.1.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.1.2.1 dcp server

Description

With this command, you configure the read and write permissions for the DCP server and enable it.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
dcp server {read-only|read-write}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
read-only	only reading is permitted on the DCP server	-
read-write	reading and writing is permitted on the DPC server	Default: read-write

Result

The read and write permissions for the DPC server are configured.

The DCP server is enabled.

Further notes

You disable the DCP server with the `no dcp server` command.

7.1.2.2 no dcp server

Description

With this command, you disable the DCP server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no dcp server
```

Result

The DCP server is disabled.

Further notes

You enable and configure the DCP server with the `dcp server` command.

7.1.2.3 ip echo-reply

Description

To check the availability of a network node, packets of the Internet Control Message Protocol (ICMP) can be sent to it. These packets of type 8 request the recipient to send a packet back to the sender (echo reply).

With this command you enable the network node to react to ping queries.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip echo-reply
```

Result

"ICMP echo reply messages" are enabled. The network node reacts to ping queries.

Further notes

You disable the setting with the `no ip echo-reply` command.

7.1.2.4 no ip echo-reply**Description**

With this command you stop the network node reacting to ping queries.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip echo-reply
```

Result

"ICMP echo reply messages" are disabled. The network node does not react to ping queries.

Further notes

You change the setting with the `ip echo-reply` command.

7.1.2.5 ip domain used server**Description**

This command specifies which DNS server the device uses.

Note

Only resource records of type A (IPv4 address of a host) are supported.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip domain used server {learned-only | manually-only | all}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
learned-only	The device uses only the DNS servers assigned by DHCP.	-
manually-only	The device uses only the manually configured DNS servers. A maximum of three DNS servers can be configured.	-
all	The device uses all available DNS servers.	-

Result

The device uses the DNS servers specified in the configuration.

7.1.2.6 ip domain lookup

Description

This command enables the DNS client of the device. To be able to use the function, a DNS server must be reachable.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip domain lookup
```

Result

The DNS client of the device is enabled and when necessary sends queries to the DNS server.

7.1.2.7 no ip domain lookup**Description**

This command disables the DNS client of the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip domain lookup
```

Result

The DNS client of the device is disabled.

7.1.2.8 ip name-server**Description**

This command specifies an IP address of a DNS server. You can configure up to 3 servers. If there is more than one server, you can specify the order in which the servers are queried. To allow this, the optional parameter `index` is available. The server with the lowest index is queried first.

if you create a server without specifying an index, the server that currently has index 1 will be overwritten.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip name-server {ipv4 <ucast_addr> | ipv6 <ip6_addr>} [index <id(1-3)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
ucast_addr	IPv4 address of the DNS server	Enter a valid IPv4 address.
ipv6	Keyword for an IPv6 address	
ip6_addr	IPv6 address of the DNS server	Enter a valid IPv6 address.
index	Keyword for the index	-
id	Index of the DNS server	1 ... 3

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP address and, if specified, the index for a DNS server have been set.

7.1.2.9 no ip name server

Description

With this command, you delete required DNS server.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ip name-server {ipv4 <ucast_addr> | ipv6 <ip6_addr>} [index <id(1-3)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for IPv4	-
ucast_addr	IP address of the DNS server	Enter a valid IPv4 address.
ipv6	Keyword for IPv6	-
ip6_addr	IPv6 address of the DNS server	Enter a valid IPv6 address.

Parameter	Description	Range of values / note
index	Keyword for the index	-
id	Index of the DNS server	1 ... 3

Result

The required DNS server was deleted.

7.1.2.10 ip route

Description

With this command, you configure a static entry in the IP routing table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip route <prefix> <mask> <next-hop> [<distance(1-255)>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Specifies the IP address or the address range	specify a valid IP address
mask	Specifies the subnet mask used for <code>prefix</code> . Use decimal notation.	enter a valid subnet mask
next-hop	Specifies the IP address to which the selected addresses will be forwarded.	specify a valid IP address
distance	The value for the administrative distance.	1 ... 255

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry in the IP routing table is configured.

Further notes

You delete an entry from the IP routing table with the `no ip route` command.

You display the IP routing table with the `show ip route` command.

7.1.2.11 no ip route**Description**

With this command, you delete a static entry from the IP routing table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ip route <prefix> <mask> <next-hop> [<distance(1-255)>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Specifies the IP address or the address range	specify a valid IP address
mask	Specifies the subnet mask used for prefix. Use decimal notation.	enter a valid subnet mask
next-hop	specifies the IP address to which the selected addresses were forwarded.	specify a valid IP address
distance	The value for the administrative distance.	1 ... 255

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is deleted.

Further notes

You configure an entry from the IP routing table with the `ip route` command.

You display the IP routing table with the `show ip route` command.

7.1.2.12 ip routing

Description

With this command, you enable the routing function for IPv4.

Note

This command is available only with layer 3. DHCP must not be enabled on any IP interface.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip routing
```

Result

The routing function is enabled.

Further notes

You disable the function with the `no ip routing` command.

You display the setting with the `show ip route` command.

7.1.2.13 no ip routing

Description

With this command, you disable IPv4 routing function on the device.

Note

IPv6 routing

If IPv6 routing is enabled on the device, this is also disabled with this function.

Note

This command is available only with layer 3.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip routing
```

Result

IPv4 routing is disabled.

Further notes

You enable the function with the `ip routing` command.

You display the setting with the `show ip route` command.

7.1.2.14 telnet-server

Description

With this command, you enable the Telnet server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
telnet-server
```

As default the function is "enabled".

Result

The Telnet server is enabled.

Further notes

You disable the Telnet server with the `no telnet-server` command.

7.1.2.15 no telnet-server**Description**

With this command, you disable the Telnet server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no telnet-server
```

Result

The Telnet server is disabled.

Further notes

You enable the Telnet server with the `telnet-server` command.

7.1.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.1.3.1 ip address

Description

With this command, you assign an IPv4 address or an IPv4 subnet to the interface.

Requirement

- DHCP was disabled with the `no ip address` command.
- You are in the Interface configuration mode of VLAN or a router port.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

or with a router port:

```
cli(config-RPort-if-Int$-$)
```

Syntax

Call up the command with the following parameters:

```
ip address <ip-address> [<subnet-mask>|<prefix-length(0-32)>] [secondary]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>ip-address</code>	IPv4 address for the Interface	Enter a valid IPv4 address
<code>subnet-mask</code>	Subnet mask of the corresponding subnet	enter a valid subnet mask
<code>prefix-length</code>	Decimal representation of the mask as a number of "1" bits	0 ... 32
<code>secondary</code>	Further subnet for this interface	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 address is assigned to the VLAN interface or the router port.

Note

Effectiveness of the command

The command is effective immediately.

If you configure the interface via which you access the device, the connection will be lost!

Further notes

You delete the IPv4 address with the `no ip address` command.

You display this setting and other information with the `show ip interface` command.

7.1.3.2 ip address dhcp

Description

With this command, the interface obtains the IPv4 address via DHCP.

Requirement

You are in the Interface configuration mode of VLAN or a router port.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

or with a router port:

```
cli(config-RPort-if-Int$-$)
```

Syntax

Call the command without parameters:

```
ip address dhcp
```

Result

The DHCP assigns the IPv4 address to the interface.

Further notes

You delete the settings with the `no ip address` command.

You display this setting and other information with the `show ip interface` command.

7.1.3.3 no ip address

Description

With this command, you delete the assignment of an IPv4 address to an interface and disable DHCP.

Requirement

You are in the Interface configuration mode of VLAN or a router port.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

or with a router port:

```
cli(config-RPort-if-Int$-$)
```

Syntax

Call up the command without parameters or with the following parameter assignment:

```
no ip address [<ip-address> | dhcp]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip-address	IPv4 address of the interface that will be deleted	Enter a valid IPv4 address
dhcp	Specify this parameter if you want to disable the DHCP function explicitly.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

If DHCP was enabled on this interface, DHCP is now disabled. Any existing dynamically learned IPv4 address will be automatically converted to a static IPv4 address.

If static IPv4 addresses were configured and if no explicit IPv4 address was transferred as a parameter, all static IPv4 addresses will be deleted from this interface.

If a static IPv4 address was specified explicitly, this address is deleted from this interface.

Note

Effectiveness of the command

The command is effective immediately.

If you configure the interface via which you access the device, you can lose the connection!

Further notes

You configure the static IPv4 address with the `ip address` command.

You display this setting and other information with the `show ip interface` command.

You enable DHCP with the `ip address dhcp` command.

7.1.3.4 dcp forwarding

Description

With this command, you configure the forwarding behavior of the interface for DCP frames.

Note

PROFINET configuration

Since DCP is a PROFINET protocol, the configuration created here is only effective with the VLAN associated with the TIA interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
dcp forwarding {block|forward}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
block	DCP frames are discarded	-
forward	DCP frames are forwarded	Default: forward

Result

The forwarding behavior of the interface for DCP frames is configured.

7.2 IPv6 protocol

This section describes the commands relevant for working with IPv6.

7.2.1 clear ipv6 traffic

Description

With this command, you reset the statistics counters to zero.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
clear ipv6 traffic
```

Result

The statistics counters have been reset.

Further notes

You display the statistics with the `show ipv6 traffic` command.

7.2.2 The "show" commands

This section describes commands with which you display various settings.

7.2.2.1 show ipv6 neighbors

Description

This command shows IPv6 neighbors table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 neighbors
```

Result

The IPv6 neighbors table is displayed.

Further notes

You configure a static entry with the `ipv6 neighbor` command.

7.2.2.2 show ipv6 pmtu

Description

This command shows the settings for Path MTU.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 pmtu
```

Result

The settings are displayed.

7.2.2.3 show ipv6 route

Description

This command shows the routes currently being used.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 route
```

Result

The IPv6 routing table is displayed.

Further notes

You configure a static entry with the `ipv6 route` command.

7.2.2.4 show ipv6 route summary

Description

This command shows a summary of the IPv6 routes.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 route summary
```

Result

The summary is displayed.

7.2.2.5 show ipv6 traffic

Description

This command shows the statistics for UDP and ICMPv6 for the corresponding interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 traffic [
    interface { vlan <vlan-id> | <interface-type> <interface-id> }
] [hc]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for the interface via which the statistics are created. <ul style="list-style-type: none"> VLAN Interface 	-
vlan	Keyword for a VLAN	-
vlan-id	Keyword for a VLAN connection	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
hc	Display of the High counters parameter	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the statistics are displayed for all available IP interfaces.

Result

The statistics are displayed.

Further notes

You reset the counters to zero with the `clear ipv6 traffic` command.

7.2.2.6 show ipv6 static route

Description

This command shows the routes that were generated statically.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ipv6 static route
```

Result

The static routes are displayed.

7.2.3 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.2.3.1 ipv6 neighbor

Description

With this command, you configure a static entry in the IPv6 neighbors table.

Requirement

- The neighbor node is located on the same link.
- You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 neighbor <prefix>
    {vlan <id> | [<interface-type> <interface-id>]}
    <MAC ADDRESS (xx:xx:xx:xx:xx:xx)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	IPv6 address of the neighbor node	Enter a valid IPv6 address.
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
MAC ADDRESS	Link layer address (MAC address) of the neighbor node	xx:xx:xx:xx:xx:xx

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is configured.

Further notes

You delete an entry with the `no ipv6 neighbor` command.

You display the IPv6 neighbor table with the `show ipv6 neighbors` command.

7.2.3.2 no ipv6 neighbor

Description

With this command, you delete an entry from the IPv6 neighbor table.

Requirement

- The neighbor node is located on the same link.
- You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 neighbor <prefix>
    {vlan <id> | [<interface-type> <interface-id>]}
    <MAC ADDRESS (xx:xx:xx:xx:xx:xx)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	IPv6 address of the neighbor node	Enter a valid IPv6 address.
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
MAC ADDRESS	Link layer address (MAC address) of the neighbor node	xx:xx:xx:xx:xx:xx

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is deleted.

Further notes

You configure an entry with the `no ipv6 neighbor` command.

You display the IPv6 neighbor table with the `show ipv6 neighbors` command.

7.2.3.3 ipv6 path mtu

Description

With this command, you configure maximum packet size (MTU). The setting is only effective if PMTU Discovery is enabled.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 path mtu <prefix addr> <mtu>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
prefix addr	IPv6 address of the recipient	Enter a valid IPv6 address
mtu	Size in bytes	0 ... 65535 Default: 1500

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The maximum packet size is configured.

Further notes

You display the configuration with the `show ipv6 pmtu` command.

You disable the maximum packet size with the `no ipv6 path mtu` command.

You enable the PMTU Discovery function with the command `ipv6 path mtu discovery`.

7.2.3.4 no ipv6 path mtu

Description

With this command you disable the use of the maximum packet size. In other words, the setting is no longer used with the PMTU Discovery function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 path mtu <prefix addr>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix addr	IPv6 address of the recipient	Enter a valid IPv6 address

Result

The setting for the maximum packet size is no longer used.

Further notes

You display the configuration with the `show ipv6 pmtu` command.

You configure the maximum packet size with the `ipv6 path mtu` command.

7.2.3.5 ipv6 path mtu discover

Description

With this command, you enable the PMTU Discovery function. The function automatically determines the optimum packet size along the path.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 path mtu discover
```

Result

The PMTU Discovery function is enabled.

Further notes

You disable the PMTU Discovery function with the command `no ipv6 path mtu discover`.

You display the settings with the `show ipv6 pmtu` command.

7.2.3.6 no ipv6 path mtu discover

Description

With this command, you disable the PMTU Discovery function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ipv6 path mtu discover
```

Result

The PMTU Discovery function is disabled.

Further notes

You enable the PMTU Discovery function with the command `ipv6 path mtu discover`.

You display the settings with the `show ipv6 pmtu` command.

7.2.3.7 ipv6 route

Description

With this command, you configure a static entry in the IPv6 routing table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 route <prefix> <prefix len>
(
 [<NextHop>]
 {
 vlan <id>[<administrative distance>] [unicast][<administrative distance>] [unicast]
 | [<interface-type> <interface-id>][<administrative distance>] [unicast]
 }
 )
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
prefix	IPv6 address	Enter a valid IPv6 address.
prefix len	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
NextHop	IPv6 address to which the selected addresses will be forwarded	Enter a valid IPv6 address.
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
administrative distance	Value for the administrative distance	0 ... 65535 Default: 1
unicast	Addressing mode unicast	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is configured.

Further notes

You delete a static entry from the IPv6 routing table with the `no ipv6 route` command.

You display the IPv6 routing table with the `show ipv6 route` command.

7.2.3.8 no ipv6 route

Description

With this command, you delete a static entry from the IPv6 routing table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 route <prefix> <prefix len>
(
  [<NextHop>] {
    [vlan <id> ] [<administrative distance>] [unicast] | [<short>] [unicast] |
  [<interface-type> <interface-id>]
    [<administrative distance>] [unicast]
  })
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
prefix	IPv6 address of the recipient	Enter a valid IPv6 address.
prefix len	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
NextHop	IPv6 address to which the selected addresses will be forwarded.	Enter a valid IPv6 address.
vlan	Keyword for a VLAN connection	-
id	Number of the addressed VLAN	1 ... 4094
administrative distance	The value for the administrative distance	0 ... 65535 Default: 1
unicast	Addressing mode unicast	-
short	The value for the administrative distance	0 ... 65535 Default: 1
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is deleted.

Further notes

You configure a static entry in the IPv6 routing table with the `ipv6 route` command.

You display the IPv6 routing table with the `show ipv6 route` command.

7.2.3.9 ipv6 unicast-routing

Description

With this command, you enable IPv6 routing on the device.

Note

IPv4 routing

If IPv4 routing is not enabled on the device, this is also enabled with this function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 unicast-routing
```

Result

IPv6 routing is enabled.

Further notes

You disable the IPv6 routing with the `no ipv6 unicast-routing` command.

You display the IPv6 routing table with the `show ipv6 route` command.

7.2.3.10 no ipv6 unicast-routing

Description

With this command, you disable IPv6 routing function on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 unicast-routing
```

Result

IPv6 routing is disabled. On interfaces on which IPv6 is enabled, stateless autoconfiguration is performed.

Further notes

You enable IPv6 routing with the `ipv6 unicast-routing` command.

You display the IPv6 routing table with the `show ipv6 route` command.

7.2.4 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.2.4.1 ipv6 address

Description

With these commands, you assign an IPv6 address to the interface. The IPv6 address can be assigned to the IP interface manually or by prefix delegation.

With prefix delegation, the IP interface becomes a DHCPv6 PD sub-client. This forms its IPv6 address from the prefix name, the prefix and the prefix length.

Requirement

- IPv6 is activated
- The interface is an IP interface.

- In DHCPv6 the stateless DHCPv6 autoconfiguration or prefix delegation is enabled.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 address <PD Name> <prefix> <prefix Len>
```

or

```
ipv6 address <prefix> <prefix Len> [{unicast | anycast | eui64}]
```

or

```
ipv6 address <ipv6prefix/prefix_length> [{unicast | anycast | eui-64| linklocal}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
PD Name	Prefix Name The PD router stores IPv6 prefix of the DHCPv6 server under this name.	Enter the prefix name. Requirement: Prefix delegation is enabled.
prefix ipv6prefix	IPv6 address	Enter a valid IPv6 address
prefix Len /prefix_length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 64: With EUI-64 128: The node (host) and with link-local addresses
unicast	Addressing mode unicast	-
anycast	Addressing mode anycast	-
eui64 eui-64	Interface ID according to the EUI-64 method	-
linklocal	Link local address	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv6 address is assigned to the interface.

Further notes

You delete the IPv6 address with the `no ipv6 address` command.

You enable IPv6 with the `ipv6 enable` command.

You display this setting and other information with the `show ipv6 interface` command.

You display the IPv6 address of the DHCP PD sub-client with the `show ipv6 dhcp sub-client interfaces.` command.

You enable prefix delegation with the `ipv6 address dhcp` command.

You enable stateless DHCPv6 autoconfiguration with the `ipv6 address dhcp stateless` command

7.2.4.2 no ipv6 address

Description

With this command, you delete the IPv6 address.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 address <prefix> <prefix Len> [{unicast | anycast | eui64}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>prefix</code>	IPv6 address	Enter a valid IPv6 address.
<code>prefix Len</code>	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 64: With EUI-64 128: The node (host) and with link-local addresses
<code>unicast</code>	Addressing mode unicast	-
<code>anycast</code>	Addressing mode anycast	-
<code>eui64</code>	Interface ID according to the EUI-64 method	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv6 address has been deleted.

Further notes

You configure the IPv6 address with the `ipv6 address` command.

You display this setting and other information with the `show ipv6 interface` command.

7.2.4.3 ipv6 address dhcp

Description

With this command, you specify whether the DHCPv6 client obtains the (`stateful`) from the DHCPv6 server or supports the function "prefix delegation" (`pd`). When this function is enabled, the DHCPv6 client becomes the PD router.

You can also change the prefix name. The requirement is that the prefix is not used by a PD sub-client interface.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 address dhcp [stateful | pd <PD Name (128)>] [rapid-commit]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>stateful</code>	Obtains the IPv6 address from the DHCPv6 server	-
<code>pd</code>	Keyword for IPv6 prefix delegation	-
PD Name	The prefix name id further distributed by the router	Enter the prefix name. 128 characters
<code>rapid-commit</code>	Can only be used with the <code>stateful</code> parameter. Reduces the procedure of 4 DHCPv6 messages (SOLICIT, ADVERTISE, REQUEST, REPLY) to 2 DHCPv6 messages (SOLICIT, REPLY). This is only possible when the DHCPv6 server supports this.	-

Result

The setting is configured.

Further notes

You disable the setting with the `no ipv6 address dhcp` command.

You configure the interface as a router port with the `no switchport` command.

You show the setting with the `show ipv6 dhcp interface` command.

You can display the statistics of the DHCPv6 client with the `show ipv6 dhcp client statistics` command.

7.2.4.4 ipv6 address dhcp stateless

Description

With this command, you enable DHCPv6. The interface however only obtains the configuration setting via DHCPv6.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 address dhcp
```

Result

The interface only obtains the configuration setting via DHCPv6.

Further notes

You disable DHCPv6 with the `no ipv6 address dhcp` command.

You configure the interface as a router port with the `no switchport` command.

You show the setting with the `show ipv6 dhcp interface` command.

You can display the statistics of the DHCPv6 client with the `show ipv6 dhcp client statistics` command.

7.2.4.5 no ipv6 address dhcp

Description

With this command, you delete the IPv6 address and disable DHCPv6.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 address dhcp
```

Result

DHCPv6 is disabled.

Further notes

You enable DHCPv6 with the `ipv6 address dhcp` command.

You configure the interface as a router port with the `no switchport` command.

You show the setting with the `show ipv6 dhcp interface` command.

You can display the statistics of the DHCPv6 client with the `show ipv6 dhcp client statistics` command.

7.2.4.6 ipv6 address link-local

Description

With this command, you assign a link local address to the interface.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 address <prefix> link-local
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Link local address	Specify a valid link local address. fe80::XXXX:XXXX:XXXX:XXXX

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The link local address is assigned to the interface.

Further notes

You delete the link local address with the `no ipv6 address link-local` command.

You display this setting and other information with the `show ipv6 interface` command.

7.2.4.7 no ipv6 address link-local

Description

With this command, you delete the link local address.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 address <prefix> link-local
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Link local address	Specify a valid link local address. fe80::xxxx:xxxx:xxxx:xxxx

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The link local address is deleted.

Further notes

You assign a link local address to an interface with the `ipv6 address link-local` command.

You display this setting and other information with the `show ipv6 interface` command.

7.2.4.8 ipv6 enable

Description

With this command, you enable IPv6 on the interface. As default, IPv6 is disabled.

Requirement

- IPv6 routing is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$) #
```

Requirement

You are in the Interface configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$) #
```

Syntax

Call the command without parameter assignment:

```
ipv6 enable
```

Result

IPv6 is enabled.

Further notes

You configure an IPv6 address with the `ipv6 address` command.

You display this setting and other information with the `show ipv6 interface` command.

You enable IPv6 routing with the `ipv6 unicast-routing` command.

7.2.4.9 ipv6 interface-identifier

Description

With this command, you configure the interface ID. The interface ID uniquely identifies the IPv6 interface on the link. Along with the prefix, the interface ID forms the IPv6 address, see Structure of an IPv6 address (Page 51).

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 interface-identifier <prefix>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Interface ID	Enter an interface ID. Maximum 64 bits

Result

The interface ID is configured.

Further notes

You delete the interface ID with the `no ipv6 interface-identifier` command.

You display this setting and other information with the `show running-config` command.

7.2.4.10 no ipv6 interface-identifier**Description**

With this command, you delete the interface ID.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 interface-identifier <prefix>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
prefix	Interface ID	Enter an interface ID.

Result

The interface ID has been deleted.

Further notes

You configure the interface ID with the `ipv6 interface-identifier` command.

You display this setting and other information with the `show running-config` command.

7.2.4.11 ipv6 nd ra-lifetime

Description

With this command, you configure the lifetime of the IPv6 router advertisement packets.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 nd ra-lifetime <LifeTime (0-9000)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
LifeTime	Lifetime	0 ... 9000 Default: 1800

Result

The lifetime is configured.

Further notes

You display this setting and other information with the `show ipv6 interface` command.

7.2.4.12 ipv6 nd suppress-ra

Description

With this command, you disable the distribution of IPv6 router advertisement packets. As default, the router advertisements are disabled.

Requirement

- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 nd suppress-ra
```

Result

IPv6 router advertisement packets are not distributed.

Further notes

You enable IPv6 routing with the `ipv6 unicast-routing` command.

You display this setting and other information with the `show ipv6 interface` command.

You enable the distribution of IPv6 router advertisement packets with the command `no ipv6 nd suppress-ra`.

7.2.4.13 no ipv6 nd suppress-ra

Description

With this command, you enable the distribution of IPv6 router advertisement packets.

Requirement

- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

IPv6 router advertisement packets are not distributed.

Further notes

You display this setting and other information with the `show ipv6 interface` command.

You disable the distribution of IPv6 router advertisement packets with the command `ipv6 nd suppress-ra`.

7.3 DHCPv4 client (IPv4)

This section describes commands of the Dynamic Host Configuration Protocol (DHCP).

7.3.1 The "show" commands

This section describes commands with which you display various settings.

7.3.1.1 `show ip dhcp client stats`

Description

With this command, you display the statistical counters of the DHCP client.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip dhcp client stats
```

Result

The counters are displayed.

7.3.1.2 show ip dhcp client

Description

With this command, you display the configuration settings of the DHCP client.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip dhcp client
```

Result

The configuration settings of the DHCP client are displayed.

7.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.3.2.1 ip dhcp config-file-request

Description

If the DHCP config file request option is set, the device requests the TFTP address and the name of a configuration file from the DHCP server. If the device is restarted following the completed download, the configuration settings are read from this file.

With this command, you enable the DHCP config file request option.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip dhcp config-file-request
```

Result

The DHCP config file request option is enabled.

Further notes

You disable the DHCP config file request option with the `no ip dhcp config-file-request` command.

7.3.2.2 no ip dhcp config-file-request

Description

With this command, you disable the DHCP config file request option.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip dhcp config-file-request
```

Result

The DHCP config file request option is disabled.

Further notes

You enable the DHCP config file request option with the `ip dhcp config-file-request` command.

7.3.2.3 ip dhcp client mode

Description

With this command, you configure the type of identifier with which the DHCP client logs on with its DHCP server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp client mode {mac|client-id<client-id>|sysname|pnio-name-of-station}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mac	The client registers with its MAC address	-
client-id	The client registers with the assigned ID	-
client-id	Name of the assigned ID	max. 32 characters
sysname	The client registers with the assigned system name	-
pnio-name-of-station	The client logs in with the PROFINET name. The name is assigned with the PST tool.	-

Result

The registration mode of the DHCP client is configured.

7.4 DHCPv6 client (IPv6)

This section describes commands for DHCPv6.

7.4.1 The "show" commands

This section describes commands with which you display various settings.

7.4.1.1 show ipv6 dhcp

Description

This command shows the DHCPv6 configuration.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 dhcp
```

Result

The configuration is displayed.

7.4.1.2 show ipv6 dhcp interface

Description

This command shows the DHCPv6 configuration and the DHCPv6 information that was received from the DHCPv6 server.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 dhcp interface [{vlan <vlan-id(1-4094)> | <interface-type> <interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information is displayed.

7.4.1.3 show ipv6 dhcp pd sub-client interfaces

Description

This command shows the configuration of the DHCPv6 PD sub-client

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 dhcp pd sub-client interfaces
```

Result

The information is displayed.

7.4.2 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.4.2.1 ipv6 dhcp authentication client

Description

With this command, you configure the HMAC-MD5 function for authentication of DHCP messages.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp authentication client {realm <string(1-128)> | key <string (1-64)> | keyid <value>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
realm	Keyword for the name of the database area	-
string	Name of the database area in which the password for the HMAC algorithm MD5 is stored	Enter a name. 1 ... 128
key	Keyword for the password	-
string	Password for the HMAC algorithm MD5	Enter a valid password. 1 ... 64

Parameter	Description	Range of values / note
key-id	Keyword for the ID of the password	-
value	ID of the password	Enter a valid ID. 0 ... 4294967295

Result

The HMAC-MD5 function is configured.

Further notes

You configure the interface as a router port with the `no switchport` command.

You enable the function DHCPv6 client with the `ipv6 address dhcp` command.

You display the setting with the `show ipv6 dhcp interface` command.

7.4.2.2 ipv6 dhcp client information refresh minimum

Description

With this command, you configure the interval after which the DHCP client refreshes the configuration parameters.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp client information refresh minimum <seconds value(600-4294967295)>
```

The parameter has the following meaning:

Parameters	Description	Range of values / note
seconds value	Length of the interval in seconds	600 ... 4294967295 Default: 4294967295 (24 hours)

Result

The interval is specified. When the time elapses, the DHCPv6 client sends an information request message to refresh the configuration parameters.

Further notes

You enable the function DHCPv6 client with the `ipv6 address dhcp` command.

You display the setting with the `show ipv6 dhcp` command.

You configure the setting with the `ipv6 dhcp client information refresh minimum` command.

7.4.2.3 no ipv6 dhcp client information refresh minimum

Description

With this command, you reset the interval to the default value.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 dhcp client information refresh minimum
```

Result

The interval is reset.

Further notes

You enable the function DHCPv6 client with the `ipv6 address dhcp` command.

You configure the interface as a router port with the `no switchport` command.

You display the setting with the `show ipv6 dhcp` command.

You configure the interval with the `ipv6 dhcp client information refresh minimum` command.

7.4.2.4 ipv6 dhcp client option

Description

With this command, you specify DHCPv6 option classes. With DHCPv6 option classes, DHCPv6 clients can be identified by DHCPv6 servers.

Via the user classes, for example, the DHCPv6 clients of a specific location can be identified.

With the vendor class, the DHCPv6 clients of a certain vendor can be identified.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp client option {user-class <string (1-128)> | vendor-class <string (1-128)> | vendor-specific [<string (1-128)>]}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
user-class	Keyword for user class	
string	User class	Enter the required user class. 1 ... 128 characters
vendor-class	Keyword for vendor class	-
string	Vendor class	Enter the required vendor class. 1 ... 128 characters
vendor-specific	Keyword for vendor-specific configuration	
string	Name of the vendor-specific configuration	Enter the required name. 1 ... 128 characters

Result

The setting is configured.

Further notes

You disable the setting with the `no ipv6 dhcp client option` command.

7.4.2.5 no ipv6 dhcp client option

Description

With this command, you remove the DHCPv6 option classes.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 dhcp client option {user-class | vendor-class | vendor-specific }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
user-class	User class	Enter the required user class.
vendor-class	Vendor class	Enter the required vendor class.
vendor-specific	Name of the vendor-specific configuration	Enter the required name.

Result

The required setting is removed.

Further notes

You configure the setting with the `ipv6 dhcp client option` command.

7.4.2.6 ipv6 dhcp client reconfig-accept

Description

A DHCPv6 server can request a DHCPv6 client to refresh its IPv6 address or configuration data at any time.

If the option "DHCP reconfig-accept" is set, the DHCPv6 client accepts the reconfiguration message. This is assuming that it contains the correct reconfiguration key. Via this key, the DHCP client identifies the DHCPv6 server

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameters:

```
ipv6 dhcp client reconfig-accept
```

Result

The option "DHCP reconfig-accept" is enabled.

Further notes

You disable the option with the `no ipv6 dhcp client reconfig-accept` command.

7.4.2.7 no ipv6 dhcp client reconfig-accept

Description

With this command, you enable the "DHCP reconfig-accept" option.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameters:

```
no ipv6 dhcp client reconfig-accept
```

Result

The DHCP config file request option is enabled.

Further notes

You enable the option with the `ipv6 dhcp client reconfig-accept` command.

7.4.2.8 ipv6 dhcp client request

Description

With this command you specify which configuration parameters will be requested, e.g. the IPv6 address of the DNS server.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp client request {dns-server-address | domain-name | sntp-server-address |  
option <code (1-100)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>dns-server-address</code>	IPv6 address of the DNS server	-
<code>domain-name</code>	Domain name	-
<code>sntp-server-address</code>	IPv6 address of the SNTP server	-
<code>option</code>	Keyword for the option code	-
<code>code</code>	Number of the DHCPV6 option	Enter the required number. 1 ... 200

Result

The setting is configured.

Further notes

You remove the request with the `no ipv6 dhcp client request` command.

7.4.2.9 no ipv6 dhcp client request**Description**

With this command, you remove the request for the configuration parameter.

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ipv6 dhcp client request {dns-server-address | domain-name | sntp-server-address |
option <code (1-100)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>dns-server-address</code>	IPv6 address of the DNS server	-
<code>domain-name</code>	Domain name	-
<code>sntp-server-address</code>	IPv6 address of the SNTP server	-
<code>option</code>	Keyword for the option code	-
<code>code</code>	ID of the DHCPV6 option	Specify the required ID of the DHCPv6 option. 1 ... 100

Result

The required configuration parameter is removed.

Further notes

You configure the request with the `ipv6 dhcp client request` command.

7.4.2.10 ipv6 dhcp client-id type

Description

With this command, you specify what forms the DUID (DHCP Unique Identifier).

Requirement

- DHCPv6 is activated.
- IPv6 is activated
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp client-id type {llt | en | ll}
```

The parameters have the following meaning:

Parameters	Description	Range of values / note
llt	DUID is based on the link local address and a time stamp	-
en	DUID is assigned by the vendor (en = enterprise number)	-
ll	DUID is based on the link local address	-

Result

The DUID is specified.

Further notes

You enable DHCPv6 with the `ipv6 address dhcp` command.

You display the setting with the `show ipv6 dhcp interface` command.

7.4.2.11 ipv6 dhcp client-id interface

Description

With this command, you specify which IP interface uses a DUID of the type `llt` or `ll`.

Requirement

- DHCPv6 Is activated.
- The DUID is of the type `11t` or `11`
- The interface is an IP interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp client-id interface {<interface-type> <interface-id>}
```

The parameters have the following meaning:

Parameters	Description	Range of values / note
<code>interface-type</code>	Type or speed of the interface	Enter a valid interface.
<code>interface-id</code>	Slot no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP interface is assigned.

Further notes

You enable the function DHCPv6 client with the `ipv6 address dhcp` command.

You configure the DUID with the `ipv6 dhcp client-id type` command.

7.5 DHCP server

This section describes commands relevant for configuring the DHCP server.

Requirement

The connected devices are configured so that they obtain the IPv4 address from a DHCP server.

7.5.1 The "show" commands

This section describes commands with which you display various settings.

7.5.1.1 show ip dhcp-server bindings

Description

This command shows the current assignments of IPv4 addresses of the DHCP server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip dhcp-server bindings
```

Result

The information is displayed.

7.5.1.2 show ip dhcp-server pools

Description

The command shows the DHCP server configuration of a specific IPv4 address band or all IPv4 address bands.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip dhcp-server pools [pool-id (1-24)]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
pool-id	ID of the addressed IPv4 address band	1 ... 24

If no parameters are specified, the settings for all address bands are displayed.

Result

The configuration of the DHCP server is displayed.

7.5.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.5.2.1 ip dhcp-server

Description

With this command, you enable the DHCP server on the device.

Note

To avoid conflicts with IPv4 addresses, only one device may be configured as a DHCP server in the network.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ip dhcp-server
```

Result

The DHCP server is enabled.

Further notes

You disable the DHCP server with the `no ip dhcp-server` command.

7.5.2.2 no ip dhcp-server

Description

With this command, you disable the DHCP server on the device.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ip dhcp-server
```

Result

The DHCP server is disabled.

Further notes

You enable the DHCP server with the `ip dhcp-server` command.

7.5.2.3 ip dhcp-server icmp-probe

Description

With this command you enable the function "Probe address with ICMP echo before offer". The DHCP server checks whether or not the IPv4 address has already been assigned. If no reply is received, the DHCP server can assign the IPv4 address.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ip dhcp-server icmp-probe
```

Result

The function is enabled.

Further notes

You disable the function with the `no ip dhcp-server icmp-probe` command.

7.5.2.4 no ip dhcp-server icmp-probe

Description

With this command you disable the function "Probe address with ICMP echo before offer".

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ip dhcp-server icmp-probe
```

Result

The function is disabled.

Further notes

You enable the function with the `ip dhcp-server icmp-probe` command.

7.5.2.5 ip dhcp-server pool

Description

With this command, you have three options of changing to the DHCPPOOL configuration mode and to assign an interface to the IPv4 address band.

1. If you call the command `ip dhcp-server pool` with the parameter `pool-id` (1-24), you change to the corresponding DHCPPOOL configuration mode. The corresponding pool ID must have already been created.
2. If you call the `ip dhcp-server pool` command with the parameter `vlan` or `interface-type/interface-id`, an IPv4 address band with the next free pool ID is created and the

specified interface assigned directly to it. This is followed by a change to the DHCPPOOL configuration mode. You then configure the other settings in the DHCPPOOL configuration mode.

3. If you call the `ip dhcp-server pool` command without parameters, and IPv4 address band with the next free pool ID is created and you change directly to the corresponding DHCPPOOL configuration mode.

You then configure the interface and the other settings in the DHCPPOOL configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp-server pool [{ <pool-id (1-24)> | [{ vlan <vlan-id (1-4094)> | <interface-  
type> <interface-id> }]]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
pool-id	ID of the addressed IPv4 address band	1 ... 24
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Auto-Hotspot".

Result

The ID of the addressed IPv4 address band is configured.

You are now in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Further notes

You exit the DHCPPOOL configuration mode with the `exit` command.

You delete the entry with the `no ip dhcp-server pool` command.

7.5.2.6 no ip dhcp-server pool

Description

With this command, you delete the required IPv4 address band.

Requirement

- The IPv4 address band is not enabled.
- You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ip dhcp-server pool <pool-id (1-24)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
pool-id	ID of the addressed IPv4 address band	1 ... 24

Result

The required IPv4 address band is deleted.

Further notes

You create an IPv4 address band with the `ip dhcp-server pool` command.

7.5.3 Commands in the DHCPPOOL configuration mode

This section describes commands that you can call up in the DHCPPOOL Configuration mode.

In the Global Configuration mode, enter the `ip dhcp-server pool` command to change to this mode.

- If you exit the DHCPPOOL Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the DHCPPOOL Configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.5.3.1 lease-time

Description

With this command, you specify how long the assigned IPv4 address remains valid. When half the period of validity has elapsed, the DHCP client can extend the period of the assigned IPv4 address. When the entire time has elapsed, the DHCP client needs to request a new IPv4 address.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
lease-time <seconds (60-31536000)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Time until renewal of the assigned IPv4 address in seconds	60 ... 31536000

Result

The time is configured.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

7.5.3.2 network

Description

With this command you configure the IPv4 address band from which the DHCP client receives any IPv4 address.

Note**Assignment of IP addresses**

The requirement for the assignment is that the IPv4 address of the interface is located within the IPv4 address band. If this is not the case, the interface does not assign any IPv4 addresses

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call up the command with the following parameters:

```
network <lower-IP> <upper-IP> { <subnet-mask> | / <prefix-length (1-32)> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
lower-IP	Start of the IPv4 address band	Enter a valid IPv4 address.
upper-IP	End of the IPv4 address band	Enter a valid IPv4 address.
subnet-mask	Subnet mask of the corresponding subnet	Enter a valid subnet mask
prefix-length	Decimal representation of the mask as a number of "1" bits	1 ... 32

Result

The IPv4 address band is configured. The DHCP options 1, 3, 6, 66 and 67 are created automatically. With the exception of option 1, the options can be deleted.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You assign an IP address to an interface with the `set interface` command.

You configure the DHCP option 67 with the `option value-string` command.

You configure the DHCP options 3, 6 and 66 with the `option` command.

You delete the DHCP option with the `no option` command.

7.5.3.3 Option (IP address)

Description

With this command you configure the DHCP options 3 and 6 that contain an IPv4 address as DHCP parameter. The DHCP options 3 and 6 are created automatically when the IPv4 address band is created.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
option <option-code> { <ip-address-list> | int-ip }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
option-code	Code of the DHCP option	<ul style="list-style-type: none"> 3 - Default gateway 6 - DNS server
ip-address-list	IPv4 address or IPv4 address list	<ul style="list-style-type: none"> DHCP option 3 (default gateway): Enter the DHCP parameter as an IPv4 address, e.g. 192.168.100.2. DHCP option 6 (name server): Enter the DHCP parameter as an IPv4 address, e.g. 192.168.100.2. You can specify up to three IPv4 addresses separated by commas.
int-ip	Uses IPv4 address of the interface that is assigned to the IPv4 address band.	Only with DHCP option 3

Result

The DHCP option is created.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You disable the IPv4 address band with the `no pool-enable` command.

You delete the DHCP option with the `no option` command.

You configure the DHCP options 12, 66 and 67 with the `option value-string` command.

You configure the interface with the `set interface` command.

7.5.3.4 option value-string

Description

With this command you configure DHCP options 12, 66 and 67 that contain a string as DHCP parameter. The DHCP options 66 and 67 are created automatically when the IPv4 address band is created.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call up the command with the following parameters:

```
option <option-code> value-string <dhcp-param>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
option-code	Code of the DHCP option	<ul style="list-style-type: none"> 12 - Host name 66 - TFTP server 67 - Bootfile name
dhcp-param	Name of the file	Enter the name in the string format.

Result

The DHCP option is configured.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You delete the DHCP option with the `no option` command.

You configure the DHCP options 3 and 6 with the `option (IP address)` command.

You disable the IPv4 address band with the `no pool-enable` command.

7.5.3.5 no option

Description

With this command, you delete the DHCP option with the specified number.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
no option <option-code>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
option-code	Code of the DHCP option	Enter a valid DHCP option code.

Result

The specified DHCP option is deleted.

Further notes

You configure the DHCP options 12, 66 and 67 with the `option value-string` command.

You configure the DHCP options 3 and 6 with the `option` command.

7.5.3.6 pool-enable

Description

With this command you specify that this IPv4 address band will be used.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call the command without parameter assignment:

```
pool-enable
```

Result

The setting is enabled.

Note

If the IPv4 address band is enabled, the following parameters can no longer be edited:

- DHCP options (`option ...`)
 - Port Range (`ports`)
 - Relay Agent Information (`relay-information`)
 - Static Leases (`static-lease`)
-

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You disable the setting with the `no pool-enable` command.

7.5.3.7 no pool-enable

Description

With this command you specify that this IPv4 address band will not be used.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call the command without parameter assignment:

```
no pool-enable
```

Result

The setting is disabled.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You enable the setting with the `pool-enable` command.

7.5.3.8 ports

Description

With this command you enable the ports via which the IPv4 addresses of an address band in the local subnet are assigned.

After you have created an IPv4 address band, all ports are selected that are currently located in the corresponding VLAN. If you add ports to the VLAN later, these ports are not automatically enabled.

With address assignments via a relay agent, you cannot restrict the ports.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
ports [<interface-type> <0/a-b, 0/c, ...>] [<interface-type> <0/a-b, 0/c, ...>][add]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface
0/a-b,0/c,...	Port no. of the interface	
add	Adds an interface to an existing configuration.	-

For information on identifiers of addresses and interfaces, refer to the section "Auto-Hotspot".

Result

The selected ports will be enabled. Before the IPv4 address band can be used, it still needs to be activated.

Further notes

You disable the ports with the `no ports` command.

You display the setting with the `show ip dhcp-server pools` command.

You enable the IPv4 address band with the `pool-enable` command.

7.5.3.9 no ports

Description

With this command you disable the ports via which the IPv4 addresses of an address band in the local subnet are assigned.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call up the command with the following parameters:

```
no ports [<interface-type> <0/a-b, 0/c, ...>] [<interface-type> <0/a-b, 0/c, ...>]
[all]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface
0/a-b,0/c,...	Port no. of the interface	
all	All ports will be disabled.	-

For information on identifiers of addresses and interfaces, refer to the section "Auto-Hotspot".

Result

The selected ports will be disabled.

Further notes

You enable the ports with the `ports` command.

You display the setting with the `show ip dhcp-server pools` command.

You enable the IPv4 address band with the `pool-enable` command.

7.5.3.10 relay-information

Description

With this command you define that devices with a certain remote ID and circuit ID are assigned the IPv4 addresses from a specific address band.

If you create such an entry for an address band, address pool only reacts to DHCP queries via a DHCP relay agent (option 82). You can create further address bands for the same VLAN IP interfaces so that the pools react to different requests.

Note

Extension or release of an IPv4 address assigned via a relay agent.

With address assignments via a relay agent "Renew" and "Release" messages going directly from the client to the server are ignored by the server.

- The extension of the period for an IPv4 address assigned via a relay agent is achieved using a "Rebinding" message that the client sends automatically as a broadcast.
 - To speed up the release of an IPv4 address assigned via a relay agent, configure a shorter period of validity with the `lease-time` command.
-

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call up the command with the following parameters:

```
relay-information <remote-id> <circuit-id>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>remote-id</code>	Remote ID of the device	Enter the remote ID of the device.
<code>circuit-id</code>	Circuit ID of the device.	Enter the circuit ID of the device.

Result

Devices with a certain remote ID and circuit ID are assigned the IPv4 addresses from a specific address band. Before the IPv4 address band can be used, it still needs to be activated.

Further notes

You cancel the assignment with the `no relay-information` command.

You display the setting with the `show ip dhcp relay information` command.

You enable the IPv4 address band with the `pool-enable` command.

7.5.3.11 no relay-information**Description**

With this command you cancel the assignment of devices with a certain remote ID and circuit ID to IPv4 addresses from a specific address band.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli(config-dhcp-pool-<ID>)#
```

Syntax

Call up the command with the following parameters:

```
no relay-information <remote-id> <circuit-id>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
remote-id	Remote ID of the device	Enter the remote ID of the device.
circuit-id	Circuit ID of the device.	Enter the circuit ID of the device.

Result

The assignment is canceled.

Further notes

With the `relay-information` command, you assign devices with a certain remote ID and circuit IPv4 addresses from a specific address band.

You display the setting with the `show ip dhcp relay information` command.

You enable the IPv4 address band with the `pool-enable` command.

7.5.3.12 set-interface

Description

With this command, you specify the interface via which the IPv4 addresses are dynamically assigned.

The requirement for the assignment is that the IPv4 address of the interface is located within the IPv4 address band. If this is not the case, the interface does not assign any IPv4 addresses.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
set-interface {vlan <vlan-id (1-4094)> | <interface-type> <interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection.	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Auto-Hotspot".

Result

The interface is assigned. Before the IPv4 address band can be used, it still needs to be activated.

Further notes

You display the setting with the `show ip dhcp-server pools` command.

You enable the IPv4 address band with the `pool-enable` command.

7.5.3.13 static-lease

Description

With this command you specify that devices with a certain MAC address or client ID are assigned to the preset IPv4 address.

Requirement

- The assignment has not yet been created.
- You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
static-lease {mac <mac-address> | client-id <string>} <ip-address>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mac	Keyword for a MAC address	-
mac-address	Unicast MAC address	Specify the MAC address. aa:bb:cc:dd:ee:ff
client-id	Keyword for a DHCP client ID	-
string	Freely definable DHCP client ID	Enter the required designation. Maximum of 254 characters
ip-address	Unicast IPv4 address	Enter a valid IPv4 address. The IPv4 address must match the subnet of the IPv4 address band.

Result

The assignment is specified.

Further notes

You display the setting with the `show ip dhcp dhcp-server bindings` command.

You disable the IPv4 address band with the `no pool-enable` command.

You delete the assignment with the `no static-lease` command.

7.5.3.14 no static-lease

Description

With this command, you delete the assignment of an IPv4 address to a MAC address.

Requirement

You are in the DHCPPOOL configuration mode.

The command prompt is as follows:

```
cli (config-dhcp-pool-<ID>) #
```

Syntax

Call up the command with the following parameters:

```
no static-lease { mac <mac-address> | client-id <string> }
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
mac	Keyword for a MAC address	-
mac-address	Unicast MAC address	Specify the MAC address. aa:bb:cc:dd:ee:ff
client-id	Keyword for a DHCP client ID	-
string	Freely definable DHCP client ID	Enter the required designation.

Result

The assignment is deleted.

Further notes

You configure the assignment with the `static-lease` command.

7.6 DHCPv4 Relay Agent (IPv4)

This section describes commands for the DHCP Relay Agent.

7.6.1 The "show" commands

This section describes commands with which you display various settings.

7.6.1.1 show dhcp server

Description

With this command, you display the IP addresses of the DHCP servers to which the device forwards the frames.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode or in the Global Configuration mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show dhcp server
```

Result

The IP addresses of the DHCP servers are displayed.

Further notes

With the "ip dhcp server" command, you specify the IP addresses.

7.6.1.2 show ip dhcp relay information

Description

This command displays the DHCP relay agent settings for all or for a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode or in the Global configuration mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ip dhcp relay information [vlan <vlan-id>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The configuration settings are displayed.

7.6.2 Commands in the Global Configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.6.2.1 ip dhcp server

Description

With this command, you specify the IP addresses of the DHCP servers to which the DHCP relay agent forwards the frames. You can specify up to four IP addresses for the DHCP relay agent.

Requirement

- You are in the Global configuration mode.
The command prompt is:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp server <ip address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip address	IPv4 address of the DHCP server	enter a valid IP address

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP address is specified.

Further notes

You remove the IP address with the `no ip dhcp server` command.

You enable the DHCP Relay Agent with the `service dhcp-relay` command.

You display the IP addresses with the `show dhcp server` command.

You display the settings with the `show ip dhcp relay information` command.

7.6.2.2 no ip dhcp server

Description

With this command, you delete the IP address of the DHCP server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
no ip dhcp server <ip address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip address	IP address of the DHCP server	Enter the IP address to be deleted.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP address is removed.

Further notes

You enable the DHCP Relay Agent with the `service dhcp-relay` command.

You create the IP address with the `ip dhcp server` command.

You display the IP addresses with the `show dhcp server` command.

7.6.2.3 ip dhcp relay circuit-id option

Description

The Circuit ID is a sub option of the "DHCP Relay Information" option. The Circuit ID contains information about the origin of the DHCP packet.

With this command, you specify the information contained in the Circuit ID.

The Circuit ID is encoded in the DHCP packet if the "DHCP relay information" option is enabled.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp relay circuit-id option [router-index] [vlanid] [recv-port]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
router-index	The router index is added to the Circuit ID.	Default setting
vlanid	The VLAN ID is added to the Circuit ID.	-
recv-prot	The Circuit ID is added to the receiving port.	-

Result

The content of the Circuit ID is specified.

Further notes

You enable the DHCP Relay Information option with the `ip dhcp relay information option` command.

You display the information with the `show ip dhcp relay information` command.

7.6.2.4 ip dhcp relay information option

Description

With this command, you enable the "IP DHCP Relay Information" option. If the option is enabled, prior to forwarding to the DHCP server, information about the origin of the DHCP query is encoded in the packet. If the DHCP server sends a response, the information is removed again before forwarding to the DHCP client.

This information is only encoded in the data packet if the DHCP relay agent is enabled.

Requirement

You are in the Global configuration mode or in the Interface configuration mode of VLAN.

The command prompt is as follows:

```
cli(config)# or cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ip dhcp relay information option
```

Result

The option is enabled.

Further notes

You disable the option with the `no ip dhcp relay information option` command.

You enable the DHCP Relay Agent with the `service dhcp-relay` command.

You configure the content of the information with the `ip dhcp relay circuit-id option` command.

You can display the status of this option and other information with the `show ip dhcp relay information` command.

7.6.2.5 no ip dhcp relay information option

Description

With this command, you disable the "IP DHCP Relay Information" option.

Requirement

You are in the Global configuration mode or in the Interface configuration mode of VLAN.

The command prompt is as follows:

```
cli(config)# OR cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The option is disabled.

Further notes

You enable the option with the `ip dhcp relay information option` command.

You can display the status of this option and other information with the `show ip dhcp relay information` command.

7.6.2.6 service dhcp-relay

Description

With this command, you enable the DHCP relay agent on the device. The DHCP relay agent forwards DHCP queries to DHCP servers located in a different subnet.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
service dhcp-relay
```

Result

The DHCP Relay Agent is activated.

Further notes

You disable the DHCP Relay Agent with the `no service dhcp-relay` command.

You create the IP addresses of the DHCP server with the `ip dhcp server` command.

You can display the status of this function and other information with the `show ip dhcp relay information` command.

7.6.2.7 no service dhcp-relay

Description

This command disables the DHCP relay agent.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no service dhcp-relay
```

Result

The DHCP Relay Agent is disabled.

Further notes

You enable the DHCP Relay Agent with the `service dhcp-relay` command.

You can display the status of this function and other information with the `show ip dhcp relay information` command.

7.6.3 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.6.3.1 ip dhcp relay circuit-id

Description

With this command, you assign a Circuit ID to the interface.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp relay circuit-id <circuit-id>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
circuit-id	Circuit ID	1 ... 188

Result

The Circuit ID is assigned.

Further notes

You remove the Circuit ID with the `no ip dhcp relay circuit-id` command.

You display the IP addresses with the `show dhcp server` command.

You display the settings with the `show ip dhcp relay information` command.

7.6.3.2 no ip dhcp relay circuit-id

Description

With this command, you remove the Circuit ID.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The Circuit ID is removed.

Further notes

You configure the Circuit ID with the `ip dhcp relay circuit-id` command.

You display the IP addresses with the `show dhcp server` command.

You display the settings with the `show ip dhcp relay information` command.

7.6.3.3 ip dhcp relay remote-id

Description

With this command, you specify the device ID.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip dhcp relay remote-id <remote-id name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
remote-id name	Device ID	max. 32 characters Default: XYZ

Result

The device ID is specified.

Further notes

You remove the device ID with the `no ip dhcp relay remote-id` command.

You display the IP addresses with the `show dhcp server` command.

You display the settings with the `show ip dhcp relay information` command.

7.6.3.4 no ip dhcp relay remote-id

Description

With this command, you remove the device identifier.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip dhcp relay remote-id
```

Result

The device ID is removed.

Further notes

You configure the device ID with the `ip dhcp relay remote-id` command.

You display the IP addresses with the `show dhcp server` command.

You display the settings with the `show ip dhcp relay information` command.

7.7 DHCPv6 Relay Agent (IPv6)

This section describes commands for the DHCPv6 Relay Agent.

7.7.1 The "show" commands

This section describes commands with which you display various settings.

7.7.1.1 show ipv6 dhcp relay statistics

Description

This command displays the DHCPv6 relay agent settings for all or for a selected interface.

Requirement

- The DHCPv6 relay agent is enabled.

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 dhcp relay statistics [interface {vlan <vlan-id(1-4094)> | <interface-type> <interface-id>} ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Shows that an interface description follows	-
vlan	Keyword for a VLAN connection	-

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter, the entries are displayed for all available interfaces.

Result

The configuration settings are displayed.

Further notes

You enable the DHCPv6 relay agent function with the `ipv6 dhcp relay` command.

7.7.2 clear ipv6 dhcp relay statistics

Description

With this command, you reset the counters.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
clear ipv6 dhcp relay statistics [interface {vlan <VlanId(1-4094)> |<interface-type>
<interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Shows that an interface description follows	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not specify any parameters, the counter is reset on all interfaces.

Result

The counters are reset.

Further notes

You enable the DHCPv6 relay agent with the `ipv6 dhcp relay` command.

You display the information with the `show ipv6 dhcp relay information` command.

7.7.3 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.7.3.1 ipv6 dhcp relay remote-id

Description

With this command, you specify whether the DHCP relay agent option 37 (Remote ID) is used.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp relay remote-id {enable | disable}
```

The parameters have the following meaning:

Parameters	Description	Range of values / note
enable	Remote ID is used	-
disable	Remote ID is not used	-

Result

The Remote ID is activated.

Further notes

You configure the type of remote ID with the `ipv6 dhcp relay remote-id type` command.

7.7.4 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.7.4.1 ipv6 dhcp relay

Description

With this command, you enable the DHCPv6 relay agent. You can also specify the interface via which a DHCPv6 server can be reached

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp relay [destination <prefix> [interface {vlan <vlan-id (1-4094)> |  
<interface-type> <interface-id>}]]
```

The parameters have the following meaning:

Parameters	Description	Range of values / note
destination	Keyword for the IPv6 address of the destination DHCPv6 server	-
prefix	IPv6 address	Enter a valid IPv6 address.
interface	Shows that an interface description follows	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The DHCP Relay Agent is enabled.

Further notes

You disable the DHCPv6 relay agent with the `no ipv6 dhcp relay` command.

You configure the interface as a router port with the `no switchport` command.

You display the setting with the `show ipv6 dhcp interface` command.

You display the statistics with the `show ipv6 dhcp relay statistics` command.

7.7.4.2 no ipv6 dhcp relay

Description

With this command, you disable the DHCPv6 relay agent. You can also remove the DHCPv6 servers.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config-if-$$) #
```

Syntax

Call up the command with the following parameters:

```
no ipv6 dhcp relay [destination <prefix> {link-local | <prefix Len> } [interface
{Vlan <vlan-id (1-4094)> | <interface-type> <interface-id>}]]
```

The parameters have the following meaning:

Parameters	Description	Range of values / note
destination	Keyword for the IPv6 address of the destination DHCPv6 server	-
prefix	IPv6 address	Enter a valid IPv6 address.
link-local	Link local address of the DHCP relay agent	-
prefix Len	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
interface	Shows that an interface description follows	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The DHCPv6 relay agent is disabled.

Further notes

You enable the DHCPv6 relay agent with the `ipv6 dhcp relay` command.

You configure the interface as a router port with the `no switchport` command.

You display the setting with the `show ipv6 dhcp interface` command.

You display the statistics with the `show ipv6 dhcp relay statistics` command.

7.7.4.3 ipv6 dhcp relay remote-id type

Description

With this command, you specify the type of the remote ID.

Requirement

- The interface is an IPv6 interface.
- The DHCPv6 relay agent is enabled.
- The Remote ID is activated.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp relay remote-id type {duid | system-name | mgmt-ip | userDefined}
```

The parameter has the following meaning:

Parameters	Description	Range of values / note
duid	Uses the DHCP unique identifier You configure the entry with the <code>ipv6 dhcp relay remote-id duid</code> command.	-
system-name	Uses the system name.	-
mgmt-ip	Uses the management IPv6 address	-
userDefined	Uses a user-defined entry You configure the entry with the <code>ipv6 dhcp relay remote-id userDefined</code> command.	-

Result

The remote ID is specified.

Further notes

You enable the DHCPv6 relay agent with the `ipv6 address dhcp` command.

You enable the remote ID with the `ipv6 dhcp relay remote-id` command.

You configure the interface as a router port with the `no switchport` command.

7.7.4.4 ipv6 dhcp relay remote-id duid

Description

With this command, you specify the DUID (DHCP Unique Identifier).

Requirement

- The interface is an IPv6 interface.
- The DHCPv6 relay agent is enabled.
- In "remote-id type", duid is set.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 dhcp relay remote-id duid <duid-id string(299)>
```

The parameter has the following meaning:

Parameters	Description	Range of values / note
duid-id	DHCP unique identifier	Enter the DUID. max. 299 characters

Result

The DUID is specified.

Further notes

You enable the remote ID with the `ipv6 dhcp relay remote-id` command.

You enable the DHCPv6 relay agent with the `ipv6 address dhcp relay` command.

You configure the interface as a router port with the `no switchport` command.

You configure the remote ID type with the `ipv6 dhcp relay remote-id type` command.

7.7.4.5 ipv6 dhcp relay remote-id userDefined

Description

With this command, you configure a designation for the remote ID.

Requirement

- The interface is an IPv6 interface.
- The DHCPv6 relay agent is enabled.
- In "remote-id type", userDefined is set.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 dhcp relay remote-id userDefined <user-specific-ascii string(128)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
user-specific-ascii	Designation of the remote ID.	max. 128 characters

Result

The designation is specified.

Further notes

You enable the remote ID with the `ipv6 dhcp relay remote-id` command.

You enable the DHCPv6 relay agent with the `ipv6 address dhcp relay` command.

You configure the interface as a router port with the `no switchport` command.

You configure the remote ID type with the `ipv6 dhcp relay remote-id type` command.

7.8 SNMP

This section describes commands of the Simple Network Management Protocol (SNMP).

7.8.1 The "show" commands

This section describes commands with which you display various settings.

7.8.1.1 show snmp

Description

This command shows the status information of SNMP.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp
```

Result

The status information is displayed.

7.8.1.2 show snmp community

Description

This command shows the details of the configured of SNMP communities.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp community
```

Result

The details of the configured SNMP communities are displayed.

7.8.1.3 show snmp engineID

Description

This command shows the SNMP identification number of the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp engineID
```

Result

The SNMP identification number of the device is displayed.

7.8.1.4 show snmp filter

Description

This command shows the configured SNMP filters.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp filter
```

Result

The configured SNMP filters are displayed.

7.8.1.5 show snmp group

Description

This command shows the configured SNMP groups.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show snmp group
```

Result

The configured SNMP groups are displayed.

7.8.1.6 show snmp group access

Description

This command shows the rights of the configured SNMP groups.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show snmp group access
```

Result

The rights of the configured SNMP groups are displayed.

7.8.1.7 show snmp inform statistics

Description

This command shows the statistics of the Inform Messages.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp inform statistics
```

Result

The statistics of the Inform Messages are displayed.

7.8.1.8 show snmp notif

Description

With this command, you display the configured SNMP notification types.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp notif
```

Result

The configured SNMP notification types are displayed.

7.8.1.9 show snmp targetaddr**Description**

This command shows the configured SNMP target addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show snmp targetaddr
```

Result

The configured SNMP target addresses are displayed.

7.8.1.10 show snmp targetparam**Description**

This command shows the configured SNMP target parameters.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show snmp targetparam
```

Result

The configured SNMP target parameters are displayed.

7.8.1.11 show snmp tcp

Description

This command shows the configuration for SNMP via TCP.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp tcp
```

Result

The configuration for SNMP via TCP is displayed.

7.8.1.12 show snmp user

Description

This command shows the settings for the SNMP user.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show snmp user
```

Result

The settings for the SNMP user are displayed.

7.8.1.13 show snmp viewtree

Description

This command shows the settings for the SNMP tree view.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show snmp viewtree
```

Result

The settings for the SNMP tree view are displayed.

7.8.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.8.2.1 snmpagent

Description

With this command, you enable the SNMP agent function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
snmpagent
```

Result

The SNMP agent function is enabled.

Further notes

You disable the SNMP agent function with the `no snmpagent` command.

7.8.2.2 no snmpagent

Description

With this command, you disable the SNMP agent function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no snmpagent
```


Result

The SNMP agent function is disabled.

Further notes

You enable the SNMP agent function with the `snmpagent` command.

7.8.2.3 snmp agent version

Description

With this command, you configure whether all SNMP queries or only SNMPv3 queries are processed.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp agent version {v3only|all}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
v3only	only SNMPv3 queries are processed	-
all	all SNMP queries are processed	Default: all

Result

The setting is configured.

7.8.2.4 snmp access

Description

With this command, you configure the access to an SNMP group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp access <GroupName> {v1|v2c|v3 {auth|noauth|priv}}
 [read <ReadView|none>][write <WriteView|none>][notify <NotifyView|none>]
 [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
GroupName	Name of the group to which access is configured	max. 32 characters
Version	Selects the version of the protocol used	<ul style="list-style-type: none"> v1 v2c v3
Authentication	Selects the authentication method:	<ul style="list-style-type: none"> auth enables MD5 or SHA as authentication method noauth no authentication priv enables authentication and encryption
read	the data can be read Keyword	<ul style="list-style-type: none"> ReadView none
write	the data can be read and written Keyword	<ul style="list-style-type: none"> WriteView none
notify	Changes can be set as a tag Keyword	<ul style="list-style-type: none"> NotifyView none
Storage type	specifies whether the settings remain following a restart	<ul style="list-style-type: none"> volatile (volatile): The settings are lost after a restart nonvolatile (non-volatile): The settings are retained after a restart

The keywords need to be specified.

If optional parameters are not specified when configuring a group, the default value will be used.

Result

The settings for access to an SNMP group are configured.

Further notes

You delete the access to an SNMP group with the `no snmp access` command.

You display the configured SNMP groups with the `show snmp group` command.

You display the access configurations for SNMP groups with the `show snmp group access` command.

You display the configured SNMP tree views with the `show snmp viewtree` command.

7.8.2.5 no snmp access

Description

With this command, you delete the access to an SNMP group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp access <GroupName> {v1|v2c|v3 {auth|noauth|priv}}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
GroupName	Name of the group to which access is deleted	max. 32 characters
Version	Selects the version of the protocol used	<ul style="list-style-type: none"> • v1 • v2c • v3
Authentication	Selects the authentication method:	<ul style="list-style-type: none"> • auth • noauth • priv

Result

The access to an SNMP group is deleted.

Further notes

You configure the setting with the `snmp access` command.

You display the configured SNMP groups with the `show snmp group` command.

You display the access configurations for SNMP groups with the `show snmp group access` command.

You display the configured SNMP tree views with the `show snmp viewtree` command.

7.8.2.6 snmp community index**Description**

With this command, you configure the details of an SNMP community.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp community index <CommunityIndex> name <CommunityName>
    security <SecurityName> [context <Name>][{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
CommunityIndex	Index of the community	max. 32 characters
name	Keyword for the name of the community	-
CommunityName	Name of the community	max. 32 characters
security	Keyword for the security name	-
SecurityName	Security name	max. 32 characters
context	Keyword for the context name	-
Name	Context name	max. 32 characters
Storage type	specifies whether the settings remain following a restart	<ul style="list-style-type: none"> volatile (volatile): The settings are lost after a restart nonvolatile (non-volatile): The settings are retained after a restart

If optional parameters are not specified when configuring a community, the default values apply.

Result

The settings are configured.

Further notes

You delete the details of an SNMP community with the `no snmp community index` command.

You show the details of an SNMP community with the `show snmp community` command.

You show the status information of the SNMP communication with the `show snmp` command.

7.8.2.7 no snmp community index

Description

With this command, you delete the details of an SNMP community.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp community index <CommunityIndex>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
CommunityIndex	Name of the community	max. 32 characters

Result

The details of an SNMP community are deleted.

Further notes

You configure the details of an SNMP community with the `snmp community index` command.

You show the details of an SNMP community with the `show snmp community` command.

You show the status information of the SNMP communication with the `show snmp` command.

7.8.2.8 snmp engineid migrate

Description

With this command, you enable the SNMPv3 user migration.

If the function is enabled, an SNMP engine ID is generated that can be migrated. You can transfer configured SNMPv3 users to a different device. If you enable this function and load the configuration of the device on another device, configured SNMPv3 users are retained.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
snmp engineid migrate
```

Result

The SNMPv3 user migration is enabled.

Further notes

You disable the SNMPv3 user migration with the `no snmp engineid migrate` command.

7.8.2.9 no snmp engineid migrate

Description

With this command, you disable the SNMPv3 user migration.

If the function is disabled, a device-specific SNMP engine ID is generated. To generate the ID, the agent MAC address of the device is used. You cannot transfer this SNMP user configuration to other devices.

If you load the configuration of the device on another device, all configured SNMPv3 users are deleted.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no snmp engineid migrate
```

Result

The SNMPv3 user migration is disabled.

Further notes

You enable the SNMPv3 user migration with the `snmp engineid migrate` command.

7.8.2.10 snmp group

Description

With this command, you configure the details of an SNMP group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp group <GroupName> user <UserName> security-model {v1|v2c|v3}
    [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
GroupName	Name of the group	max. 32 characters
user	Keyword for the user name	-
UserName	Name of the user	max. 32 characters
security-model	specifies which security settings will be used	<ul style="list-style-type: none"> • v1 • v2c • v3

Parameter	Description	Range of values / note
Storage type	specifies whether the settings remain following a restart	<ul style="list-style-type: none"> <code>volatile</code> (volatile): The settings are lost after a restart <code>nonvolatile</code> (non-volatile): The settings are retained after a restart

If optional parameters are not specified when configuring a group, the default values apply.

Result

The details of the group are configured.

Further notes

You delete the details of an SNMP group with the `no snmp group` command.

You display the created SNMP groups with the `show snmp group` command.

You display the created SNMP user with the `show snmp user` command.

7.8.2.11 no snmp group

Description

With this command, you delete the details of an SNMP group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp group <GroupName> user <UserName> security-model {v1|v2c|v3}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
GroupName	Name of the group	max. 32 characters
user	Keyword for the user name	-

Parameter	Description	Range of values / note
UserName	Name of the user	max. 32 characters
security-model	Specifies which security settings are used for sending	<ul style="list-style-type: none"> • v1 • v2c • v3

Result

The details of the group are deleted.

Further notes

You change the details of an SNMP group with the `snmp group` command.

You display the created SNMP groups with the `show snmp group` command.

You display the created SNMP user with the `show snmp user` command.

7.8.2.12 snmp notify

Description

With this command, you configure the details of the SNMP notifications.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp notify <NotifyName> tag <TagName> type {Trap|Inform}
    [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
NotifyName	Name of the SNMP notification	max. 32 characters
tag	Keyword for a target key	-
TagName	Name of the target key	max. 32 characters

Parameter	Description	Range of values / note
Type	Type of the SNMP notification	<ul style="list-style-type: none"> Trap generates a trap Inform generates a log entry or sends an entry to the log server
Storage type	specifies whether the settings remain following a restart:	<ul style="list-style-type: none"> volatile (volatile): The settings are lost after a restart nonvolatile (non-volatile): The settings are retained after a restart

Result

The details of the SNMP notifications are configured.

Further notes

You delete the details of an SNMP notification with the `no snmp notify` command.

You display the configured SNMP notifications with the `show snmp notif` command.

You display the configured SNMP target addresses with the `show snmp targetaddr` command.

7.8.2.13 no snmp notify

Description

With this command, you delete the details of the SNMP notifications.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp notify <NotifyName>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
NotifyName	Name of the notification	max. 32 characters

Result

The details of the SNMP notifications are deleted.

Further notes

You change the details of an SNMP group with the `snmp notify` command.

You display the configured SNMP notifications with the `show snmp notif` command.

You display the configured SNMP target addresses with the `show snmp targetaddr` command.

7.8.2.14 snmp targetaddr

Description

With this command, you configure the SNMP target address.

Requirement

- The SNMP target parameters are configured.

You are in the Global configuration mode.

The command prompt is:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp targetaddr <TargetAddressName> param <ParamName>
    {ipv4 <IPAddress> | fqdn-name <FQDN> | ipv6 <IP6-Address> }
    [timeout <Seconds(1-1500)>] [retries <RetryCount(1-3)>]
    [taglist <TagIdentifier | none>] [{volatile | nonvolatile}]
    [port <integer (1-65535)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
TargetAddressName	Name of the target address	Maximum of 32 characters
param	Keyword for the parameter name	-
ParamName	Name of the parameter	Maximum of 32 characters
ipv4	Keyword for an IPv4 address	-

Parameter	Description	Range of values / note
IPAddress	IPv4 address	Enter a valid IPv4 unicast address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
IP6-Address	IPv6 address	Enter a valid IPv6 address.
timeout	Keyword for the time the SNMP agent waits for a response before it repeats the inform request message	-
Seconds	Time in seconds	1 ... 1500
retries	Keyword for the maximum number of attempts to obtain a response to an inform request message	-
RetryCount	Number of attempts	1 ... 3
taglist	Keyword for tag list	-
TagIdentifier	Tag identifier that selects the destination address for SNMP.	Specify the tag identifier.
none	No tag identifier	-
volatile nonvolatile	Specifies whether the settings remain following a restart.	<ul style="list-style-type: none"> • volatile: The default settings are used after a restart. • nonvolatile: The saved settings are used after a restart.
port	Keyword for the port number at which the SNMP manager receives traps and inform messages	-
integer	Port number	1 ... 65535

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

If optional parameters are not specified when configuring, the default values apply.

Result

The SNMP target address is configured.

Further notes

You delete the SNMP target address with the `no snmp targetaddr` command.

You display the SNMP target address with the `show snmp targetaddr` command.

You configure the SNMP target parameters with the `snmp targetparams` command.

You display the SNMP target parameters with the `show snmp targetparam` command.

7.8.2.15 no snmp targetaddr

Description

With this command, you delete the SNMP target address.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
no snmp targetaddr <TargetAddressName>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
TargetAddressName	SNMP target address	max. 32 characters

Result

The SNMP target address is deleted.

Further notes

You change the SNMP target address with the `snmp targetaddr` command.

You display the SNMP target address with the `show snmp targetaddr` command.

7.8.2.16 snmp targetparams

Description

With this command, you configure the SNMP target parameters.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
snmp targetparams <ParamName>
    user <UserName>
    security-model {v1|v2c|v3 {auth|noauth|priv}}
    message-processing {v1|v2c|v3} [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ParamName	Name of the SNMP parameter	max. 32 characters
user	Keyword for the user name	-
UserName	Value for the user name	max. 32 characters
security-model	Specifies which SNMP version is used. With SNMPv3 a security level (authentication, encryption) can also be configured.	<ul style="list-style-type: none"> • SNMP version <ul style="list-style-type: none"> - v1 - v2c - v3 • Security level for v3 <ul style="list-style-type: none"> - auth Authentication enabled / no encryption enabled - noauth No authentication enabled, no encryption enabled - priv Authentication enabled / encryption enabled
message-processing	Specifies which SNMP version is used for processing the messages and whether the settings remain following a restart.	<ul style="list-style-type: none"> • SNMP version <ul style="list-style-type: none"> - v1 - v2c - v3 • Settings after the restart <ul style="list-style-type: none"> - volatile (volatile): The settings are lost after a restart - nonvolatile (non-volatile): The settings are retained after a restart

Keywords need to be specified.

If optional parameters are not specified when configuring, the default values apply.

Result

The SNMP target parameters are configured.

Further notes

You delete the SNMP target parameters with the `no snmp targetparams` command.

You display settings of this function with the `show snmp targetparam` command.

You configure the user profile with the `snmp user` command.

You display the list of users with the `show snmp user` command.

7.8.2.17 no snmp targetparams

Description

With this command, you delete the SNMP target parameters.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp targetparams <ParamName>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ParamName	Name of the SNMP parameter	max. 32 characters

Result

The SNMP target parameters are deleted.

Further notes

You change the SNMP target parameters with the `snmp targetparams` command.

You display settings of this function with the `show targetparam` command.

7.8.2.18 snmp v1-v2 readonly

Description

With this command, you block write access for SNMPv1 and SNMPv2 PDUs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
snmp v1-v2 readonly
```

Result

Write access for SNMPv1 and SNMPv2 PDUs is blocked.

Further notes

You release write access for SNMPv1 and SNMPv2 PDUs with the `no snmp v1-v2 readonly` command.

7.8.2.19 no snmp v1-v2 readonly

Description

With this command, you enable write access for SNMPv1 and SNMPv2 PDUs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no snmp v1-v2 readonly
```

Result

Write access for SNMPv1 and SNMPv2 PDUs is enabled.

Further notes

You block write access for SNMPv1 and SNMPv2 PDUs with the `snmp v1-v2 readonly` command.

7.8.2.20 snmp user

Description

With this command, you configure the details of an SNMP user.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
snmp user <UserName> [auth {md5|sha} <passwd> [priv DES <passwd>]]  
    [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
UserName	Name of the user	max. 32 characters
auth	specifies that authentication takes place and which algorithm is used	<ul style="list-style-type: none"> md5 (Message Digest 5) sha (Secure Hash Algorithm) Default: No authentication
passwd	Password for authentication	max. 32 characters
priv DES	specifies that there is encryption	- Default: no encryption
passwd	Value for the password of the encryption	max. 32 characters
Storage type	specifies whether the settings remain following a restart:	<ul style="list-style-type: none"> volatile (volatile): The default settings are used after a restart nonvolatile (non-volatile): The saved settings are used after a restart

If optional parameters are not specified when configuring an SNMP user, the default values apply.

Result

The details of the SNMP user are configured.

Further notes

You delete the settings with the `no snmp user` command.

You display the configured users with the `show snmp user` command.

7.8.2.21 no snmp user**Description**

With this command, you delete the details of an SNMP user.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp user <UserName>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
UserName	Name of the user	max. 32 characters

Result

The details of the SNMP user are deleted.

Further notes

You change the settings with the `snmp user` command.

You display the configured users with the `show snmp user` command.

7.8.2.22 snmp view**Description**

With this command, you configure an SNMP view.

Requirement

- An SNMP group has been created
- The access to the group is configured with `snmp access`
- You are in the Global Configuration mode.
The command prompt is:
`cli(config)#`

Syntax

Call up the command with the following parameters:

```
snmp view <ViewName> <OIDTree> [mask<OIDMask>] {included|excluded}
      [{volatile|nonvolatile}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ViewName	Name of the SNMP view	max. 32 characters
OIDTree	Object ID	Path information of the MIB tree
mask	Keyword for the OID mask	-
OIDMask	Mask that filters access to the elements of the MIB tree	A series of "0" and "1" separated by dots in keeping with the path information of the MIB tree
View type	Specifies whether the filtered elements are used or excluded	<ul style="list-style-type: none"> • <code>included</code> (Default) • <code>excluded</code>
Storage type	specifies whether the settings remain following a restart:	<ul style="list-style-type: none"> • <code>volatile</code> (volatile): The settings are lost after a restart • <code>nonvolatile</code> (non-volatile): The settings are retained after a restart (default)

If optional parameters are not specified when configuring, the default values apply.

Result

The SNMP view is configured.

Further notes

You delete the view with the `no snmp view` command.

You display the configured view trees with the `show snmp viewtree` command.

You display the SNMP group access rights with the `show snmp group access` command.

You configure the SNMP group access rights with the `snmp access` command.

7.8.2.23 no snmp view

Description

With this command, you delete an SNMP view.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no snmp view <ViewName> <OIDTree>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ViewName	Name of the view	max. 32 characters
OIDTree	Object ID	Path information of the MIB tree

Result

The SNMP view is deleted.

Further notes

You configure a view with the `snmp view` command.

You display the configured view trees with the `show snmp viewtree` command.

7.9 SMTP Client

This section describes commands of the Simple Mail Transfer Protocol (SMTP).

7.9.1 The "show" commands

This section describes commands with which you display various settings.

7.9.1.1 show events smtp-server

Description

This command shows the configured e-mail servers.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events smtp-server
```

Result

The configured e-mail servers are displayed.

7.9.1.2 show events sender email

Description

This command shows the configured e-mail sender address.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events sender email
```

Result

The configured e-mail sender address is displayed.

7.9.1.3 show events smtp-port

Description

This command shows the configured SNMP port.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events smtp-port
```

Result

The configured SMTP port is displayed.

7.9.2 Commands in the Events configuration mode

This section describes commands that you can call up in the EVENTS configuration mode.

In the Global configuration mode, enter the `events` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

- If you exit the EVENTS configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the EVENTS configuration mode with the `end` command, you return to the Privileged EXEC mode.

7.9.2.1 smtp-server

Description

With this command, you configure an entry for an SMTP server.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
smtp-server { ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr> } <receiver mail-address>
```

The parameters have the following meaning:

Parameter	Description	Note on the range if values
ipv4	Keyword for an IPv4 address	-
ucast_addr	IPv4 address of the SMTP server	Enter a valid IPv4 unicast address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the SMTP server	Enter a valid IPv6 address.
receiver mail-address	Name of the recipient	Maximum of 100 characters

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

Result

An entry for the SMTP server is configured.

Further notes

You delete an SMTP server entry with the `no smtp-server` command.

7.9.2.2 no smtp-server

Description

With this command, you delete an SMTP server entry.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
no smtp-server { ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr> }
```

The parameters have the following meaning:

Parameter	Description	Note on the range if values
ipv4	Keyword for an IPv4 address	-
ucast_addr	IPv4 address of the SMTP server	Enter a valid IPv4 unicast address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the SMTP server	Enter a valid IPv6 address.

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

Result

The SMTP server entry is deleted.

Further notes

You configure an SMTP server entry with the `smtp-server` command.

7.9.2.3 sender mail-address

Description

With this command, you configure the e-mail name of the sender.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
sender mail-address <mail-address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
mail-address	Email name of the sender	max. 100 characters

Result

The e-mail name of the sender is configured.

Further notes

You reset the e-mail name of the sender with the `no sender mail-address`.

You display the setting with the `show events sender email` command.

7.9.2.4 no sender mail-address

Description

With this command, you reset the e-mail name of the sender.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call the command without parameters:

```
no sender mail-address
```

Result

The e-mail name of the sender is reset.

Further notes

You configure the e-mail name of the sender with the `sender mail-address`.

You display the setting with the `show events sender email` command.

7.9.2.5 send test mail

Description

With this command, you send an e-mail according to the currently configured SMTP settings.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call the command without parameters:

```
send test mail
```

Result

An e-mail according to the currently configured SMTP settings is sent.

Further notes

You can display the current SMTP settings with the `show events smtp-server` command.

7.9.2.6 smtp-port

Description

With this command, you configure an SMTP port.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
smtp-port <smtp-port(1-65535)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
smtp-port	Value for the SMTP port	1 ... 65535 Default: 25

Result

An SMTP port is configured.

Further notes

You can reset the setting to the default with the `no smtp-port` command.

You display the setting with the `show smtp-port` command.

7.9.2.7 no smtp-port

Description

With this command, you reset the SMTP port to the default.

The default value is 25.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call the command without parameters:

```
no smtp-port
```

Result

The SMTP port is reset to the default value.

Further notes

You configure the setting with the `smtp-port` command.

You display the setting with the `show smtp-port` command.

7.10 HTTP server

This section describes commands of the Hypertext Transfer Protocol (HTTP).

7.10.1 The "show" commands

This section describes commands with which you display various settings.

7.10.1.1 show ip http server status

Description

This command shows the status of the HTTP server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip http server status
```

Result

The status of the HTTP server is displayed.

7.10.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.10.2.1 ip http

Description

With this command, you enable HTTP on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip http
```

As default the function is "enabled".

Result

HTTP is enabled on the device.

Further notes

You can display the setting of this function and other information with the `show ip http server status` command.

You deactivate HTTP on the device with the `no ip http` command.

7.10.2.2 no ip http

Description

With this command, you disable HTTP on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip http
```

Result

HTTP is disabled on the device.

Further notes

You can display the setting of this function and other information with the `show ip http server status` command.

You enable HTTP with the `ip http` command.

7.11 HTTPS server

This section describes commands of the Hypertext Transfer Protocol Secure (HTTPS).

7.11.1 The "show" commands

This section describes commands with which you display various settings.

7.11.1.1 show ip http secure server status

Description

This command shows the status of the HTTPS server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip http secure server status
```

Result

The status, cipher suite and version of the HTTPS server are displayed.

7.11.1.2 show ssl server-cert

Description

This command shows the SSL server certificate.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ssl server-cert
```

Result

The SSL server certificate is displayed.

7.12 ARP

This section describes commands of the Address Resolution Protocol (ARP).

7.12.1 The "show" commands

This section describes commands with which you display various settings.

7.12.1.1 show ip arp

Description

With this command, you display the IP ARP table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
ip-address	Shows the IP addresses of the entries in the ARP table	-
mac-address	Shows the MAC addresses of the entries in the ARP table	-
summary	Shows a summary of the entries in the ARP table	-
information	Displays information on the ARP configuration	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the IP ARP table is displayed.

Result

The IP ARP table is displayed.

7.12.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.12.2.1 arp

Description

With this command, you generate a static entry in the ARP cache.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
arp <ip address> <hardware address> {Vlan <vlan-id(1-4094)> | <interface-type>
<interface-id> | Cpu0}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip address	Value for the IP address to be linked to a device (physical address)	IP address or IP alias
hardware address	Physical address that will be linked with the IP address	MAC address of the device
Vlan	Keyword for a VLAN connection	-
vlan-id	Number of the VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
Cpu0	The interface is configured as "Out-of-band management interface"	-

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 44)".

Result

The entry is generated in the ARP cache.

Further notes

You delete a static entry from the ARP cache with the `no arp` command.

You can display the status of this function and other information with the `show ip arp` command.

You configure the router port with the `no switchport` command.

7.12.2.2 no arp

Description

With this command, you delete an entry from the ARP cache.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no arp <ip address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip address	Value of the IP address whose entry will be deleted	IP address or IP alias

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 44)".

Result

The entry is deleted from ARP cache.

Further notes

You generate a static entry in the ARP cache with the `arp` command.

You can display the status of this function and other information with the `show ip arp` command.

You configure the router port with the `no switchport` command.

7.12.2.3 arp timeout

Description

With this command, you configure the timeout setting of the ARP cache.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
arp timeout <seconds(30-86400)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Value for the timeout in seconds	30 ... 86400 Default: 300

Result

The setting for the timeout setting of the ARP cache is configured.

Further notes

You can reset the timeout setting to the default with the `no arp timeout` command.

You can display the status of this function and other information with the `show ip arp` command.

7.12.2.4 no arp timeout

Description

With this command, you reset the timeout setting of the ARP cache back to the default value.

The default value for the timeout setting is 300 seconds.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no arp timeout
```

Result

The timeout setting for the ARP cache is reset to the default value.

Further notes

You change the timeout setting with the `arp timeout` command.

You can display the status of this function and other information with the `show ip arp` command.

7.13 SSH server

This section describes commands of the Secure Shell (SSH) Server.

7.13.1 The "show" commands

This section describes commands with which you display various settings.

7.13.1.1 show ip ssh

Description

This command shows the settings of the SSH server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip ssh
```

Result

The settings for the SSH server are displayed.

7.13.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

7.13.2.1 ssh-server

Description

With this command, you enable the SSH protocol on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ssh-server
```

As default the function is "enabled".

Result

The SSH protocol is enabled on the device.

Further notes

You disable the SSH protocol with the `no ssh-server` command.

7.13.2.2 no ssh-server

Description

With this command, you disable the SSH protocol on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ssh-server
```

Result

The SSH protocol is disabled on the device.

Further notes

You enable the SSH protocol with the `ssh-server` command.

Layer 2 management protocols

In this part, you will find sections relating to the topics GARP, GMRP, GVRP, IGMP/MLD snooping and IGMP/MLD querying.

8.1 GARP

This section describes commands of the following protocols:

- GARP - Generic Attribute Registration Protocol
- GMRP - GARP Multicast Registration Protocol
- GVRP - GARP VLAN Registration Protocol

8.1.1 The "show" commands

This section describes commands with which you display various settings.

8.1.1.1 show forward-all

Description

With this command, you display the entries of the GMRP forward all table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show forward-all
```

Result

The entries of the GMRP forward all table are displayed.

8.1.1.2 show forward-unregistered

Description

With this command, you display the entries of the GMRP forward unregistered table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show forward-unregistered
```

Result

The entries of the GMRP forward unregistered table are displayed.

8.1.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.1.2.1 gmrp

Description

With this command, you enable the GMRP function for all or individual interfaces on the device.

Requirement

You are in the Global configuration mode

or

You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config) #  
cli (config-if-$$$) #
```

Syntax

Call the command without parameters:

```
gmrp
```

Result

In the Global configuration mode: The GMRP function is enabled on the device.

In the Interface configuration mode: The GMRP function is enabled for this interface.

Further notes

You need to enable GMRP globally for this device before you enable GMRP for individual interfaces.

If you want to enable or disable the function for a specific interface on the device, use the `no gmrp` command in the Interface configuration mode.

You can display the status of this function and other information with the `show vlan device info` command.

8.1.2.2 no gmrp

Description

With this command, you disable the GMRP function for all or individual interfaces on the device.

Requirement

You are in the Global configuration mode

or

You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config) #  
cli (config-if-$$$) #
```

Syntax

Call the command without parameters:

```
no gmrp
```

Result

In the Global configuration mode: The GMRP function is disabled on the device.

In the Interface configuration mode: The GMRP function is disabled for this interface.

Further notes

If you want to enable the function for a specific interface on the device, use the `gmrp` command.

You can display the status of this function and other information with the `show vlan device info` command.

8.1.2.3 gvrp

Description

With this command, you enable the GVRP function for all or individual interfaces on the device.

Requirement

You are in the Global configuration mode

or

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config)#
```

```
cli (config-if-$$$) #
```

Syntax

Call the command without parameters:

```
gvrp
```

Result

In the Global configuration mode: The GVRP function is enabled on the device.

In the Interface configuration mode: The GVRP function is enabled for this interface.

Further notes

If you have enabled the GARP module, you start GVRP explicitly with this command.

If you want to disable the function for a specific interface on the device, use the `no gvrp` command.

You can display the status of this function and other information with the `show vlan device info` command.

8.1.2.4 no gvrp

Description

With this command, you disable the GVRP function for all or individual interfaces on the device.

Requirement

You are in the Global configuration mode

or

You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config) #
```

```
cli (config-if-$$$) #
```

Syntax

Call the command without parameters:

```
no gvrp
```

Result

In the Global configuration mode: The GVRP function is disabled on the device.

In the Interface configuration mode: The GVRP function is disabled for this interface.

Further notes

If you want to enable the function for a specific interface on the device, use the `gvrp` command.

You can display the status of this function and other information with the `show vlan device info` command.

8.2 IGMP

This section describes the commands for the Internet Group Management Protocol (IGMP).

IGMP is a network protocol used for IP multicast. When IP multicasting IP packets with one IP address are distributed to multiple clients at the same time. IGMP can manage dynamic and static multicast groups.

8.2.1 The "show" commands

This section describes commands with which you display various settings.

8.2.1.1 show ip igmp global-config

Description

With this command, you display the general information on IGMP for the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

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

Result

The information is displayed.

8.2.1.2 show ip igmp group-list

Description

With this command, you display the list of configured multicast groups.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip igmp group-list
```

Result

The list is displayed.

8.2.1.3 show ip igmp groups

Description

With this command, you display the list of joined multicast groups.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ip igmp groups
```

Result

The list is displayed.

8.2.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.2.2.1 ip igmp

Description

With this command, you enable IGMP globally on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ip igmp
```

Result

IGMP is enabled.

Further notes

You disable IGMP with the `no ip igmp` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.2.2 no ip igmp

Description

With this command, you disable IGMP globally on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp
```

Result

IGMP is disabled.

Further notes

You enable IGMP with the `ip igmp` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.2.3 ip igmp group-list**Description**

With this command, you define a multicast group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp group-list <integer> <ip-address> <mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
integer	Number of the multicast group	1 ... 4294967295
ip-address	IP address of the multicast group	Specify the IP address.
mask	Subnet mask of the multicast group	Specify the subnet mask.

Result

The multicast group has been created.

Further notes

You delete a multicast group with the `no ip igmp group-list` command.

You display the configured multicast groups with the `show ip igmp group-list` command.

8.2.2.4 no ip igmp group-list

Description

With this command, you delete a multicast group.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ip igmp group-list <integer>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
integer	Number of the multicast group	1 ... 4294967295

Result

The multicast group has been deleted.

Further notes

You define a multicast group with the `ip igmp group-list` command.

You display the configured multicast groups with the `show ip igmp group-list` command.

8.2.2.5 ip igmp limit

Description

With this command, you define the maximum number of multicast groups that can be learned using IGMP on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
ip igmp limit <value(1-4096)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Number of multicast groups	1 ... 4096

Result

The maximum number is defined.

Further notes

You delete the limit for learnable multicast groups on the device with the `no ip igmp limit` command.

You display the configured multicast groups with the `show ip igmp global-config` command.

8.2.2.6 no ip igmp limit

Description

With this command, you delete the limit for learnable multicast groups on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp limit
```

Result

The limit is deleted.

Further notes

You define the maximum number of multicast groups that can be learned using IGMP with the `ip igmp limit` command.

You display the configured multicast groups with the `show ip igmp global-config` command.

8.2.3 Commands in the VLAN configuration mode

This section describes commands that you can call up in the VLAN Configuration mode.

In the Global Configuration mode, enter the `vlan $$$` command to change to this mode. When doing this, you need to replace the `$$$` placeholders with the relevant VLAN ID.

Commands relating to other topics that can be called in the VLAN Configuration mode can be found in the relevant sections.

- If you exit the VLAN Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the VLAN Configuration mode with the `end` command, you return to the Privileged EXEC mode.

8.2.3.1 ip igmp

Description

With this command, you enable IGMP on an interface.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ip igmp
```

Result

IGMP is enabled on the interface.

Further notes

You disable IGMP on an interface with the `no ip igmp` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.2 no ip igmp

Description

With this command, you disable IGMP on an interface.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp
```

Result

IGMP is disabled on the interface.

Further notes

You enable IGMP on an interface with the `ip igmp` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.3 ip igmp explicit-tracking

Description

With this command, you enable the function "Explicit Tracking" on an interface.

If the "Explicit Tracking" function is enabled, the multicast router tracks precisely which clients log on to a multicast group (Join) and log off (Leave). As soon as the last client has logged off from a multicast group, the multicast router deletes the multicast group. Since the multicast router has precise information about the logged on and logged off clients, the multicast router does not need to query whether a further client wants to receive the multicast.

Requirement

- You use IGMP version 3.
- You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ip igmp explicit-tracking
```

Result

"Explicit Tracking" is enabled on the interface.

Further notes

You configure the IGMP version with the `ip igmp version` command.

You disable "Explicit Tracking" on an interface with the `no ip igmp explicit-tracking` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.4 no ip igmp explicit-tracking

Description

With this command, you disable the function "Explicit Tracking" on an interface.

Requirement

- You use IGMP version 3.
- You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp explicit-tracking
```

Result

"Explicit Tracking" is disabled on the interface.

Further notes

You enable "Explicit Tracking" on an interface with the `ip igmp explicit-tracking` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.5 ip igmp immediate-leave

Description

With this command, you enable the function "Immediate Leave" on an interface. If the function "Immediate Leave" is enabled, the multicast router deletes a multicast group as soon as it receives a Leave message from the last logged-on client. The multicast router does not query whether a further client wants to receive the multicast.

Use this function on IGMPv1 and IGMPv2 interfaces with only one client or on IGMPv3 interfaces on which the "Explicit Tracking" function is enabled.

With IGMPv1 and IGMPv2 only one client responds with a Join message to a query of the multicast router. All other clients that want to receive the same multicast suppress their Join message. The multicast router therefore does not know how many clients are logged on and how many Leave messages it needs to receive before it can delete the multicast group.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ip igmp immediate-leave
```

Result

The "Immediate Leave" function is enabled on the interface.

Further notes

You configure the IGMP version with the `ip igmp version` command.

You enable "Explicit Tracking" on an interface with the `ip igmp explicit-tracking` command.

You disable the "Immediate Leave" function on an interface with the `no ip igmp immediate-leave` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.6 no ip igmp immediate-leave

Description

With this command, you disable "Immediate Leave" function on an interface.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The "Immediate Leave" function is disabled on the interface.

Further notes

You enable the "Immediate Leave" function on an interface with the `ip igmp immediate-leave` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.7 ip igmp last-member-query-interval

Description

With this command you specify the period of time in which the multicast router searches for further clients that want to receive a multicast after the last Leave message.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp last-member-query-interval <value(1-255) tenths of seconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
value	Value for the time interval	1 ... 255 Default: 10
tenths of seconds	Specified in tenths of seconds	-

Result

The period of time is specified.

Further notes

You can reset the time to the default with the `no ip igmp last-member-query-interval` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.8 no ip igmp last-member-query-interval

Description

With this command, you reset the time during which the multicast router searches for further clients after the last Leave message to the default value.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The period of time is reset.

Further notes

You configure the time with the `ip igmp last-member-query-interval` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.9 ip igmp limit**Description**

With this command, you define the maximum number of multicast groups that can be learned using IGMP on an interface. You can define an exception for special multicast groups.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp limit <value(1-4096)> [except <Group-List id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
value	Number of multicast groups	1 ... 1000
except	Keyword for an exception	-
Group-List id	ID of the multicast group excluded by the limit	Specify a valid ID.

Result

The maximum number and exceptions are defined.

Further notes

You define a multicast group with the `ip igmp group-list` command.

You display the configured multicast groups with the `show ip igmp group-list` command.

You delete the limit for learnable multicast groups on an interface with the `no ip igmp limit` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.10 no ip igmp limit

Description

With this command, you delete the limit for learnable multicast groups on the an interface.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp limit
```

Result

The limit is deleted.

Further notes

You define the maximum number of multicast groups that can be learned using IGMP on an interface with the `ip igmp limit` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.11 ip igmp query-interval

Description

With this command, you define the interval but which the multicast router sends IGMP queries.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp query-interval <value (1-31744) seconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
value	Length of the interval	1 ... 31744 Default: 125
seconds	Specified in seconds	-

Result

The interval is defined.

Further notes

You reset the interval to the default with the `no ip igmp query-interval` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.12 no ip igmp query-interval

Description

With this command, you reset the time interval at which the multicast router sends IGMP queries to the default value.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The interval is reset.

Further notes

You define the interval with the `ip igmp query-interval` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.13 ip igmp query-max-response-time**Description**

With this command you specify the period of time in an IGMP query that the client has to respond to a query.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp query-max-response-time <value (1-255) tenths of seconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
value	Value for the time interval	1 ... 255 Default: 100
tenths of seconds	Specified in tenths of seconds	-

Result

The period of time is specified.

Further notes

You can reset the time to the default with the `no ip igmp query-max-response-time` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.14 no ip igmp query-max-response-time

Description

With this command you reset the period of time in an IGMP query that the client has to respond to a query to the default value.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The period of time is reset.

Further notes

You configure the time with the `ip igmp query-max-response-time` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.15 ip igmp robustness

Description

With this command, you take into account the packet loss rate of a network..

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp robustness <value(1-3)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value for the time interval	1 ... 3 Default: 2 Select the setting 1 for networks with a low packet loss rate. Select the setting 3 for networks with a higher packet loss rate.

Result

The setting for the packet loss rate of a network is specified.

Further notes

You can reset the setting to the default with the `no ip igmp robustness` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.16 no ip igmp robustness

Description

With this command, you reset the setting for the packet loss rate of a network to the default value.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ip igmp robustness
```

Result

The setting for the packet loss rate of a network is reset.

Further notes

You configure the setting with the `ip igmp robustness` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.17 ip igmp static-group

Description

With this command, you define a static multicast group. The clients are signed statically and do not need to log on.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp static-group <Group Address> [source <Source Address>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group	-
source	Keyword for a client	-
Source Address	IP address of the client	-

Result

The client is statically assigned to the multicast group.

Further notes

You delete the assignment of a client with the `no ip igmp static-group` command.

You display the list of configured multicast groups with the `show ip igmp group-list` command.

8.2.3.18 no ip igmp static-group

Description

With this command, you delete the assignment of a client to a static multicast group..

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no ip igmp static-group <Group Address> [source <Source Address>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group	-
source	Keyword for a client	-
Source Address	IP address of the client	-

Result

The client is deleted from the multicast group.

Further notes

You assign a client to a multicast group with the `ip igmp static-group` command.

You display the list of configured multicast groups with the `show ip igmp group-list` command.

8.2.3.19 ip igmp version

Description

This command specifies which version of IGMP will be used on an interface..

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
1	Version 1	-
2	Version 2	Default
3	Version 3	-

Result

The version of IGMP used by the device is specified.

Further notes

You can reset the version to the default with the `no ip igmp version` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.2.3.20 no ip igmp version

Description

With this command, you reset the IGMP version back to the default value.

Requirement

You are in the Interface Configuration mode of VLAN.

The command prompt is as follows:

```
cli(config-if-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip igmp version
```

Result

The version is reset.

Further notes

You configure the IGMP version with the `ip igmp version` command.

You display the setting and other information with the `show ip igmp global-config` command.

8.3 IGMP snooping

This section describes the snooping functionality of the Internet Group Management Protocol.

8.3.1 The "show" commands

This section describes commands with which you display various settings.

8.3.1.1 show ip igmp snooping

Description

This command shows information about IGMP snooping for all or a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode or in the Global configuration mode.

The command prompt is as follows:

```
cli> or cli# or cli(config)#
```

Syntax

Call up the command with the following parameters:

```
show ip igmp snooping [Vlan<vlan id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information about IGMP snooping is displayed.

8.3.1.2 show ip igmp snooping forwarding-database

Description

This command shows the multicast forwarding entries for all or a selected VLAN.

Requirement

- IGMP snooping is enabled on the device
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ip igmp snooping forwarding-database [Vlan<vlan id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The multicast forwarding entries are displayed.

8.3.1.3 show ip igmp snooping globals

Description

This command shows an overview of the settings of IGMP snooping.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameter assignment:

```
show ip igmp snooping globals
```

Result

The settings are displayed.

8.3.1.4 show ip igmp snooping groups**Description**

This command shows information about IGMP snooping for all or a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode or in the Global configuration mode.

The command prompt is as follows:

```
cli> OR cli# OR cli(config)#
```

Syntax

Call up the command with the following parameters:

```
show ip igmp snooping groups [Vlan <vlan id> [Group <Address>]] [{static|dynamic}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094
Group		
Address		
-		<ul style="list-style-type: none"> • static • dynamic

For information on names of addresses and interfaces, refer to the section "Auto-Hotspot".

Result

The information about IGMP snooping is displayed.

8.3.1.5 show ip igmp snooping mrouter**Description**

This command shows the ports at which IGMP queriers are connected for all or a selected VLAN..

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
show ip igmp snooping mrouter [Vlan <vlan index>] [detail]
```

The parameters have the following meaning:

Parameters	Description	Range of values
Vlan	Keyword for a VLAN or VLAN range	-
vlan index	Number of the addressed VLAN or VLAN range	1 ... 4094
detail	Specifies that detailed information is displayed.	-

Result

A list of the active ports is displayed.

8.3.1.6 show ip igmp snooping statistics

Description

This command shows the statistical information about IGMP snooping for all or a selected VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip igmp snooping statistics [Vlan<vlan id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The statistical information is displayed.

8.3.1.7 show ip igmp snooping switch-ip**Description**

This command shows the IP address of the source for IGMP snooping.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip igmp snooping switch-ip
```

Result

The IP address is displayed.

8.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.3.2.1 ip igmp snooping version

Description

This command specifies which version of IGMP snooping the device will use. When shipped, the device uses IGMPv3.

Note

There is no separate show command to display the version of IGMP used by the device. This information is shown when you enter the `show ip igmp snooping` command in the User EXEC mode or in the Privileged EXEC mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp snooping version {v1 | v2 | v3}
```

The parameters have the following meaning:

Parameter	Description
v1	IGMPv1
v2	IGMPv2
v3	IGMPv3

Result

The version of IGMP snooping used by the device is specified.

8.3.2.2 ip igmp vlan-snooping

Description

With this command, you enable IGMP snooping for all VLANs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip igmp vlan-snooping
```

Result

IGMP snooping is enabled for all VLANs.

Further notes

You disable IGMP snooping with the `no ip igmp vlan-snooping` command.

8.3.2.3 no ip igmp vlan-snooping**Description**

With this command, you disable IGMP snooping for all VLANs.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip igmp vlan-snooping
```

Result

IGMP snooping is disabled for all VLANs.

Further notes

You enable IGMP snooping with the `ip igmp vlan-snooping` command.

8.3.2.4 ip igmp snooping clear counters**Description**

With this command, you delete the counters for all or a selected VLAN.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp snooping clear counters [Vlan <vlanid (1-4094)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlanid	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select a VLAN, the counters of all VLANs will be deleted.

Result

The counters are deleted.

8.3.2.5 ip igmp snooping switch-ip

Description

With this command, you configure the IP address of the source for IGMP snooping.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp snooping switch-ip<switch-ipaddr>
```


The parameter has the following meaning:

Parameter	Description	Range of values / note
switch-ipaddr	Address of the source	Specify a valid IP address. Default: 0.0.0.0

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP address is configured.

8.3.2.6 ip igmp snooping port-purge-interval

Description

The time after which a port is deleted from the list if no IGMP router control packets are received is known as the purge time.

With this command, you configure this purge time for a port for a VLAN in seconds.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip igmp snooping port-purge-interval <(130-1225)seconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
-	Value for the purge time in seconds	130 ... 1225 Default: 260

Result

The purge time is configured.

Further notes

You can reset the setting to the default with the `no ip igmp snooping port-purge-interval` command.

You can display the status of this function and other information with the `show ip igmp snooping globals` command.

8.3.2.7 no ip igmp snooping port-purge-interval

Description

With this command, you reset the setting for the purge time to the default value.
The default value is 260 seconds.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip igmp snooping port-purge-interval
```

Result

The purge time is reset to the default value.

Further notes

You configure the setting with the `ip igmp snooping port-purge-interval` command.

You can display the status of this function and other information with the `show ip igmp snooping globals` command.

8.3.3 Commands in the VLAN configuration mode

This section describes commands that you can call up in the VLAN Configuration mode.

In the Global Configuration mode, enter the `vlan $$$` command to change to this mode.
When doing this, you need to replace the `$$$` placeholders with the relevant VLAN ID.

Commands relating to other topics that can be called in the VLAN Configuration mode can be found in the relevant sections.

- If you exit the VLAN Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the VLAN Configuration mode with the `end` command, you return to the Privileged EXEC mode.

8.3.3.1 ip igmp snooping static-group

Description

With this command, you create a static IGMP entry in the FDB.

Requirement

You are in the VLAN Configuration mode.

The command prompt is as follows:

```
cli (config-vlan-$$$) #
```

Syntax

Call up the command with the following parameters:

```
ip igmp snooping static-group <mcast_addr> ports <interface-type> <iface_list>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
static-group	Keyword for a static entry	-
mcast_addr	Value for a multicast address	Enter a valid multicast address.
ports	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
iface_list	Module no. and port no. of the interface	

Result

The static IGMP entry has been created.

Further notes

You delete a static IGMP entry with the `no ip igmp snooping static-group` command.

8.3.3.2 no ip igmp snooping static-group

Description

With this command, you delete a static IGMP entry.

Requirement

You are in the VLAN Configuration mode.

The command prompt is as follows:

```
cli (config-vlan-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no ip igmp snooping static-group <mcast_addr>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
static-group	Keyword for a static entry	-
mcast_addr	Value for a multicast address	Enter a valid multicast address.

Result

The static IGMP entry has been deleted.

Further notes

You create a static IGMP entry with the `ip igmp snooping static-group` command.

8.4 IGMP querier

This section describes the commands for the query functionality of the Internet Group Management Protocol (IGMP).

8.4.1 Commands in the Global Configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.4.1.1 ip igmp snooping querier

Description

With this command, you configure the IGMP snooping switch as querier.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip igmp snooping querier
```

As default the function is "disabled".

Result

The IGMP snooping switch is configured as querier.

Further notes

You delete the setting with the `no ip igmp snooping querier` command.

You can display the status of this function and other information with the `show ip igmp snooping` command.

8.4.1.2 no ip igmp snooping querier

Description

With this command, you delete the configuration of an IGMP snooping switch as querier.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip igmp snooping querier
```

Result

The configuration of the IGMP snooping switch as querier is deleted.

Further notes

You configure the setting with the `ip igmp snooping querier` command.

You can display the status of this function and other information with the `show ip igmp snooping` command.

8.5 Ring redundancy and standby connection

The ring redundancy function allows several devices to be interconnected in a ring structure. Since such a topology is not supported in normal network operation, such rings are logically disconnected using the Media Redundancy Protocol (MRP) or the High Speed Redundancy Protocol (HRP). If one component fails, all other elements of the ring can still be reached.

The device that logically disconnects the ring is known as the Redundancy Manager (RM).

The simple structure of the individual MRP rings allows shorter reaction times if disruptions occur.

Complex network topologies cannot be set up with this function.

This means that two rings can be connected redundantly in each case via two links (master, slave). This function is known as the standby connection.

One link is active on an interface of the master device and the second is inactive on an interface of the slave device.

Note

Position of master and slave device

The master and slave device of a standby connection (link pair between different structures of the ring redundancy) must be located in the same ring.

This section describes commands of the ring redundancy function.

Note

Avoiding bad configurations

When using the commands in this section, you should take particular care because a bad configuration of this function can have serious negative effects on the network.

8.5.1 clear hrp counters

Description

With this command, you reset the HRP counters.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
clear hrp counters
```

Result

The HRP counters have been reset.

8.5.2 clear ring-redundancy manager counters

Description

With this command, you reset the following counters:

- How often the device as redundancy manager switched to the active status, i.e. closed the ring.
- The maximum delay time of the test frames of the redundancy manager.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
clear ring-redundancy manager counters
```

Result

The counters are reset.

8.5.3 clear standby counter

Description

With this command, you reset the counters of the standby function.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
clear standby counter
```

Result

The standby counter is reset.

8.5.4 The "show" commands

This section describes commands with which you display various settings.

8.5.4.1 show hrp counters

Description

With this command, you display the following information:

- How often the device as redundancy manager switched to the active status, i.e. closed the ring.
- The maximum delay time of the test frames of the redundancy manager.
- How often the IE switch has changed the standby status from "Passive" to "Active".

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show hrp counters
```

Result

The counters are displayed.

8.5.4.2 show ring-redundancy

Description

With this command, you show the current configuration of the ring redundancy and standby functions.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ring-redundancy
```

Result

The current configurations are displayed.

8.5.4.3 show ring-redundancy manager counters

Description

With this command, you display the following information:

- How often the device as redundancy manager switched to the active status, i.e. closed the ring.
- The maximum delay time of the test frames of the redundancy manager.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ring-redundancy manager counters
```

Result

The counters are displayed.

8.5.5 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.5.5.1 ring-redundancy configuration

Description

With this command, you change to the Redundancy Configuration mode.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ring-redundancy configuration
```

Result

You are now in the Redundancy Configuration mode.

The command prompt is as follows:

```
cli(config-red)#
```

Further notes

You exit the Redundancy Configuration mode with the `end` or `exit` command.

8.5.5.2 ring-redundancy hrpobserver

Description

With this command, you enable the observer or restart it.

The "observer" function is only available in HRP rings. The observer monitors malfunctions of the redundancy manager or incorrect configurations of an HRP ring.

If the observer is enabled, it can interrupt the connected ring if errors are detected. To do this, the observer switches a ring port to the "blocking" status. When the error is resolved, the observer enables the port again.

If numerous errors occur in quick succession, the observer no longer enables its port automatically. The ring port remains permanently in the "blocking" status. This is signaled by the error LED and a message text. After the errors have been eliminated, you can enable the port again with this command and the parameter `restart`.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ring-redundancy hrpobserver [restart]
```

The parameters have the following meaning:

Parameter	Description
<code>restart</code>	Restarts the observer.

If you do not specify the optional parameter, the observer is enabled.

Result

The observer is enabled or restarted.

Further notes

You disable the observer with the `no ring-redundancy hrpobserver` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.5.3 no ring-redundancy hrpobserver

Description

With this command, you disable the observer.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ring-redundancy hrpobserver
```

Result

The observer is disabled.

Further notes

You enable the observer with the `ring-redundancy hrpobserver` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.5.4 ring-redundancy mode

Description

With this command, you enable the ring redundancy function on a device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ring-redundancy mode {ard | mrpauto | mrpclient | hrpclient | hrpmanager}
```

The parameters have the following meaning:

Parameter	Description
ard	Enables the automatic redundancy mode (Automatic Redundancy Detection)
mrpauto	Enables the automatic MRP manager
mrpclient	Enables ring redundancy with the MRP protocol as client
hrpclient	Enables ring redundancy with the HRP protocol as client
hrpmanager	Enables ring redundancy with the HRP protocol in ring redundancy manager mode

Result

The ring redundancy function is enabled and the redundancy mode is selected.

Further notes

You disable the ring redundancy function with the `no ring-redundancy` command.

8.5.5.5 no ring-redundancy

Description

With this command, you disable the ring redundancy function on a device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ring-redundancy
```

Result

The ring redundancy function is disabled.

Further notes

You enable the ring redundancy function with the `ring-redundancy mode` command.

8.5.5.6 ring-redundancy standby

Description

With this command, you enable the standby function.

Requirement

- HRP is enabled
- You are in the Global configuration mode.

The command prompt is:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ring-redundancy standby
```

Result

The standby function is enabled.

Further notes

You disable the setting with the `no ring-redundancy standby` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.5.7 no ring-redundancy standby

Description

With this command, you disable the standby function.

Requirement

- HRP is enabled
- You are in the Global configuration mode.

The command prompt is:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ring-redundancy standby
```

Result

The standby function is disabled.

Further notes

You enable the setting with the `ring-redundancy standby` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.6 Commands in the redundancy configuration mode

This section describes commands that you can call up in the Redundancy Configuration mode.

In the Global Configuration mode, enter the `ring-redundancy configuration` command to change to this mode.

- If you exit the Redundancy Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the Redundancy Configuration mode with the `end` command, you return to the Privileged EXEC mode.

8.5.6.1 ring ports

Description

With this command, you configure the ports of the ring redundancy manager or ring redundancy client on a device.

- **Redundancy manager**
 - In the normal status, the network structure is operated via port. The other port is only used by the ring redundancy manager for checking.
 - If there is a disruption, the two parts of the ring operate via both ports.
- **Redundancy client**
 - The client forwards all frames.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli(config-red)#
```

Syntax

Call up the command with the following parameters:

```
ring ports <interface-type><interface-id><interface-type><interface-id>
```

The parameters have the following meaning:

Parameter	Description
interface-type	Specifies the interface type for the first ring port
interface-id	Specifies the number of the interface for the first ring port
interface-type	Specifies the interface type for the second ring port
interface-id	Specifies the number of the interface for the second ring port

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Note

Differing port addresses

The first and second port must be configured on different interfaces.

Result

The ports of the ring redundancy are configured.

8.5.6.2 standby connection-name

Description

With this command, you assign a name to the standby connection on the device.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli(config-red) #
```

Syntax

Call up the command with the following parameters:

```
standby connection-name <string(32)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<string(32)>	Name of the connection	max. 32 characters

Result

The standby connection is assigned a name.

8.5.6.3 no standby connection-name**Description**

With this command, you delete the name of a standby connection.

Requirement

You are in the Redundancy Configuration mode.

The command prompt is as follows:

```
cli(config-red)#
```

Syntax

Call the command without parameters:

```
no standby connection-name
```

Result

The name of the standby connection is deleted.

8.5.6.4 standby force-master**Description**

With this command, you enable the standby force-master function.

Requirement

- HRPis enabled
- You are in the Redundancy configuration mode.
The command prompt is:

```
cli(config-red)#
```

Syntax

Call the command without parameters:

```
standby force-master
```

Result

The standby force-master function is enabled.

Further notes

You disable the setting with the `no standby force-master` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.6.5 no standby force-master

Description

With this command, you disable the standby force-master function.

Requirement

- HRP is enabled
- You are in the Redundancy configuration mode.
The command prompt is:

```
cli(config-red)#
```

Syntax

Call the command without parameters:

```
no standby force-master
```

Result

The standby force-master function is disabled.

Further notes

You enable the setting with the `standby force-master` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.6.6 standby port

Description

With this command, you configure and enable the port for a standby connection on a device.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli (config-red) #
```

Syntax

Call up the command with the following parameters:

```
standby port {<interface-type> <interface-id>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The ports for a standby connection are configured and enabled.

Further notes

You disable the setting with the `no standby port` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.6.7 no standby port

Description

With this command, disable the port for a standby connection on a device.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli (config-red) #
```

Syntax

Call up the command with the following parameters:

```
no standby port [<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The ports for a standby connection are disabled.

Further notes

You enable the setting with the `standby port` command.

You can display the status of this function and other information with the `show ring-redundancy` command.

8.5.6.8 standby wait-for-partner

Description

With this command, you enable the "Wait for standby partner" function on the device. A standby connection is enabled only after the standby master and the standby slave as well as their standby partners have established a connection. This ensures that the redundant connection is really available before communication via a standby connection is enabled. As default, this function is enabled.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli(config-red)#
```

Syntax

Call the command without parameters:

```
standby wait-for-partner
```

Result

The "Wait for standby partner" function is enabled.

8.5.6.9 no standby wait-for-partner

Description

With this command, you disable the "Wait for standby partner" function on the device. A standby connection is enabled even if the standby master has not yet established a connection to the standby slave.

Requirement

You are in the Redundancy configuration mode.

The command prompt is as follows:

```
cli (config-red) #
```

Syntax

Call the command without parameters:

```
no standby wait-for-partner
```

Result

The "Wait for standby partner" function is disabled.

8.6 Unicast

The commands in this section configure the procedures for handling Unicast frames.

The commands allow the following:

- Filtering of Unicast frames
- Blocking of ports
- Automatic learning of Unicast
- Blocking unknown Unicast frames.

With the "show" commands, you can display the configuration data.

8.6.1 The "show" commands

This section describes commands with which you display various settings.

8.6.1.1 show unicast-block config

Description

This command shows the unicast blocking settings for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show unicast-block config [port <interface-type> <interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of interfaces and addresses, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The unicast blocking settings for ports are displayed.

8.6.1.2 show mac-address-table dynamic unicast**Description**

This command shows the table with the dynamic unicast MAC addresses assigned by the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table dynamic unicast[vlan<vlan-range>]
    [address<aa:aa:aa:aa:aa:aa>] [{interface<interface-type>
    <interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The dynamic unicast MAC addresses are displayed.

8.6.1.3 show mac-address-table static unicast

Description

This command shows the table with the static unicast MAC addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table static unicast[vlan<vlan-range>]
 [address<aa:aa:aa:aa:aa:aa>] [{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The static unicast MAC addresses are displayed.

8.6.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.6.2.1 mac-address-table static unicast

Description

With this command, you generate a static unicast MAC address entry in the forwarding database.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table static unicast <aa:aa:aa:aa:aa:aa>
  vlan <vlan-id(1-4094)>
  interface ([<interface-type> <interface-id>]
            [<interface-type> <0/a-b, 0/c,...>]
            [port-channel <interface-list>])
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address of the interface	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
port-channel	Keyword for a port channel connection	Enter a valid port channel connection.
interface-list	Number of the addressed port channel	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry in the forwarding database is generated.

Further notes

With the `show mac-address-table static unicast` command, you display the list of configured entries.

With the `no mac-address-table static unicast` command, you delete an entry.

8.6.2.2 no mac-address-table static unicast

Description

With this command, you disable the "static unicast" function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no mac-address-table static unicast <aa:aa:aa:aa:aa:aa> vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address	Specify a valid MAC address.
vlan	Keyword for a VLAN connection	-
vlan-id	Range of values of the VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The "static unicast" function is disabled.

Further notes

You activate the setting with the `no mac-address-table static unicast` command.

8.7 Multicast

The commands in this section configure the procedures for handling Multicast frames.

The commands allow the following:

- Configuration of groups
- IGMP/MLD
- GMRP
- Blocking unknown Multicast frames.

With the "show" commands, you can display the configuration data.

8.7.1 The "show" commands

This section describes commands with which you display various settings.

8.7.1.1 show multicast-block config

Description

This command shows the multicast blocking settings for ports.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show multicast-block config [port <interface-type> <interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
port	Keyword for a port description	-
interface-type	Type of interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all ports are displayed.

Result

The multicast blocking settings for ports are displayed.

8.7.1.2 show mac-address-table dynamic multicast

Description

This command shows the table with the dynamic multicast MAC addresses assigned by the device.

Note

The device does not learn any reserved multicast addresses, see also RFC 5771.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table dynamic multicast[vlan<vlan-range>]
    [address<aa:aa:aa:aa:aa:aa>]
    [{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type of interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The dynamic multicast MAC addresses are displayed.

8.7.1.3 show mac-address-table static multicast**Description**

This command shows the table with the static multicast MAC addresses.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show mac-address-table static multicast[vlan<vlan-range>]
  [address<aa:aa:aa:aa:aa:aa>][{interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-range	Number of the addressed VLAN	1 ... 4094
address	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address	-
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The static multicast MAC addresses are displayed.

8.7.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.7.2.1 mac-address-table block static multicast

Description

With this command, you configure static multicast addresses that will be blocked.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table block static multicast <aa:aa:aa:aa:aa:aa> vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the VLAN	1 ... 4094
address	Keyword for a MAC address	-
-	MAC address	aa:aa:aa:aa:aa:aa

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The settings for static multicast blocking are configured.

Further notes

You enable / disable the setting with the `no mac-address-table static multicast <mac address> <vlan-id(1-4094)>` command.

8.7.2.2 mac-address-table static multicast

Description

With this command, you configure a static multicast address.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table static multicast <aa:aa:aa:aa:aa:aa> vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
-	MAC address of the interface	aa:aa:aa:aa:aa:aa
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The settings for "static multicast" are configured.

Further notes

You disable the setting with the `no mac-address static multicast` command.

8.7.2.3 no mac-address-table static multicast

Description

With this command, you delete a static multicast address.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no mac-address-table static multicast <aa:aa:aa:aa:aa:aa> vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:a a:aa	MAC address of the interface	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The "static multicast" function is disabled.

8.8 MLD Snooping (IPv6)

This section describes commands for MLD snooping. MLD (Multicast Listener Discovery) snooping only forwards multicast packets to the intended host instead of flooding all ports with them.

8.8.1 The "show" commands

This section describes commands with which you display various settings.

8.8.1.1 show ipv6 mld snooping

Description

This command shows the information about MLD snooping for all or a selected VLAN.

Requirement

- MLD snooping is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 mld snooping [Vlan <vlan id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094

If you specify VLAN, the configuration of all VLANs is displayed.

Result

The information about MLD snooping is displayed.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

8.8.1.2 show ipv6 mld snooping forwarding-database

Description

This command shows the multicast forwarding entries for all or a selected VLAN.

Requirement

- MLD snooping must be enabled globally and in the VLANs.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 mld snooping forwarding-database [Vlan <vlan id>]
```

The parameters have the following meaning

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094

If you specify VLAN, the configuration of all VLANs is displayed.

Result

The multicast forwarding entries are displayed.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

8.8.1.3 show ipv6 mld snooping groups

Description

This command shows the information about the MLD snooping groups for all or a selected VLAN.

Requirement

- MLD snooping is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 mld snooping groups [Vlan <vlan id> [Group <Address>]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan id	Number of the addressed VLAN	1 ... 4094
Group	Keyword for an MLD snooping group	-
Address	Address of the MLD snooping group	Enter a valid address.

If you do not select any parameter from the parameter list, the configuration is displayed for all interfaces.

Result

The information on the MLD snooping group is displayed.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

8.8.1.4 show ipv6 mld snooping globals

Description

This command shows general information on MLD snooping for the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 mld snooping globals
```

Result

The information is displayed.

8.8.1.5 show ipv6 mld snooping mrouter

Description

This command shows the ports at which IGMP queriers are connected for all or a selected VLAN..

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 mld snooping mrouter [Vlan <vlan index>] [detail]
```

The parameters have the following meaning:

Parameters	Description	Range of values
Vlan	Keyword for a VLAN or VLAN range	-
vlan index	Number of the addressed VLAN or VLAN range	1 ... 4094
detail	Specifies that detailed information is displayed.	-

Result

A list of the active ports is displayed.

8.8.1.6 show ipv6 mld snooping statistics

Description

This command shows the MLD snooping statistics for all or a selected VLAN.

Requirement

- MLD snooping is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 mld snooping statistics [Vlan <vlan id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

If you specify VLAN, the configuration of all VLANs is displayed.

Result

The statistics are displayed.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

You reset the counters to zero with the `ipv6 mld snooping clear counters` command.

8.8.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

8.8.2.1 ipv6 mld join ratelimit

Description

With this command, you define the maximum number of Join messages on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 mld join ratelimit <value(100-1000)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Number of Join messages	100-1000 Default: 0

Result

The maximum number is defined.

Further notes

You delete the limit for Join-messages on the device with the `no ipv6 mld join ratelimit` command.

You can display the status of this function and other information with the `show ipv6 mld snooping globals` command.

8.8.2.2 no ipv6 mld join ratelimit

Description

With this command, you delete the limit for Join messages on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 mld join ratelimit
```

Result

The limit is deleted.

Further notes

You define the max. number of Join-messages on the device with the `ipv6 mld join ratelimit` command.

You can display the status of this function and other information with the `show ipv6 mld snooping globals` command.

8.8.2.3 ipv6 mld snooping

Description

With this command, you enable MLD snooping on the device or on the required VLAN.

For MLD snooping to work, you need to enable the function globally and in the VLANs. In the Global configuration mode, enable MLD snooping on the device or globally. To enable MLD snooping on the required VLAN, execute the command in the VLAN configuration mode.

Requirement

- GMRP is disabled.
- You are in the Global configuration mode or in the VLAN configuration mode.

The command prompt is in the Global configuration mode is:

```
cli(config)#
```

or in the VLAN configuration mode:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 mld snooping
```

Result

MLD snooping is enabled.

Further notes

You disable GMRP with the `no grmp` command.

You disable MLD snooping with the `no ipv6 mld snooping` command.

You display the setting and other information with the `show ipv6 mld snooping` and `show ipv6 mld snooping globals` commands.

8.8.2.4 no ipv6 mld snooping

Description

With this command, you disable MLD snooping on the device or on the required VLAN.

Requirement

You are in the Global configuration mode or in the VLAN configuration mode.

The command prompt is in the Global configuration mode is:

```
cli(config)#
```

or in the VLAN configuration mode:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 mld snooping
```

Result

MLD snooping is disabled.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

8.8.2.5 ipv6 mld snooping clear counters

Description

With this command, you reset the counters of the MLD snooping statistics to zero.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 mld snooping clear counters [Vlan <vlanid (1-4094)>]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN	-
vlan id	Number of the addressed VLAN	1 ... 4094

Result

The counters are reset.

8.8.2.6 ipv6 mld snooping port-purge-interval

Description

The time after which a port is deleted from the list if no MLD packets are received is known as the purge time.

With this command, you configure this purge time for a port or for a VLAN in seconds.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 mld snooping port-purge-interval <(130 - 1225) seconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
-	Value for the purge time in seconds	130 ... 1225 Default: 260

Result

The purge time is configured.

Further notes

You can reset the setting to the default with the `ipv6 mld snooping port-purge-interval` command.

You can display the status of this function and other information with the `show ipv6 mld snooping globals` command.

8.8.2.7 no ipv6 mld snooping port-purge-interval

Description

With this command, you reset the setting for the purge time to the default value.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ipv6 mld snooping port-purge-interval
```

Result

The purge time is reset to the default value.

Further notes

You configure the setting with the `ipv6 mld snooping port-purge-interval` command.

You can display the status of this function and other information with the `show ipv6 mld snooping globals` command.

8.8.3 Commands in the VLAN configuration mode

This section describes commands that you can call up in the VLAN Configuration mode.

In the Global Configuration mode, enter the `vlan $$$` command to change to this mode. When doing this, you need to replace the `$$$` placeholders with the relevant VLAN ID.

Commands relating to other topics that can be called in the VLAN Configuration mode can be found in the relevant sections.

- If you exit the VLAN Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the VLAN Configuration mode with the `end` command, you return to the Privileged EXEC mode.

8.8.3.1 ipv6 mld snooping

Description

With this command, you enable MLD snooping on the device or on the required VLAN.

For MLD snooping to work, you need to enable the function globally and in the VLANs. In the Global configuration mode, enable MLD snooping on the device or globally. To enable MLD snooping on the required VLAN, execute the command in the VLAN configuration mode.

Requirement

- GMRP is disabled.
- You are in the Global configuration mode or in the VLAN configuration mode.

The command prompt is in the Global configuration mode is:

```
cli(config)#
```

or in the VLAN configuration mode:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 mld snooping
```

Result

MLD snooping is enabled.

Further notes

You disable GMRP with the `no grmp` command.

You disable MLD snooping with the `no ipv6 mld snooping` command.

You display the setting and other information with the `show ipv6 mld snooping` and `show ipv6 mld snooping globals` commands.

8.8.3.2 no ipv6 mld snooping

Description

With this command, you disable MLD snooping on the device or on the required VLAN.

Requirement

You are in the Global configuration mode or in the VLAN configuration mode.

The command prompt is in the Global configuration mode is:

```
cli(config)#
```

or in the VLAN configuration mode:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 mld snooping
```

Result

MLD snooping is disabled.

Further notes

You enable MLD snooping with the `ipv6 mld snooping` command.

8.8.3.3 ipv6 mld snooping querier

Description

With this command, you configure the MLD snooping on the device as querier for a specific VLAN.

Requirement

- The VLANs on the device are enabled.
- You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call the command without parameters:

```
ipv6 mld snooping querier
```

Result

MLD snooping is configured as querier.

Further notes

You can display the status of this function and other information with the `show ipv6 mld snooping` command.

8.8.3.4 ipv6 mld snooping version

Description

This command specifies which version of MLD the device will use in this VLAN.

Requirement

You are in the VLAN configuration mode.

The command prompt is as follows:

```
cli(config-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 mld snooping version {v1 | v2}
```

The parameters have the following meaning:

Parameter	Description
v1	MLDv1
v2	MLDv2 Default

Result

The version of MLD used by the device in this VLAN is specified.

Layer 3 functions

This part contains the sections that describe the following:

- OSPFv2 (IPv4)
- OSPFv3 (IPv6)
- RIPv2 (IPv4)
- RIPng (IPv6)
- VRRP (IPv4)
- VRRPv3 (IPv4/IPv6)
- Route maps (IPv4/IPv6)
- NAT (IPv4)
- PIM (IPv4)

The layer 3 functions describe the routing properties of the device. These are not normally included in the basic device and if necessary must be enabled or released extra.

9.1 The "show" commands

This section describes commands with which you display various settings.

9.1.1 show ip protocol

Description

This command shows the current settings of the activated routing protocols.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip protocol
```

Result

The current settings of the activated routing protocols are displayed.

9.2 OSPFv2 (IPv4)

This section describes the commands relevant for working with routing with OSPF.

9.2.1 The "show" commands

This section describes commands with which you display various settings.

9.2.1.1 show ip ospf

Description

This command shows information about routing with OSPF.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip ospf
```

Result

The configuration for routing with OSPF is displayed.

9.2.1.2 show ip ospf route

Description

This command shows the routes that were generated with OSPF.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call the command without parameters:

```
show ip ospf route
```

Result

The routes are displayed.

9.2.1.3 show ip ospf - database summary

Description

This command shows a summary of the database.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf
    [area-id]
database
    [{
        database-summary|self-originate|adv-router <ip-address>
    }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
database-summary	Number of LSA types per area and the total number of areas	-
self-originate	Number of LSAs generated by the local router.	-
adv-router	Keyword for the router-specific LSA	
ip-address	shows the router-specific LSA for a specific IP address	specify a valid IP address. If no IP address is entered, the specific LSAs of the local router are displayed.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The summary of the database is displayed.

9.2.1.4 show ip ospf ... database ...

Description

This command shows information about a specific or all LSA types.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf
  [area-id]
database
  {
    asbr-summary|external|network|
    nssa-external|router|summary
  }
  [link-state-id]
  [{
    adv-router <ip-address>|self-originate
  }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area.
asbr-summary	only shows information of the LSA type ASBR (Autonomous System Border Router). (Type 4)	-
external	only shows information of the LSA type "External" (Type 5)	-
network	only shows information of the LSA type "Network" (Type 2)	-
nssa-external	only shows information of the LSA type "NSSA (Not so stubby area) External" (Type 7)	-
router	only shows information of the LSA type "Router" (Type 1)	-
summary	only shows information of the LSA type "Summary" (Type 3)	-
link-state-id	ID of the LSA . Link State ID depends on the LSA type.	Link State ID consists of 4 numbers each between 0 and 255
adv-router	Keyword for the router-specific LSA	-
ip-address	shows the router-specific LSA for a specific IP address	specify a valid IP address. If no IP address is entered, the specific LSAs of the local router are displayed.
self-originate	Number of LSAs generated by the local router	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information on the selected LSA type is displayed.

9.2.1.5 show ip ospf border-routers

Description

This command shows the routes to the area border routers and to the AS boundary routers.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ip ospf border-routers
```

Result

The routes are displayed.

9.2.1.6 show ip ospf interface**Description**

This command shows the information on the OSPF interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf interface
[[
  vlan<vlan-id(1-4094)>|<interface-type><interface-id>
]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the information is displayed for all available interfaces.

Result

The information of the OSPF interface is displayed.

9.2.1.7 show ip ospf neighbor

Description

This command shows information about the detected neighboring routers.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf neighbor  
[  
  vlan <vlan-id(1-4094)>|<interface-type><interface-id>  
]  
[Neighbor ID]  
[detail]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
Neighbor ID	Router ID of the neighbor	The ID consists of 4 numbers each between 0 and 255 and can match the IP address of the router.
detail	OSPF information on the neighbor	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information on the neighboring routers is displayed.

9.2.1.8 show ip ospf request-list

Description

This command shows the request list. This request list contains the information required for the LSAs.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf request-list
  [<neighbor-id>]
  [{
    vlan <vlan-id (1-4094)> |
    <interface-type> <interface-id>
  }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
neighbor-id	Router ID of the neighbor	Enter the router ID. The router ID consists of 4 numbers each between 0 and 255.
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the request list is displayed for all neighbors.

Result

The request list displayed.

9.2.1.9 show ip ospf retransmission-list

Description

This command shows which queries are still open in the form of a list.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf retransmission-list  
  [<neighbor-id>]  
  [{  
    vlan <vlan-id (1-4094)>|<interface-type> <interface-id>  
  }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
neighbor-id	Router ID of the neighbor	Enter the router ID. The router ID consists of 4 numbers each between 0 and 255.
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the list is displayed for all neighbors.

Result

The list is displayed.

9.2.1.10 show ip ospf virtual-links

Description

This command shows an overview of the virtual connections.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip ospf virtual-links
```

Result

The overview is displayed.

9.2.1.11 show ip ospf area-range

Description

This command shows the grouped address ranges.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip ospf {area-range|summary-address}
```

The parameters have the following meaning:

Parameter	Description
area-range	Grouped area range. The address range is created with the "area-range" command.
summary-address	Grouped address range for OSPF. The address range is created with the "summary-address" command.

Result

The grouped address ranges are displayed.

9.2.2 Commands in the Global Configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.2.2.1 `router ospf`

Description

With this command, you enable routing with OSPF and change to the OSPF Router configuration mode.

Note

This command is available only with layer 3.

Requirement

- IPv4 routing is activated
- You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
router ospf
```

Result

Routing with OSPF is enabled.

You are now in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli (config-ospf)#
```

Further notes

You disable routing with OSPF with the `no router ospf` command.

You enable IPv4 routing with the `ip routing` command.

9.2.2.2 no router ospf

Description

With this command, you disable routing with OSPF.

Note

This command is available only with layer 3.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no router ospf
```

Result

Routing with OSPF is disabled.

Further notes

You enable routing with OSPF with the `router ospf` command.

9.2.3 Commands in the Router Configuration mode

This section describes commands that you can call up in the Router configuration mode.

In the Global configuration mode, enter the `router ospf` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

- If you exit the Router configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Router configuration mode with the `end` command, you return to the Privileged EXEC mode.

Requirement

The commands are available if the following requirements are met:

- The device supports the routing function.
- The routing function is enabled.

9.2.3.1 ASBR Router

Description

With this command, you specify that the router is an Autonomous System Boundary Router (ASBR).

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call the command without parameters:

```
ASBR Router
```

Result

The autonomous system boundary router is enabled.

Further notes

You disable the autonomous system boundary router with the `no ASBR Router` command.

You can display the status of this function and other information with the `show ip ospf` command.

9.2.3.2 no ASBR Router

Description

With this command, you disable the autonomous system boundary router.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call the command without parameters:

```
no ASBR Router
```

Result

The autonomous system boundary router is disabled.

Further notes

You enable the autonomous system boundary router with the `ASBR Router` command.

You can display the status of this function and other information with the `show ip ospf` command.

9.2.3.3 area range

Description

With this command, you assign an area ID an address range. The address range is used to group the routes within OSPF.

Note

This command is available only with layer 3.

Requirement

- The router is an area border router
- You are in the OSPF Router configuration mode.
The command prompt is:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
area <AreaId> range  
<Network>  
<Mask>  
[  
    advertise | notadvertise  
]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
AreaId	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
Network	IP address of the address range	specify the IP address
Mask	Subnet mask of the address range	specify the subnet mask.
advertise	The address range is advertised to the outside. A summary LSA of Type 3 is generated.	-
notadvertise	The address range is not advertised to the outside.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is configured.

Further notes

You delete the address range with the `no area range` command.

You can display the status of this function and other information with the `show ip ospf - area-range / summary-address` command.

9.2.3.4 area range summary

Description

With this command, you assign an area ID an address range. The address range is used to group the routes within OSPF.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
area <AreaId> range
<Network>
<Mask>
{
  summary | Type7
}
[ {
  advertise | notadvertise
}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
AreaId	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
Network	IP address of the address range	specify the IP address
Mask	Subnet mask of the address range	specify the subnet mask.
summary	Summary LSA	-
Type7	LSA type 7	-
advertise	The address range is advertised outside the ranges. If the Area ID is 0.0.0.0, the router generates an LSA message of Type 5. If the Area ID is not 0.0.0.0, the router generates an LSA message of Type 7 in an NSSA.	-

Parameter	Description	Range of values / note
notadvertise	The address range is not advertised to the outside.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is configured.

Further notes

You delete the address range with the `no area range` command.

You can display the status of this function and other information with the `show ip ospf - area-range / summary-address` command.

9.2.3.5 no area range

Description

With this command, you delete the address range.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
area <AreaId> range <Network> <Mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
AreaId	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
Network	IP address of the address range	specify the IP address
Mask	Subnet mask of the address range	specify the subnet mask.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is deleted.

Further notes

You create address ranges with the `area range` command.

9.2.3.6 area nssa

Description

With this command, you configure areas of the type NSSA (not-so-stubby-area).

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
area <area-id> nssa
[ {
  no-summary | default-information-originate
} ]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify a valid ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
no-summary	NSSA does not receive a summary LSA.	--
default-information-originate	Generating a standard route (LSA type 7) in the NSSA.	--

Result

The area of the type NSSA is configured.

Further notes

You change the type of the area with the `no area` command.

9.2.3.7 area stub

Description

With this command, you configure areas of the type Stub.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify a valid ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
no-summary	The router does not send or receive a summary LSA	--

Result

The area of the type Stub is configured.

Further notes

You change the type of the area with the `no area` command.

9.2.3.8 no area

Description

With this command, you remove or change an area of the type "Stub" or "NSSA".

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
no area <area-id>
[
  { stub | nssa }
]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	enter a valid ID. x.x.x.x x = 0 ... 255 The area ID 0.0.0.0 is reserved for the backbone area and cannot be deleted.
stub	Stub area	--
nssa	NSSA area	--

Result

The area is removed or changed.

9.2.3.9 area virtual-link

Description

With this command, you create a virtual connection to the backbone area.

Note

This command is available only with layer 3. The router must be an Area Border Router (ABR) or an Autonomous System Boundary Router (ASBR). The router ID must correspond to the IP address of the interface of the transit area network.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
area <area-id> virtual-link <router-id>
  [authentication
    {
      simple |messagedigest| null
    }
  ]
  [hello-interval <value (1-65535)>]
  [retransmit-interval <value(0-3600)>]
  [transmit-delay <value (0-3600)>]
  [dead-interval <value>]
```

```

[[
 authentication-key <key (8)> | message-digest-key <Key-id (0-255)>
  md5 <key(16)>
]]

```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify a valid ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
router-id	ID of the router. The router ID must correspond to the IP address of the interface of the transit area network.	-
authentication	Keyword for the authentication method of the virtual connection	<ul style="list-style-type: none"> • simple enables authentication using a password • messagedigest enables authentication using MD5 • none no authentication
hello-interval	Keyword for the interval at which Hello packets are sent over the virtual link	-
value	specifies the length of the interval in seconds.	enter the interval 1-65535
retransmit-interval	Keyword for the interval after which packets whose receipt was not confirmed are transferred again.	-
value	specifies the length of the interval in seconds.	enter the interval 0-3600
transmit-delay	Keyword for the time that a link state update packet requires for transmission over the virtual link.	-
value	Specifies the length of the interval in seconds.	enter the interval 0-3600
dead-interval	Keyword for the interval after which the neighbor router is classified as "failed" if Hello packets from it are not received.	-
value	Specifies the length of the interval in seconds.	enter the interval 0-0x7ffffff
authentication-key	Keyword for the unencrypted password	-
key	Password	enter the password. Maximum length: 8 characters
message-digest-key	Keyword for the ID of the password	-
key-id	ID of the password.	specify the ID 0 ... 255

Parameter	Description	Range of values / note
md5	Keyword for the password	-
key	Password	enter the password Maximum length: 16 characters

Result

The virtual link is created.

Further notes

You delete the virtual link with the `no area virtual link` command.

You display information about the virtual link with the `show ip ospf virtual` command.

9.2.3.10 no area virtual-link**Description**

With this command, you delete a virtual link.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
no area <area-id> virtual-link <router-id>
  [authentication]
  [hello-interval]
  [retransmit-interval]
  [transmit-delay]
  [dead-interval]
  [{
    authentication-key | message-digest-key <Key-id (0-255)>
  }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area-ID	specify a valid ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area
router-id	ID of the router	-
authentication	Keyword for the authentication method of the virtual connection	<ul style="list-style-type: none"> • simple enables authentication using a password • messagedigest enables authentication using MD5 • none no authentication
hello-interval	Keyword for the interval at which Hello packets are sent over the virtual link	-
retransmit-interval	Keyword for the interval after which packets whose receipt was not confirmed are transferred again.	-
transmit-delay	Keyword for the time that a link state update packet requires for transmission over the virtual link.	--
dead-interval	Keyword for the interval after which the neighbor router is classified as "failed" if Hello packets from it are not received.	-
authentication-key	Keyword for the unencrypted password	-
message-digest-key	Keyword for the ID of the password	-
key-id	ID of the password.	specify the ID 0 ... 255

Result

The virtual link is removed.

Further notes

You create virtual links with the `area virtual link` command.

You display information about the virtual link with the `show ip ospf virtual` command.

9.2.3.11 compatible rfc1583

Description

With this command, you enable compatibility with RFC 1583. Use the command if you still have old OSPFv2 routers in operation that are not compatible with RFC 2328.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli (config-ospf) #
```

Syntax

Call the command without parameters:

```
compatible rfc1583
```

Result

The compatibility with RFC 1583 is enabled.

Further notes

You disable the compatibility with the `no compatible rfc1583` command.

You can display the status of this function and other information with the `show ip ospfcommand`.

9.2.3.12 no compatible rfc1583

Description

With this command, you disable compatibility with RFC 1583.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call the command without parameters:

```
compatible rfc1583
```

Result

The compatibility with RFC 1583 is disabled.

Further notes

You enable the compatibility with the `compatible rfc1583` command.

You can display the status of this function and other information with the `show ip ospf` command.

9.2.3.13 default-information originate

Description

With this command, you enable the function with which a standard route is generated for external routes into the OSPF routing domain.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
default-information originate [(  
    [always]  
    [metric <metric-value (0-0xffffffff)>]  
    [metric-type <type (1-2)>]])]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
always	An external standard route is always generated.	
metric	Keyword for the metric of the external standard route.	--
metric-value	Value of the metric	0-0xffffffff
metric-type	Keyword for the type of the external standard route	--
type	Type of the external route	<ul style="list-style-type: none">• 1 - type 1 External and internal costs• 2 - type 2 External costs

Result

The function is enabled.

Further notes

You disable the function with the `no default-information originate` command.

9.2.3.14 no default-information originate

Description

With this command, you disable the function with which a standard route is generated for external routes into the OSPF routing domain.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli (config-ospf) #
```

Syntax

Call up the command with the following parameters:

```
no default-information originate [(
    [always]
    [metric <metric-value (0-0xffffffff)>]
    [metric-type <type (1-2)>]])]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
always	The external standard route is always generated.	
metric	Keyword for the metric of the external standard route.	--
metric-value	Value of the metric	0-0xffffffff
metric-type	Keyword for the type of the external standard route	--
type	Type of the external route	<ul style="list-style-type: none"> • 1 - type 1 External and internal costs • 2 - type 2 External costs

Result

The function is disabled.

Further notes

You enable the function with the `default-information originate` command.

9.2.3.15 default-information originate always

Description

With this command, you enable the function with which a standard route is always generated for external routes into the OSPF routing domain.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
default-information originate always  
    [metric <metric-value (0-0xffffffff)>]  
    [metric-type <type (1-2)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
metric	Keyword for the metric of the external standard route.	--
metric-value	Value of the metric	0-0xffffffff
metric-type	Keyword for the type of the external standard route	--
type	Type of the external route	<ul style="list-style-type: none">• 1 - type 1 External and internal costs• 2 - type 2 External costs

Result

The function is enabled.

Further notes

You disable the function with the `no default-information originate always` command.

9.2.3.16 no default-information originate always

Description

With this command, you disable the function with which a standard route is always generated for external routes into the OSPF routing domain.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli (config-ospf) #
```

Syntax

Call up the command with the following parameters:

```
no default-information originate always
    [metric <metric-value (0-0xffffffff)>]
    [metric-type <type (1-2)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
metric	Keyword for the metric of the external standard route.	--
metric-value	Value of the metric	0-0xffffffff
metric-type	Keyword for the type of the external standard route	--
type	Type of the external route	<ul style="list-style-type: none"> • 1 - type 1 External and internal costs • 2 - type 2 External costs

Result

The function is disabled.

Further notes

You enable the function with the `default-information originate always` command.

9.2.3.17 network area

Description

With this command, you specify an OSPF interface and the Area ID connected to the OSPF interface.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
network <network number> area <area-id>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
network number	IP interface that will be used by OSPF.	Enter the IP address of the interface for which OSPF will be enabled.
area-id	Area-ID	specify an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The OSPF interface is configured.

Further notes

You remove the OSPF interface and the area with the `no network area` command.

You can display the status of this function and other information with the `show ip ospf interface` command.

9.2.3.18 no network area

Description

With this command, you remove the OSPF interface and the Area ID connected to the OSPF interface.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli (config-ospf) #
```

Syntax

Call up the command with the following parameters:

```
no network <network number> area <area-id>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
network number	Network number	Enter a valid network number
area-id	Area-ID	enter an ID. x.x.x.x x = 0 ... 255 0.0.0.0 = backbone area

Result

The OSPF interface is removed.

Further notes

You create the OSPF interface and the area with the `network area` command.

You can display the status of this function and other information with the `show ip ospf interface` command.

9.2.3.19 redist-config

Description

With this command, you configure the information for the route. The routes are further distributed with this information.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
redist-config <Network> <Mask>  
[metric-value <metric (1 - 16777215)>]  
[metrictype {  
    asExtttype1 | asExtttype2  
}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Network	Target address of the route.	enter the IPv4 address.
Mask	Subnet mask of this route	specify the subnet mask.
metric-value	Keyword for the metric of the route	-
metric	Metric	1 - 16777215
metrictype	Keyword for the connection costs	<ul style="list-style-type: none">asExtttype1 External and internal costsasExtttype2 External costs

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information for the route is specified.

Further notes

You remove the information with the `no redist-config` command.

You distribute the routes with the `reistribute` command.

9.2.3.20 no redist-config

Description

With this command, you delete the information for the new external routes.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
no redist-config <Network> <Mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Network	Target address of the route.	specify the IP address.
Mask	Subnet mask of this route	specify the subnet mask.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information for the route is deleted.

Further notes

You create the information with the `redist-config` command.

9.2.3.21 redistribute

Description

With this command, you specify which known routes are distributed via OSPF.

Note

This command is available only with layer 3.

Requirement

- The router is an ASBR router.
- You are in the OSPF Router configuration mode.
The command prompt is:

```
cli(config-ospf)#
```


Syntax

Call up the command with the following parameters:

```
redistribute {static | connected | rip | default | all}
```

The parameters have the following meaning:

Parameter	Description
static	static routes
connected	connected routes
rip	RIP routes
default	standard routes
all	all routes

Result

Which routes are distributed via OSPF is specified.

Further notes

You enable the ASBR router with the `ASBR Router` command.

You disable the distribution of the routes with the `no redistribute` command.

You create the information for the routes with the `redist-config` command.

You create the information for external the routes with the `default-information originate` command.

9.2.3.22 no redistribute

Description

With this command, you disable distribution of routes with OSPF.

Note

This command is available only with layer 3.

Requirement

- The router is an ASBR router.

You are in the OSPF Router configuration mode.

The command prompt is:

```
cli (config-ospf) #
```

Syntax

Call up the command with the following parameters:

```
no redistribute {static | connected | rip | default | all}
```

The parameters have the following meaning:

Parameter	Description
static	static routes
connected	connected routes
rip	RIP routes
default	standard routes
all	all routes

Result

Which routes are distributed via OSPF is disabled.

Further notes

You enable the distribution of the routes with the `redistribute` command.

9.2.3.23 distribute-list route-map

Description

This command enables the filtering of the routing information according to a route map for incoming routing information.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
distribute-list route-map <name(1-20)> in
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	Incoming routing information is filtered.	-

Result

The filtering is enabled.

9.2.3.24 no distribute-list route-map

Description

This command disables the filtering of the routing information according to a route map for incoming routing information.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
no distribute-list route-map <name(1-20)> in
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	Incoming routing information is filtered.	-

Result

The filtering is disabled.

9.2.3.25 router id

Description

With this command, you specify the ID of the router.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

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

The parameter has the following meaning:

Parameter	Description	Range of values / note
router ip address	IP address	Enter the IP address of the router or a value in the IP address format.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The ID of the router is specified.

Further notes

You display the router ID and other information with the `show ip ospf interface` command.

9.2.3.26 summary-address

Description

With this command, you assign an area ID an address range. The address range is used to group the external routes.

Note

This command is available only with layer 3.

Requirement

- The router is an area border router (ABR)
- You are in the OSPF Router configuration mode.

The command prompt is:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

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

The parameters have the following meaning:

Parameter	Description	Range of values / note
Network	IP address of the address range	specify the IP address
Mask	Subnet mask of the address range	specify the subnet mask.
AreaId	Area-ID	specify a valid ID. x.x.x.x x = 255 0.0.0.0 = backbone area
allowAll	The backbone area generates an LSA message of Type 5 for the address range. LSA messages of Type 7 also generated for this address range in the connected NSSAs.	-
denyAll	No LSA is of Type 5 or Type 7 is generated for the address range.	-
advertise	The address range is advertised outside the areas. In the backbone area, the router generates an LSA message of Type 5. If the Area ID is not 0.0.0.0, the router generates an LSA message of Type 7 in an NSSA	-
not-advertise	No LSA messages of Type 5 are generated in the backbone area. The NSSAs connected to the backbone area generate LSA messages of Type 7. The other areas do not generate any LSA	-
Translation	Keyword for the P bit. The P bit indicates to the NSSA-ABR whether the LSA message of Type 7 is translated to Type 5.	-
enabled	P bit = 1. LSA message is translated	-
disabled	P bit = 0. LSA message is not translated	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is created.

Further notes

You delete the address range with the `no summary-address` command.

You can display the status of this function and other information with the `show ip ospf - area-range / summary-address` command

9.2.3.27 no summary-address

Description

With this command, you delete the address range.

Note

This command is available only with layer 3.

Requirement

You are in the OSPF Router configuration mode.

The command prompt is as follows:

```
cli(config-ospf)#
```

Syntax

Call up the command with the following parameters:

```
no summary-address <Network> <Mask> <AreaId>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Network	IP address of the address range	specify the IP address
Mask	Subnet mask of the address range	specify the subnet mask.
AreaId	Area-ID	specify a valid ID. x.x.x.x x = 255 0.0.0.0 = backbone area

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is deleted.

Further notes

You configure the address range with the `summary-address` command.

9.2.4 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.2.4.1 ip ospf authentication

Description

With this command, you specify the type of authentication. The following methods are possible:

- Authentication using an unencrypted password.
- Authentication using MD5

Note

This command is available only with layer 3.

Requirement

- The interface is an IP interface.
- Authentication using MD5: A password and a key ID are created.
- Authentication using an unencrypted password: A password is created.
- You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf authentication [{message-digest}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
message-digest	Authentication using MD5	-

If you enter the command without parameters, an unencrypted password is used for authentication.

Result

The type of authentication is specified.

Further notes

You remove the type of authentication with the `no ip ospf authentication` command.

You create the password for MD5 with the `ip ospf message-digest-key` command.

You create the password with the `ip ospf authentication` command.

9.2.4.2 no ip ospf authentication

Description

With this command, you reset the type of authentication back to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ip ospf authentication
```


Result

The type of authentication is reset.

Further notes

You enable the authentication with the `ip ospf authentication` command.

9.2.4.3 ip ospf authentication-key

Description

With this command, you specify the password.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:
`cli(config-if-$$$)#`

Syntax

Call up the command with the following parameters:

```
ip ospf authentication-key <password (8)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
Password	Password	Enter a password. Maximum length: 8 characters

Result

The password is specified.

Further notes

You delete the password with the `no ip ospf authentication-key` command.

9.2.4.4 no ip ospf authentication-key

Description

With this command, you delete the password.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli (config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip ospf authentication-key
```

Result

The password is deleted.

Further notes

You configure the password with the `ip ospf authentication-key` command.

9.2.4.5 ip ospf cost

Description

With this command, you specify the costs for the OSPF interface.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf cost <cost (1-65535)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
cost	Costs for the OSPF interface	1 ... 65535

Result

The costs are specified.

Further notes

You delete the costs with the `no ip ospf cost` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

9.2.4.6 no ip ospf cost

Description

With this command, you delete the costs.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip ospf cost
```

Result

The costs are deleted.

Further notes

You create the costs with the `ip ospf cost` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

9.2.4.7 ip ospf dead-interval

Description

With this command, you specify the time that can elapse before the neighbor router is assumed to have "failed". This means that no more Hello packets were received from it during this time.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf dead-interval <seconds (0-0x7fffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Interval in seconds	0 ... 0x7fffffff

Result

The interval is specified.

Further notes

You delete the interval with the `no ip ospf dead-interval` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

9.2.4.8 no ip ospf dead-interval

Description

With this command, you delete the interval.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The interval is deleted.

Further notes

You specify the interval with the `ip ospf dead-interval` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

You configure the router port with the `no switchport` command.

9.2.4.9 ip ospf hello-interval

Description

With his command, you specify the interval between two Hello packets.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli (config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf hello-interval <seconds (1 - 65535)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Interval in seconds	0 ... 65535

Result

The interval is specified.

Further notes

You delete the interval with the `no ip ospf hello-interval` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

9.2.4.10 no ip ospf hello-interval

Description

With this command, you delete the interval.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The interval is deleted.

Further notes

You configure the interval with the `ip ospf hello-interval` command.

You show the configuration of the OSPF interface with the `show ip ospf interface` command.

9.2.4.11 ip ospf message-digest-key

Description

With this command, you specify the password and the ID for authentication with MD5.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli (config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf message-digest-key <Key-ID (0-255)> md5 <md5-Key (16)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Key-ID	ID of the password	0 ... 255
md5	Keyword for the password	-
md5-Key	Password for authentication	enter a password Maximum length: 16 characters

Result

The password and the ID are specified.

Further notes

You delete the password with the `no ip ospf message-digest-key` command.

9.2.4.12 no ip ospf message-digest-key

Description

With this command, you delete the required password.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli (config-if-$$$)#
```


Syntax

Call up the command with the following parameters:

```
no ip ospf message-digest-key <Key-ID (0-255)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
Key-ID	ID of the password	Enter a valid ID.

Result

The password is deleted.

Further notes

You specify the password with the `ip ospf message-digest-key` command.

9.2.4.13 ip ospf retransmit-interval

Description

With this command, you specify the time after which an LSA message is transferred again if no confirmation has been received.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf retransmit-interval <seconds (0 - 3600)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Interval in seconds	0 - 3600

Result

The interval is specified.

Further notes

You delete the interval with the `no ip ospf retransmit-interval` command.

9.2.4.14 no ip ospf retransmit-interval

Description

With this command, you delete the interval.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:
`cli(config-if-$$$)#`

Syntax

Call the command without parameter assignment:

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

Result

The interval is deleted.

Further notes

You configure the interval with the `ip ospf retransmit-interval` command.

You configure the router port with the `no switchport` command.

9.2.4.15 ip ospf transmit-delay

Description

With this command, you specify the time required to transfer and LSA message.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf transmit-delay <seconds (0 - 3600)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Interval in seconds	0 - 3600

Result

The interval is specified.

Further notes

You delete the interval with the `no ip ospf transmit-delay` command.

9.2.4.16 no ip ospf transmit-delay

Description

With this command, you delete the interval.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

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

Result

The interval is deleted.

Further notes

You configure the interval with the `ip ospf transmit-delay` command.

9.2.4.17 ip ospf priority

Description

With this command, you specify the router priority. The designated router is identified based on the priority.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf priority <value (0 - 255)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
Value	Priority	0 ... 255 Default: 1

Result

The priority is specified.

Further notes

You can reset the priority to the default with the `no ip ospf priority` command.

You display the router ID and other information with the `show ip ospf interface` command.

9.2.4.18 no ip ospf priority

Description

With this command, you reset the value for the priority to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode.
The command prompt is:
`cli(config-if)#`

Syntax

Call the command without parameter assignment:

```
no ip ospf priority
```

Result

The value for the priority is reset to the default.

Further notes

You configure the priority with the `ip ospf priority` command.

You display the router ID and other information with the `show ip ospf interface` command.

9.3 OSPFv3 (IPv6)

This section describes the commands relevant for working with routing with OSPFv3. Version 3 of OSPF is based on version 2 and is only used with IPv6. A large part of the routing mechanisms was adopted. OSPFv3 is defined in the RFCs 2740 and 5340.

The following has not changed:

- The statuses that a router runs through to establish a connection to the neighbor router.
- The areas : Backbone, Stub Area, Totally Stubby Area, Not So Stubby Area (NSSA)
- The router types: Internal Router (IR), Area Border Router (ABR), Backbone Router (BR), Autonomous System Area Border Router (ASBR), Designated Router (DR)
- The router ID, the area ID and the ID of the LSA are entered in the IPv4 address format:
x.x.x.x

What has changed?

Terms

The terms network or subnet are replaced by link.

Authentication

The authentication was removed. Instead OSPFv3 uses IPsec, that is implemented in IPv6.

Neighbor routers

The neighbor routers are identified via the router ID.

Neighbor database

The neighbor database (link state database - LSDB) is divided into different areas of application:

- Link scope LSDB
Contains the link LSA
- Area scope LSDB
contains the following LSAs
 - Router LSA
 - Network LSA
 - Inter-area prefix LSA
 - Inter area router LSA
 - Intra area prefix LSA
- AS scope LSDB
Contains the AS external LSA

LSA types

Two new LSA types were defined for OSPFv3.

OSPFv2	OSPFv3	Who	Within	Description
1 Router LSA	0x2001 Router LSA	every router	Area	No longer contains address information. This is contained in the new LSA type 2009.
2 Network LSA	0x2002 Network LSA	DR	Area	No longer contains address information. This is contained in the new LSA type 2009.
3 Summary LSA	0x2003 Inter-area prefix LSA	ABR	Area	Same function as in OSPFv2, simply renamed
4 AS Summary LSA	0x2004 Inter-Area Router LSA	ABR	Area	Same function as in OSPFv2, simply renamed
5 AS External LSA	0x4005 AS External LSA	ASBR	AS	Same function as in OSPFv2, simply renamed
7 NSSA External LSA	0x2007 Type 7 LSA	NSSA ASBR	NSSA	Same function as in OSPFv2, simply renamed
	0x2008 Link LSA	every router	Link	The LSA is sent by the router to every router linked to it. The LSA contains the link local address of the router and a list with IPv6 prefixes configured on the link.
	0x2009 Intra area prefix LSA	every router	Area	The LSA is sent only within an area. The LSA contains the IPv6 prefixes connected to the router or network.

In contrast to OSPFv2, OSPFv3 can forward unknown LSA types. Previously these were deleted and not distributed further.

9.3.1 The "show" commands

This section describes commands with which you display various settings.

9.3.1.1 show ipv6 ospf

Description

This command shows information on routing via OSPFv3.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ipv6 ospf
```

Result

The configuration is displayed.

9.3.1.2 show ipv6 ospf ... database ...

Description

This command shows information about a specific LSA type or all LSA types.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 ospf
    [area <AreaID>]
    database
    [ {
        router|network|as-external|inter-prefix|inter-router|intra-
prefix|link|nssa
    } ]
    [{
        detail|HEX
    }]
}}
```


The parameters have the following meaning:

Parameters	Description	Range of values / note
area	Keyword for the area ID	-
AreaID	Area ID	Specify an ID x.x.x.x x = 0 ... 255
router	only shows information of the LSA type "Router" (type 2001)	-
network	only shows information of the LSA type "Network" (type 2002)	-
as-external	only shows information of the LSA type "AS External" (type 4005)	-
inter-prefix	only shows information of the LSA type "inter-area prefix" (type 2003)	-
inter-router	only shows information of the LSA type "inter-area router" (type 2004)	-
intra-prefix	only shows information of the LSA type "intra-area prefix" (type 2009)	-
link	only shows information of the LSA type "link" (type 2008)	-
nssa	only shows information of the LSA type "type-7 LSA" (type 2007)	-
detail	shows Information in detail	
HEX	shows Information in hexadecimal format	

If you do not select any parameters from the parameter list, the entire content of the database is shown.

Result

The information is displayed.

9.3.1.3 show ipv6 ospf areas

Description

This command shows information on the areas.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 ospf areas
```

Result

The information is displayed.

9.3.1.4 show ipv6 ospf border-routers

Description

This command shows the OSPFv3 routes to the area border routers and to the AS boundary routers.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ipv6 ospf border-routers
```

Result

The OSPFv3 routers are shown.

9.3.1.5 show ipv6 ospf host

Description

This command shows the SMS host table

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 ospf host
```

Result

The host table is shown.

9.3.1.6 show ipv6 ospf interface

Description

This command shows the information on the OSPFv3 interface.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 ospf interface  
[  
  vlan<vlan-id(1-4094)>|<interface-type><interface-id>  
]
```

The parameters have the following meaning:

Parameters	Description	Values
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the information is displayed for all available interfaces.

Result

The Information of the OSPFv3 interface is displayed.

9.3.1.7 show ipv6 ospf neighbor

Description

This command shows information about the detected neighboring routers.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 ospf neighbor [ <Neighbor-RouterID> ]
```

The parameter has the following meaning:

Parameters	Description	Values
Neighbor-RouterID	Router ID of the neighbor	Specify the ID 0 ... 64

If you do not enter a router ID, information on all neighbor routers that can be reached via the link is shown.

Result

The information is displayed.

9.3.1.8 show ipv6 ospf redist-config

Description

This command shows the information that is distributed via the routes of the routing table.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 ospf redist-config
```

Result

The information is displayed.

9.3.1.9 show ipv6 ospf redundancy

Description

This command shows OSPFv3 redundancy.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show ipv6 ospf redundancy
```

Result

The OSPFv3 redundancy is shown.

9.3.1.10 show ipv6 ospf route

Description

This command shows the routes that were generated with OSPFv3.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show ipv6 ospf route
```

Result

The routes are displayed.

9.3.1.11 show ipv6 ospf virtual-links

Description

This command shows an overview of the virtual connections of OSPFv3.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 ospf virtual-links
```

Result

The overview is displayed.

9.3.1.12 show ipv6 ospf area-range

Description

This command shows the grouped address ranges.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 ospf {area-range|summary-prefix}
```

The parameters have the following meaning:

Parameters	Description	Values
area-range	Grouped area range. The address range is created with the "area-range" command.	-
summary-prefix	Grouped address range for OSPFv3 The address range is created with the "summary-address" command.	-

Result

The grouped address ranges are displayed.

9.3.1.13 show ipv6 ospf request-list / retrans-list

Description

This command shows a list with LSAs.

Note

This command is available only with layer 3.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 ospf { request-list | retrans-list } [ <Neighbor-RouterID>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
request-list	Request list for which LSA information is required.	-
retrans-list	List with LSAs from which information was sent but the acknowledgement of the recipient is missing.	-
Neighbor-RouterID	Router ID of the neighbor	Specify the ID in the IPv4 address format x.x.x.x x = 0 ... 255

If you do not specify a router ID, the list for all neighbors is shown.

Result

The list is displayed.

9.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.3.2.1 ipv6 router ospf

Description

With this command, you enable routing with OSPFv3 and change to the Router configuration mode.

Note

This command is available only with layer 3.

Requirement

- IPv6 routing is activated.
- You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 router ospf
```

Result

Routing with OSPFv3 is enabled.

You are now in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3)#
```

Further notes

You disable routing with OSPFv3 with the `no ipv6 router ospf` command.

You enable IPv6 routing with the `ipv6 unicast-routing` command.

9.3.2.2 no ipv6 router ospf

Description

With this command, you disable routing with OSPFv3.

Note

This command is available only with layer 3.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 router ospf
```

Result

Routing with OSPFv3 is disabled.

Further notes

You enable routing with OSPFv3 with the `ipv6 router ospf` command.

9.3.3 Commands in the Router configuration mode

This section describes commands that you can call up in the Router Configuration mode.

In the global configuration mode, enter the `ipv6 router ospf` command to change to this mode.

Commands relating to other topics that can be called in the Global Configuration mode can be found in the relevant sections.

- If you exit the Router Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the Router Configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.3.3.1 area

Description

With this command, you configure areas of the type NSSA (not-so-stubby-area) or stub.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call up the command with the following parameters:

```
area <area-id>
{ {
  stub | nssa
} [
no-summary
] }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area
stub	Stub area The LSA types router, network, inter-area prefix, intra-area prefix and link are stored in the database.	-
nssa	NSSA Stub area that also has external routing information (NSSA-LSA)	-
no-summary	NSSA / stub areas do not receive any inter-area prefix LSAs (summary LSA)	only with area border routers

Result

The area of the type NSSA or stub is configured.

Further notes

You change the type of the area with the `no area` command.

You can display the status of this function and other information with the `show ipv6 ospf areas` command.

You display the content of the database with the `show ipv6 ospf ... database ...` command.

9.3.3.2 no area

Description

With this command, you remove or change an area. To remove an area, there must be no IPv6 interface connected to it.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
no area <area-id>
[ {
  stub | nssa | virtual-link <router-id> [default-metric |
  {range {summary | Type7} | summary-prefix}
  <IPv6-Prefix> <Prefix-Length>
} ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 The area ID 0.0.0.0 is reserved for the backbone area and cannot be deleted.
stub	Stub area	-
nssa	NSSA	-

Parameter	Description	Range of values / note
virtual-link	Virtual link	-
router-id	ID of the router	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255
default-metric	Metric of the standard route	-
range	Address range	-
summary	LSA type 3	-
Type7	LSA type 7	-
summary-prefix	Address range of external routes	-
IPv6-Prefix	IPv6 address	Enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The area is removed or changed.

9.3.3.3 area range - ipv6prefix/prefix_length

Description

With this command, you assign an area ID an address range. The address range is used to group the routes within OSPFv3.

Note

This command is available only with layer 3.

Requirement

- The router is an area border router
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
area <Area-ID> range
<IPv6-Prefix> / <Prefix-Length>
[ {
advertise | not-advertise
} ]
[tag <value>] [cost <cost>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Area-ID	Area ID	specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area
IPv6-Prefix	IPv6 address	enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
advertise	The address range is advertised outside the ranges. A summary LSA of type 3 is generated.	-
not-advertise	The address range is not advertised to the outside.	-
tag	Keyword for tag:	-
value	Value that is assigned to the aggregated routes.	1 ... 65535
cost	Keyword for the costs	-
value	Costs for the OSPF interface.	1 ... 65535

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is configured.

Further notes

You delete the address range with the `no area range` command.

You configure the area with the `area` command.

You can display the status of this function and other information with the `show ipv6 ospf area-range` command.

9.3.3.4 area range - ipv6prefix and prefix length

Description

With this command, you assign an area ID an address range. The address range is used to group the routes within OSPFv3.

Note

This command is available only with layer 3.

Requirement

- The area is of the type NSSA
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
area <Area-ID> range
    <IPv6-Prefix> <Prefix-Length>
    [{
        advertise | not-advertise
    }]
    {
        summary | Type7
    }
    [tag <tag-value>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Area-ID	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area
IPv6-Prefix	IPv6 address	Enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
advertise	The address range is advertised outside the ranges. If the Area ID is 0.0.0.0, the router generates an LSA message of Type 3. If the Area ID is not 0.0.0.0, the router generates an LSA message of type 7 in an NSSA.	-

Parameter	Description	Range of values / note
not-advertise	The address range is not advertised to the outside.	-
summary	LSA type 3: Inter-area prefix LSA	-
Type7	LSA type 7	-
tag	Keyword for tag:	-
tag-value	Value that is assigned to the aggregated routes. (optional)	1 ... 65535

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is configured.

Further notes

You delete the address range with the `no area range` command.

You configure the area with the `area` command.

You can display the status of this function and other information with the `show ipv6 ospf area-range` command.

9.3.3.5 no area range

Description

With this command, you delete the address range.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```


Syntax

Call up the command with the following parameters:

```
no area <Area-ID> range
  <IPv6-Prefix> / <Prefix-Length>
  [{
advertise | not-advertise
}]
[
cost <cost>
]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
AreaID	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area
IPv6-Prefix	IPv6 address	Enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
advertise	The address range is advertised outside the ranges.	-
not-advertise	The address range is not advertised to the outside.	-
cost	Keyword for the costs	-
value	Costs for the OSPF interface	1 ... 65535

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is deleted.

Further notes

You configure the address range with the `no area range` command.

You configure the area with the `area` command.

You can display the status of this function and other information with the `show ipv6 ospf area-range` command.

9.3.3.6 area summary-prefix

Description

With this command, you assign an area ID an address range. The address range is used to group the external routes.

Note

This command is available only with layer 3.

Requirement

- The area is of the type NSSA
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
area <AreaID> summary-prefix
  <IPv6-Prefix> <Prefix-Length>
  [{
    allowAll | denyAll | advertise | not-advertise
  }]
  [
    Translation { enabled | disabled }
  ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
AreaID	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area
IPv6-Prefix	IPv6 address	enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
allowAll	The backbone area generates an LSA message of type 5 for the address range. LSA messages of Type 7 also generated for this address range in the connected NSSAs.	only with backbone area
denyAll	No LSA is of type 5 or type 7 is generated for the address range.	only with backbone area

Parameter	Description	Range of values / note
advertise	The address range is advertised outside the areas. In the backbone area, the router generates an LSA message of type 5. If the Area ID is not 0.0.0.0, the router generates an LSA message of Type 7 in an NSSA.	-
not-advertise	No LSA messages of type 5 are generated in the backbone area. The NSSAs connected to the backbone area generate LSA messages of type 7. The other areas do not generate any LSA.	-
Translation	Keyword for the P bit. The P bit indicates to the NSSA-ABR whether the LSA message of type 7 is translated to type 5.	-
enabled	P bit = 1. LSA message is translated	-
disabled	P bit = 0. LSA message is not translated	-

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The address range is configured.

Further notes

You delete the address range with the `no area range` command.

You configure the area with the `area` command.

You can display the status of this function and other information with the `show ipv6 ospf summary-prefix` command.

9.3.3.7 area virtual-link

Description

With this command you configure a virtual point-to-point link from a backbone router to a router of a remote area. The transit areas are the areas that are bridged.

Note

This command is available only with layer 3.

Requirement

- The router is an Area Border Router (ABR) or an Autonomous System Boundary Router (ASBR).
- No stub area
- The virtual link needs to be configured on both routers
- Both routers are connected to the transit area.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call up the command with the following parameters:

```
area <area-id> virtual-link <router-id>
  [hello-interval <seconds>]
  [retransmit-interval<seconds>]
  [transmit-delay <seconds>]
  [dead-interval<seconds>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
area-id	Area ID	Specify the ID in the IPv4 address format x.x.x.xx = 0 ... 255 0.0.0.0 = backbone area
router-id	Router ID of the virtual router in the transit area	Specify the ID in the IPv4 address format x.x.x.xx = 0 ... 255
hello-interval	Keyword for the interval at which Hello packets are sent over the virtual link	-
seconds	Length of the interval	1 ... 65535 s Default: 10 The routers located on the same link must have the same interval.
retransmit-interval	Keyword for the interval after which packets whose receipt was not confirmed are transferred again.	-
seconds	Length of the interval	0 ... 3600 s Default: 20
transmit-delay	Keyword for the time that a link state update packet requires for transmission over the virtual link.	--
seconds	Length of the interval	0 ... 3600 s Default: 1

Parameter	Description	Range of values / note
dead-interval	Keyword for the interval after which the neighbor router is classified as "failed" if Hello packets from it are not received.	-
seconds	Length of the interval	1 ... 65535 s Default: 60 The value must be a multiple of the hello interval. The routers located on the same link must have the same interval.

Result

The virtual link is created.

Further notes

You delete the virtual link with the `no area` command.

You display information about the virtual links with the `show ipv6 ospf virtual link` command.

9.3.3.8 ASBR Router

Description

With this command, you specify that the router is an Autonomous System Boundary Router (ASBR).

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call the command without parameters:

```
ASBR Router
```

Result

The autonomous system boundary router is enabled.

Further notes

You disable the autonomous system boundary router with the `no ASBR Router` command.

You enable the distribution of the routes with the `redistribute` command.

You create the information for the routes with the `redist-config` command.

You can display the status of this function and other information with the `show ipv6 ospf` command.

9.3.3.9 no ASBR Router

Description

With this command, you disable the autonomous system boundary router.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call the command without parameters:

```
no ASBR Router
```

Result

The autonomous system boundary router is disabled.

Further notes

You enable the autonomous system boundary router with the `ASBR Router` command.

You can display the status of this function and other information with the `show ipv6 ospf` command.

9.3.3.10 distribute-list

Description

This command enables the filtering of the routing information according to a route map for incoming routing information.

Note

This command is available only with layer 3.

Requirement

- OSPFv3 routing is activated.
- The router is an ASBR router.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
distribute-list route-map <name(20)> in
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters
in	Incoming routing information is filtered.	-

Result

The filtering is enabled.

Further notes

You disable the filtering with the `no distribute-list` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.11 no distribute-list

Description

This command disables the filtering of the routing information according to a route map for incoming routing information.

Note

This command is available only with layer 3.

Requirement

- OSPFv3 routing is activated.
- The router is an ASBR router.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
no distribute-list route-map <name(20)> in
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters
in	Incoming routing information is filtered.	-

Result

The filtering is disabled.

Further notes

You enable the filtering with the `distribute-list` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.12 host

Description

With this command, you create an entry in the host table and assign an area ID and / or a metric to it.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call up the command with the following parameters:

```
host <IPv6-Address>  
{  
  metric <cost>  
} [  
  area-id {<AreaID>}  
]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
IPv6-Address	IPv6 address prefix of the host	Enter a valid IPv6 address
metric	Keyword for the metric of the external standard route.	-
cost	Value of the metric	
area-id	Keyword for the area ID	-
AreaID	Area ID	Specify the ID in the IPv4 address format x.x.x.x = 0 ... 255 0.0.0.0 = backbone area

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is configured in the host table.

Further notes

You remove an entry with the `no host` command.

You display the host table with the `show ipv6 ospf host` command.

9.3.3.13 no host

Description

With this command, you remove an entry in the host table.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
no host <IPv6-Address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
IPv6-Address	IPv6 address of the host	Enter a valid IPv6 address

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry has been removed

Further notes

You create an entry with the `host` command.

You display the host table with the `show ipv6 ospf host` command.

9.3.3.14 passive-interface

Description

With this command, you specify that the OSPFv3 interfaces are inactive, that are configured afterwards.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call the command without parameter assignment:

```
passive-interface
```

Result

The configuration is active.

Further notes

You disable the configuration with the `no passive-interface` command.

You can display the status of this function and other information with the `show ipv6 ospf interface` command.

9.3.3.15 no passive-interface

Description

With this command, you specify that the OSPFv3 interfaces are active, that are configured afterwards.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf passive-interface
```

Result

The configuration is active.

Further notes

You enable the configuration with the `passive-interface` command.

You can display the status of this function and other information with the `show ipv6 ospf interface` command.

9.3.3.16 `redist-config`

Description

With this command, you configure the information for external routes. The routes are further distributed with this information

Note

This command is available only with layer 3.

Requirement

- The router is an ASBR router.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
redist-config <IPv6-Prefix> <Prefix-Length>
[metric-value <metric>]
  [metrictype {
asExtttype1 | asExtttype2
}] [tag <tag-value>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
IPv6-Prefix	IPv6 address	Enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself
metric-value	Keyword for the metric of the route	-
metric	Metric	1 ... 16777215
metrictype	Keyword for the connection costs	-
asExtttype1	External and internal costs	-
asExtttype2	External costs	-
tag	Keyword for tag:	-
tag-value	Value that is assigned to the aggregated routes.	1 ... 65535

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information for the route is specified.

Further notes

You enable the ASBR router with the `ASBR Router` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You enable the distribution of the routes with the `redistribute` command.

You delete the information with the `no redist-config` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.17 no redist-config

Description

With this command, you delete the information for the new external routes.

Note

This command is available only with layer 3.

Requirement

- The router is an ASBR router.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call up the command with the following parameters:

```
no redist-config <IPv6-Prefix> <Prefix-Length>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
IPv6-Prefix	IPv6 address	Enter a valid IPv6 address
Prefix-Length	Number of bits belonging to the prefix (from left to right)	1 ... 128 bits 128: The node (host) itself

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information for the route is deleted.

Further notes

You enable the ASBR router with the `ASBR Router` command.

You create the information with the `redist-config` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.18 redistribute

Description

With this command, you specify which routes are distributed via OSPFv3.

Note

This command is available only with layer 3.

Requirement

- OSPFv3 routing is activated.
- The router is an ASBR router
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
redistribute {static | connected | ripng | bgp}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
static	static routes	-
connected	connected routes	-
ripng	RIPv3 routes	-
bgp	BGP routes	-

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The routes are specified that are distributed via OSPFv3.

Further notes

You enable the ASBR router with the `ASBR Router` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You disable the distribution of the routes with the `no redistribute` command.

You create the information for the routes with the `redist-config` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.19 no redistribute

Description

With this command, you disable distribution of routes with OSPFv3.

Note

This command is available only with layer 3.

Requirement

- The router is an ASBR router.
- You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli(config-ospfv3)#
```

Syntax

Call up the command with the following parameters:

```
no redistribute {static | connected | ripng | bgp }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
static	static routes	-
connected	connected routes	-
ripng	RIPng routes	-
bgp	BGP routes	-

Result

The routes are specified that are not distributed via OSPFv3.

Further notes

You enable the ASBR router with the `ASBR Router` command.

You enable the distribution of the routes with the `redistribute` command.

You display the setting with the `show ipv6 ospf` command.

9.3.3.20 router id

Description

With this command, you specify the ID of the router.

Note

This command is available only with layer 3.

Requirement

You are in the OSPFv3 router configuration mode.

The command prompt is as follows:

```
cli (config-ospfv3) #
```

Syntax

Call up the command with the following parameters:

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

The parameter has the following meaning:

Parameter	Description	Range of values / note
IPv4-Address	Router ID	Specify the ID in the IPv4 address format. x.x.x.x x = 0 ... 255

Result

The ID of the router is specified.

Further notes

You display the router ID and other information with the `show ipv6 ospf interface` command.

9.3.4 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.3.4.1 ipv6 ospf area

Description

With this command, you enable OSPFv3 on the interface. The interface is assigned to an area.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- The router ID is configured.
- OSPFv3 routing is activated.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf area <IPv4-Address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
IPv4-Address	IPv4 address of the interface with which the OSPFv3 protocol instance is connected.	specify the IP address in the IPv4 address format. x.x.x.x

Result

The interface is assigned to an area.

Further notes

You configure the router ID with the `router-id` command.

You disable OSPFv3 with the `no ipv6 ospf` command.

You show the configuration of the OSPFv3 interface with the `show ipv6 ospf interface` command.

9.3.4.2 no ipv6 ospf

Description

With this command, you enable OSPFv3 on the interface.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- The router ID is configured.
- OSPFv3 routing is activated.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf
```

Result

The interface is removed from the area.

Further notes

You configure the router ID with the `router-id` command.

You enable OSPFv3 with the `ipv6 ospf area` command.

You show the configuration of the OSPFv3 interface with the `show ipv6 ospf interface` command.

9.3.4.3 ipv6 ospf dead-interval

Description

With this command, you specify the time that can elapse before the neighbor router is assumed to have "failed". This means that no more Hello packets were received from it during this time.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf dead-interval <interval>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
interval	Interval in seconds	1 ... 65535 Default: 40 The value must be four times the hello interval. The routers located on the same link must have the same interval.

Result

The interval is specified.

Further notes

You display the configuration with the `show ip ospf interface` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You can reset the interval to the default with the `no ipv6 ospf dead-interval` command.

9.3.4.4 no ipv6 ospf dead-interval

Description

With this command, you reset the interval to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
 - You are in the Interface configuration mode
- The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf dead-interval
```

Result

The interval is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the interval with the `no ipv6 ospf dead-interval` command.

You display the configuration with the `show ip ospf interface` command.

9.3.4.5 ipv6 ospf hello-interval

Description

With his command, you specify the interval between two Hello packets.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf hello-interval <interval>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
interval	Interval in seconds	1 ... 65535 Default: 10 The routers located on the same link must have the same interval.

Result

The interval is specified.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You reset the interval to the default with the `no ipv6 ospf hello-interval` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.6 no ipv6 ospf hello-interval

Description

With this command, you reset the interval to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf hello-interval
```

Result

The interval is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the interval with the `ipv6 ospf hello-interval` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.7 ipv6 ospf metric

Description

With this command, you specify the metric for OSPFv3.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf metric <metric>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
metric	Value for the metric	1 ... 65535 Default: 1

Result

The metric is specified.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You can reset the metric to the default with the `no ipv6 ospf metric` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.8 no ipv6 ospf metric

Description

With this command, you reset the metric back to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf metric
```

Result

The metric is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the metric with the `ipv6 ospf metric` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.9 `ipv6 ospf passive-interface`

Description

With this command, you deactivate the OSPF interface. The router then does not send any hello packets on this interface and can also not establish a link via this interface.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 ospf passive-interface
```

Result

The OSPF interface is inactive.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You enable the interface with the `no ipv6 ospf passive-interface` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.10 no ipv6 ospf passive-interface

Description

With this command, you enable the OSPFv3 interface.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config-if-$$) #
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf passive-interface
```

Result

The OSPFv3 interface "" is enabled.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You deactivate the OSPFv3 interface with the `ipv6 ospf passive-interface` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.11 ipv6 ospf priority

Description

With this command, you specify the router priority. The designated router is identified based on the priority.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf priority <priority>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
priority	Priority	0 ... 255 Default: 1

Result

The priority is specified.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You reset the priority to the default with the `no ipv6 ospf priority` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.12 no ipv6 ospf priority

Description

With this command, you reset the router priority back to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf priority
```

Result

The priority is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the priority with the `ipv6 ospf priority` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.13 ipv6 ospf retransmit-interval

Description

With this command you specify the time after which packets whose receipt was not confirmed are transferred again.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip ospf retransmit-interval <interval>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
interval	Interval in seconds	1 ... 1800 Default: 5

Result

The interval is specified.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You reset the interval to the default with the `no ipv6 ospf retransmit-interval` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.14 no ipv6 ospf retransmit-interval

Description

With this command, you reset the interval to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf retransmit-interval
```

Result

The interval is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the interval with the `ipv6 ospf retransmit-interval` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.15 `ipv6 ospf transmit-delay`

Description

With this command you specify the time that a link state update packet requires for transmission.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Requirement

- Layer 3 interface
- The router ID is configured.

- OSPFv3 routing is activated.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 ospf transmit-interval <1-1800>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
-	Interval in seconds	1 ... 1800 Default: 1

Result

The interval is specified.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You reset the interval to the default with the `no ipv6 ospf transmit-interval` command.

You display the configuration with the `show ipv6 ospf interface` command.

9.3.4.16 no ipv6 ospf transmit-delay

Description

With this command, you reset the interval to the default value.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 ospf transmit-delay
```

Result

The interval is reset.

Further notes

You enable OSPFv3 routing with the `ipv6 router ospf` command.

You configure the interval with the `ipv6 ospf transmit-delay` command.

You enable OSPFv3 routing with the `ipv6 router ospf` command.

9.4 VRRPv2 (IPv4)

This section describes the commands relevant for working with routing with VRRP.

Note

- The commands are only available with layer 3 and only in conjunction with VLAN interfaces. Router ports are not supported
 - Enable routing to be able to use VRRP.
 - VRRP supports only IPv4. If you want to use IPv4 and IPv6, use VRRPv3
-

VRRP and DHCP server

If you want to operate a DHCP server on the devices of a VRRP group, the DHCP server must be configured on the master router. Backup routers do not react to DHCP queries. Make sure that the master router is statically configured and that after a failure, becomes the master of the VRRP group again.

9.4.1 The "show" commands

This section describes commands with which you display various settings.

9.4.1.1 show vrrp

Description

This command shows the settings of a virtual router.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show vrrp [interface vlan <vlan-id(1-4094)> <VrId(1-255)>]  
[{:brief|detail|statistics}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
VrId	ID of the virtual router	1 ... 255
brief	shows brief information on VRRP	-
detail	shows detailed information on VRRP.	-
statistics	shows the statistics of the VRRP protocol	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings of the virtual router are displayed.

9.4.1.2 show vrrp interface

Description

This command shows the settings of VRRP for the interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show vrrp interface [vlan <vlan-id(1-4094)>] [{brief|detail|statistics}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
brief	shows brief information on VRRP	-
detail	shows detailed information on VRRP.	-
statistics	shows the statistics of the VRRP protocol	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings for the interface are displayed.

9.4.1.3 show vrrp track

Description

With this command, you display the configured interface tracking.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show vrrp track
```

Result

The configured interface tracking is displayed.

9.4.2 Commands in the Global Configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.4.2.1 router vrrp

Description

With this command, you enable routing with VRRP and change to the VRRP Router Configuration mode.

Note

This command is available only with layer 3.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
router vrrp
```

Result

Routing with VRRP is enabled.

You are now in the VRRP Router Configuration mode.

The command prompt is as follows:

```
cli (config-vrrp)#
```

Further notes

You disable routing with VRRP with the `no router vrrp` command.

9.4.2.2 no router vrrp

Description

With this command, you disable routing with VRRP.

Note

This command is available only with layer 3.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no router vrrp
```

Result

Routing with VRRP is disabled.

Further notes

You enable routing with VRRP with the `router vrrp` command.

9.4.3 Commands in the VRRP Router Configuration mode

This section describes commands that you can call up in the VRRP Router Configuration mode.

In the Global Configuration mode, enter the `router vrrp` command to change to this mode.

- If you exit the VRRP Router Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the VRRP Router Configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.4.3.1 interface

Description

With this command, you decide the interface for which you want to assign parameters in the VRRP Router configuration mode.

There you can edit the settings for a VRRP interface. You select the VRRP interface with the parameters of this command.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call up the command with the following parameters:

```
interface vlan<vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Further notes

You exit the VRRP Interface configuration mode with the `end` or `exit` command.

You delete a VRRP interface with the `no interface` command.

You display the status and the configuration of the VRRP interfaces with the `show vrrp` or `show vrrp interface` command.

9.4.3.2 no interface

Description

With this command, you delete a VRRP interface.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call up the command with the following parameters:

```
no interface vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-id	Module no. and port no. of the interface	Enter a valid interface.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The VRRP interface is deleted.

Further notes

You configure a VRRP interface with the `interface` command.

You display the status and the configuration of the VRRP interface with the `show vrrp` or `show vrrp interface` command.

9.4.3.3 track interface

Description

With this command, you configure the tracking of interfaces.

When the link of one or more tracked interfaces changes from "up" to "down", the priority of the assigned VRRP interface is reduced. When the link of the interface changes back from "down" to "up", the original priority of the VRRP interface is restored.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call up the command with the following parameters:

```
track <group-index> interface { vlan <vlan-id (1-4094)> | <interface-type>
<interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The selected interface is monitored.

Further notes

You delete an interface tracking with the `no interface interface` command.

You display the configured interface tracking with the `show vrrp track` command.

You assign a VRRP interface to an interface tracking with the `vrrp track decrement` command.

You configure the value by which the priority is reduced with the command `vrrp track decrement`.

With the `track links` command you configure how many of the monitored interfaces need to change their status before the priority of the assigned VRRP interface is changed.

9.4.3.4 no track interface

Description

With this command, you delete the tracking of interfaces.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call up the command with the following parameters:

```
no track <group-index> interface { vlan <vlan-id (1-4094)> | <interface-type>  
<interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

Interface tracking is deleted.

Further notes

You configure an interface tracking with the `track interface` command.

You display the configured interface tracking with the `show vrrp track` command.

9.4.3.5 track links

Description

With this command you define how many tracked interfaces need to change to the "down" status, before the priority of the assigned VRRP interface is changed.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call up the command with the following parameters:

```
track <group-index> links <links-to-track(1-255)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
links-to-track	Number of interfaces	1 ... 255

Result

The number of tracked interfaces is defined.

Further notes

You delete the configuration with the `no track links` command.

You configure the tracking of interfaces with the `track interface` command.

You display the configured number of tracked interfaces with the `show vrrp track` command.

9.4.3.6 no track links

Description

With this command, you delete the the number of tracked interfaces.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp) #
```

Syntax

Call up the command with the following parameters:

```
no track <group-index> links
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-

Result

The number of tracked interfaces is deleted.

Further notes

You configure the number of tracked interfaces with the `track links` command.

You display the configured number of tracked interfaces with the `show vrrp track` command.

9.4.3.7 vrrp virtual-ping

Description

With this command, you enable pings to virtual addresses.

Requirement

- The Router configuration mode is enabled.
- You are in the VRRP Router configuration mode.
The command prompt is:

```
cli(config-vrrp)#
```

Syntax

Call the command without parameters:

```
vrrp virtual-ping
```

Result

The function for pings to virtual addresses is enabled.

Further notes

You disable the setting with the `no vrrp virtual-ping` command.

You display the status of this function and other information in Privileged EXEC mode with the `show vrrp` command.

9.4.3.8 no vrrp virtual-ping

Description

With this command, you disable pings to virtual addresses.

Requirement

- The Router configuration mode is enabled.
- You are in the VRRP Router configuration mode.
The command prompt is:

```
cli(config-vrrp)#
```

Syntax

Call the command without parameters:

```
no vrrp virtual-ping
```

Result

The function for pings to virtual addresses is disabled.

Further notes

You enable the setting with the `vrrp virtual-ping` command.

You display the status of this function and other information in Privileged EXEC mode with the `show vrrp` command.

9.4.3.9 vrrp vrid-track

Description

With this command, you enable VRID tracking.

When enabled, all interfaces of a VRID are monitored. When the link of an interface changes from "up" to "down", the priority of all VRRP interfaces with the same VRID is reduced to the value "0".

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call the command without parameter assignment:

```
vrrp vrid-track
```

Result

VRID tracking is enabled.

Further notes

You disable VRID tracking with the `no vrrp vrid-track` command.

You display configured VRID trackings with the command `show vrrp interface` or `show vrrp interface - vrid` with the parameter `detail`.

9.4.3.10 no vrrp vrid-track

Description

With this command, you disable VRID tracking.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp)#
```

Syntax

Call the command without parameter assignment:

```
no vrrp vrid-track
```

Result

VRID tracking is disabled.

Further notes

You enable VRID tracking with the `vrrp vrid-track` command.

You display configured VRID trackings with the command `show vrrp interface` or `show vrrp interface - vrid` with the parameter `detail`.

9.4.4 Commands in the Interface Configuration mode

This section describes commands that you can call up in the Interface configuration mode.

- The commands are only available with layer 3
- Enable routing to use VRRP.
- You can only use VRRP in conjunction with VLAN interfaces.
- VRRP only supports IPv4. If you want to use IPv4 and IPv6, use VRRPv3

Note

The commands are only available with layer 3 and only in conjunction with VLAN interfaces.

In the VRRP Router configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the Interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the VRRP Router configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.4.4.1 vrrp associated-ip

Description

With this command, you specify which IPv4 addresses the virtual router monitors.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> associated-ip <ip_addr>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ip_addr	Value for an IPv4 address	Enter a valid IPv4 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 addresses are specified.

Further notes

You can create a maximum of 52 virtual IP addresses.

You configure a VRRP interface with the `interface` command.

You remove an IPv4 address with the `no vrrp associated-ip` command.

You remove all IPv4 addresses with the `vrrp group shutdown` command.

You display the IPv4 addresses with the `show vrrp interface - vrid` command.

9.4.4.2 no vrrp associated-ip**Description**

With this command, you remove an IPv4 address from the virtual router.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> associated-ip <ip_addr>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ip_addr	Value for an IPv4 address	Enter a valid IPv4 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 address is removed from the virtual router.

Further notes

You configure a VRRP interface with the `interface` command.

You display the IPv4 addresses with the `show vrrp interface - vrid` command.

9.4.4.3 vrrp group shutdown

Description

With this command, you remove all assigned IPv4 addresses from the virtual router.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> group shutdown
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

All IPv4 addresses of the group are removed.

Further notes

You configure a VRRP interface with the `interface` command.

You display the IPv4 addresses with the `show vrrp interface - vrid` command.

9.4.4.4 vrrp preempt

Description

With this command, you specify that a router with higher priority can take over the master role from a router with lower priority.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> preempt [delay minimum <value(0-30)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
delay minimum	Keyword for a period of time	-
value	Time after which the new Master router sends its VRRP packet.	0 ... 30

Result

The function is enabled.

Further notes

You enable routing with VRRP with the `router vrrp` command.

You disable the function with the `no vrrp preempt` command.

You can display the status of the function with the `show vrrp interface - vrid` or with the `show vrrp interface` command.

9.4.4.5 no vrrp preempt

Description

With this command, you specify that a router cannot take over the master role from a router with lower priority. The master role is adopted only if the current master router fails.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> preempt
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The function is disabled.

Further notes

You configure a VRRP interface with the `interface` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

You enable the function with the `vrrp preempt` command.

You can display the status of the function with the `show vrrp interface - vrid` or with the `show vrrp interface` command.

9.4.4.6 vrrp primary-ip

Description

With this command, you specify the primary IPv4 address specified with the VRRP packets as the source address.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> primary-ip <ip_addr>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ip_addr	Value for an IPv4 address	Enter a valid IPv4 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The primary IPv4 address is specified.

Further notes

You configure a VRRP interface with the `interface` command.

You remove the primary IPv4 address with the `no vrrp primary-ip` command.

You show the configuration of the virtual router with the `show vrrp interface - vrid` command.

9.4.4.7 no vrrp primary-ip

Description

With this command, you remove an IPv4 address from the virtual router.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> ipv4 <uicast_addr > [secondary]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
uicast_addr	Value for an IPv4 unicast address	Enter a valid IPv4 unicast address.
secondary	Secondary IP addresses	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IPv4 address is removed from the virtual router.

Further notes

You configure a VRRP interface with the `interface` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

You display the IPv4 addresses with the `show vrrp interface - vrid` command.

9.4.4.8 vrrp priority

Description

With this command, you specify the priority of the virtual router. The current master router is automatically given 255. All other priorities can be distributed freely among the VRRP routers. The higher the priority, the earlier the VRRP router becomes "Master".

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> priority <priority(1-254)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
priority	Priority of the virtual router	1 ... 254 Default: 1

Result

The priority of the virtual router is specified.

Further notes

You configure a VRRP interface with the `interface` command.

You reset the priority to the default with the `no vrrp priority` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

You display the priority with the `show vrrp interface - vrid` command.

9.4.4.9 no vrrp priority

Description

With this command, you reset the router priority back to the default value.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> priority
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The priority is reset.

Further notes

You configure a VRRP interface with the `interface` command.

You create the priority with the `vrrp priority` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

You display the priority with the `show vrrp interface - vrid` command.

9.4.4.10 vrrp text-authentication

Description

With this command, you specify that VRRP packets are authenticated using an unencrypted password. If an incoming VRRP packet contains an invalid password, it is discarded.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> text-authentication <password>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
password	Password	Enter a password. Maximum length: 8 characters

Result

The authentication is enabled.

Further notes

You configure a VRRP interface with the `interface` command.

You disable the authentication with the `no vrrp text-authentication` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

9.4.4.11 no vrrp text-authentication

Description

Was this command, you specify that VRRP packets are not authenticated.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> text-authentication
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The authentication is disabled.

Further notes

You configure a VRRP interface with the `interface` command.

You enable the authentication with the `vrrp text-authentication` command.

You assign IPv4 addresses to a virtual router with the `vrrp associated-ip` command.

9.4.4.12 vrrp timer

Description

With this command, you specify the time interval after which a virtual router with the "Master" status sends an advertisement packet again.

Note

This command is available only with layer 3.

Requirement

- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode .The command prompt is:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> timer <interval(1-255)secs>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
interval	Time interval in seconds	1 ... 255 Default: 1 s

Result

The time interval is specified

Further notes

You configure a VRRP interface with the `interface` command.

You enable routing with VRRP with the `router vrrp` command.

You reset the time interval to the default with the `no vrrp timer` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You show the interval with the `show vrrp interface - vrid` command.

9.4.4.13 no vrrp timer

Description

With this command, you reset the time interval to the default value.

Note

This command is available only with layer 3.

Requirement

- Routing with VRRP is enabled.
- An IPv4 address is assigned to the virtual router.
- You are in the VRRP Interface configuration mode
.The command prompt is:

```
cli (config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> timer
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The time interval is reset.

Further notes

- You configure a VRRP interface with the `interface` command.
- You enable routing with VRRP with the `router vrrp` command.
- You configure the interval with the `vrrp timer` command.
- You assign IPv4 addresses to a virtual router with the `vrrp ipv4` command.
- You show the interval with the `show vrrp interface - vrid` command.

9.4.4.14 vrrp track decrement

Description

With this command you assign a VRRP interface to an interface tracking and configure the value by which the priority is reduced.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> track <group-index> decrement <integer(1-254)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
group-index	ID of the interface tracking	-
integer	Value by which priority of the VRRP interface will be reduced	1 ... 254

Result

A VRRP interface is assigned to interface tracking. The value by which the priority will be reduced is defined.

Further notes

You delete the configuration with the `no vrrp track` command.

You display the assignment and value of the priority with the command `show vrrp interface` or `show vrrp interface - vrid` with the parameter `detail`.

You configure the tracking of interfaces with the `track interface` command.

9.4.4.15 no vrrp track decrement

Description

With this command, you delete the assignment of interface tracking to a VRRP interface and the value by which the priority is reduced..

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-if)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> track
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The assignment and the value by which the priority will be reduced is defined are deleted.

Further notes

You assign a VRRP interface to an interface tracking and configure the value by which the priority is reduced with the command `no vrrp track`.

You display the assignment and value of the priority with the command `show vrrp interface` or `show vrrp interface - vrid` with the parameter `detail`.

9.5 VRRPv3 (IPv4 / IPv6)

This section describes the commands relevant for working with routing with VRRPv3. Version 3 of VRRP is based on version 2.

Note

- Enable routing to be able to use VRRPv3.
 - The commands are only available with layer 3 and only in conjunction with VLAN interfaces. Router ports are not supported.
 - Simultaneous operation of VRRP and VRRPv3 is not possible.
 - VRRPv3 supports IPv4 and IPv6. Both can be configured and operated at the same time with VRRP3.
-

VRRP and DHCP server

If you want to operate a DHCP server on the devices of a VRRP group, the DHCP server must be configured on the master router. Backup routers do not react to DHCP queries. Make sure that the master router is statically configured and that after a failure, becomes the master of the VRRP group again.

9.5.1 clear vrrp3 statistics

Description

With this command, you reset the counters to zero.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameter assignment:

```
clear vrrp3 statistics
```

Result

The counters are reset.

Further notes

You display the table with the commands `show vrrp3 interface` and `show vrrp3 interface - vrid`.

9.5.2 The "show" commands

This section describes commands with which you display various settings.

9.5.2.1 show vrrp3

Description

This command shows the settings of a virtual router.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show vrrp3 [interface vlan <vlan-id(1-4094)> <VrId(1-255)>]  
[ {brief|detail|statistics} ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
VrId	ID of the virtual router	1 ... 255
brief	shows brief information on VRRP	-
detail	shows detailed information on VRRP.	-
statistics	shows the statistics of the VRRP protocol	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings of the virtual router are displayed.

9.5.2.2 show vrrp3 interface

Description

This command shows the settings of VRRP3 for the interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show vrrp3 interface [vlan <vlan-id(1-4094)>] [{brief|detail|statistics}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
VlanId	Number of the addressed VLAN	1 ... 4094
brief	shows brief information on VRRP	-
detail	shows detailed information on VRRP.	-
statistics	shows the statistics of the VRRP protocol	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The settings for the interface are displayed.

9.5.2.3 show vrrp3 track

Description

With this command, you display the configured interface tracking.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```


Syntax

Call the command without parameter assignment:

```
show vrrp3 track
```

Result

The configured interface tracking is displayed.

9.5.3 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.5.3.1 router vrrp3

Description

With this command, you enable routing with VRRPv3 and change to the VRRP3 Router configuration mode.

Note

This command is available only with layer 3.

Requirement

- IPv6 routing is enabled.
- You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
router vrrp3
```

Result

Routing with VRRP3 is enabled.

You are now in the VRRP3 Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3)#
```

Further notes

You disable routing with VRRP with the `no router vrrp3` command.

You enable IPv6 routing with the `ipv6 unicast-routing` command.

You configure an IPv6 address for the interface with the `ipv6 address` command.

9.5.3.2 no router vrrp3

Description

With this command, you disable routing with VRRPv3.

Note

This command is available only with layer 3.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no router vrrp3
```

Result

Routing with VRRPv3 is disabled.

Further notes

You enable routing with VRRPv3 with the `router vrrp3` command.

9.5.4 Commands in the VRRP3 Router configuration mode

This section describes commands that you can call up in the VRRP3 Router configuration mode.

In the Global configuration mode, enter the `router vrrp3` command to change to this mode.

- If you exit the VRRP3 Router configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the VRRP3 Router configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.5.4.1 interface

Description

With this command, you decide the interface for which you want to assign parameters in the VRRP3 Router configuration mode.

There you can edit the settings for a VRRP3 interface. You select the VRRP3 interface with the parameters of this command.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
interface vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

You are now in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Further notes

You exit the VRRP3 Interface configuration mode with the `end` or `exit` command.

You delete a VRRP3 interface with the `no interface` command.

You display the status and the configuration of the VRRP3 interfaces with the `show vrrp3` or `show vrrp3 interface` command.

9.5.4.2 no interface

Description

With this command, you delete a VRRP3 interface.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
no interface vlan <vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The VRRP3 interface has been deleted.

Further notes

You configure a VRRP3 interface with the `interface` command.

You display the status and the configuration of the VRRP3 interface with the `show vrrp3` or `show vrrp3 interface` command.

9.5.4.3 track interface

Description

With this command, you configure the tracking of interfaces.

When the link of one or more tracked interfaces changes from "up" to "down", the priority of the assigned VRRP interface is reduced. When the link of the interface changes back from "down" to "up", the original priority of the VRRP interface is restored.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
track <group-index> interface { vlan <vlan-id (1-4094)> | <interface-type>  
<interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The selected interface is monitored.

Further notes

You delete an interface tracking with the `no interface interface` command.

You display the configured interface tracking with the `show vrrp track` command.

You assign a VRRP interface to an interface tracking with the `vrrp track decrement` command.

You configure the value by which the priority is reduced with the command `vrrp track decrement`.

With the `track links` command you configure how many of the monitored interfaces need to change their status before the priority of the assigned VRRP interface is changed.

9.5.4.4 no track interface

Description

With this command, you delete the tracking of interfaces.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
no track <group-index> interface { vlan <vlan-id (1-4094)> | <interface-type>
<interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
vlan	Keyword for a VLAN connection	-

Parameter	Description	Range of values / note
vlan-id	Number of the addressed VLAN	1 ... 4094
interface-type	Type of interface	Specify a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

Interface tracking is deleted.

Further notes

You configure an interface tracking with the `track interface` command.

You display the configured interface tracking with the `show vrrp track` command.

9.5.4.5 track links

Description

With this command you define how many tracked interfaces need to change to the "down" status, before the priority of the assigned VRRP interface is changed.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
track <group-index> links <links-to-track(1-255)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-
links-to-track	Number of interfaces	1 ... 255

Result

The number of tracked interfaces is defined.

Further notes

You delete the configuration with the `no track links` command.

You configure the tracking of interfaces with the `track interface` command.

You display the configured number of tracked interfaces with the `show vrrp track` command.

9.5.4.6 no track links

Description

With this command, you delete the the number of tracked interfaces.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call up the command with the following parameters:

```
no track <group-index> links
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
group-index	ID of the interface tracking	-

Result

The number of tracked interfaces is deleted.

Further notes

You configure the number of tracked interfaces with the `track links` command.

You display the configured number of tracked interfaces with the `show vrrp track` command.

9.5.4.7 vrrp virtual-ping

Description

With this command, you enable the ping function to virtual IPv4 addresses.

Requirement

You are in the VRRP3 Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3)#
```

Syntax

Call the command without parameter assignment:

```
vrrp virtual-ping
```

Result

The ping function to virtual IPv4 addresses is enabled.

Further notes

You disable the ping function for virtual IPv4 addresses with the `no vrrp virtual-ping` command.

You display the status and the configuration of the VRRP3 interfaces with the `show vrrp3` command.

9.5.4.8 no vrrp virtual-ping

Description

With this command, you disable pings to virtual IPv4 addresses.

Requirement

You are in the VRRP3 Router configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3)#
```

Syntax

Call the command without parameter assignment:

```
no vrrp virtual-ping
```

Result

The function for pings to virtual IPv4 addresses is disabled.

Further notes

You enable the ping function for virtual IPv4 addresses with the `vrrp virtual-ping` command.

You display the status and the configuration of the VRRP3 interfaces with the `show vrrp3` command.

9.5.4.9 vrrp vrid-track

Description

With this command, you enable VRID tracking.

When enabled, all interfaces of a VRID are monitored. When the link of an interface changes from "up" to "down", the priority of all VRRP interfaces with the same VRID is reduced to the value "0".

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call the command without parameter assignment:

```
vrrp vrid-track
```

Result

VRID tracking is enabled.

Further notes

You disable VRID tracking with the `no vrrp vrid-track` command.

You display configured VRID trackings with the command `show vrrp3` or `show vrrp3 interface` with the parameter `detail`.

9.5.4.10 no vrrp vrid-track

Description

With this command, you disable VRID tracking.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Router configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3)#
```

Syntax

Call the command without parameter assignment:

```
no vrrp vrid-track
```

Result

VRID tracking is disabled.

Further notes

You enable VRID tracking with the `vrrp vrid-track` command.

You display configured VRID trackings with the command `show vrrp3` or `show vrrp3 interface` with the parameter `detail`.

9.5.5 Commands in the Interface Configuration mode

This section describes commands that you can call up in the Interface configuration mode.

Note

The commands are only available with layer 3 and only in conjunction with VLAN interfaces. Router ports are not supported.

In the VRRP3 Router configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the VRRP3 Router configuration mode can be found in the relevant sections.

- If you exit the VRRP3 Router configuration mode with the `exit` command, you return to the Interface configuration mode.
- If you exit the VRRP3 Router configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.5.5.1 vrrp accept-mode

Description

With this command, you enable the ping function for virtual IPv6 addresses on the VRRP3 interface.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> accept-mode
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The ping function to virtual IPv6 addresses is enabled.

Further notes

You disable the ping function for virtual IPv6 addresses with the `no vrrp accept-mode` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You can display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.2 no vrrp accept-mode

Description

With this command, you disable the ping function for virtual IPv6 addresses on the VRRP3 interface.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> accept-mode
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The ping function to virtual IPv6 addresses is disabled.

Further notes

You configure a VRRP3 interface with the `interface` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You enable the ping function for virtual IPv6 addresses with the `vrrp accept-mode` command.

You can display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.3 vrrp associated-ip

Description

With this command, you specify which IP addresses the virtual router monitors.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> associated-ip [{ ipv4 <ip_addr> | ipv6 <ip6_addr> }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ipv4	Keyword for IPv4 address	-
ip_addr	IPv4 address	Enter a valid IPv4 address.
ipv6	Keyword for IPv6 address	-
ip6_addr	IPv6 address	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP addresses are specified.

Further notes

You can create a maximum of 52 virtual IPv4/IPv6 addresses.

You configure a VRRP3 interface with the `interface` command.

You remove an IP address with the `no vrrp associated-ip` command.

You display the IP addresses with the `show vrrp3` command.

9.5.5.4 no vrrp associated-ip

Description

With this command, you remove an IP address from the virtual router.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3-if-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> associated-ip [{ ipv4 <ip_addr> | ipv6 <ip6_addr> }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ipv4	Keyword for IPv4 address	-
ip_addr	IPv4 address	Enter a valid IPv4 address.
ipv6	Keyword for IPv6 address	-
ip6_addr	IPv6 address	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP address is removed from the virtual router.

Further notes

You configure a VRRP3 interface with the `interface` command.

You display the IP addresses with the `show vrrp` command.

9.5.5.5 vrrp compatible-mode

Description

With this command, you enable compatibility with VRRPv2. For configured IPv4 addresses, when enabled, the VRRP router sends and receives VRRPv2 frames in addition to VRRPv3 frames. Only necessary when not all VRRP routers support VRRPv3.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> compatible-mode
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The compatibility is enabled.

Further notes

You enable routing with VRRP3 with the `router vrrp3` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You disable the compatibility with the `no vrrp compatible-mode` command.

You can display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.6 no vrrp compatible-mode

Description

With this command, you disable compatibility with VRRPv2. The VRRP router can only send and receive VRRP packets of version 3.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3-if-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> compatible-mode
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The compatibility is disabled.

Further notes

You configure a VRRP3 interface with the `interface` command.

You assign IPv4 / IPv6 addresses to a virtual router with the `vrrp associated-ip` command.

You enable the compatibility with the `vrrp compatible-mode` command.

You can display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.7 vrrp preempt

Description

With this command, you specify that a router with higher priority can take over the master role from a router with lower priority.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> preempt
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
delay minimum	Keyword for a period of time	-

Result

The function is enabled.

Further notes

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You enable routing with VRRP3 with the `router vrrp` command.

You disable the function with the `no vrrp preempt` command.

You can display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.8 no vrrp preempt

Description

With this command, you specify that a router cannot take over the master role from a router with lower priority. The master role is adopted only if the current master router fails.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> preempt
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The function is disabled.

Further notes

You configure a VRRP3 interface with the `interface` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You enable the function with the `vrrp preempt` command.

You display the status of the function with the `show vrrp3` or with the `show vrrp3 interface` command.

9.5.5.9 vrrp primary-ip

Description

With this command, you specify the primary IP address specified with the VRRP3 packets as the source address.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> primary-ip [{ ipv4 <ip_addr> | ipv6 <ip6_addr> }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ipv4	Keyword for IPv4 address	-
ip_addr	IPv4 address	Enter a valid IPv4 address.
ipv6	Keyword for IPv6 address	-
ip6_addr	IPv6 address	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The primary IP address is specified.

Further notes

You configure a VRRP3 interface with the `interface` command.

You remove the primary IP address with the `no vrrp primary-ip` command.

You show the configuration of the virtual router with the `show vrrp3` command.

9.5.5.10 no vrrp primary-ip

Description

With this command, you remove a primary IP address from the virtual router.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3-if-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> primary-ip [{ ipv4 <ip_addr> | ipv6 <ip6_addr> }]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
ipv4	Keyword for IPv4 address	-
ip_addr	IPv4 address	Enter a valid IPv4 address.
ipv6	Keyword for IPv6 address	-
ip6_addr	IPv6 address	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The primary IP address is removed from the virtual router.

Further notes

You configure a VRRP3 interface with the `interface` command.

You assign a primary IP address to a virtual router with the `vrrp primary-ip` command.

You display the IP addresses with the `show vrrp3` command.

9.5.5.11 vrrp priority

Description

With this command, you specify the priority of the virtual router. The current master router is automatically given 255. All other priorities can be distributed freely among the VRRP routers. The higher the priority, the earlier the VRRP router becomes "Master".

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> priority <priority(1-254)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
priority	Priority of the virtual router	1 ... 254 Default: 1

Result

The priority of the virtual router is specified.

Further notes

You configure a VRRP3 interface with the `interface` command.

You reset the priority to the default with the `no vrrp priority` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You display the priority with the `show vrrp3` command.

9.5.5.12 no vrrp priority

Description

With this command, you reset the router priority back to the default value.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> priority
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The priority is reset.

Further notes

You configure a VRRP3 interface with the `interface` command.

You create the priority with the `vrrp priority` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You display the priority with the `show vrrp3` command.

9.5.5.13 vrrp timer

Description

With this command, you specify the time interval after which a virtual router with the "Master" status sends an advertisement packet again.

Note

This command is available only with layer 3.

Requirement

- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> timer <interval(10-4095)centiseconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
interval	Time interval in hundredths of seconds	10 ... 4095 Default: 10

Result

The time interval is specified.

Further notes

You configure a VRRP3 interface with the `interface` command.

You enable routing with VRRP3 with the `router vrrp3` command.

You reset the time interval to the default with the `no vrrp timer` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You show the interval with the `show vrrp3` command.

9.5.5.14 no vrrp timer

Description

With this command, you reset the time interval to the default value.

Note

This command is available only with layer 3.

Requirement

- Routing with VRRP3 is enabled.
- An IP address is assigned to the virtual router.
- You are in the VRRP3 Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> timer <interval(50-4095)centiseconds>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
interval	Time interval in hundredths of seconds	50 ... 4095

Result

The time interval is reset.

Further notes

You configure a VRRP3 interface with the `interface` command.

You enable routing with VRRP3 with the `router vrrp3` command.

You configure the interval with the `vrrp timer` command.

You assign IP addresses to a virtual router with the `vrrp associated-ip` command.

You show the interval with the `show vrrp3` command.

9.5.5.15 vrrp track decrement

Description

With this command you assign a VRRP interface to an interface tracking and configure the value by which the priority is reduced.

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli(config-vrrp-v3-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
vrrp <vrid(1-255)> track <group-index> decrement <integer(1-254)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255
group-index	ID of the interface tracking	-
integer	Value by which priority of the VRRP interface will be reduced	1 ... 254

Result

A VRRP interface is assigned to interface tracking. The value by which the priority will be reduced is defined.

Further notes

You delete the configuration with the `no vrrp track` command.

You display the assignment and value of the priority with the command `show vrrp` or `show vrrp interface` with the parameter `detail`.

You configure the tracking of interfaces with the `track interface` command.

9.5.5.16 no vrrp track decrement

Description

With this command, you delete the assignment of interface tracking to a VRRP interface and the value by which the priority is reduced..

Note

This command is available only with layer 3.

Requirement

You are in the VRRP Interface configuration mode.

The command prompt is as follows:

```
cli (config-vrrp-v3-if-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no vrrp <vrid(1-255)> track
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
vrid	ID of the virtual router	1 ... 255

Result

The assignment and the value by which the priority will be reduced is defined are deleted.

Further notes

You assign a VRRP interface to an interface tracking and configure the value by which the priority is reduced with the command `no vrrp track`.

You display the assignment and value of the priority with the command `show vrrp` or `show vrrp interface` with the parameter `detail`.

9.6 RIPv2 (IPv4)

This section describes the commands relevant for working with routing with RIPv2.

RIPv2 is only used with IPv4 and is defined in RFC 2453. It is based on the distance vector algorithm of Bellman-Ford.

RIPv2 uses the UDP port 520.

9.6.1 show ip rip

Description

This command shows the RIP information.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip rip {database [<ip-address> <mask>] | statistic }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
database	The information of the RIP database is displayed.	-
ip-address	The destination address of the route for which information is displayed.	Specify a valid IP address.
mask	The subnet mask of this route.	Enter a valid subnet mask.
statistic	Statistical information is displayed, for example the number of updates.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The database or statistical information is displayed.

9.6.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

Note

These commands are available only with layer 3.

9.6.2.1 router rip

Description

With this command, you enable the RIP protocol and change to the Router configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameter assignment:

```
router rip
```

Result

Routing with RIP is enabled.

You are now in the Router configuration mode.

The command prompt is as follows:

```
cli (config-rip) #
```

Further notes

You disable the RIP protocol with the `no router rip` command.

9.6.2.2 no router rip

Description

With this command, you disable the RIP protocol.

Note

This command is available only in layer 3 (IPv4).

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no router rip
```

Result

Routing with RIP is disabled.

Further notes

You enable the RIP protocol with the `router rip` command.

9.6.3 Commands in the RIPv2 Router configuration mode

This section describes commands that you can call up in the RIPv2 Router configuration mode.

In the Global configuration mode, enter the `router rip` command to change to this mode.

- If you exit the RIPv2 Router configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the RIPv2 Router configuration mode with the `end` command, you return to the Privileged EXEC mode.

Note

These commands are available only with layer 3.

9.6.3.1 auto-summary

Description

This command automatically summarizes routing information according to IP classes. When possible, subnets are summarized according to classes (A, B or C) and entered as single routes. As default, this function is enabled.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli (config-rip) #
```

Syntax

Call the command without parameter assignment:

```
auto-summary
```

Result

Subnets are entered in the routing table summarized as class A, B or C networks.

9.6.3.2 no auto-summary

Description

This command disables the automatic summarizing of routing information.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli (config-rip) #
```

Syntax

Call the command without parameter assignment:

```
no auto-summary
```

Result

Subnets are not summarized according to classes.

9.6.3.3 distance

Description

With this command, you specify the administrative distance for the RIP protocol. This value is taken into account if routing information is learned from different routing protocols.

The lowest value for the administrative distance "1" means the highest reliability of the routing information. Routing information from a system with the value "255" is so unreliable that it is not learnt by the neighbor routers.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
distance dist<1-255> [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
dist	The value for the administrative distance.	1 ... 255 Default: 120
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters.

Result

The value for the administrative distance is set.

Further notes

You reset the administrative distance to the default with the `no distance` command.

9.6.3.4 no distance

Description

This command resets the administrative distance to the default (120).

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
no distance [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters.

Result

The value for the administrative distance is reset.

Further notes

You specify the administrative distance with the `distance` command.

9.6.3.5 distribute-list route-map

Description

This command enables the filtering of the routing information according to a route map for incoming or outgoing routing information.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
distribute-list route-map <name(20)> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	Incoming routing information is filtered.	-
out	Outgoing routing information is filtered.	-

Result

The filtering is enabled.

9.6.3.6 no distribute-list route-map

Description

This command disables the filtering of the routing information according to a route map for incoming or outgoing routing information.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
no distribute-list route-map <name(20)> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	The filtering for incoming routing information is disabled.	-
out	The filtering for outgoing routing information is disabled.	-

Result

The filtering is disabled.

9.6.3.7 network

Description

This command enables the RIP protocol for an IP interface.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli (config-rip) #
```

Syntax

Call up the command with the following parameters:

```
network <ip-address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip-address	The IP address for which RIP will be enabled.	Specify a valid IP address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

RIP is enabled for the specified IP interface.

9.6.3.8 no network

Description

This command disables the RIP protocol for an IP interface.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli (config-rip) #
```

Syntax

Call up the command with the following parameters:

```
no network <ip-address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
ip-address	The IP address for which RIP will be disabled.	Specify a valid IP address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

RIP is disabled for the specified IP interface.

9.6.3.9 redistribute

Description

This command specifies which route information is forwarded by RIP.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
redistribute {all | default | connected | ospf | static} [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
all	All available route information is distributed.	-
default	Default routes are distributed.	-
connected	Routing information of local subnets (IP interfaces) is distributed for which RIP is not configured.	-
ospf	Routes learned by OSPF are distributed.	-
static	Static routes are distributed.	-
route-map	Keyword for a route map.	-
name	Name of the route map.	Maximum of 20 characters

Result

The information forwarded by RIP has been specified.

9.6.3.10 no redistribute

Description

This command specifies which route information is not forwarded by RIP.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
no redistribute {all | default | connected | ospf | static} [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
all	The forwarding of route information is disabled for all protocols.	-
default	Default routes are not forwarded.	-
connected	Route information of local subnets is not forwarded.	-
ospf	No routes learned by OSPF are distributed.	-
static	No static routes are forwarded.	-
route-map	Keyword for a route map.	-
name	Name of the route map.	Maximum of 20 characters

Result

In certain cases, forwarding of routing information is disabled.

9.6.3.11 version

Description

With this command, you specify which version the RIP protocol uses to send and receive routing information.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
version <1 | 2 | 12 | none>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
1	Only routing information corresponding to RIPv1 (RFC 1058) is evaluated and sent.	Routing information is only distributed and received using broadcasts.
2	Only routing information corresponding to RIPv2 (RFC 2453) is evaluated and sent.	Routing information is only distributed and received using multicasts (224.0.0.9).
12	Only routing information corresponding to RIPv1 and RIPv2 is evaluated and sent.	Routing information is distributed and received using broadcasts and multicasts (224.0.0.9). Default setting
none	There is no processing of routing information using RIP.	-

Result

It has been specified which RIP packets will be processed.

9.6.3.12 no version

Description

The updating of route information is according to RIPv1 or RIPv2 (default for this parameter)

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call the command without parameter assignment:

```
no version
```

Result

Both RIPv1 and RIPv2 packets are processed.

9.6.3.13 output-delay

Description

With this command, you configure the delayed forwarding of RIP updates.

Requirement

You are in the RIPv2 Router configuration mode.

The command prompt is as follows:

```
cli(config-rip)#
```

Syntax

Call up the command with the following parameters:

```
output-delay <milli-seconds (8-50)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
milli-seconds	Delay in milliseconds.	8 ... 50

Result

RIP updates are forwarded only after the set delay.

9.6.4 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

Note

These commands are available only with layer 3.

9.6.4.1 ip rip default route originate

Description

This command enables the forwarding of a default route.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip rip default route originate <metric(1-15)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
metric	Value for the metric information.	1 ... 15

Result

The default route is forwarded.

9.6.4.2 no ip rip default route originate

Description

This command disables the distribution of the default routes.

Requirement

- The interface is an IPv4 interface.
 - You are in the Interface configuration mode
- The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameters:

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

Result

No default route is forwarded.

9.6.4.3 ip rip receive version

Description

This command specifies the RIP version for incoming routing information.

Requirement

- The interface is an IPv4 interface.
 - You are in the Interface configuration mode
- The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip rip receive version (1 | 2 | 12 | none)
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
1	Only RIPv1 updates are received.	-
2	Only updates to RIPv2 are received.	-
12	Updates that correspond to RIPv1 or RIPv2 are received.	-
none	No RIP updates are received.	-

Result

It has been specified which RIP version incoming updates need to have.

9.6.4.4 no ip rip receive version

Description

This command specifies that there is no restriction relating to the version of received RIP updates. Updates according to RIPv1 and RIPv2 are received.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config-if-$$) #
```

Syntax

Call the command without parameters:

```
no ip rip receive version
```

Result

All RIP updates are received.

9.6.4.5 ip rip send version

Description

This command specifies the RIP version for outgoing routing information.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli (config-if-$$) #
```

Syntax

Call up the command with the following parameters:

```
ip rip send [demand] version (1 | 2 | 12 | none)
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
demand	Updates are sent only when requested.	-
1	Only RIPv1 updates are sent.	-
2	Only RIPv2 updates are sent.	-
12	RIPv1 and RIPv2 updates are sent.	-
none	No RIP updates are sent.	-

Result

It has been specified which RIP version outgoing updates need to have.

9.6.4.6 no ip rip send version

Description

This command specifies that there is no restriction relating to the version of outgoing RIP updates. Updates according to RIPv1 and RIPv2 are sent.

Requirement

- The interface is an IPv4 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameters:

```
no ip rip send version
```

Result

All RIP updates are sent.

9.7 RIPng (IPv6)

This section describes the commands relevant for working with routing with RIPng.

RIPng (RIP next generation) is only used with IPv6 and is defined in RFC 2080. As with RIP (IPv4), RIPng is based on the distance vector algorithm of Bellman-Ford.

In contrast to RIPv2, RIPng is activated directly on the interface (VLAN interface / router port) and not on the entire device.

RIPng uses the UDP port 521 and RIP the UDP port 520.

9.7.1 The "show" commands

This section describes commands with which you display various settings.

9.7.1.1 show ipv6 rip

Description

This command shows the information of the RIP database.

Requirement

- Routing with RIPng is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ipv6 rip [database]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
database	The information of the RIP database is displayed.	-

Result

The information of the RIP database is displayed.

Further notes

You enable routing with RIP with the `ipv6 router rip` command.

9.7.1.2 show ipv6 rip filter

Description

This command shows the configured filters.

Requirement

- Routing with RIPng is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 rip filter
```

Result

The configured SNMP filters are displayed.

9.7.1.3 show ipv6 rip peer-table-status

Description

This command shows the peer status information

Requirement

- Routing with RIPng is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 rip peer-table-status
```

Result

The information is displayed.

9.7.1.4 show ipv6 rip peer-trig-update-interval

Description

This command shows the configured timers.

Requirement

- Routing with RIPng is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 rip peer-trig-update-interval
```

Result

The information is displayed.

9.7.1.5 show ipv6 rip stats

Description

This command shows statistical information, e.g. the number of updates.

Requirement

- Routing with RIPng is enabled.
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ipv6 rip stats
```

Result

The information is displayed.

9.7.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.7.2.1 ipv6 router rip

Description

With this command, you enable RIPng routing on the device change to the Router configuration mode.

Note

This command is available only with layer 3 (IPv6).

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 router rip
```

Result

Routing with RIPng is enabled.

You are now in the RIPng router configuration mode.

The command prompt is as follows:

```
cli (config-ripng)#
```

Further notes

You disable routing with RIPng with the `no ipv6 router rip` command.

You display the setting and other information with the `show ipv6 rip` command.

9.7.2.2 no ipv6 router rip

Description

With this command, you enable RIPng routing on the device.

Note

This command is available only with layer 3 (IPv6).

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 router rip
```

Result

Routing with RIPng is disabled.

Further notes

You enable routing with RIP with the `ipv6 router rip` command.

You display the setting and other information with the `show ipv6 rip` command.

9.7.3 Commands in the RIPng Router configuration mode

This section describes commands that you can call up in the Router Configuration mode.

In the global configuration mode, enter the `ipv6 router rip` command to change to this mode.

Commands relating to other topics that can be called in the Global Configuration mode can be found in the relevant sections.

- If you exit the Router Configuration mode with the `exit` command, you return to the Global Configuration mode.
- If you exit the Router Configuration mode with the `end` command, you return to the Privileged EXEC mode.

Requirement

- The device supports the routing function
- IPv6 and IPv6 routing is activated.

Note

These commands are available only with layer 3.

9.7.3.1 distance

Description

With this command, you specify the administrative distance for the RIP protocol. This value is taken into account if routing information is learned from different routing protocols.

The lowest value for the administrative distance "1" means the highest reliability of the routing information. Routing information from a system with the value "255" is so unreliable that it is not learnt by the neighbor routers.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
distance dist<1-255> [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
dist	The value for the administrative distance.	1 ... 255 Default: 120
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters.

Result

The value for the administrative distance is set.

Further notes

You reset the administrative distance to the default with the `no distance` command.

9.7.3.2 no distance

Description

With this command, you reset the administrative distance back to the default value.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
no distance [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
route-map	Keyword for a route map	-
name	Name of the route map	Maximum of 20 characters.

Result

The value for the administrative distance is reset.

Further notes

You specify the administrative distance with the `distance` command.

9.7.3.3 distribute prefix

Description

This command enables the filtering of the routing information according to an IPv6 address for incoming or outgoing routing information.

Note

This command is available only with layer 3.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
distribute prefix <ip6_addr> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Values
ip6_addr	IPv6 address	enter a valid IPv6 address
in	Incoming routing information is filtered.	-
out	Outgoing routing information is filtered.	-

Result

Filtering is enabled.

Further notes

You disable filtering with the `no distribute prefix` command.

You display the configured filters with the `show ipv6 rip filter` command.

9.7.3.4 no distribute prefix

Description

This command disables the filtering of the routing information according to an IPv6 address for incoming or outgoing routing information.

Note

This command is available only with layer 3.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
no distribute prefix <ip6_add> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Values
ip6_add	IPv6 address	Enter a valid IPv6 address
in	The filtering for incoming routing information is disabled.	-
out	The filtering for outgoing routing information is disabled.	-

Result

Filtering is disabled.

Further notes

You enable filtering with the `distribute prefix` command.

You display the configured filters with the `show ipv6 rip filter` command.

9.7.3.5 distribute-list route-map

Description

This command enables the filtering of the routing information according to a route map for incoming or outgoing routing information.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
distribute-list route-map <name(20)> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	Incoming routing information is filtered.	-
out	Outgoing routing information is filtered.	-

Result

The filtering is enabled.

9.7.3.6 no distribute-list route-map

Description

This command disables the filtering of the routing information according to a route map for incoming or outgoing routing information.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
no distribute-list route-map <name(20)> {in | out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the routing table.	Maximum of 20 characters.
in	The filtering for incoming routing information is disabled.	-
out	The filtering for outgoing routing information is disabled.	-

Result

The filtering is disabled.

9.7.3.7 redistribute

Description

With this command you specify which route information is forwarded by RIP.

Note

This command is available only with layer 3.

Requirement

You are in the RIP router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
redistribute {static|connected|ospf} metric <integer(0-16)> [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
default	Default routes are distributed.	-
connected	Route information of local subnets (IP interfaces) is distributed for which RIP is not configured.	-

Parameter	Description	Range of values / note
ospf	Routes learned by OSPF are distributed.	-
static	Static routes are distributed.	-
metric	Keyword for the metric of the external standard route.	-
integer	Value of the metric (hop counter)	0 ... 16 15 longest possible distance 16: unreachable
route-map	Keyword for a route map.	-
name	Name of the route map.	Maximum of 20 characters

Result

The information forwarded by RIP has been specified.

Further notes

You disable the forwarding with the `no redistribute` command.

You display the setting and other information with the `show ipv6 rip` command.

9.7.3.8 no redistribute

Description

This command specifies which route information is not forwarded by RIP.

Note

This command is available only with layer 3.

Requirement

You are in the RIPng router configuration mode.

The command prompt is as follows:

```
cli(config-ripng)#
```

Syntax

Call up the command with the following parameters:

```
no redistribute {default | connected | ospf | static} [route-map <name(20)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
default	Default routes are not forwarded.	-
connected	Route information of local subnets is not forwarded.	-
ospf	No routes learned by OSPF are forwarded.	-
static	No static routes are forwarded.	-
route-map	Keyword for a route map.	-
name	Name of the route map.	Maximum of 20 characters

Result

In certain cases, forwarding of routing information is disabled.

Further notes

You enable the forwarding with the `no redistribute metric` command.

You display the setting and other information with the `show ipv6 rip` command.

9.7.4 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

Note

These commands are available only with layer 3.

9.7.4.1 ipv6 rip default-information originate

Description

With this command you enable the function that an IPv6 standard route is generated in the IPv6 routing table via this interface for routes from the local RIP database.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 rip default-information originate
```

Result

The function is enabled.

Further notes

You disable the function with the `no ipv6 rip default-information originate` command.

You display the IPv6 routing table with the `show ipv6 route` command.

9.7.4.2 no ipv6 rip default-information

Description

With this command you disable the function that a standard route is generated in the IPv6 routing table for routes from the local RIP database.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 rip default-information
```

Result

The function is disabled.

Further notes

You enable IPv6 with the `ipv6 enable` command.

You enable the function with the `ipv6 rip default-information originate` command.

9.7.4.3 ipv6 rip

Description

This command enables RIPng routing on the interface.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
ipv6 rip
```

Result

RIPng routing is enabled.

Further notes

You display this setting and other information with the `show ipv6 rip` command.

You disable RIP routing with the `no ipv6 rip` command.

9.7.4.4 no ipv6 rip

Description

This command disables RIPng routing on the interface.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no ipv6 rip
```

Result

RIPng routing is enabled.

Further notes

You display this setting and other information with the `show ipv6 rip` command.

You enable RIP routing with the `ipv6 rip` command.

9.7.4.5 ipv6 rip metric-offset

Description

As default, the metric increases by 1 (metric offset) with incoming RIPng routes. With this command, you can specify a different offset. The RIPng route is further distributed with the new metric.

Note

This command is available only with layer 3.

Requirement

- The interface is an IPv6 interface.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ipv6 rip metric-offset <integer (1-15)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
integer	Metric offset	1 ... 15 Default: 1

Result

The metric offset is configured.

9.8 Route maps (IPv4 / IPv6)

This section describes the commands relevant for working with route maps.

With route maps, you control how routing information is further processed. You can filter routing information and specify whether the information is further processed, modified or discarded.

Route maps operate according to the following principle:

- Routing information is compared with the filters of the route maps.
- The comparison is continued until the filters of a route map match the properties of an item of information.
- The information is then processed according to the route map settings:
 - The routing information is discarded.
 - The properties of the routing information are changed.

9.8.1 show route-map

Description

This command shows the configured route maps.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show route-map [name (1-20)]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
name	Name of the route map	1 ... 20

If no parameters are specified, all configured route maps are displayed.

Result

The route maps are displayed.

Further notes

You create a route map and change to the Route maps configuration mode with the command `route-map`.

9.8.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.8.2.1 route-map**Description**

With this command you create a route map and change to the Route maps configuration mode.

Note

This command is available only with layer 3.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
route-map <name(1-20)> [ {permit | deny } ] [ <seqnum(1-10)> ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the route map	0 ... 20
permit	The routing information is further processed according to the settings you make for the commands <code>set metric</code> and <code>set tag</code> .	-

Parameter	Description	Range of values / note
deny	The routing information is discarded.	-
seqnum	Sequence number of the route map	1 ... 10 If you do not specify a sequence number, 1 is assigned automatically.

Result

The route map has been created.

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Further notes

You delete a route map with the `no route-map` command.

You display the setting and other information with the `show route-map` command.

9.8.2.2 no route-map

Description

With this command, you delete a route map.

Note

This command is available only with layer 3.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
route-map <name(1-20)> [ <seqnum(1-10)> ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
name	Name of the route map	0 ... 20
seqnum	Sequence number of the route map	1 ... 10

Result

The route map has been deleted.

Further notes

You create a route map and change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3 Commands in the Route maps configuration mode

This section describes commands that you can call up in the Route maps configuration mode.

In the global configuration mode, enter the `route-map` command to change to this mode.

- If you exit the Route maps configuration mode with the `exit` command, you return to the global configuration mode.
- If you exit the Route maps Configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.8.3.1 match destination ip

Description

With this command, you specify whether or not the routing information for a route map is filtered based on the destination IPv4 address.

Note

This command is available only with layer 3 (IPv4).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```


Syntax

Call up the command with the following parameters:

```
match destination ip <Ip address> <Net Mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Ip address	IPv4 address	Enter the IPv4 address of the destination on which the filtering is based.
Net Mask	Subnet mask of the corresponding subnet	Enter the subnet mask of the destination on which the filtering is based.

Result

The filter for the destination IPv4 address is created.

Further notes

You delete the filter for the destination IPv4 address with the `no match destination ip` command.

You create a filter for the destination IPv6 address with the `match destination ipv6` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.2 no match destination ip

Description

With this command, you delete the filter for the destination IPv4 address.

Note

This command is available only with layer 3 (IPv4).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match destination ip <Ip address> <Net Mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Ip address	IPv4 address	Enter the IPv4 address of the destination on which the filtering is based.
Net Mask	Subnet mask of the corresponding subnet	Enter the subnet mask of the destination on which the filtering is based.

Result

The filter for the destination IPv4 address is deleted.

Further notes

You create a filter for the destination IPv4 address with the `match destination ip` command.

You create a filter for the destination IPv6 address with the `match destination ipv6` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.3 match destination ipv6

Description

With this command, you specify whether or not the routing information for a route map is filtered based on the destination IPv6 address.

Note

This command is available only with layer 3 (IPv6).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match destination ipv6 <IPv6 address> <Prefix Length>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
IPv6 address	IPv6 address	Enter the IPv6 address of the destination on which the filtering is based.
Prefix Length	Decimal representation of the mask as a number of "1" bits	0 ... 128 Enter the mask of the destination on which the filtering is based.

Result

The filter for the destination IPv6 address is created.

Further notes

You delete the filter for the destination IPv6 address with the `no match destination ipv6` command.

You create a filter for the destination IPv4 address with the `match destination ip` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.4 no match destination ipv6

Description

With this command, you delete the filter for the destination IPv6 address.

Note

This command is available only with layer 3 (IPv6).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match destination ipv6 <IPv6 address> <Prefix Length>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
IPv6 address	IPv6 address	Enter the IPv6 address of the destination on which the filtering is based.
Prefix Length	Decimal representation of the mask as a number of "1" bits	0 ... 128 Enter the mask of the destination on which the filtering is based.

Result

The filter for the destination IPv6 address is deleted.

Further notes

You create a filter for the destination IPv6 address with the `match destination ipv6` command.

You create a filter for the destination IPv4 address with the `match destination ip` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.5 match interface

Description

With this command, you specify whether or not the routing information for a route map is filtered based on the interface.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match interface {Vlan < vlan-id(1-4094)> | <interface-type> < interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN	-
vlan-id	Keyword for a VLAN connection	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

Result

The filter for the interface is created.

Further notes

You delete the filter for the interface with the `no match interface` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.6 no match interface

Description

With this command, you delete the filter for the interface.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no match interface {Vlan < vlan-id(1-4094)> | <interface-type> < interface-id> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN	-
vlan-id	Keyword for a VLAN connection	1 ... 4094
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

Result

The filter for the interface is deleted.

Further notes

You create a filter for an interface with the `match interface` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.7 match metric

Description

With this command, you specify whether or not the routing information for a route map is filtered based on the value of the metric.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match metric <value(0-0xffffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the metric	0 ... 0xfffff You can enter the value in decimal or hexadecimal.

Result

The filter for the value of the metric is created.

Further notes

You delete the filter for the value of the metric with the `no match metric` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.8 no match metric

Description

With this command, you delete the filter for the value of the metric.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match metric <value(0-0xfffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the metric	0 ... 0xfffff You can enter the value in decimal or hexadecimal.

Result

The filter for the value of the metric is deleted.

Further notes

You create a filter for the value of the metric with the `match metric` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.9 match metric-type**Description**

With this command, you specify whether or not the routing information for a route map is filtered based on the type of the metric.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match metric-type {inter-area | intra-area | type-1-external | type-2-external }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
inter-area	Routes learnt from different areas	-
intra-area	Routes that originate from the same area	-
type-1-external	Routes whose path costs (metric) are made up from the external path costs and the patch costs to the ASBR	-
type-2-external	Routes with only external path costs (metric)	-

Result

The filter for the type of the metric is created.

Further notes

You delete the filter for the type of the metric with the `no match metric-type` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.10 no match metric-type

Description

With this command, you delete the filter for the type of the metric.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match metric-type {inter-area | intra-area | type-1-external | type-2-external }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>inter-area</code>	Routes learnt from different areas	-
<code>intra-area</code>	Routes that originate from the same area	-
<code>type-1-external</code>	Routes whose path costs (metric) are made up from the external path costs and the patch costs to the ASBR	-
<code>type-2-external</code>	Routes with only external path costs (metric)	-

Result

The filter for the type of the metric is deleted.

Further notes

You create a filter for the type of the metric with the `match metric-type` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.11 match next-hop ip

Description

With this command, you specify whether or not the filtering for a route map will be based on the router (IPv4) to which the routing information is sent next.

Note

This command is available only with layer 3 (IPv4).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match next-hop ip <next-hop Ip address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
next-hop Ip address	IPv4 address	Enter the IPv4 address of the router to which the routing information will be sent next.

Result

The filter for the next router (IPv4) is created.

Further notes

You delete the filter for the next router (IPv4) with the `no match next-hop ip` command.

You create a filter for the next router (IPv6) with the `match next-hop ipv6` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.12 no match next-hop ip

Description

With this command, you delete the filter for the next router (IPv4).

Note

This command is available only with layer 3 (IPv4).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match next-hop ip <next-hop Ip address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
next-hop Ip address	IPv4 address	Enter the IPv4 address of the router to which the routing information will be sent next.

Result

The filter for the next router (IPv4) is deleted.

Further notes

You create a filter for the next router (IPv4) with the `match next-hop ip` command.

You create a filter for the next router (IPv6) with the `match next-hop ipv6` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.13 match next-hop ipv6

Description

With this command, you specify whether or not the filtering for a route map will be based on the router (IPv6) to which the routing information is sent next.

Note

This command is available only with layer 3 (IPv6).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match next-hop ipv6 <next hop IPv6 address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
next-hop Ipv6 address	IPv6 address	Enter the IPv6 address of the router to which the routing information will be sent next.

Result

The filter for the next router (IPv6) is created.

Further notes

You delete the filter for the next router (IPv6) with the `no match next-hop ipv6` command.

You create a filter for the next router (IPv4) with the `match next-hop ip` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.14 no match next-hop ipv6

Description

With this command, you delete the filter for the next router (IPv6).

Note

This command is available only with layer 3 (IPv6).

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match next-hop ipv6 <next hop IPv6 address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
next-hop IPv6 address	IPv6 address	Enter the IPv6 address of the router to which the routing information will be sent next.

Result

The filter for the next router (IPv6) is deleted.

Further notes

You create a filter for the next router (IPv6) with the `match next-hop ipv6` command.

You create a filter for the next router (IPv4) with the `match next-hop ip` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.15 match route-type

Description

With this command, you specify whether or not the routing information for a route map is filtered based on the type of the route.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match route-type {local | remote }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
local	Directly connected routes (local interfaces)	-
remote	Learnt or statically configured routes	-

Result

The filter for the type of the route is created.

Further notes

You delete the filter for the type of the route with the `no match route-type` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.16 no match route-type

Description

With this command, you delete the filter for the type of the route.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match route-type {local | remote }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
local	Directly connected routes (local interfaces)	-
remote	Learnt or statically configured routes	-

Result

The filter for the type of the route is deleted.

Further notes

You create a filter for the type of the route with the `match route-type` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.17 match tag

Description

With this command, you specify whether or not the routing information for a route map is filtered based on tags.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
match tag <value (1-0xffffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the tag	1 ... 0xffffffff You can enter the value in decimal or hexadecimal.

Result

The filter for a tag is created.

Further notes

You delete the filter for a tag with the `no match tag` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.18 no match tag

Description

With this command, you delete the filter for a tag.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no match tag <value (1-0xffffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the tag	1 ... 0xffffffff You can enter the value in decimal or hexadecimal.

Result

The filter for a tag is deleted.

Further notes

You create the filter for a tag with the `match tag` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.19 set metric

Description

With this command, you specify whether the routing information is forwarded with a changed metric.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
set metric <value(0-0xffffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the metric	0 ... 0xffffffff Enter the new value for the metric with which the routing information will be forwarded. You can enter the value in decimal or hexadecimal.

Result

The routing information is forwarded with a changed metric.

Further notes

You delete the setting that the metric of the routing information is changed with the `no set metric` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.20 **no set metric**

Description

With this command, you delete the setting that the metric of the routing information is changed.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli (config-rmap-$$$) #
```

Syntax

Call the command without parameter assignment:

```
no set metric
```

Result

The metric of the routing information is not changed.

Further notes

You define the setting that the metric of the routing information is changed with the `set metric` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.21 **set tag**

Description

With this command, you specify whether the routing information is forwarded with a changed tag.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
set tag <value(1-0xffffffff)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value of the tag	1 ... 0xffffffff Enter the new value for the tag with which the routing information will be forwarded. You can enter the value in decimal or hexadecimal.

Result

The routing information is forwarded with a changed tag.

Further notes

You delete the setting that the tag of the routing information is changed with the `no set tag` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.8.3.22 no set tag

Description

With this command, you delete the setting that the tag of the routing information is changed.

Note

This command is available only with layer 3.

Requirement

You are now in the Route maps configuration mode.

The command prompt is as follows:

```
cli(config-rmap-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no set tag
```

Result

The tag of the routing information is not changed.

Further notes

You define the setting that the tag of the routing information is changed with the `set tag` command.

You change to the Route maps configuration mode with the command `route-map`.

You display the setting and other information with the `show route-map` command.

9.9 NAT (IPv4)

Note

NAT/NAPT is possible only on layer 3 of the ISO/OSI reference model. To use the NAT function, the networks must use the IPv4 protocol.

When using the ISO protocol that operates at layer 2, it is not possible to use NAT.

With Network Address Translation (NAT), IP subnets are divided into "Inside" and "Outside". The division is from the perspective of a NAT interface. All networks that can be reached via the NAT interface itself count as being "Outside" for this interface. All networks that can be reached via IP interfaces of the same device count as being "Inside" for the NAT interface.

If there is routing via a NAT interface, the source or destination IP addresses of the transferred data packets are changed at the transition between "Inside" and "Outside". Whether the source or destination IP address is changed depends on the communication direction. The address of the communications node located "Inside" is always adapted. Depending on the perspective the IP address of the communications node is identified as "Local" or "Global".

		Perspective	
		Local	Global
Position	Inside	An actual IP address that is assigned to a device in the internal network. This address cannot be reached from the external network.	An IP address at which an internal device can be reached from the external network.
	Outside	An actual IP address that is assigned to a device in the external network. Since only "inside" addresses are implemented, there is no distinction between made between outside local and outside global.	

Computing capacity

Due to the load limitation of the CPU packet receipt of the device is limited to 300 packets a second. This corresponds to a maximum data through of 1.7 Mbps. This load limitation does not apply per interface but generally for all packets going the CPU.

The entire NAT communication runs via the CPU and therefore represents competition for IP communication going to the CPU, e.g. WBM and Telnet.

Note that a large part of the computing capacity is occupied if you use NAT.

NAT

With Network Address Translation (NAT), the IP address in a data packet is replaced by another. NAT is normally used on a gateway between an internal network and an external network.

With source NAT, the inside local source address of an IP packet from a device in the internal network is rewritten to an inside global address by a NAT device at the network transition.

With destination NAT, the inside global destination address of an IP packet from a device in the external network is rewritten to an inside local address by a NAT device at the network transition.

To translate the internal into the external IP address and back, the NAT device maintains a translation list. The address assignment can be dynamic or static.

NAPT

In Network Address Port Translation (NAPT), several internal IP addresses are translated into the same external IP address. To identify the individual nodes, the port of the internal device is also stored in the translation list of the NAT device and translated for the external address.

If several internal devices send a query to the same external destination IP address via the NAT device, the NAT device enters its own external source IP address in the header of these forwarded frames. Since the forwarded frames have the same external source IP address, the NAT device assigns the frames to the devices using a different port number.

If a device from the external network wants to use a service in the internal network, the translation list for the static address assignment needs to be configured.

NAT/NAPT and IP routing

You can enable NAT/NAPT and IP routing at the same time. In this case, you need to regulate the reachability of internal addresses from external networks with ACL rules.

9.9.1 The "show" commands

9.9.1.1 show ip nat config

Description

This command shows the global NAT/NAPT configuration.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip nat config
```

Result

The global NAT configuration is displayed.

Further notes

You enable NAT/NAPT for the entire device with the `ip nat` command in the Global configuration mode.

You disable NAT/NAPT for the entire device with the `no ip nat` command in the Global configuration mode.

You delete the periods of time with the `ip nat timeout` command.

You can reset the time periods to the default with the `ip nat timeout` command.

9.9.1.2 show ip nat service

Description

This command shows static port translations (NAPT) for an interface with a service.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip nat service
```

Result

The information is displayed.

Further notes

You configure static port translations for an interface with the `ip nat service` command.

You delete a configuration with the `no ip nat service` command.

9.9.1.3 show ip nat service portrange

Description

This command shows static port translations (NAPT) for an interface with a port range.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ip nat service portrange
```

Result

The selected service, start and end port of an interface are displayed.

Further notes

You configure static port translations for an interface with a port range with the `ip nat service portrange` command.

You delete a configuration with the `no ip nat service portrange` command.

9.9.1.4 show ip nat summary

Description

This command shows the NAT/NAPT configuration of the interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ip nat summary
```

Result

The current NAT/NAPT configuration of the interfaces is displayed.

Further notes

You enable NAT for the selected IP interface with the `ip nat` command in the Interface configuration mode.

You disable NAT for the selected IP interface with the `no ip nat` command in the Interface configuration mode.

You enable NAPT for the selected IP interface with the `ip nat napt` command in the Interface configuration mode.

You disable NAPT for the selected IP interface with the `no ip nat napt` command in the Interface configuration mode.

9.9.1.5 show ip nat

Description

This command shows address translations or active connections depending on the selected parameter.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip nat { interface | static | translations }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Shows the configuration of the dynamic address translations.	-
static	Shows the configuration of the static 1:1 address translations.	-
translations	Displays the active NAT connections.	-

Result

The configured address translations or active connections are displayed.

Further notes

You configure a static address translation with the `ip nat static` command.

You delete a static address translation with the `no ip nat static` command.

You configure a dynamic address translation with the `ip nat pool` command.

You delete a dynamic address translation with the `no ip nat pool` command.

9.9.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.9.2.1 ip nat

Description

With this command you enable NAT/NAPT for the entire device.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip nat
```

Result

NAT/NAPT is enabled globally for the entire device. The device operates as a NAT router.

Further notes

You disable NAT/NAPT for the entire device with the `no ip nat` command.

You display the current configuration with the command.

9.9.2.2 no ip nat

Description

With this command you disable NAT/NAPT for the entire device.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip nat
```

Result

NAT/NAPT is disabled globally for the entire device.

Further notes

You enable NAT/NAPT for the entire device with the `ip nat` command.

You display the current configuration with the command.

9.9.2.3 ip nat timeout

Description

With this command you define periods of time after which existing connections are deleted if there is no data exchange.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip nat {idle timeout <seconds (60-86400)> | {tcp | udp } timeout <seconds (300-86400)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
idle timeout	Keyword for the time after which a xxxx connection is deleted	-
seconds	Value for the time in seconds	For the parameter <code>idle</code> : <ul style="list-style-type: none"> • 60 ... 86400 For the parameter <code>udp</code> : <ul style="list-style-type: none"> • 300 ... 86400
tcp	Keyword for the time after which a TCP connection is deleted	-
udp	Keyword for the time after which a UDP connection is deleted	-

Result

The time periods are defined.

Further notes

You can reset the time periods to the default with the `ip nat timeout` command.

You display the current configuration with the command.

9.9.2.4 no ip nat timeout

Description

With this command you reset periods of time after which existing connections are deleted back to the default value.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
no ip nat {idle | {tcp | udp } timeout
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
idle	Keyword for the time period of a xxxx connection	-
tcp	Keyword for the time period of a TCP connection	-
udp	Keyword for the time period of a UDP connection	-

Result

The time periods are reset.

Further notes

You delete the periods of time with the `ip nat timeout` command.

You display the current configuration with the command.

9.9.3 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

9.9.3.1 ip nat

Description

With this command, you enable NAT for the IP interface.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ip nat
```

Result

NAT is activated for the IP interface.

Further notes

You disable NAT for the selected IP interface with the `no ip nat` command.

You display the current configuration with the `show ip nat summary` command.

9.9.3.2 no ip nat

Description

With this command, you disable NAT for the selected IP interface.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip nat
```

Result

NAT is deactivated for the selected IP interface.

Further notes

You enable NAT for the selected IP interface with the `ip nat` command.

You display the current configuration with the `show ip nat summary` command.

9.9.3.3 ip nat napt

Description

With this command, you enable NAPT for the selected IP interface.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ip nat napt
```

Result

NAPT is activated for the selected IP interface.

Further notes

You disable NAPT for the selected IP interface with the `no ip nat napt` command.

You display the current configuration with the `show ip nat summary` command.

9.9.3.4 no ip nat napt

Description

With this command, you disable NAPT for the selected IP interface.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip nat napt
```


Result

NAPT is deactivated for the selected IP interface.

Further notes

You enable NAPT for the selected IP interface with the `ip nat napt` command.

You display the current configuration with the `show ip nat summary` command.

9.9.3.5 ip nat pool

Description

With this command, you configure a pool for dynamic address translations.

As default, the device cannot be reached from an external network. If the device wants to communicate in an external network, an inside global address is assigned to it dynamically. Using this inside global address, the device can be reached from the external network until the timer of the connection elapses.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip nat pool <inside global ip> <mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>inside global ip</code>	Start address for the dynamic assignment of addresses at which devices will be reachable from external.	Enter a valid IPv4 address.
<code>mask</code>	Address mask of the external subnet	Enter a valid subnet mask.

Result

A pool is defined.

Further notes

You delete a dynamic address translation with the `no ip nat pool` command.

You display the current configuration with the `show ip nat` command.

9.9.3.6 no ip nat pool**Description**

With this command, you delete a pool for dynamic address translations.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ip nat pool <inside global ip>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
inside global ip	Start address for the dynamic assignment of addresses at which devices are reachable from external.	Enter a valid IPv4 address.

Result

A pool is deleted.

Further notes

You configure a dynamic address translation with the `ip nat pool` command.

You display the current configuration with the `show ip nat` command.

9.9.3.7 ip nat service**Description**

With this command you configure static port translations (NAPT) for an interface with a service.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip nat service <inside local ip> [<inside local port number>]
  { auth | dns | ftp | pop3 | pptp | smtp | telnet | http | nntp | snmp | other
  [<inside global port number>]}
  [{ tcp | udp | any }] [<description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>inside local ip</code>	Actual address of the device that should be reachable from external.	Enter a valid IPv4 address.
<code>inside local port number</code>	Port that will be assigned to the inside local address.	If you do not specify any ports, the port that you assign for the <code>inside global port number</code> parameter will be entered.
Service	Service for which the port translation is valid.	<ul style="list-style-type: none"> • auth • dns • ftp • pop3 • pptp • smtp • telnet • http • nntp • snmp • other
<code>inside global port number</code>	Port that will be assigned to the inside global address.	If you have selected the <code>other</code> service, you can enter a port. If you have selected another service, a port will be specified.
Protocol	Protocol for which the port translation is valid.	<ul style="list-style-type: none"> • tcp • udp • any
<code>description</code>	Description for the port translation	-

Result

The static port translation with a service is configured.

Further notes

You delete a configuration with the `no ip nat service` command.

You configure static port translations for an interface with a port range with the `ip nat service portrange` command.

You display the current configuration with the `show ip nat service` command.

9.9.3.8 no ip nat service

Description

With this command you delete static port translations (NAPT) for an interface with a service.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ip nat service {{<inside local ip> <inside local port number> [{ tcp | udp | any  
}] | all}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>inside local ip</code>	Actual address of the device that is reachable from external.	Enter a valid IPv4 address.
<code>inside local port number</code>	Port that is assigned to the inside local address.	-
Protocol	Protocol for which the port translation is valid.	<ul style="list-style-type: none"> • tcp • udp • any
<code>all</code>	Deletes all port translations	-

Result

The static port translation with a service is deleted.

Further notes

You configure static port translations with a service for an interface with the `ip nat service` command.

You configure static port translations for an interface with a port range with the `ip nat service portrange` command.

You display the current configuration with the `show ip nat service` command.

9.9.3.9 ip nat service portrange

Description

With this command you configure static port translations (NAPT) for an interface with a port range.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip nat service portrange <inside local ip> {tcp|udp|any} <inside local start port no>
<inside local end port no> [<description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
inside local ip	Actual address of the device that should be reachable from external.	Enter a valid IPv4 address.
Protocol	Protocol for which the port translation is valid.	<ul style="list-style-type: none"> • tcp • udp • any
inside local start port no	Start port that will be assigned to the inside local address.	The port range you define will also be used for the port of the inside global address. A port range can only be translated to the same port range.
inside local end port no	End port that will be assigned to the inside local address.	
description	Description for the port translation	-

Result

The static port translation with a port range is configured.

Further notes

You delete a configuration with the `no ip nat service portrange` command.

You configure static port translations with a service for an interface with the `ip nat service` command.

You display the current configuration with the `show ip nat service portrange` command.

9.9.3.10 no ip nat service portrange

Description

With this command you delete static port translations (NAPT) for an interface with a port range.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ip nat service portrange <inside local ip> {tcp|udp|any} <inside local start port no> <inside local end port no>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>inside local ip</code>	Actual address of the device that is reachable from external.	Enter a valid IPv4 address.
Protocol	Protocol for which the port translation is valid.	<ul style="list-style-type: none"> • tcp • udp • any
<code>inside local start port no</code>	Start port that is assigned to the inside local address.	-
<code>inside local end port no</code>	End port that is assigned to the inside local address.	-

Result

The static port translation with a port range is deleted.

Further notes

You configure static port translations for an interface with a port range with the `ip nat service portrange` command.

You configure static port translations with a service for an interface with the `ip nat service` command.

You display the current configuration with the `show ip nat service portrange` command.

9.9.3.11 ip nat static

Description

With this command, you configure static 1:1 address translations.

You specify which inside global address the inside local address of a device will be converted to and vice versa. This variant allows connection establishment in both directions. The device in the internal network can be reached from the external network.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip nat static <inside local ip> <inside global ip>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
inside local ip	Actual address of the device that should be reachable from external.	Enter a valid IPv4 address.
inside global ip	Address at which the device will be reachable from external	Enter a valid IPv4 address.

Result

A static address translation is defined.

Further notes

You delete a static address translation with the `no ip nat static` command.

You display the current configuration with the `show ip nat` command.

9.9.3.12 no ip nat static

Description

With this command, you delete static 1:1 address translations.

Requirement

You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
no ip nat static <inside local ip>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
inside local ip	Actual address of the device that is reachable from external.	Enter a valid IPv4 address.

Result

A static address translation is deleted.

Further notes

You configure a static address translation with the `ip nat static` command.

You display the current configuration with the `show ip nat` command.

9.10 PIM (IPv4)

Protocol Independent Multicast (PIM) allows the dynamic routing of multicast packets, regardless of the routing protocol such as OSPFv2 or static routing (IPv4). PIM expands the routing information of the unicast routing protocol active on the router with additional information for multicast operation.

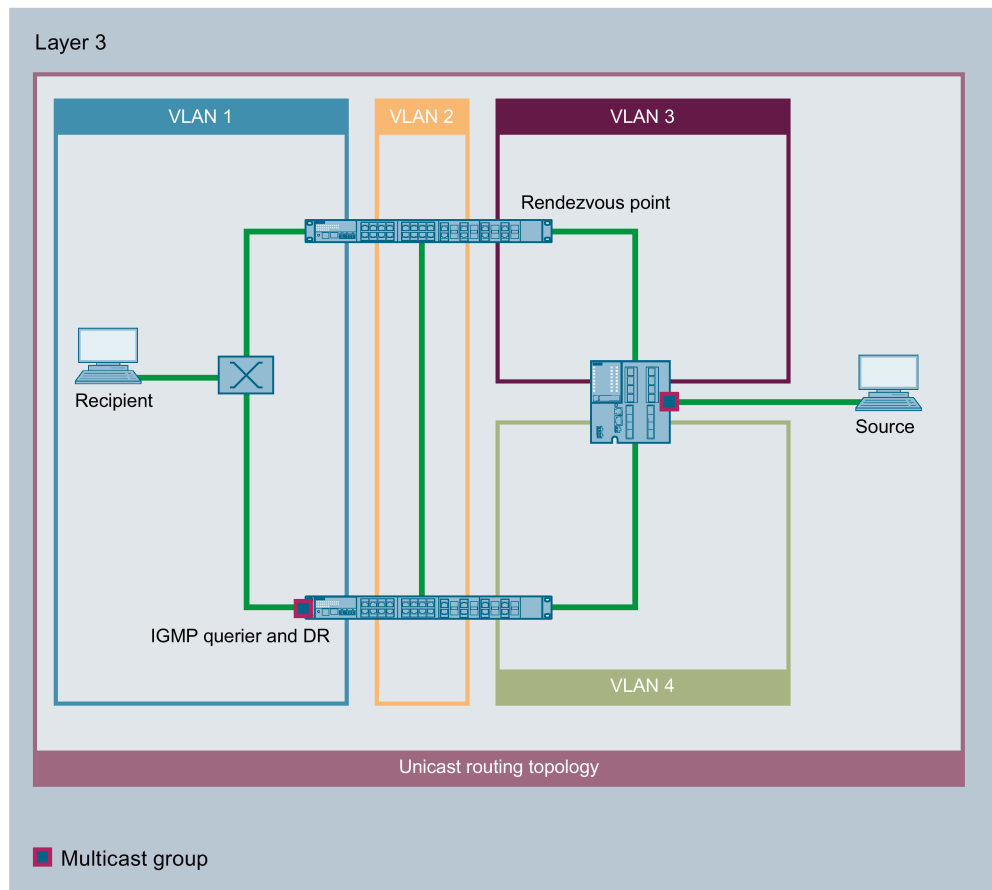
Requirements for PIM:

- IGMP is enabled on all routers of the routing topology.
- PIM is enabled on all routers of the routing topology.
- There is at least one rendezvous point (RP).
- In every subnet there is a designated router (DR).
- The DR must also be the IGMP querier.

PIM operates in the sparse mode designed for networks with a low node density.

If a router receives a multicast, it sends this information to the rendezvous point (RP). A device that wants to receive a multicast sends an IGMP Join to the routers in its network. The designated router (DR) of the network sends this request to the RP. The RP therefore has the unicast address of the sender and a unicast address for the recipient, that of the DR.

Between the sender and recipient the shortest path is selected based on the routing table and the information can be sent.



In this example the source sends a multicast to the connected router. The router sends this information to the rendezvous point.

The recipient sends an IGMP Join to its IGMP querier and designated router. The DR forwards the request to the RP.

Based on the routing table, the shortest path is selected for the multicast.

9.10.1 The "show" commands

This section describes commands with which you display various settings.

9.10.1.1 show ip pim rp-hash

Description

With this command, you display the rendezvous point (RP) of a multicast group.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim rp-hash [<multicast_Group_address> <Group_mask>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
multicast_Group_addresses	Address of the multicast group	-
Group_mask	Subnet mask that restricts the multicast band	-

If no parameters are specified, the RPs of all multicast groups are displayed.

Result

The current rendezvous point of the multicast group is displayed.

Further notes

You define interfaces as candidates for rendezvous points with the command `rp-candidate rp-address`.

You configure a device as a static rendezvous point with the `ip pim static-rp` command.

You specify the interfaces for static rendezvous points with the `rp-static rp-address` command.

9.10.1.2 show ip pim interface detail

Description

With this command, you display detailed settings for PIM.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim interface [vlan <vlan-id(1-4094)>] detail
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all interfaces are displayed.

Result

Detailed settings for PIM are displayed.

Further notes

You enable PIM globally on the device with the `ip pim routing` command.

You assign an interface to PIM with the `ip pim` command.

9.10.1.3 show ip pim neighbor

Description

With this command, you display the PIM neighborhood table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim neighbor [ vlan <vlan-id(1-4094)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all interfaces are displayed.

Result

The current PIM neighborhood table is displayed.

Further notes

You enable PIM globally on the device with the `ip pim routing` command.

9.10.1.4 `show ip pim rp-candidate`

Description

With this command, you display the interfaces of the device that are candidates for rendezvous points.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip pim rp-candidate
```

Result

The interfaces of the device that are candidates for rendezvous points are displayed.

Further notes

You specify the interface candidates for rendezvous points with the `rp-candidate rp-address` command.

9.10.1.5 `show ip pim rp-set`

Description

With this command, you display all rendezvous points of the network.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim rp-set [rp-address]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
rp-address	IP address of the interface	-

Result

The multicast groups with rendezvous points belonging to them are displayed.

Further notes

You define interfaces as candidates for rendezvous points with the command `rp-candidate rp-address`.

You configure a device as a static rendezvous point with the `ip pim static-rp` command.

You specify the interfaces for static rendezvous points with the `rp-static rp-address` command.

9.10.1.6 show ip pim bsr

Description

With this command, you display information on the selected bootstrap router (BSR).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show ip pim bsr
```

Result

The information on the selected bootstrap router is displayed.

Further notes

You configure candidates for the bootstrap router with the `ip pim bsr-candidate` command.

9.10.1.7 show ip pim rp-static

Description

With this command, you display the static rendezvous points of the device.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip pim rp-static
```

Result

The static rendezvous points of the device are displayed.

Further notes

You specify the interfaces for static rendezvous points with the `rp-static rp-address` command.

9.10.1.8 show ip pim thresholds

Description

With this command, you display the threshold information for PIM.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show ip pim thresholds
```

Result

The threshold information is displayed.

9.10.1.9 show ip pim rpf

Description

Reverse Path Forwarding (RPF) is used to prevent routing loops.

RPF works with the source IP address of the multicast packet and the interface on which it was received. If a multicast packet is received on an interface, RPF checks whether the shortest path to the multicast source is via this interface. If this condition is met, the router forwards the packet to all multicast nodes. If the condition is not met, it discards the packet.

With this command, you display the RPF settings for a multicast packet.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim rpf <source-address>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
source-address	Source IP address of the multicast packet	Enter a valid IPv4 multicast address.

Result

The RPF settings are displayed.

9.10.1.10 show ip pim mroute

Description

With this command, you display the PIM routing table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show ip pim mroute [ {proxy | {group-address | source-address } summary } ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
proxy	Shows the proxy table.	-
group-address	Address of the multicast group	-
source-address	Source IP address of the multicast packet	Enter a valid IPv4 multicast address.
summary	Shows a summary of the entries.	-

Result

The current PIM routing table is displayed.

9.10.2 ip pim clear counters

Description

This command, you reset the counters of an interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```


Syntax

Call up the command with the following parameters:

```
ip pim clear counters [{vlan <vlan-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Note

PIM does not support any router ports.

If no parameters are specified, the settings for all interfaces are displayed.

Result

The counters of the interface are reset.

9.10.3 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

9.10.3.1 ip pim routing

Description

With this command, you enable PIM globally on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
ip pim routing
```

Result

Pim is enabled on all interfaces of the device.

Further notes

You disable PIM globally on the device with the `no ip pim routing` command.

You display detailed settings for PIM with the `show ip pim interface detail` command.

9.10.3.2 no ip pim routing

Description

With this command, you disable PIM globally on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip pim routing
```

Result

PIM is disabled on all interfaces of the device.

Further notes

You enable PIM globally on the device with the `ip pim routing` command.

You display detailed settings for PIM with the `show ip pim interface detail` command.

9.10.3.3 router pim

Description

With this command, you change to the PIM configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameter assignment:

```
router pim
```

Result

You are now in the PIM configuration mode.

The command prompt is as follows:

```
cli (router-pim) #
```

Further notes

You enable PIM globally on the device with the `ip pim routing` command.

9.10.3.4 ip pim static-rp

Description

With this command, you configure the device as a static rendezvous point.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
ip pim static-rp
```

Result

The device is a static rendezvous point.

Further notes

You delete the configuration with the `no ip pim static-rp` command.

You specify the interfaces for static rendezvous points with the `rp-static rp-address` command.

You display the static rendezvous points with the `show ip pim rp-static` command.

9.10.3.5 no ip pim static-rp

Description

With this command, you delete the configuration of the device as a static rendezvous point.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no ip pim static-rp
```

Result

The device is not a static rendezvous point.

Further notes

You configure the device as a rendezvous point with the `ip pim static-rp` command.

You specify the interfaces for static rendezvous points with the `rp-static rp-address` command.

You display the static rendezvous points with the `show ip pim rp-static` command.

9.10.4 Commands in the PIM configuration mode

This section describes commands that you can call up in the PIM configuration mode.

In the global configuration mode, enter the `router pim` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

- If you exit the PIM configuration mode with the `exit` command, you return to the global configuration mode.
- If you exit the PIM configuration mode with the `end` command, you return to the Privileged EXEC mode.

Requirement

The commands are available if the following requirements are met:

- The device supports the routing function.
- The routing function is enabled.

9.10.4.1 `rp-candidate rp-address`

Description

With this command you specify which interfaces will be candidates for the rendezvous point (RP).

Within a PIM component you can configure several candidates for the RP. The BSR coordinates the candidates and decides on the RP.

Requirement

You are in the PIM configuration mode.

The command prompt is as follows:

```
cli (router-pim) #
```

Syntax

Call up the command with the following parameters:

```
rp-candidate rp-address <Group Address> <Group Mask> <IP address> [Priority <0-255>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group for which the interface will become RP.	-
Group Mask	Subnet mask that restricts the multicast band	-
IP address	IP address of the interface that will become RP	-
Priority	Priority of the interface	0 ... 255 Default: 192

Result

The interface is a candidate for the rendezvous point.

Further notes

You delete RP candidates with the `no rp-candidate rp-address` command.

You display the interface candidates for rendezvous points with the `show ip pim rp-candidate` command.

9.10.4.2 no rp-candidate rp-address

Description

With this command, you delete RP candidates.

Requirement

You are in the PIM configuration mode.

The command prompt is as follows:

```
cli(router-pim)#
```

Syntax

Call up the command with the following parameters:

```
no rp-candidate rp-address <Group Address> <Group Mask> <RP address>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group	-
Group Mask	Subnet mask that restricts the multicast band	-
RP address	IP address of the interface	-

Result

The interface is not a candidate for the rendezvous point.

Further notes

You define interface candidates for the rendezvous point (RP) with the `rp-candidate rp-address` command.

You display the interface candidates for rendezvous points with the `show ip pim rp-candidate` command.

9.10.4.3 rp-static rp-address

Description

With this command you specify which interfaces will become static rendezvous points. Configure the static RP on all devices of the PIM component.

Requirement

You are in the PIM configuration mode.

The command prompt is as follows:

```
cli(router-pim)#
```

Syntax

Call up the command with the following parameters:

```
rp-static rp-address <Group Address> <Group Mask> <IP address>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group for which the interface will become RP.	-
Group Mask	Subnet mask that restricts the multicast band	-
IP address	IP address of the interface that will become RP	-

Result

The interface is a static rendezvous point.

Further notes

You delete the static RPs with the `no rp-static rp-address` command.

You display the static rendezvous points with the `show ip pim rp-static` command.

9.10.4.4 no rp-static rp-address

Description

With this command, you delete static rendezvous points.

Requirement

You are in the PIM configuration mode.

The command prompt is as follows:

```
cli(router-pim)#
```

Syntax

Call up the command with the following parameters:

```
no rp-static rp-address <Group Address> <Group Mask>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
Group Address	Address of the multicast group	-
Group Mask	Subnet mask that restricts the multicast band	-

Result

The interface is not a static rendezvous point.

Further notes

You define an interface as a static RP with the `rp-static rp-address` command.

You display the static rendezvous points with the `show ip pim rp-static` command.

9.10.5 Commands in the Interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

Note

PIM does not support any router ports.

9.10.5.1 `ip pim bsr-candidate`

Description

With this command, you specify that the interface will become a candidate for the bootstrap router.

A BSR coordinates the rendezvous points in a PIM network.

Requirement

- The interface is not a router port.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip pim bsr-candidate <value (0-255)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
value	Value for the priority	0 ... 255

Result

The interface is a candidate for the bootstrap router.

Further notes

You delete BSR candidates with the `no ip pim bsr-candidate` command.

You can display information about the selected bootstrap router with the `show ip pim bsr` command.

9.10.5.2 no ip pim bsr-candidate

Description

With this command, you delete BSR candidates.

Requirement

- The interface is not a router port.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip pim bsr-candidate
```

Result

The interface is a candidate for the bootstrap router.

Further notes

You define interface candidates for the bootstrap router with the `ip pim bsr-candidate` command.

You can display information about the selected bootstrap router with the `show ip pim bsr` command.

9.10.5.3 ip pim

Description

With this command, you assign an interface to PIM.

Requirement

- The interface is not a router port.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
ip pim
```

Result

The interface is assigned to PIM.

Further notes

You delete the assignment with the `no ip pim` command.

9.10.5.4 no ip pim

Description

With this command, you delete the assignment of an interface to PIM.

Requirement

- The interface is not a router port.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip pim
```

Result

The assignment of the interface to PIM is deleted.

Further notes

You assign an interface to PIM with the `ip pim` command.

9.10.5.5 `ip pim dr-priority`

Description

With this command you specify which interfaces will be candidates for the designated router (DR).

The DR forwards the IGMP Joins to the rendezvous point.

Requirement

- The interface is not a router port.
- The DR is also the IGMP querier.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call up the command with the following parameters:

```
ip pim dr-priority <priority(1-4294967295)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
priority	Priority for deciding on the DR	1 ... 4294967295 The router with the highest priority becomes the DR.

Result

The interface is a candidate for the designated router.

Further notes

You delete DR candidates with the `no ip pim dr-priority` command.

You display with the `show ip pim interface` command.

9.10.5.6 no ip pim dr-priority

Description

With this command, you delete DR candidates.

Requirement

- The interface is not a router port.
- You are in the Interface configuration mode

The command prompt is as follows:

```
cli(config-if-$$)#
```

Syntax

Call the command without parameter assignment:

```
no ip pim dr-priority
```

Result

The interface is not a candidate for the designated router.

Further notes

You define interface candidates for the designated router with the `ip pim dr-priority` command.

You display with the `show ip pim interface` command.

Load control

This part contains the sections describing the functions for controlling and balancing network load.

10.1 Rate control

This section describes commands for controlling and restricting the data transmission rate of an interface.

10.1.1 The "show" commands

This section describes commands with which you display various settings.

10.1.1.1 show rate-limit output

Description

This command shows the packet rate for limiting the outgoing data stream of one or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show rate-limit output[interface<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the entries are displayed for all available interfaces.

Result

The entries are displayed.

10.1.2 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

10.1.2.1 rate-limit output

Description

With this command, you configure and enable the data rate in Kbps for limiting the outgoing data stream of the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
rate-limit output <rate-value>
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>rate-value</code>	Value for the in data rate in Kbps	Default: The data rate is set to 0. The outgoing data stream is not limited.

If you do not select any parameters from the parameter list, the default value is used.

Result

The limitation of the outgoing data stream of the interface with the data rate is enabled.

Further notes

You disable the function with the `no rate-limit output` command.

10.1.2.2 no rate-limit output

Description

With this command, you disable the data rate for limiting the outgoing data stream of the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no rate-limit output
```

Result

The limitation of the outgoing data stream of the interface with the data rate is disabled.

Further notes

You enable the function with the `rate-limit output` command.

10.1.2.3 storm-control

Description

With this command, you enable data rate for limiting the incoming data stream of the interface for broadcast, multicast or unknown unicast packets.

Note

Applications

Storm control is only supported on physical interfaces.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
storm-control {broadcast | multicast | dlf}
```

The parameters have the following meaning:

Parameter	Description
broadcast	Limits broadcast packets
multicast	Limits multicast packets
dlf	Limits unicast packets with unresolvable addresses (dlf = destination lookup fail)

As default the function is "disabled" for all transfer types.

Note

Configuration of the threshold value

The default value for the storm control level is 0 Kbps. The incoming data stream is not limited.

To have the incoming data stream limited, configure the threshold value with the `storm-control level` command.

Result

The storm control function is enabled.

Further notes

You enable the function with the `no storm-control` command.

You configure the threshold value for the storm control function with the `storm-control level` command.

10.1.2.4 no storm-control

Description

With this command, you disable the storm control function for broadcast, multicast or unknown unicast packets.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no storm-control{broadcast|multicast|dlf}
```

The parameters have the following meaning:

Parameter	Description
broadcast	Disables broadcast storm control
multicast	Disables multicast storm control
dlf	Disables unknown unicast storm control

if you call up the function without parameters, it is disabled for all types of transmission.

Result

The storm control function is disabled.

Further notes

You enable the function with the `storm-control` command.

10.1.2.5 storm-control level

Description

With this command, you configure the value for the storm control function in Kbps.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
storm-control level <rate-value>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
rate-value	Value for the in data rate in Kbps	The value range depends on the port speed. The entry is rounded down to the next valid value. If small values are entered, the value is rounded up to the next valid value. Default: The data rate is set to 0. The incoming data stream is not limited.

Result

The value for the storm control function is configured.

Further notes

You can reset the setting to the default with the `no storm-control level` command.

10.1.2.6 no storm-control level

Description

With this command, you reset the value for the storm control function to the default value.

The default value for the storm control level is 0 Kbps. The incoming data stream is not limited.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no storm-control level
```

Result

The value for the storm control function is reset to the default.

Further notes

You configure the value for the storm control function with the `storm-control level` command.

10.2 Static MAC filtering

This section describes commands for filtering data packet on an interface.

10.2.1 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

10.2.1.1 mac-address-table block static multicast

Description

With this command, you configure a static multicast MAC address without outgoing ports.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table block static multicast<aa:aa:aa:aa:aa:aa>vlan<vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
-	MAC address of the interface	aa:aa:aa:aa:aa:aa
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The static multicast MAC address is configured.

Further notes

You delete the static multicast MAC address with the `no mac-address-table static multicast` command.

10.2.1.2 mac-address-table static multicast

Description

With this command, you generate a static multicast MAC address entry in the forwarding database.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table static multicast <aa:aa:aa:aa:aa:aa>
  vlan<vlan-id(1-4094)>
  interface([<interface-type><0/a-b,0/c,...>]
    [<interface-type><0/a-b,0/c,...>]
    [port-channel<1-8>]])
  [forbidden-ports([<interface-type><0/a-b,0/c,...>]
    [<interface-type><0/ab,0/c,...>]
    [port-channel <1-8>]])
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address of the interface	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface	Keyword for a an interface description	-
interface-type	Type of interface	Enter a valid interface.
0/a-b, 0/c,...	Module no. and port no. of the interface	
port-channel	Specifies the name of a port channel	1-8
forbidden-ports	Keyword for the interface description of the blocked ports	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry in the forwarding database is generated.

Further notes

With the `show mac-address-table static multicast` command, you display the list of configured entries.

With the `no mac-address-table static multicast` command, you delete an entry.

10.2.1.3 no mac-address-table static multicast

Description

With this command, you delete a static multicast MAC address entry from the forwarding database.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no mac-address-table static multicast<aa:aa:aa:aa:aa:aa>
    vlan<vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address of the interface	-
vlan	Keyword for the number of a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is deleted from the forwarding database.

Further notes

With the `show mac-address-table static multicast` command, you display the list of configured entries.

With the `mac-address-table static multicast` command, you create an entry.

10.2.1.4 mac-address-table static unicast

Description

With this command, you generate a static unicast MAC address entry in the forwarding database.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
mac-address-table static unicast <aa:aa:aa:aa:aa:aa>
  vlan <vlan-id(1-4094)>
  interface ([<interface-type> <interface-id>]
            [<interface-type> <0/a-b, 0/c,...>]
            [port-channel <interface-list>])
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address of the interface	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
port-channel	Keyword for a port channel connection	Enter a valid port channel connection.
interface-list	Number of the addressed port channel	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry in the forwarding database is generated.

Further notes

With the `show mac-address-table static unicast` command, you display the list of configured entries.

With the `no mac-address-table static unicast` command, you delete an entry.

10.2.1.5 no mac-address-table static unicast

Description

With this command, you delete a static unicast MAC address entry from the forwarding database.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no mac-address-table static unicast <aa:aa:aa:aa:aa:aa>
    vlan<vlan-id(1-4094)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
aa:aa:aa:aa:aa:aa	MAC address of the interface	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the addressed VLAN	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The entry is deleted from the forwarding database.

Further notes

With the `show mac-address-table static unicast` command, you display the list of configured entries.

With the `mac-address-table static unicast` command, you create an entry.

10.2.2 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

10.2.2.1 switchport ingress-filter

Description

With incoming packets, the ingress filter checks whether the port on which the packet was received belongs to the sending VLAN. If this is not the case, the packet is not processed.

With this command, you enable the ingress filter.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
switchport ingress-filter
```

Result

The ingress filter is activated.

Further notes

You disable the filter with the `no switchport ingress-filter` command.

You can display the status of the ingress filter and other settings with the `show vlan port config` command.

10.2.2.2 no switchport ingress-filter

Description

With this command, you disable the ingress filter.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport ingress-filter
```

Result

The ingress filter is deactivated.

Further notes

You enable the filter with the `switchport ingress-filter` command.

You can display the status of the ingress filter and other settings with the `show vlan port config` command.

10.3 Dynamic MAC aging

The section describes commands with which the aging of dynamically learned entries is configured in a MAC address list.

10.3.1 The "show" commands

This section describes commands with which you display various settings.

10.3.1.1 show mac-address-table aging-time

Description

To ensure that the address entries are up-to-date, MAC addresses are only kept in the address table for a specified time.

This command shows the time after which the MAC addresses are removed from the address table.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show mac-address-table aging-time
```

Result

The time is displayed.

10.3.1.2 **show mac-address-table aging-status**

Description

This command shows whether or not MAC aging is enabled.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call the command without parameters:

```
show mac-address-table aging-status
```

Result

The status of the MAC aging is displayed.

10.3.2 **Commands in the global configuration mode**

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

10.3.2.1 **mac-address-table aging-time**

Description

With this command, you configure the aging of a dynamically learned entry in the MAC address list.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac-address-table aging-time <seconds(10-630)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
seconds	Life of the entry in seconds	10 ... 630 Default: 40

Result

The value of the aging of a dynamically learned entry is configured.

Further notes

You can reset the setting to the default with the `no mac-address-table aging-time` command.

You display the setting with the `show mac-address-table aging-time` command.

10.3.2.2 no mac-address-table aging-time**Description**

With this command, you reset the value for the aging of a dynamically learned entry in the MAC address list to the default value.

The default value is 40 s.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no mac-address-table aging-time
```

Result

The value of the aging of a dynamically learned entry is reset to the default value.

Further notes

You configure the setting with the `mac-address-table aging-time` command.

You display the setting with the `show mac-address-table aging-time` command.

10.3.2.3 mac-address-table aging

Description

With this command, you enable the "Aging" function. The "Aging" function ensures that an entry in the MAC address list that was learned dynamically is deleted again after a certain time.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
mac-address-table aging
```

Result

The "Aging" function is enabled.

Further notes

You configure the time with the `mac-address-table aging-time` command.

You disable the "Aging" function with the `no mac-address-table aging` command.

10.3.2.4 no mac-address-table aging

Description

With this command, you disable the "Aging" function.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no mac-address-table aging
```

Result

The "Aging" function is disabled.

Further notes

You enable the "Aging" function with the `mac-address-table aging` command.

10.4 Flow control

The flow control function monitors the incoming data traffic of a port. If there is overload ("Congestion", "Overflow") it sends a signal to the connection partner. If the flow control function receives a signal at the sending end, it stops the data transmission to avoid loss of data.

This section describes commands of the flow control function.

10.4.1 The "show" commands

This section describes commands with which you display various settings.

10.4.1.1 show flow-control

Description

This command shows the settings of the flow control function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show flow-control [interface <interface-type><interface-id>]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>interface</code>	Keyword for a an interface description	-
<code>interface-type</code>	Type or speed of the interface	Enter a valid interface.
<code>interface-id</code>	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the information for the router will be displayed.

Result

The settings of the flow control function are displayed.

10.4.2 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

10.4.2.1 flowcontrol

Description

The flow control function monitors a connection at the receiving end to make sure that not more data is received than can be processed. If flow control detects a threat of data overflow, the partner at the sending end is sent a signal to stop transmitting.

With this command, you configure the flow control function for an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli (config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
flowcontrol {on|off}
```

The parameters have the following meaning:

Parameter	Description
on	Enables the function
off	Disables the function

Result

The settings for the flow control function are configured.

Further notes

You can display the status of this function with the `show flow-control` command.

10.5 Service classes

This section describes commands for configuring the assignment tables for service classes and the Differentiated Services Code Point (DSCP).

10.5.1 The "show" commands

This section describes commands with which you display various settings.

10.5.1.1 show qos cos-map

Description

This command shows the assignment table of CoS priorities to queues.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show qos cos-map
```

Result

The assignment table of CoS priorities to queues is displayed.

Further notes

You configure the assignment of the CoS priority to a queue with the `cos-map` command.

10.5.1.2 `show qos dscp-map`

Description

This command shows the assignment table of DSCP priorities to queues.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show qos dscp-map
```

Result

The assignment table of DSCP priorities to queues is displayed.

Further notes

You configure the assignment of the DSCP priority to a queue with the `dscp-map` command.

10.5.1.3 `show qos-trust-mode`

Description

This command shows port by port the method according to which packets to be forwarded are prioritized.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show qos-trust-mode
```

Result

The list for all ports with the corresponding Trust mode is displayed.

10.5.2 Commands in the Global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

10.5.2.1 qos

Description

With this command, you change to the QOS configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
qos
```

Result

You are now in the QOS configuration mode.

The command prompt is as follows:

```
cli(config-qos)#
```

Further notes

You exit the QOS configuration mode with the command `end` or `exit`.

10.5.3 Commands in the QOS configuration mode

This section describes commands that you can call up in the QOS configuration mode.

In the Global configuration mode, enter the `qos` command to change to this mode.

- If you exit the QOS configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the QOS configuration mode with the `end` command, you return to the Privileged EXEC mode.

10.5.3.1 `cos-map`

Description

In a network, each data stream is assigned a service class that decides its priority. In special situations, it may be necessary to change this priority.

This change is made using a table in which the service classes are assigned to another queue.

With this command, you configure the assignment table for service classes.

With queues 1 - 6 frames with a lower priority are occasionally processed even if there are frames with high priority in the queue.

With queues 7 - 8 only frames with a high priority are processed as long as there are frames with high priority in the queue.

Requirement

You are in the QOS configuration mode.

The command prompt is as follows:

```
cli(config-qos)#
```

Syntax

Call up the command with the following parameters:

```
cos-map <cos(0-7)> queue <queue(1-8)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
cos	Service class	0 ... 7
queue	Keyword for a queue	-
queue	Queue that it is assigned to this service class	1 ... 8

The service classes (COS) are assigned to the queues as follows:

COS 0 → Queue 2

COS 1 → Queue 1

COS 2 → Queue 3

COS 3 → Queue 4

COS 4 → Queue 5

COS 5 → Queue 6

COS 6 → Queue 7

COS 7 → Queue 8

Result

The assignment table for service classes is configured.

10.5.3.2 dscp-map

Description

In a network, each IP packet is assigned a DSCP code that decides its priority. In special situations, it may be necessary to change this priority.

This change is made using a table in which the DSCP codes are assigned to another queue.

With this command, you configure the assignment table for DSCP codes.

With queues 1 - 6 frames with a lower priority are occasionally processed even if there are frames with high priority in the queue.

With queues 7 - 8 only frames with a high priority are processed as long as there are frames with high priority in the queue.

Requirement

You are in the QOS configuration mode.

The command prompt is as follows:

```
cli(config-qos)#
```

Syntax

Call up the command with the following parameters:

```
dscp-map <dscp (0-63)> queue <queue(1-8)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
dscp	DSCP code	0 ... 63
queue	Keyword for a queue	-
queue	Queue that is assigned to this DSCP code	1 ... 8

The DSCP codes are assigned to the queues as follows:

DSCP codes 0 - 7 → Queue 2
 DSCP codes 8 - 15 → Queue 1
 DSCP codes 16 - 23 → Queue 3
 DSCP codes 24 - 31 → Queue 4
 DSCP codes 32 - 39 → Queue 5
 DSCP codes 40 - 47 → Queue 6
 DSCP codes 48 - 55 → Queue 7
 DSCP codes 56 - 63 → Queue 8

Result

The assignment table for DSCP codes is configured.

10.5.3.3 qos-trust-mode

Description

With this command you can set the method according to which packets to be forwarded are prioritized port by port.

Requirement

You are in the QOS configuration mode.

The command prompt is as follows:

```
cli(config-qos)#
```

Syntax

Call up the command with the following parameters:

```
qos-trust-mode interface <interface-type> <interface-id > {untrust|cos|dscp|cos-dscp}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
untrust	Incoming packets are forwarded with the priority of the receiving port. If there is a DSCP value in the IP header, this is ignored. If a VLAN tag exists, it is replaced by the priority value of the receiving port.	-
cos	If an incoming packet contains a VLAN tag, it is forwarded with this prioritization. If there is a DSCP value in the IP header, this is ignored. If the packet does not contain a VLAN tag it is forwarded with the prioritization of the receiving port.	-
dscp	If an incoming packet contains a DSCP prioritization, it is forwarded with this prioritization. If there is a VLAN tag, this is ignored. If the packet does not contain DSCP prioritization it is forwarded with the prioritization of the receiving port.	-
cos-dscp	With an incoming packet, there is a sequential check to determine which prioritization it contains. If it contains a DSCP prioritization, it is handled as in the "Trust DSCP" mode. If it does not contain any DSCP prioritization, it is checked for a VLAN tag. If it contains a VLAN tag, it is forwarded with this prioritization. If the packet does not contain DSCP prioritization or a VLAN tag it is forwarded with the prioritization of the receiving port.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The prioritization for forwarding packets is configured.

Security and authentication

This part contains the sections that describe the access rights and authentication methods.

11.1 User management

This section describes commands for access as administrator and the configuration of the authentication methods.

When you transfer the configuration of a device to TIA, the configured users, roles and groups are not transferred.

11.1.1 The "show" commands

This section describes commands with which you display various settings.

11.1.1.1 show password-policy

Description

This command shows which password policy is currently being used.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
show password-policy
```

Result

The currently valid password policy is displayed.

Further notes

You configure the password policy with the `password policy` command.

11.1.1.2 show roles

Description

This command shows the created roles.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
show roles
```

Result

The created roles are shown.

Further notes

You create a role with the `role` command.

You delete a role with the `no role` command.

11.1.1.3 show user-accounts

Description

This command shows the created users.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
show user-accounts [external]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
external	Keyword for the table "External User Accounts"	-

If you do not specify the optional parameters, the local users are shown.

Result

The created users are shown.

Further notes

You create a new local user and create an entry in the table "External User Accounts" with the `user-account` command.

You link a user created on an external server with a role on the device in the table "External User Accounts" with the `user-account-ext` command.

You delete a local user and the corresponding entry in the table "External User Accounts" with the `no user-account` command.

You delete a link in the table "External User Accounts" with the `no user-account-ext` command.

11.1.1.4 show user-groups

Description

This command shows the links between groups and roles.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
show user-groups
```

Result

The links are shown.

Further notes

You link a group with a role with the `user-group` command.

You delete a link with the `no user-group` command.

11.1.1.5 show users

Description

This command shows the logged-in CLI users.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show users
```

Result

The logged-in CLI users are displayed.

11.1.2 change password

Description

With this command, you change the password of the logged in user.

Requirement

- You are logged into the device with a local user account
- You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
change password <passwd>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
passwd	Value for the password	Enter the password. The entry depends on the password policy. The <code>show password-policy</code> command shows which password policy is currently being used.

Result

The password is changed.

Note

Changing the password in Trial mode

Even if you change the password in Trial mode, this change is saved immediately.

Further notes

You create a user with the `user-account` command.

You delete a user with the `no user-account` command.

You show the created users with the `show user-accounts` command.

You configure the password policy with the `password-policy` command.

11.1.3 whoami

Description

This command shows the user name of the logged in user.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
whoami
```

Result

The user name of the logged in user is displayed.

11.1.4 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.1.4.1 password policy

Description

With this command you specify which password policy will be used when assigning new passwords.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
password policy < low | high >
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
low	Password policy: Low	Password length: at least 6 characters
high	Password policy: High	Password length: at least 8 characters at least 1 uppercase letter at least 1 special character at least 1 number

Result

The password policy is specified:

Further notes

You assign a new password with the `user-account` command.

You display the setting with the `show password-policy` command.

11.1.4.2 role**Description**

With this command, you create roles that are valid locally on the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
role <role-name> function-rights <function-rights-value(1-15)> [description <role-  
description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>role-name</code>	Role name	Enter a name for the role. The name must meet the following conditions: <ul style="list-style-type: none"> • It must be unique. • It must be between 1 and 64 characters long.
<code>function-rights</code>	Keyword for the function rights	-
<code>function-rights-value</code>	Value of the function rights	Select the function rights of the role. <ul style="list-style-type: none"> • 1 Users with this role can read device parameters but cannot change them. • 15 Users with this role can both read and change device parameters.

Parameter	Description	Range of values / note
description	Keyword for the description	-
role-description	Content of the description	Enter a description for the role. The description text can be up to 100 characters long.

Result

The role is created.

Note

Role name cannot be changed

After creating a role, the name of the role can no longer be changed.

If a name of a role needs to be changed, the role must be deleted and a new role created.

Note

Function rights changeable with restrictions

You can only change the function rights of a role when the role is no longer linked to a user.

Further notes

You delete a role with the `no role` command.

You show the created roles with the `show roles` command.

11.1.4.3 no role

Description

With this command, you delete a role.

Note

You can only delete a role when the role is not linked to a user.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call up the command with the following parameters:

```
no role <role-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
role-name	Role name	Enter the name of a role.

Result

The role is deleted.

Further notes

You create a role with the `role` command.

You show the created roles with the `show roles` command.

11.1.4.4 user-account

Description

With this command, you specify a new user. You can also change the password / role / description of an already created user.

When you create a local user an entry is generated automatically in the table "External User Accounts".

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
user-account <user-name> password <user-password> role <user-role> [description  
<user-description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>user-name</code>	User name	Enter the name for the user. The name must meet the following conditions: <ul style="list-style-type: none"> • It must be unique. • It must be between 1 and 250 characters long.
<code>password</code>	Keyword for a password	-
<code>user-password</code>	Value for the password	Enter the password. The strength of the password depends on the set password policy: <code>low</code> : Password length: at least 6 characters <code>high</code> : The password must meet the following conditions: <ul style="list-style-type: none"> • Password length: at least 8 characters • at least 1 uppercase letter • at least 1 special character • at least 1 number
<code>role</code>	Keyword for a role	-
<code>user-role</code>	Role	Enter a role. You can choose between system-defined and self-defined roles.
<code>description</code>	Keyword for the description	-
<code>user-description</code>	Content of the description	Enter a description for the user account. The description text can be up to 100 characters long.

Result

The user has been created.

Note

User name cannot be changed

After creating a user, the user name can no longer be modified. If a user name needs to be changed, the user must be deleted and a new user created.

Further notes

You delete a user with the `no user-account` command.

You configure the password policy with the `password policy` command.

You show the created users with the `show user-accounts` command.

You display the currently valid password policy with the `show password-policy` command.

11.1.4.5 no user-account

Description

With this command, you delete a user.

Note

Default users "admin" as well as logged in users cannot be deleted.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
no user-account <user-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
user-name	User name	Enter a valid user name.

Result

The user has been deleted.

Further notes

You create a user with the `user-account` command.

You show the created users with the `show user-accounts` command.

11.1.4.6 user-account-ext

Description

With this command you link a user with a role in the table "External User Accounts". The user is defined on RADIUS server. The roll is defined locally on the device.

When a RADIUS server authenticates a user, the corresponding group however is unknown or does not exist, the device checks whether or not there is an entry for the user in the table "External User Accounts". If an entry exists, the user is logged in with the rights of the

associated role. If the corresponding group is known on the device, both tables are evaluated. The user is assigned the role with the higher rights.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
user-account-ext <user-name-ext> role <user-role-ext> [description <user-ext-
description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
user-account-ext	Keyword for a user in the table "External User Accounts"	-
user-name-ext	User name	Enter the name for the user. The name must meet the following conditions: <ul style="list-style-type: none"> • It must be unique. • It must be between 1 and 250 characters long.
role	Keyword for the role name	-
user-role-ext	Role name	Enter a role. You can choose between system-defined and self-defined roles.
description	Keyword for the description	-
user-ext-description	Content of the description	Enter a description for the user in the table "External User Accounts". The description text can be up to 100 characters long.

Result

A link in the table "External User Accounts" has been created.

Note

User name cannot be changed

After creating a user, the user name can no longer be modified. If a user name needs to be changed, the user must be deleted and a new user created.

Further notes

You delete a link with the `no user-account-ext` command.

You show the links in the table "External User Accounts" with the `show user-accounts external` command.

11.1.4.7 no user-account-ext**Description**

With this command, you delete the link between a user and a role in the table "External User Accounts".

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no user-account-ext <user-name-ext>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
<code>user-name-ext</code>	User name	Enter the name of a user.

Result

The link in the table "External User Accounts" has been deleted.

Further notes

You link a user with a role in the table "External User Accounts" with the `user-account-ext` command.

You show the links in the table "External User Accounts" with the `show user-accounts external` command.

11.1.4.8 user-group**Description**

With this command you link a group with a role.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
user-group <user-group-name> role <role-name> [description <user-group-description>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
user-group	Keyword for a group name	-
user-group-name	Group name	Enter the name of the group. The name must match the group on the RADIUS server. The name must meet the following conditions: <ul style="list-style-type: none"> • It must be unique. • It must be between 1 and 64 characters long.
role	Keyword for the role name	-
role-name	Role name	Enter a role name. Users who are authorized with the linked group on the RADIUS server receive the rights of this role locally on the device. You can choose between system-defined and self-defined roles.
description	Keyword for the description	-
user-group-description	Content of the description	Enter a description for the link. The description text can be up to 100 characters long.

Result

The group is linked to a role.

Further notes

You delete a link with the `no user-group` command.

You show the created links with the `show user-groups` command.

11.1.4.9 no user-group

Description

With this command, you delete the link between a group and a role.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
no user-group <user-group-name>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
user-group-name	Group name	Enter the name of a group.

Result

The link is deleted.

Further notes

You link a group with a role with the `user-group` command.

You show the created links with the `show user-groups` command.

11.1.4.10 username

Description

With this command, you change the password of the factory set default user "admin".

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
username {admin} password <passwd>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
admin	User name of the default user with read and write access to the configuration data.	-
password	Keyword for a password	-
passwd	Value for the password	Enter the password. The strength of the password depends on the set password policy: <ul style="list-style-type: none"> • low: Password length: at least 6 characters • high: The password must meet the following conditions: <ul style="list-style-type: none"> – Password length: at least 8 characters – at least 1 uppercase letter – at least 1 special character – at least 1 number

Result

The password is changed.

Note

Changing the password in Trial mode

Even if you change the password in Trial mode, this change is saved immediately.

Further notes

You show the created users with the `show user-accounts` command.

You can also change the passwords with the `user-account` command.

You display the currently valid password policy with the `show password-policy` command.

11.2 RADIUS client

RADIUS (Remote Authentication Dial-In User Service) is a client/server protocol that allows the centralized logging in of users logging on in a physical or virtual network. This makes central administration of user data possible.

This section describes commands relevant for the configuration of this service.

11.2.1 The "show" commands

This section describes commands with which you display various settings.

11.2.1.1 show radius statistics

Description

This command shows the connection statistics from the RADIUS client to the RADIUS server.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
show radius statistics
```

Result

The connection statistics are displayed.

11.2.1.2 show radius server

Description

This command shows the RADIUS server configuration.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call up the command with the following parameters:

```
show radius server [{<ucast_addr> | <ip6_addr>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ucast_addr	Value for an IPv4 unicast address	Enter a valid unicast address.
ip6_addr	Value for an IPv6 address	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, all configured RADIUS servers are displayed.

Result

The RADIUS server configuration is displayed.

11.2.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.2.2.1 login authentication

Description

With this command, you enable authentication via a RADIUS server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
login authentication {radius | local-and-radius | radius-fallback-local}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>radius</code>	The login is via a RADIUS server.	-
<code>local-and-radius</code>	The login is possible both with the users that exist in the firmware (user name and password) and via a RADIUS server.	The local users have priority. The user is first searched for in the local database. If the user does not exist there, a RADIUS query is sent.
<code>radius-fallback-local</code>	The authentication must be handled via a RADIUS server.	A local authentication is performed only when the RADIUS server cannot be reached in the network.

Result

The authentication is made according to the selected parameter.

Further notes

You disable the authentication via a RADIUS server with the `no login authentication` command.

You can display the status of this function and other information with the `show device information` command.

11.2.2.2 no login authentication

Description

With this command, you disable authentication via a RADIUS server.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no login authentication
```

Result

The RADIUS authentication is deactivated.

Note

The login is possible only with a local user name and password. If the local logon fails, there is no authentication via a RADIUS server.

Further notes

You enable the authentication via a RADIUS server with the `login authentication` command.

11.2.2.3 radius authorization-mode

Description

With this command you specify for the login authentication how the rights are assigned to the user with a successful authentication.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
radius authorization-mode { standard | vendor-specific }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>standard</code>	In this mode the user is logged in with administrator rights if the server returns the value "Administrative User" to the device for the attribute "Service Type". In all other cases the user is logged in with read rights.	Default
<code>vendor-specific</code>	In this mode the assignment of rights depends on whether and which group the server returns for the user and whether or not there is an entry for the user in the table "External User Accounts".	-

Result

The assignment of rights during the login authentication is defined.

Further notes

You can display the status of this function and other information with the `show device information` command.

11.2.2.4 radius-server

Description

With this command, you configure a RADIUS server entry on the RADIUS client.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
radius-server { ipv4 <ipv4-address> | fqdn-name <FQDN> | ipv6 <ipv6-address> } [auth-  
port <portno(1-65535)>] [retransmit <1-5>] [key <secret-key-string>] [primary]  
[login | dot1x | login-dot1x] [test]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
ipv4-address	IPv4 address of the RADIUS server	Enter a valid IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ipv6-address	IPv6 address of the RADIUS server	Enter a valid IPv6 address.
auth-port	Keyword for the UDP port number for authentication	
portno	Number of the port	1 ... 65535 Default: 1812
retransmit	Keyword for the number of connection retries	-
-	Enter the maximum number of retries for an attempted query. The initial connection attempt is repeated the number of times specified here before another configured RADIUS server is queried or the login counts as having failed.	1 ... 5 Default: 3 (retries, this means 4 connection attempts)

Parameter	Description	Range of values / note
key	Keyword for the key for communication between the authenticator and the server	-
secret-key-string	Value for the key	127 characters Default: "default"
primary	Identifies the RADIUS server as primary server	-
login	The server is used only for the login authentication.	-
dot1x	The server is used only for the 802.1X authentication.	-
login-dot1x	The server is used for both authentication procedures.	Default setting
test	Tests whether or not the specified RADIUS server is available. At the same time you can create a new RADIUS server and run the test.	-

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

If optional parameters are not specified when configuring, the default values apply.

Note

Primary server

In a network, only one RADIUS server can be selected as the primary server.

If you select a RADIUS server as the primary server, this replaces the server that previously had the role of primary server.

11.2.2.5 no radius-server

Description

With this command, you delete a RADIUS server entry on the RADIUS client.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no radius-server { ipv4 <ipv4-address> | fqdn-name <FQDN> | ipv6 <ipv6-address>}
[primary]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
ipv4-address	IPv4 address of the RADIUS server	Enter a valid IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ipv6-address	IPv6 address of the RADIUS server	Enter a valid IPv6 address.
primary	Identifies the RADIUS server as primary server	-

For information on addresses and interfaces, refer to the section "Addresses and interface names (Page 42)".

Result

The entry for a connection between the RADIUS client and a server or the identification as primary server is deleted.

Further notes

You configure the connection of a RADIUS client to a server with the `radius-server` command.

You show the configuration of a RADIUS server on the client with the `show radius server` command.

You show the statistical information of this function with the `show radius statistics` command.

11.3 MAC access control list

This section describes commands for working with MAC access control lists.

11.3.1 The "show" commands

This section describes commands with which you display various settings.

11.3.1.1 show access-lists

Description

This command shows the configuration of the access control lists (Access Control List).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show access-lists [ [{ip | mac}] <access-list-number (1-128)> ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Selects IP-based access lists (IP ACL)	-
mac	Selects MAC-based access lists (MAC ACL)	-
access-list-number	Number of the access control list	1 ... 128

If you do not select any parameters from the parameter list, the configuration of all access control lists will be displayed.

Result

The configuration of the access control lists is displayed.

11.3.1.2 show interface access lists

Description

This command shows the access control list of one or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> Or cli#
```

Syntax

Call up the command with the following parameters:

```
show interface access-lists [<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the configuration is displayed for all available interfaces.

Result

The access control list of the selected IP interface is displayed.

11.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.3.2.1 mac access-list extended

Description

With this command, you generate a MAC access control list and change to the MAC ACL configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
mac access-list extended<access-list-number(1-128)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
access-list-number	Number of the access control list	1 ... 128

Result

A MAC access control list has been generated.

You are now in the MAC ACL configuration mode.

The command prompt is as follows:

```
cli(config-ext-macl)#
```

Further notes

You delete the MAC access control list with the `no mac access-list extended` command.

You exit the MAC ACL configuration mode with the `exit` command.

You display the configuration of the access control list with the `show access-lists` command.

11.3.2.2 no mac access-list extended

Description

With this command, you delete a MAC access control list.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no mac access-list extended <short(1-128)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
short	Number of the access control list	1 ... 128

Result

The MAC access control list is deleted.

Further notes

You generate a MAC ACL with the `mac access-list extended` command.

You display the configuration of the access control list with the `show access-lists` command.

11.3.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.3.3.1 mac access-group

Description

With this command, you enable the access control of the packets of an interface.

Requirement

- A MAC access control list has been created.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
mac access-group <access-list-number(1-128)>{in|out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
access-list-number	Number of the access control list	1 ... 128
in	Specifies that incoming packets are filtered	-
out	Specifies that outgoing packets are filtered	-

Result

The packets are filtered according to the access control list (ACL).

Further notes

You disable the setting with the `no mac access-group` command.

You display the statistical data of the access control list with the `show access-lists` command.

11.3.3.2 no mac access-group

Description

With this command, you disable the access control of the packets of an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no mac access-group <access-list-number (1-128)>{in|out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
access-list-number	Number of the access control list	1 ... 128
in	Specifies that incoming packets are filtered	-
out	Specifies that outgoing packets are filtered	-

Result

The packet filtering according to the access control list (ACL) is canceled.

Further notes

You enable the setting with the `mac access-group` command.

You display the configuration of the access control list with the `show access-lists` command.

11.3.4 Commands in the MAC ACL configuration mode

This section describes commands that you can call up in the MAC ACL configuration mode.

In the Global configuration mode, enter the `mac access-list extended` command to change to this mode.

- If you exit the MAC ACL configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the MAC ACL configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.3.4.1 permit

Description

With this command, you configure a MAC address control list that describes the MAC addresses for which incoming and/or outgoing data traffic is permitted.

The access control list contains only one entry. If you want to lock or permit further addresses, create a new access control list.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the MAC ACL configuration mode.

The command prompt is as follows:

```
cli(config-ext-macl)#
```

Syntax

Call up the command with the following parameters:

```
permit {any|host<src-mac-address>}{any|host<dest-mac-address>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Keyword for "all"	-
host	Keyword for the MAC address of an incoming connection that is permitted	-
src-mac-address	MAC address of the permitted incoming connection	Specify a valid MAC address.
any	Keyword for "all"	-
host	Keyword for the MAC address of an outgoing connection that is permitted	-
dest-mac-address	MAC address of the permitted outgoing connection	Specify a valid MAC address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Note

MAC address input

Use "any", if the rule is to apply to all src and/or dest MAC addresses. This corresponds to the MAC address "00:00:00:00:00:00".

Result

The MAC access control list is configured.

Further notes

You exit the MAC ACL configuration mode with the `exit` command.

You delete the MAC access control list with the `no mac access-list` extended command.

You display the configuration of the access control list with the `show access-lists` command.

11.3.4.2 deny

Description

With this command, you configure a MAC address control list that describes the MAC addresses for which incoming and/or outgoing data traffic is locked.

The access control list contains only one entry. If you want to lock or permit further addresses, create a new access control list.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the MAC ACL configuration mode.

The command prompt is as follows:

```
cli(config-ext-macl)#
```

Syntax

Call up the command with the following parameters:

```
deny {any|host<src-mac-address>} {any|host<dest-mac-address>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Keyword for "all"	-
host	Keyword for the MAC address of an incoming connection that is locked	-
src-mac-address	MAC address of the locked incoming connection	Specify a valid MAC address.

Parameter	Description	Range of values / note
any	Keyword for "all"	-
host	Keyword for the MAC address of an outgoing connection that is locked	-
dest-mac-address	MAC address of the locked outgoing connection	Specify a valid MAC address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Note

MAC address input

Use "any", if the rule is to apply to all src and/or dest MAC addresses. This corresponds to the MAC address "00:00:00:00:00:00".

Result

The MAC access control list is configured.

Further notes

You exit the MAC ACL configuration mode with the `exit` command.

You delete the MAC access control list with the `no mac access-list extended` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4 IP access control list

Note

IP access control lists are available only with IPv4.

Note

Refer to the information and restrictions in section "Configuration limits (Page 37)".

This section describes commands for working with IP access control lists.

11.4.1 The "show" commands

This section describes commands with which you display various settings.

11.4.1.1 show access-lists

Description

This command shows the configuration of the access control lists (Access Control List).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show access-lists [ [{ip | mac}] <access-list-number (1-128)> ]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip	Selects IP-based access lists (IP ACL)	-
mac	Selects MAC-based access lists (MAC ACL)	-
access-list-number	Number of the access control list	1 ... 128

If you do not select any parameters from the parameter list, the configuration of all access control lists will be displayed.

Result

The configuration of the access control lists is displayed.

11.4.1.2 show interface access lists**Description**

This command shows the access control list of one or all interfaces.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show interface access-lists [<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameter from the parameter list, the configuration is displayed for all available interfaces.

Result

The access control list of the selected IP interface is displayed.

11.4.2 Commands in the Global Configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.4.2.1 ip access-list

Description

With this command, you generate a MAC access control list and change to the ACL standard configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
ip access-list standard<access-list-number(1-128)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
standard	Specifies that a standard access control list is generated	-
access-list-number	Number of the standard access control list	1 ... 128

Result

The access control list has been generated.

You are in the ACL Standard configuration mode.

The command prompt is:

```
cli(config-std-nacl)#
```

Further notes

You delete the IP access control list with the `no ip access-list` command.

You exit the ACL Standard configuration mode with the `exit` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.2.2 no ip access-list

Description

With this command, you delete an IP access control list.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no ip access-list standard<access-list-number(1-128)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
standard	Specifies that a standard access control list is generated	-
access-list-number	Number of the standard access control list	1 ... 128

Result

The access control list is deleted.

Further notes

You generate an IP access control list with the `ip access-list` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.3 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.4.3.1 ip access-group

Description

With this command, you enable the access control of the packets of an interface.

Note

In the internal configuration mode of a VLAN, the ACL rule applies to all ports that belong to the VLAN.

Requirement

- An IP access list has been created.
- You are in the Interface Configuration mode of a switch port, a router port or a VLAN. The command prompt is as follows:

- With a switch port:

```
cli(config-if-Gi$-$)#
```

```
cli(config-if-Ex$-$)#
```

- With a router port

```
cli(config-RPort-Gi$-$)#
```

- With a VLAN

```
cli(config-if-vlan-$$$)#
```

Syntax

Call up the command with the following parameters:

```
ip access-group <access-list-number(1-128)> {in|out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
access-list-number	Number of the access control list	1 ... 128
in	Specifies that incoming packets are filtered	-
out	Specifies that outgoing packets are filtered	-

Note

Restrictions when filtering layer 2 interfaces

Use an expanded MAC address access control list to filter packets outgoing on layer 2 interfaces.

Result

The packets are filtered according to the access control list (ACL).

Further notes

You disable the setting with the `no ip access-group` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.3.2 no ip access-group

Description

With this command, you disable the access control of the packets of an interface.

Requirement

You are in the Interface Configuration mode of a switch port, a router port or a VLAN.
The command prompt is as follows:

- With a switch port:

```
cli (config-if-Gi$-$) #
```

```
cli (config-if-Ex$-$) #
```

- With a router port

```
cli (config-RPort-Gi$-$) #
```

- With a VLAN

```
cli (config-if-vlan-$$$) #
```

Syntax

Call up the command with the following parameters:

```
no ip access-group [<access-list-number(1-128)>]{in|out}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
access-list-number	Number of the access control list	1 ... 128
in	Specifies that incoming packets are filtered	-
out	Specifies that outgoing packets are filtered	-

If you do not specify a number for an access control list, all lists of an interface are disabled.

Result

The packet filtering according to the access control list (ACL) is canceled.

Further notes

You enable the setting with the `ip access-group` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4 Commands in the ACL standard configuration mode

This section describes commands that you can call up in the ACL standard configuration mode.

In the Global configuration mode, enter the `ip access-list standard <acl-num>` command, to change to the configuration mode for this ACL. If an ACL with the specified number does not exist, an ACL with the corresponding number is created.

Note

You can display existing access control lists with the `show access-lists` command.

- If you exit the ACL standard configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the ACL standard configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.4.4.1 permit

Description

With this command, you configure an IP access control list. The IP ACL contains a description of the IP addresses for which the incoming and outgoing frames will be forwarded.

You have the following options:

- All incoming and/or outgoing frames are forwarded.
- Incoming and/or outgoing frames of a specific host are forwarded.
- Incoming and/or outgoing frames of hosts of a specific subnet are forwarded.
- Incoming and/or outgoing frames of a specific protocol are forwarded.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
permit {any | ospf | vrrp | <protocol-type type(1-255)>} {any | host <src-ip> | <network-src-ip> <mask>} {any | host <dest-ip> | <network-dest-ip> <mask>} [dscp <value (0-63)>]
```

or

```
permit {any | host <src-ip> | <network-src-ip> <mask>} [{any | host <dest-ip> | <network-dest-ip> <mask>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Allows all protocols.	-
ospf	Forwarding of OSPF frames.	-
vrrp	Forwarding of VRRP frames.	-
protocol-type	Keyword for the protocol type	-
type	Protocol type	1 ... 255
any	Allows all incoming frames	-
host	Keyword for a single IP address	-
src-ip	Source IP address	Enter a valid IP address.
network-src-ip	Network source address	Enter a valid combination of IP address and subnet mask.
mask	Corresponding subnet mask	
any	Allows all outgoing frames	-
host	Keyword for a single IP address	-
dest-ip	Destination IP address	Enter a valid IP address.
network-dest-ip	Network destination address	Enter a valid combination of IP address and subnet mask.
mask	Corresponding subnet mask	

Parameter	Description	Range of values / note
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IP address), you will need to specify the subnet mask "255,255,255,255". As an alternative, you can specify the keyword "host" followed by the IP address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.2 deny

Description

With this command, you configure an IP access control list. The IP ACL contains a description of the IP addresses for which the incoming and outgoing frames will not be forwarded.

You have the following options:

- All incoming and/or outgoing frames are not forwarded.
- Incoming and/or outgoing frames of a specific host are not forwarded.
- Incoming and/or outgoing frames of hosts of a specific subnet are not forwarded.
- Incoming and/or outgoing frames of a specific protocol are not forwarded.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
deny {any | ospf | vrrp | <protocol-type type(1-255)>} {any | host <src-ip> | <network-src-ip> <mask>} {any | host <dest-ip> | <network-dest-ip> <mask>} [dscp <value (0-63)>]
```

or

```
deny {any | host <src-ip> | <network-src-ip> <mask>} [ { any | host <dest-ip> | <network-dest-ip> <mask>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Blocks all protocols.	-
ospf	Blocks OSPF frames.	-
vrrp	Blocks VRRP frames.	-
protocol-type	Keyword for the protocol type	-
type	Protocol type	1 ... 255
any	Blocks all incoming frames	-
host	Keyword for a single IP address	-
src-ip	Source IP address	Enter a valid IP address.
network-src-ip	Network source address	Enter a valid combination of IP address and subnet mask.
mask	Corresponding subnet mask	
any	Blocks all outgoing frames	-
host	Keyword for a single IP address	-
dest-ip	Destination IP address	Enter a valid IP address.
network-dest-ip	Network destination address	Enter a valid combination of IP address and subnet mask.
mask	Corresponding subnet mask	
value	Value	0 ... 63

Parameter	Description	Range of values / note
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IP address), you will need to specify the subnet mask "255,255,255,255". As an alternative, you can specify the keyword "host" followed by the IP address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.3 permit icmp

Description

With this command, you configure an IP access control list for ICMP messages.

You have the following options:

- All incoming and/or outgoing ICMP messages are forwarded.
- Incoming and/or outgoing ICMP messages of a specific host are forwarded.
- Incoming and/or outgoing ICMP messages of hosts of a specific subnet are forwarded.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
permit icmp {any | host <src-ip-address> | <src-ip-address> <src-mask>} [{any | host  
<dest-ip-address> | <dest-ip-address> <dest-mask>}] [<message-type type(0-255)>]  
[<message-code code(0-255)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Allows all incoming frames	-
host	Keyword for a an individual IPv4 address	-
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	
any	Allows all outgoing frames	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
dest-mask	Corresponding subnet mask	
message-type	Keyword for the ICMP message type	-
type	ICMP message type	0 ... 255
message-code	Keyword for the ICMP message code	-
code	ICMP message code	0 ... 255

Result

The IP access list for ICMP messages has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.4 deny icmp

Description

With this command, you configure an IP access control list for ICMP messages.

You have the following options:

- All incoming and/or outgoing ICMP messages are not forwarded.
- Incoming and/or outgoing ICMP messages of a specific host are not forwarded.
- Incoming and/or outgoing ICMP messages of hosts of a specific subnet are not forwarded.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
deny icmp {any | host <src-ip-address> | <src-ip-address> <src-mask>} [{any | host  
<dest-ip-address> | dest-ip-address> <dest-mask>}] [<message-type type(0-255)>]  
[<message-code code(0-255)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Blocks all incoming frames	-
host	Keyword for a an individual IPv4 address	-

Parameter	Description	Range of values / note
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	
any	Blocks all outgoing frames	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
dest-mask	Corresponding subnet mask	
message-type	Keyword for the ICMP message type	-
type	ICMP message type	0 ... 255
message-code	Keyword for the ICMP message code	-
code	ICMP message code	0 ... 255

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list for ICMP messages has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.5 permit tcp

Description

With this command, you configure an IP access control list for the TCP protocol.

You have the following options:

- All incoming and/or outgoing TCP segments are forwarded.
- Incoming and/or outgoing TCP segments of a specific host are forwarded.

- Incoming and/or outgoing TCP segments of hosts of a specific subnet are forwarded.
- Incoming and/or outgoing TCP segments are forwarded to specific ports.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli (config-std-nacl) #
```

Syntax

Call up the command with the following parameters:

```
permit tcp {any | host <src-ip-address> | <src-ip-address> <src-mask>} [{ gt <src-  
port-number(1-65535)> | lt <src-port-number(1-65535)> | eq <src-port-number(1-65535)>  
| range <src-port-number (1-65535)> <src-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)>}] [dscp<value(0-63)>] [{ack | rst}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Forwards all incoming TCP segments.	-
host	Keyword for a an individual IPv4 address	-
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	
src-port-number		
port-number	Port number	1 ... 65535
gt	Keyword for port numbers higher than the specified number (gt: greater than).	-
lt	Keyword for port numbers lower than the specified number (lt: less than).	-
eq	Keyword for a specific port number (eq:equal).	-

Parameter	Description	Range of values / note
range	Keyword for a range of port numbers. Following this, the first and last port number of the range is specified.	-
any	Forwards all outgoing TCP segments.	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
dest-mask	Corresponding subnet mask	
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63
ack	Forwards ACK segments.	-
rst	Forwards RST segments.	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list for TCP segments has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.6 deny tcp

Description

With this command, you configure an IP access control list for the TCP protocol.

You have the following options:

- All incoming and/or outgoing TCP segments are not forwarded.
- Incoming and/or outgoing TCP segments of a specific host are not forwarded.
- Incoming and/or outgoing TCP segments of hosts of a specific subnet are not forwarded.
- Incoming and/or outgoing TCP segments are not forwarded to specific ports.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
deny tcp {any | host <src-ip-address> | <src-ip-address> <src-mask>} [{ gt <src-port-number(1-65535)> | lt <src-port-number(1-65535)> | eq src-port-number(1-65535)> | range <src-port-number (1-65535)> <src-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)>}] [dscp<value(0-63)>] [{ack | rst}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Blocks all incoming TCP segments	-
host	Keyword for a an individual IPv4 address	-
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	
src-port-number		
port-number	Port number	1 ... 65535
gt	Keyword for port numbers higher than the specified number (gt: greater than).	-
lt	Keyword for port numbers lower than the specified number (lt: less than).	-

Parameter	Description	Range of values / note
eq	Keyword for a specific port number (eq:equal).	-
range	Keyword for a range of port numbers. Following this, the first and last port number of the range is specified.	-
any	Blocks all outgoing TCP segments	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
mask	Corresponding subnet mask	
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63
ack	Blocks ACK segments	-
rst	Blocks RST segments	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list for TCP segments has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.7 permit udp

Description

With this command, you configure an IP access control list for the UDP protocol.

You have the following options:

- All incoming and/or outgoing UDP datagrams are forwarded.
- Incoming and/or outgoing UDP datagrams of a specific host are forwarded.
- Incoming and/or outgoing UDP datagrams of hosts of a specific subnet are forwarded.
- Incoming and/or outgoing UDP datagrams are forwarded to specific ports.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following 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)>}] [dscp<value(0-63)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
any	Forwards all incoming UDP frames.	-
host	Keyword for a an individual IPv4 address	-
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	

Parameter	Description	Range of values / note
src-port-number	Source port number	1 ... 65535
dest-port-number	Destination port number	
gt	Keyword for port numbers higher than the specified number (gt: greater than).	-
lt	Keyword for port numbers lower than the specified number (lt: less than).	-
eq	Keyword for a specific port number (eq:equal).	-
range	Keyword for a range of port numbers. Following this, the first and last port number of the range is specified.	-
any	Forwards all outgoing TCP segments.	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
dest-mask	Corresponding subnet mask	
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list for UDP datagrams has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete an IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.4.4.8 deny udp

Description

With this command, you configure an IP access control list for the UDP protocol.

You have the following options:

- All incoming and/or outgoing UDP datagrams are not forwarded.
- Incoming and/or outgoing UDP datagrams of a specific host are not forwarded.
- Incoming and/or outgoing UDP datagrams of hosts of a specific subnet are not forwarded.
- Incoming and/or outgoing UDP datagrams are not forwarded to specific ports.

Note

Processing order of the lists

The access control lists are processed on the interface in the order in which they were created.

The index number of the access control list is not used for this.

Requirement

You are in the ACL standard configuration mode.

The command prompt is as follows:

```
cli(config-std-nacl)#
```

Syntax

Call up the command with the following parameters:

```
deny udp {any | host <src-ip-address> | <src-ip-address> <src-mask>} [{ gt <src-port-  
number(1-65535)> | lt <src-port-number(1-65535)> | eq <src-port-number(1-65535)> |  
range <src-port-number (1-65535)> <src-port-number (1-65535)>}] [{any | host <dest-  
ip-address> | <dest-ip-address> dest-mask}] [{ gt <dest-port-number(1-65535)> | lt  
<dest-port-number(1-65535)> | eq <dest-port-number(1-65535)> | range <dest-port-  
number (1-65535)> <dest-port-number (1-65535)>}] [dscp<value(0-63)>]
```

Parameter	Description	Range of values / note
any	Blocks all incoming UDP frames	-
host	Keyword for a an individual IPv4 address	-
src-ip-address	Source IPv4 address	Enter a valid IPv4 address.
src-ip-address	Network source address	Enter a valid combination of IPv4 address and subnet mask.
src-mask	Corresponding subnet mask	
src-port-number	Source port number	1 ... 65535
dest-port-number	Destination port number	

Parameter	Description	Range of values / note
gt	Keyword for port numbers higher than the specified number (gt: greater than).	-
lt	Keyword for port numbers lower than the specified number (lt: less than).	-
eq	Keyword for a specific port number (eq:equal).	-
range	Keyword for a range of port numbers. Following this, the first and last port number of the range is specified.	-
any	Blocks all outgoing TCP segments	-
host	Keyword for a an individual IPv4 address	-
dest-ip-address	Destination IPv4 address	Enter a valid IPv4 address.
dest-ip-address	Network destination address	Enter a valid combination of IPv4 address and subnet mask.
dest-mask	Corresponding subnet mask	
dscp	Keyword for the Differentiated Services Codepoint	-
value	Value for the Differentiated Services Codepoint	0 ... 63

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The IP access list for UDP datagrams has been configured.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255". As an alternative, you can specify the keyword "host" followed by the IPv4 address.

Further notes

You delete the IP access control list with the `no ip access-list standard <acl-num>` command.

You display the configuration of the access control list with the `show access-lists` command.

11.5 Port Access Control List Locked Ports

With the Port Access Control List Locked Ports functionality, MAC addresses that do not age are collected on a port after the `start` command. With the `stop` command, these addresses are converted to static entries in the address list and the aging is reactivated for all the addresses that follow.

If the learning of addresses on this port is then disabled, data packets are only forwarded to the static addresses entered in the table.

This section describes commands relevant for the configuration of this function.

11.5.1 The "show" commands

This section describes commands with which you display various settings.

11.5.1.1 show lock port

Description

This command shows whether or not the learning of MAC entries is enabled or locked on an interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show lock port [<interface-type><interface-id>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select an interface, the configuration of all interfaces is displayed.

Result

The configuration of the interface for the learning of MAC entries is displayed.

11.5.2 Commands in the Global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.5.2.1 clear-all-static-unicast

Description

With this command, you delete all static unicast MAC address entries from the MAC address table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
clear-all-static-unicast
```

Result

The static unicast MAC address entries are deleted from the MAC address table.

11.5.2.2 auto-learn

Description

With this command, you change to the AUTOLEARN mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```


Syntax

Call the command without parameters:

```
auto-learn
```

Result

You are now in the AUTOLEARN mode.

The command prompt is as follows:

```
cli(config-auto-learn)#
```

Further notes

You exit the AUTOLEARN configuration mode with the command `end` or `exit`.

11.5.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.5.3.1 switchport lock

Description

With this command, you block the learning of MAC entries. Only the static address entries of the MAC address list are used on the port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
switchport lock
```

Result

The learning of MAC addresses is blocked.

Further notes

You enable the learning of MAC addresses with the `no switchport lock` command.

You display the configuration with the `show lock port` command.

11.5.3.2 no switchport lock

Description

With this command, you enable the learning of MAC addresses.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no switchport lock
```

Result

The learning of MAC addresses is enabled.

Further notes

You block the learning of MAC addresses with the `switchport lock` command.

You display the configuration with the `show lock port` command.

11.5.4 Commands in the AUTOLEARN mode

This section describes commands that you can call up in the AUTOLEARN mode.

In the Global configuration mode, enter the `auto-learn` command to change to this mode.

- If you exit the AUTOLEARN mode with the `exit` command, you return to the Global configuration mode.
- If you exit the AUTOLEARN mode with the `end` command, you return to the Privileged EXEC mode.

11.5.4.1 start

Description

With this command, you start automatic learning. During automatic learning, the aging timer is disabled for all learned addresses.

Requirement

You are in the AUTOLEARN mode.

The command prompt is as follows:

```
cli(config-auto-learn)#
```

Syntax

Call the command without parameters:

```
start
```

Result

The learned MAC addresses are entered in the "port database" with the aging time 0. (The entries are NOT deleted when the "MAC Address Aging Time" expires).

Further notes

You stop automatic learning with the `stop` command.

11.5.4.2 stop

Description

With this command, you stop automatic learning and convert all learned MAC addresses to static entries.

Requirement

You are in the AUTOLEARN mode.

The command prompt is as follows:

```
cli(config-auto-learn)#
```

Syntax

Call the command without parameters:

```
stop
```

Result

Automatic learning is stopped and all learned entries are converted to static entries.

Further notes

You start automatic learning with the `start` command.

11.6 Management Access Control List

This section describes the commands relevant for working with the management access control list.

11.6.1 The "show" commands

This section describes commands with which you display various settings.

11.6.1.1 show authorized-managers

Description

This command shows the information about the configuration of the authorized managers.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show authorized-managers[ip-source<ip-address>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip-source	Keyword for the network or host address	-
ip-address	Value for an IP address	specify a valid IP address

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The information about the configuration of the authorized managers is displayed.

11.6.2 Commands in the Global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.6.2.1 `authorized-manager`

Description

With this command, you enable the authorized manager.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
authorized-manager
```

Result

The authorized manager is activated.

Further notes

You disable the function with the `no authorized-manager` command.

11.6.2.2 `no authorized-manager`

Description

With this command, you disable the authorized manager.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no authorized-manager
```

Result

The authorized manager is deactivated.

Further notes

You enable the function with the `authorized-manager` command.

11.6.2.3 authorized-manager ip-source

Description

With this command, you configure the interfaces and protocols via which an authorized manager is allowed to access the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
authorized-manager ip-source <ip-address>  
  [{<subnet-mask>|/<prefixlength(0-32)>}]  
  [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]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip-address	Specifies the network or the IP address for which the IP manager is authorized	Enter a valid IPv4 address or a network.
subnet-mask	Subnet mask that restricts the authorization	Enter a valid mask.
prefixlength	Decimal representation of the mask as a number of "1" bits	0 ... 32
interface	Keyword for a an interface description	-
interface-type	Type of interface	Enter a valid interface.
0/a-b,0/c,...	Module no. and port no. of the interface	
vlan	Keyword for a VLAN connection	-
a,b or a-b or a,b,c-d	Number of a VLAN or VLAN range	Enter a valid VLAN or VLAN range.
cpu0	the Out of Band- interface is configured as a management Interface	-
service	Specifies the services for which the manager is authorized. You can select several options.	<ul style="list-style-type: none"> • snmp • telnet • http • https • ssh

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

The IP address 0.0.0.0 means "any manager".

If optional parameters are not specified when configuring, the manager is authorized for all services.

Note

Configuration of the first entry

As long as the list of authorized managers is empty, access to the system is not restricted.

As soon as the list contains an entry and the "authorized-manager" command is executed, access to the system is blocked for all others.

You should therefore configure the interface via which you access the system first because your access is otherwise blocked.

Result

The interfaces and protocols via which an authorized manager is allowed to access the device are configured.

Note

No restrictions for console port

The restrictions do not apply to the serial console (console port).

Further notes

You delete an interface for access of an authorized manager with the `no authorized-manager ip-source` command.

You show the information about the configuration of the authorized managers with the `show authorized-manager` command.

11.6.2.4 no authorized-manager ip-source

Description

With this command, you delete an interface via which an authorized manager is allowed to access the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no authorized-manager ip-source <ip-address>
    [{<subnet-mask>|<prefix-length(0-32)>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ip-address	Specifies the network or the IP address for which the IP manager is authorized	Enter a valid IP address or a network
subnet-mask	Subnet mask that restricts the authorization	Enter a valid mask
prefix-length	Decimal representation of the mask as a number of "1" bits	0 ... 32

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

An authorized manager is deleted from the list.

Further notes

You configure the interfaces and protocols via which an authorized manager is allowed to access the device with the `authorized-manager ip-source` command.

You show the information about the configuration of the authorized managers with the `show authorized-manager` command.

11.7 Port-based Network Access Control (Dot1X)

This section describes commands for working with port-based network access control (PNAC).

11.7.1 The "show" commands

This section describes commands with which you display various settings.

11.7.1.1 show dot1x

Description

This command shows information about port-based network access control (PNAC).

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show dot1x[{interface<interface-type><interface-id>|  
statistics interface<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
statistics inter- face	Keyword for the display of the statisti- cal data of the dot1x Authenticator for an interface	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The dot1x information is displayed.

11.7.1.2 show dot1x guest-vlan mac-info

Description

This command displays which MAC address and which port are assigned to a guest VLAN.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show dot1x guest-vlan mac-info
```

Result

A list with guest VLAN, MAC address and port is displayed.

11.7.1.3 **show dot1x mac-auth mac-info**

Description

This command shows the MAC addresses for which MAC authentication is enabled.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show dot1x mac-auth mac-info
```

Result

A list of the MAC addresses is displayed.

11.7.2 **Commands in the global configuration mode**

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

11.7.2.1 **dot1x guest-vlan**

Description

With this command, you enable the guest VLAN function for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
dot1x guest-vlan
```

Result

The guest VLAN function is enabled for the device.

Further notes

You also still need to enable the guest VLAN function for every port intended to use this function. You do this with the `dot1x guest-vlan` command in the Interface configuration mode.

You disable the function with the `no dot1x guest-vlan` command

You display this setting and other information with the `show dot1x` command.

11.7.2.2 no dot1x guest-vlan

Description

With this command, you disable the guest VLAN function for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no dot1x guest-vlan
```

Result

The guest VLAN function is disabled for the device.

Further notes

You enable the function with the `dot1x guest-vlan` command

You display this setting and other information with the `show dot1x` command.

11.7.2.3 dot1x mac-auth

Description

With this command, you enable MAC authentication for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
dot1x mac-auth
```

Result

MAC authentication is enabled for the device.

Further notes

You also still need to enable MAC authentication for every port intended to use this function. You do this with the `dot1x mac-auth` command in the Interface configuration mode.

You disable the function with the `no dot1x mac-auth` command.

You display this setting and other information with the `show dot1x` command.

11.7.2.4 no dot1x mac-auth

Description

With this command, you disable MAC authentication for the device.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no dot1x mac-auth
```

Result

MAC authentication is disabled for the device.

Further notes

You enable the function with the `dot1x mac-auth` command.

You display this setting and other information with the `show dot1x` command.

11.7.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

11.7.3.1 dot1x guest-vlan

Description

With this command, you enable the guest VLAN function for a port.

This function is also known as "Authentication failed VLAN".

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
dot1x guest-vlan
```

Result

The guest VLAN function is enabled for the device.

Further notes

You also need to enable the guest VLAN function for the device. You do this with the `dot1x guest-vlan` command in the Global configuration mode.

You disable the function with the `no dot1x guest-vlan` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.2 no dot1x guest-vlan

Description

With this command, you disable the guest VLAN function for a port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no dot1x guest-vlan
```

Result

The guest VLAN function is disabled for the device.

Further notes

You enable the function with the `dot1x guest-vlan` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.3 dot1x guest-vlan vlan-id

Description

With this command, you configure a guest VLAN for a port.

The port can only be assigned to the VLAN, if the VLAN has been created on the device. Otherwise Authentication is rejected.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
dot1x guest-vlan vlan-id <vlan-id (1 - 4096)>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
vlan-id	Keyword for the VLAN ID	-
-	VLAN ID	1 - 4096

Result

The guest VLAN ID is assigned to the port.

Further notes

You reset the guest VLAN ID to the default value with the `no dot1x guest-vlan vlan-id` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.4 no dot1x guest-vlan vlan-id

Description

With this command, the guest VLAN ID is reset to the default value 1.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no dot1x guest-vlan vlan-id
```


Result

The ID of the guest VLAN has the value 1.

Further notes

You configure the guest VLAN ID with the `dot1x guest-vlan vlan-id` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.5 dot1x guest-vlan reset

Description

This command removes MAC addresses from the guest VLAN. If you specify a MAC address, only this MAC address is removed from the guest VLAN. If you use this command without parameters, all MAC addresses are removed from the guest VLAN.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
dot1x guest-vlan reset [mac <aa:aa:aa:aa:aa:aa>]
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
mac	Keyword for the MAC address	-
	MAC address to be removed from the guest VLAN.	aa:aa:aa:aa:aa:aa

Result

The specified MAC address or all MAC addresses are no longer assigned to the guest VLAN.

11.7.3.6 set dot1x guest-vlan mac-addr count

Description

With this command, you specify how many MAC addresses can be authenticated on the port at the same time.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
set dot1x guest-vlan mac-addr count <num-of-addresses (1-100)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
num-of-addresses	Maximum number of devices	1 ... 100

Result

The maximum number of devices for the port has been specified.

Further notes

You display this setting and other information with the `show dot1x` command.

11.7.3.7 dot1x mac-auth

Description

With this command, you enable MAC authentication for a port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
dot1x mac-auth
```

Result

MAC authentication is enabled for a port.

Further notes

You also still need to enable MAC authentication for the device. You do this with the `dot1x mac-auth` command in the Global configuration mode.

You disable the function with the `no dot1x mac-auth` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.8 no dot1x mac-auth

Description

With this command, you disable MAC authentication for a port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no dot1x mac-auth
```

Result

MAC authentication is disabled for a port.

Further notes

You enable the function with the `dot1x mac-auth` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.9 dot1x mac-auth port reset

Description

With this command, you reset MAC authentication for a port.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
dot1x mac-auth port [mac <aa:aa:aa:aa:aa:aa>] reset
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mac	Keyword for a MAC address	-
aa:aa:aa:aa:aa:aa	MAC address of the interface	aa:aa:aa:aa:aa:aa

Result

MAC authentication is reset for the port.

11.7.3.10 dot1x mac-auth vlan-assign

Description

With this command you enable the assignment of the VLAN ID for a MAC address by the RADIUS server.

The port can only be assigned to the VLAN, if the VLAN has been created on the device. Otherwise Authentication is rejected.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
dot1x mac-auth vlan-assign
```

Result

The VLAN ID for a MAC address is assigned by the RADIUS server.

Further notes

You disable the assignment of the VLAN ID for a MAC address by the RADIUS server with the `no dot1x mac-auth vlan-assign` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.11 no dot1x mac-auth vlan-assign

Description

With this command you disable the assignment of the VLAN ID for a MAC address by the RADIUS server.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no dot1x mac-auth vlan-assign
```

Result

The VLAN ID for a MAC address is no longer assigned by the RADIUS server.

Further notes

You enable the assignment of the VLAN ID for a MAC address by the RADIUS server with the `dot1x mac-auth vlan-assign` command.

You display this setting and other information with the `show dot1x` command.

11.7.3.12 dot1x port-control

Description

With this command, you configure port control parameter of the authenticator.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
dot1x port-control {auto|force-authorized|force-unauthorized}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
auto	Authentication according to IEEE 802.1x is enabled for the interface. The data traffic via the interface is permitted or blocked depending on the authentication result.	-
force-authorized	data traffic via the interface is permitted without restrictions	Default: force-authorized enabled
force-unauthorized	data traffic via the interface is blocked	-

Result

The port control parameter is configured.

Further notes

You can reset the port control parameter to the default with the `no dot1x port-control` command.

You can display the status of this function and other information with the `show dot1x` command.

11.7.3.13 **no dot1x port-control**

Description

With this command, you reset the port control parameter of the authenticator to the default value.

The default value is `force-authorized`.

With this, data traffic is permitted without restrictions.

Requirement

You are in the Interface Configuration mode.

The command prompt is as follows:

```
cli (config-if-$$$) #
```

Syntax

Call the command without parameters:

```
no dot1x port-control
```

Result

The port control parameter of the authenticator is reset to the default value.

Further notes

You configure the port control parameter with the `dot1x port-control` command.

You can display the status of this function and other information with the `show dot1x` command.

11.7.3.14 **set dot1x mac-auth mac-addr count**

Description

With this command, you specify how many MAC addresses can be authenticated on the port at the same time.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli (config-if-$$$) #
```

Syntax

Call up the command with the following parameters:

```
set dot1x mac-auth mac-addr count <num-of-addresses (1-100)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
num-of-addresses	Maximum number of devices	1 ... 100

Result

The maximum number of devices for the port has been specified.

Further notes

You display this setting and other information with the `show dot1x` command.

11.7.3.15 dot1x reauthentication

Description

With this command, you enable the 802.1x Re-Authentication function for the selected interface. When the function is enabled, the authenticator repeats authentication of the client periodically,

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
dot1x reauthentication
```

Result

Periodic authentication is enabled for the selected interface.

Further notes

You disable the function with the `no dot1x reauthentication` command.

You can display the status of this function and other information with the `show dot1x` command.

11.7.3.16 no dot1x reauthentication

Description

With this command, you disable the function that repeats the authentication of the client by the authenticator periodically.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no dot1x reauthentication
```

Result

Periodic authentication is disabled.

Further notes

You enable the function with the `dot1x reauthentication` command.

You can display the status of this function and other information with the `show dot1x` command.

The monitoring of the system and error diagnostics are handled in different ways:

- **Events and faults handling:**
Predefined events generate a message. These messages can be distributed in different ways:
 - Entry in the local log
 - Transfer to the Syslog server
 - Sending as e-mail
 - Sending as SNMP trap
- **Syslog:**
Configures the transfer to the Syslog server
- **Remote Monitoring (RMON):**
Variables of the Management Information Base are monitored for the violation of limit values and messages are generated if they do. These messages are collected and can be distributed in the following ways:
 - Entry in the local log
 - Sending as SNMP trap
 - Transfer to the Syslog server
 - Transfer to a network management station using SNMP
- **Port mirroring:**
Mirroring of ports to analyze the data stream without disturbing operation
- **Loop detection:**
Detection and elimination of damaging loops. Loops in the network can cause total failure of the transfer and must be detected and eliminated.

12.1 Event and fault handling

In events and faults handling, you set the events whose messages will be distributed in one of the available ways.

You configure the monitoring of certain system events and power supply and physical interfaces in the Events configuration mode.

12.1.1 logging console

Description

With this command, you enable the logging of inputs and outputs to the console.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
logging console
```

Result

The logging function is enabled on the console.

Further notes

You disable the setting with the `no logging console` command.

As default the function is "disabled".

12.1.2 no logging console

Description

With this command, you disable the logging of inputs and outputs to the console.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
no logging console
```

Result

The logging function is disabled on the console.

Further notes

You enable the setting with the `logging console` command.

As default the function is "disabled".

12.1.3 The "show" commands

This section describes commands with which you display various settings.

12.1.3.1 show events config

Description

This command shows the current configuration for forwarding the messages of the various event types.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events config
```

Result

The current configuration of the events display is displayed.

12.1.3.2 show events severity

Description

This command shows the degree of severity of an event ("Info", "Warning" or "Critical") starting at which a notification (sending of an e-mail, entry in the Syslog table, entry in the Syslog file) is generated.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events severity
```

Result

The corresponding degree of severity is shown for each type of notification.

Further notes

You configure the assignment of the degree of severity of an event and the type of notification with the `severity` command.

12.1.3.3 show events faults config

Description

This command shows the current configuration of the following error monitoring functions:

- Monitoring of the power supply for power outage
- Monitoring of the network connections for a change in the connection status

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show events faults config [{power|link}]
```

The parameters have the following meaning:

Parameter	Description
power	Monitoring of the power supply for power outage
link	Monitoring of the network connections for a change in the connection status

If no parameters are specified, the settings for both error monitoring functions are displayed.

Result

The current configuration of the selected error monitoring function is displayed.

12.1.3.4 show events faults status**Description**

This command shows the status messages of fault monitoring of the power supply and network connections.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show events faults status
```

Result

A table with the status messages of the error monitoring functions is displayed.

12.1.3.5 show startup-information**Description**

This command shows the startup information.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show startup-information
```

Result

Startup information is shown.

12.1.3.6 show logbook

Description

With this command, you display the content of the logbook. The log entries are categorized differently.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show logbook
```

or

Call up the command with the following parameters:

```
show logbook { info | warning | critical }
```

The parameters have the following meaning:

Parameter	Description
info	All log entries of the categories "Information", "Warning" and "Critical" are displayed.
warning	All log entries of the categories "Warning" and "Critical" are displayed.
critical	All log entries of the category "Critical" are displayed.

Result

The content of the logbook is displayed.

12.1.3.7 show cabletest interface

Description

This command shows the result of the cable test of the interface.

Requirement

- The interface has no active data traffic.
- The `cabletest interface` function was used on the specified interface in the Global configuration mode.
- You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is:
`cli>` or `cli#`

Syntax

Call up the command with the following parameters:

```
show cabletest interface <interface-type> <interface-id>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>interface-type</code>	Type of interface	Enter a valid interface.
<code>interface-id</code>	Interface identifier	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The result is displayed.

Further notes

You enable the cable test function with the `cabletest interface` command in the Global configuration mode.

12.1.3.8 show interface transceiver details

Description

This command runs error diagnostics for an SFP port.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameter assignment:

```
show interface transceiver details
```

Result

Hardware information (model, serial number) and operating parameters (data transmission rate, voltage and current consumption as well as the transmit and receive power) for SFP port are displayed.

12.1.3.9 show power-line-state

Description

This command shows the status of the power supply.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show power-line-state
```

Result

The status of the power supply is displayed.

12.1.4 clear logbook

Description

With this command, you delete the content of the logbook.

Requirement

You are in the Privileged EXEC mode.

The command prompt is as follows:

```
cli#
```

Syntax

Call the command without parameters:

```
clear logbook
```

Result

The content of the logbook is deleted.

12.1.5 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

12.1.5.1 events

Description

With this command, you change to the EVENTS configuration mode.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
events
```

Result

You are now in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Further notes

You exit the EVENTS configuration mode with the command `end` or `exit`.

12.1.5.2 cabletest interface

Description

With this command, you enable the cable test for the specified interface.

Note

Wire pairs

Wire pairs 4-5 and 7-8 of 10/100 Mbps network cables are not used.

The wire pair assignment - pin assignment is as follows (DIN 50173):

Pair 1 = pin 1-2

Pair 2 = pin 3-6

Pair 3 = pin 4-5

Pair 4 = pin 7-8

Requirement

- The interface has no active data traffic.
- You are in the Global configuration mode.
The command prompt is:

```
cli(config)#
```

Syntax

Call up the command without parameters or with the following parameter assignment:

```
cabletest interface <interface-type> <interface-id> [force]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface-type	Type of interface	Enter a valid interface.
interface-id	Interface identifier	
force	Forces a link down during the test	Necessary parameter if there is a link up on the interface.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

Following the test phase, the result is displayed.

The value for the distance has a tolerance of +/- 1 m.

12.1.6 Commands in the Events configuration mode

This section describes commands that you can call up in the EVENTS configuration mode.

In the Global configuration mode, enter the `events` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

- If you exit the EVENTS configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the EVENTS configuration mode with the `end` command, you return to the Privileged EXEC mode.

12.1.6.1 add log

Description

With this command, you create an entry in the log.

Requirement

You are in the EVENTS Configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call the command without parameters:

```
add log <log-entry>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
log-entry	Entry in the logbook	max. 150 characters

Result

The entry has been made in the logbook.

12.1.6.2 client config

Description

With this command, you enable one of the clients that processes or forwards the messages of the device.

The following clients are available:

- `syslog`: sends the messages to the Syslog server
- `trap`: sends the messages as SNMP trap to a configured recipient
- `email`: sends the messages as e-mail

Requirement

You are in the EVENTS Configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
client config {syslog|trap|email|all}
```

The parameters have the following meaning:

Parameter	Description
<code>syslog</code>	Enables the client that sends the messages to the Syslog server
<code>trap</code>	Enables the client that sends the SNMP traps
<code>email</code>	Enables the client that sends the e-mails
<code>all</code>	Enables all clients at once

Result

The function of the client selected for the transfer is enabled.

Further notes

You display the status of the events and the clients with the `show events config` command.

You disable a client with the `no client config` command.

12.1.6.3 no client config

Description

With this command, you disable one of the clients that processes or forwards the messages of the device.

Requirement

You are in the EVENTS Configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
no client config {syslog|trap|email|all}
```

The parameters have the following meaning:

Parameter	Description
syslog	Disables the client that sends the messages to the Syslog server
trap	Disables the client that sends the SNMP traps
email	Disables the client that sends the e-mails
all	Disables all clients at once

Result

The client selected for the transfer is disabled.

Further notes

You display the status of the events and the clients with the `show events config` command.

You enable the function with the `client config` command.

12.1.6.4 event config

Description

With this command, you configure which of the various message types of the device will be stored or forwarded.

The following events or message types are available:

- Message if there is cold or warm restart
- Message when there is a status change on a physical interface

- Message if there is an incorrect login
- Message when there is a Remote Monitoring alarm (RMON alarm)
- Message when there is a status change in the power supply
- Message when there is a status change in the redundancy manager (RM)
- Message when there is a status change on a standby connection
- Message when there is a status change in the error monitoring
- Message when there is a change in the spanning tree
- Message when there is a status change of the VRRP routers
- Message if there is a status change in the detection of network loops
- Message on status change of OSPF routers
- Message when there is a status change in the diagnostics data

These messages can be processed by the clients in different ways:

- Entry in the logbook of the device
- Sending the message to the Syslog server
- Sending an e-mail
- Sending an SNMP trap

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
event config
  {cold-warmstart|linkchange|authentication-failure|
  rmon-alarm|power-change|rm-state-change|standby-state-change|faultstate-change|
  stp-change|vrrp-state-change|loopd-state-change|ospf-state-change|dot1x-port-auth-
  state-change|poe- state-change|fmp-state-change|env-data-change|all}
  {logtable|syslog|email|trap|faults|all}
```

The parameters have the following meaning:

Parameter	Description
cold-warmstart	Message if there is cold or warm restart
linkchange	Message when there is a status change on a physical interface
authentication-failure	Message if there is an incorrect login
rmon-alarm	Message when there is a RMONalarm
power-change	Message when there is a status change in the power supply
rm-state-change	Message when there is a status change in the redundancy manager
standby-state-change	Message when there is a status change on a standby connection

Parameter	Description
faultstate-change	Message when there is a status change in the error monitoring
stp-change	Message when there is a change in the spanning tree
vrrp-state-change	Message on status change of VRRP routers
loopd-state-change	Message if there is a status change in the detection of network loops
ospf-state-change	Message on status change of OSPF routers
dot1x-port-auth-state-change	Message when there is a status change in the 802.1X authentication
poe-state-change	Message on status change of PoE
fmp-state-change	Message on status change of FMP
all	All messages
logtable	Client that processes the logbook entries
syslog	Client that sends the messages to the Syslog server
email	Client that sends the e-mails
trap	Client that sends the SNMP traps
faults	Error LED lights up. The setting is possible only for a cold or warm restart.
env-data-change	Message when there is a status change in the diagnostics data
all	All clients at once

Result

The setting deciding which message of the device is stored or forwarded is configured.

Further notes

You display the status of the events and the clients with the `show events config` command.

You delete the settings with the `no event config` command.

With this command, the clients are not enabled.

To enable the clients, use the `client config` command.

Note

Changing several message types or clients

With each command call, you can only select one message type and one client.

If you want to process several message types or clients, it may be more efficient to first select the `all` option and then disable individual elements.

12.1.6.5 no event config

Description

With this command, you configure which of the various message types of the device will no longer be stored or forwarded.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
no event config
    {cold-warmstart|linkchange|authentication-failure|
    rmon-alarm|power-change|rm-state-change|standby-state-change|faultstate-change|
    stp-change|vrrp-state-change|loopd-state-change|ospf-state-change|dot1x-port-auth-
    state-change|poe- state-change|fmp-state-change|env-data-change|all}
    {logtable|syslog|email|trap|faults|all}
```

The parameters have the following meaning:

Parameter	Description
cold-warmstart	Message if there is cold or warm restart
linkchange	Message when there is a status change on a physical interface
authentication-failure	Message if there is an incorrect login
rmon-alarm	Message when there is a RMON alarm
power-change	Message when there is a status change in the power supply
rm-state-change	Message when there is a status change in the redundancy manager
standby-state-change	Message when there is a status change on a standby connection
faultstate-change	Message when there is a status change in the error monitoring
stp-change	Message when there is a change in the spanning tree
vrrp-state-change	Message on status change of VRRP routers
loopd-state-change	Message if there is a status change in the detection of network loops
ospf-state-change	Message on status change of OSPF
dot1x-port-auth-state-change	Message when there is a status change in the 802.1X authentication
poe-state-change	Message on status change of PoE
fmp-state-change	Message on status change of FMP
all	All messages
logtable	Client that processes the logbook entries
syslog	Client that sends the messages to the Syslog server
email	Client that sends the e-mails
trap	Client that sends the SNMP traps
faults	Error LED lights up. The setting is possible only for a cold or warm restart.
env-data-change	Message when there is a status change in the diagnostics data
all	All clients at once

Result

The setting deciding which messages of the device are not stored or forwarded is configured.

Further notes

You display the status of the events and the clients with the `show events config` command.

You configure which of the various message types of the device will be stored or forwarded with the `event config` command.

12.1.6.6 severity

Description

With this command, you configure the threshold values for the sending of system event notifications.

Requirement

You are in the EVENTS Configuration mode.

The command prompt is as follows:

```
cli (config-events) #
```

Syntax

Call up the command with the following parameters:

```
severity { mail | log | syslog } { info | warning | critical }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mail	Specifies the threshold value for sending system event messages by e-mail.	-
log	Specifies the threshold value for entering system event messages in the log table.	-
syslog	Specifies the threshold value for entering system event messages in the Syslog file.	-
info	System events are processed as of the severity level "Information".	-
warning	System events are processed as of the severity level "Warning".	-
critical	System events are processed as of the severity level "Critical".	-

Result

The settings for sending system event messages are configured.
The "severity" function is enabled.

Further notes

You disable the setting with the `no severity` command.
You display the status of this function and other information `show events severity`

12.1.6.7 no severity

Description

With this command, you disable the setting for the threshold values for the sending of system event notifications.

Requirement

You are in the EVENTS Configuration mode.
The command prompt is as follows:

```
cli (config-events) #
```

Syntax

Call up the command with the following parameters:

```
no severity { mail | log | syslog }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
mail	The setting of the threshold value for sending system event messages by e-mail is disabled.	-
log	The setting of the threshold value for entering system event messages in the log table disabled.	-
syslog	The setting of the threshold value the entering event messages in the Syslog file is disabled.	-

If you do not select any parameters from the parameter list, the default value is used.

Result

The settings for sending system event messages are configured.

Further notes

You enable the setting with the `severity` command.

You display the status of this function and other information `show events severity`.

12.1.6.8 power

Description

With this command, you configure and activate the monitoring of the power supplies.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
power [{L1|L2}]
```

The parameters have the following meaning:

Parameter	Description
L1	Monitoring of power supply 1
L2	Monitoring of power supply 2

If you do not select any parameters from the parameter list, the default value "L1 and L2" is used.

Result

The setting for monitoring the power supplies is configured.

Further notes

You can display the current setting with the `show events faults config` command.

You disable the function with the `no power` command.

12.1.6.9 no power

Description

With this command, you disable the monitoring of the power supplies.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
no power [{L1|L2}]
```

The parameters have the following meaning:

Parameter	Description
L1	No monitoring of power supply 1
L2	No monitoring of power supply 2

If you do not select any parameters from the parameter list, the default value "L1 and L2" is used.

Result

The setting for monitoring the power supplies is configured.

Further notes

You can display the current setting with the `show events faults config` command.

You enable the function with the `power` command.

12.1.6.10 link

Description

With this command, you configure and enable the monitoring of the physical network connections for cable breaks or for pulling of the connector.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
link {up|down} [{<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
up	Only the establishment of a connection is signaled	-
down	Only a break on a connection is signaled	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select an interface, the function is enabled for all available interfaces.

Result

The settings for monitoring the physical network connections have been configured.

Further notes

You display the setting with the `show events faults config` command.

You disable the function with the `no link` command.

12.1.6.11 no link

Description

With this command, you disable the monitoring of the physical network connections for cable breaks or for pulling of the connector.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli (config-events) #
```

Syntax

Call up the command with the following parameters:

```
no {up|down} [{<interface-type><interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
up	The message when establishing a connection is disabled	-
down	The message when a connection is down is disabled	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select an interface, the function is disabled for all available interfaces.

Result

The settings for monitoring the physical network connections have been configured.

Further notes

You can display the current setting with the `show events faults config` command.

You enable the function with the `link` command.

12.2 FMP

With Fiber Monitoring, you can monitor the received power and the loss of power on optical links between two switches.

If you enable fiber monitoring on an optical port, the device sends the current transmit power of the port to its connection partner using LLDP packets. In addition to sending, the device also checks whether corresponding information is received from the connection partner.

Regardless of whether the IE switch receives diagnostics information from its connection partner, it monitors the received power measured at the optical port for the set limit values.

If fiber monitoring is enabled on the connection partner, the connection partner transfers the current value for the transmit power of the port to the device. The device compares the value it has received for the transmit power with the actually received power. The difference between the received power and the transmit power represents the power loss on the link. The calculated power loss is also monitored for the set limit values.

If the value of the received power or the power loss falls below or exceeds the set limit values, an event is triggered. You can set limit values in two stages for messages with the severity levels "Warning" and "Critical".

12.2.1 The "show" commands

This section describes commands with which you display various settings.

12.2.1.1 show fmp limit

Description

This command shows the limit values for the received power and the power loss that you set for monitoring optical ports or connections with fiber monitoring.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show fmp limit [{interface <interface-type> <interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all interfaces are displayed.

Result

The limits set for the received power and the power loss are displayed.

12.2.1.2 show fmp status

Description

This command shows the current status and the current values of the optical ports or connections that you monitor with fiber monitoring.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call up the command with the following parameters:

```
show fmp status [{interface <interface-type> <interface-id>}]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

For information on identifiers of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If no parameters are specified, the settings for all interfaces are displayed.

Result

The status of the optical ports is displayed.

12.2.2 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

12.2.2.1 fmp

Description

With this command, you enable fiber monitoring.

Requirement

- To be able to use the fiber monitoring function, enable LLDP. The fiber monitoring information is appended to the LLDP packets.
- You can only use fiber monitoring with transceivers capable of diagnostics. Note the documentation of the devices.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
fmp
```

Default: enabled

Result

Fiber monitoring is enabled.

Further notes

You disable this function with the `no fmp` command.

You display the status of this function and other information with the `show fmp stauts` and `show fmp limit` commands.

You define the limit values with the `fmp power-loss` and `fmp rx-power` commands.

12.2.2.2 no fmp

Description

With this command, you disable fiber monitoring.

Requirement

You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameter assignment:

```
no fmp
```

Default: enabled

Result

Fiber monitoring is disabled.

Further notes

You enable this function with the `fmp` command.

You display the status of this function and other information with the `show fmp stauts` and `show fmp limit` commands.

You define the limit values with the `fmp power-loss` and `fmp rx-power` commands.

12.2.2.3 fmp power-loss

Description

With this command, you specify the limit values for monitoring the power loss per port.

Requirement

You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
rmon power-loss [req]<1/10 dBm> [dem]<1/10 dBm>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
req	Specify the value at which you are informed of the power loss of the connection by a message of the severity level "Warning"	0 ... -55 dB Default: -50 dB
dem	Specify the value at which you are informed of the power loss of the connection by a message of the severity level "Critical"	0 ... -55 dB Default: -55 dB

Result

The limits for monitoring the power loss are defined.

Further notes

You enable this function with the `fmp` command.

You disable this function with the `no fmp` command.

You display the status of this function and other information with the `show fmp stauts` and `show fmp limit` commands.

You define the limit values for the received power with the command `fmp rx-power`.

12.2.2.4 fmp rx-power

Description

With this command, you specify the limit values for monitoring the received power per port.

Requirement

You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
rmon rx-power [req]<1/10 dBm> [dem]<1/10 dBm>
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
req	Specify the value at which you are informed of the deterioration of the received power by a message of the severity level "Warning"	0 ... -40 dB The default value depends on the relevant pluggable transceiver.
dem	Specify the value at which you are informed of the deterioration of the received power by a message of the severity level "Critical"	0 ... -40 dB The default value depends on the relevant pluggable transceiver.

Result

The limits for monitoring the received power are defined.

Further notes

You enable this function with the `fmp` command.

You disable this function with the `no fmp` command.

You display the status of this function and other information with the `show fmp status` and `show fmp limit` commands.

You define the limit values for the power loss with the command `fmp power-loss`.

12.3 Loop detection

With the "Loop detection" function, you specify the ports for which loop detection will be activated. The ports involved send special test frames - the loop detection frames. If these frames are sent back to the device, there is a loop.

A "Local loop" involving this device means that the frames are received again at a different port of the same device. If the sent frames are received again at the same port, there is a "remote loop" involving other network components.

With the commands in this section, you start loop detection and decide which actions will be used on the ports affected if loops are detected.

Note

A loop is an error in the network structure that needs to be eliminated. The loop detection can help to find the errors more quickly but does not eliminate them.

Note

Note that loop detection is only possible at ports that were not configured as ring ports or standby ports.

Note

Changing the configured port status with loop detection

The configuration of the port status can be changed with the "Loop Detection" function. If, for example, the administrator has disabled a port, the port can be enabled again after a device restart by "Loop Detection". The port status "link down" is not changed by "Loop Detection".

Note

Effects of configuration using STEP 7

The configuration of Spanning Tree can be changed if you configure "Loop Detection" using STEP 7.

If you enable "Loop Detection" on a port with STEP 7, Spanning Tree is automatically disabled on this port. If you disable "Loop Detection" for the port again with STEP 7 Spanning Tree is not automatically enabled. Enable Spanning Tree with the WBM or CLI.

12.3.1 The "show" commands

This section describes commands with which you display various settings.

12.3.1.1 show loopd

Description

With this command, you display the information on loop detection.
Detected loops are shown.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call the command without parameters:

```
show loopd
```

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

Information on loop detection is displayed.

12.3.1.2 show loopd interface

Description

Displays information on the loop interface.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.
The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command without parameters or with the following parameter assignment:

```
show loopd interface [{<interface-type> <interface-id> | port-channel <port-channel-id (1-8)>}]
```


The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>interface</code>	Keyword for a an interface description	-
<code>interface-type</code>	Type or speed of the interface	Enter a valid interface.
<code>interface-id</code>	Module no. and port no. of the interface	
<code>port-channel</code>	Keyword for a port channel connection	-
<code>port-channel-id</code>	Number of the addressed port channel	1 ... 8

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The loop interface is displayed.

Further notes

You can display the status of this function and other information with the `show loopd` command.

12.3.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

12.3.2.1 loopd

Description

With this command, you enable the loop detection function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameters:

```
loopd
```

Result

The loop detection function is enabled

Further notes

You disable the function with the `no loopd` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.2.2 no loopd

Description

With this command, you disable the loop detection function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no loopd
```

Result

The loop detection function is disabled

Further notes

You enable the function with the `loopd` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.2.3 loopd vlan mode

Description

With this command, you enable the loop detection function for VLAN.

Requirement

- Loopd is activated
- You are in the Global configuration mode.

The command prompt is:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
loopd vlan mode
```

Result

The loop detection function is enabled for VLAN.

Further notes

You disable the function with the `no loopd vlan mode` command.

You can display the status of this function and other information with the `show loopd` command

12.3.2.4 no loopd vlan mode

Description

With this command, you disable the loop detection function for VLAN.

Requirement

- Loopd is activated
- You are in the Global configuration mode.

The command prompt is:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no loopd vlan mode
```

Result

The loop detection function is disabled for VLAN.

Further notes

You enable the function with the `loopd vlan mode` command.

You can display the status of this function and other information with the `show loopd` command

12.3.3 Commands in the Interface Configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

12.3.3.1 `loopd {blocked | forwarder | sender}`

Description

With this command you specify how the port handles loop detection frames.

Requirement

- Loop detection is enabled
- A Spanning Tree port, ring port or standby port cannot be the sender port.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
loopd {blocked | forwarder | sender}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
blocked	The forwarding of loop detection frames is blocked.	-
forwarder	Loop detection frames from other devices are forwarded.	Default after enabling loop detection.
sender	Loop detection frames are sent out and forwarded.	-

If you do not select any parameters from the parameter list, the default value is used.

Result

It has been configured how the port handles loop detection frames.

Further notes

You can display the status of this function and other information with the `show loopd` command.

12.3.3.2 loopd {tx-interval | detect-threshold | reaction-timeout}

Description

With this command you configure the send interval, threshold value and reaction time for loop detection.

Requirement

- Loop detection is enabled
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
loopd {tx-interval <mSec(500-5000)> | detect-threshold <integer(1-500)> | reaction-timeout <seconds(0-86400)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
tx-interval	Keyword for the send interval	-
mSec	Specifies the send interval for loop detection frames in milliseconds.	500 ... 5000 Default: 1000

Parameter	Description	Range of values / note
<code>detect-threshold</code>	Keyword for the threshold value	-
<code>integer</code>	Specifies the threshold value after how many received loop detection frames, a loop is assumed and the device reacts according to the setting.	1 ... 500 Default: 2
<code>reaction-timeout</code>	Keyword for the time to the end of the reaction time	-
<code>seconds</code>	Specifies the number of seconds after which the device automatically changes to the status in which it was before the loop.	0 ... 86400 Default: 0 If you set the value "0", you need to enable the port manually again following a loop using the command <code>loopd port reset</code> .

If you do not select any parameters from the parameter list, the default value is used. The default values apply only to a port enabled earlier with `loopd sender`.

Result

The settings are suitably configured.

Further notes

You can display the status of this function and other information with the `show loopd` command.

12.3.3.3 loopd port reset

Description

With this command, you enable a port that was blocked by loop detection.

Requirement

- Loop detection is enabled
- You are in the Interface configuration mode.
The command prompt is:
`cli(config-if-$$$)#`

Syntax

Call the command without parameters:

```
loopd port reset
```

Result

The blocked port is enabled again.

Further notes

You disable the setting with the `no loopd port reset` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.3.4 loopd reaction local

Description

With this command, you activate the "disable" reaction for a local loop. If a local loop is detected, the port is blocked.

Requirement

- Loop detection is enabled.
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
loopd reaction local
```

Result

"disable" is activated for the `loopd reaction local` function.

"disable" is the default after enabling loop detection.

Further notes

You enable the "no action" reaction with the `no loopd reaction local` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.3.5 no loopd reaction local

Description

With this command, you enable the "no action" reaction for a local loop. If a local loop is detected, this has no effect on the port.

Requirement

- Loop detection is enabled.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no loopd reaction local
```

Result

"no action" is activated for the `loopd reaction local` function.

"disable" is the default after enabling loop detection.

Further notes

You enable the "disable" reaction with the `loopd reaction local` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.3.6 loopd reaction remote

Description

With this command, you enable the "disable" reaction for a remote loop. If a remote loop is detected, the port is blocked.

Requirement

- Loop detection is enabled.
- You are in the Interface configuration mode.
The command prompt is:

```
cli(config-if-$$$)#
```


Syntax

Call the command without parameters:

```
loopd reaction remote
```

Result

"disable" is activated for the `loopd reaction remote` function.

"disable" is the default after enabling loop detection.

Further notes

You enable the "no action" reaction with the `no loopd reaction remote` command.

You can display the status of this function and other information with the `show loopd` command.

12.3.3.7 no loopd reaction remote

Description

With this command, you enable the "no action" reaction for a remote loop. If a remote loop is detected, this has no effect on the port.

Requirement

- loopd is enabled
- You are in the Interface configuration mode.

The command prompt is:

```
cli(config-if-$$$)#
```

Syntax

Call the command without parameters:

```
no loopd reaction remote
```

Result

"no action" is activated for the `loopd reaction remote` function.

"disable" is the default after enabling loop detection.

Further notes

You enable the "disable" setting with the `loopd reaction remote` command.

You can display the status of this function and other information with the `show loopd` command.

12.4 Port Mirroring

Note

It cannot be guaranteed when mirroring the data traffic that all packets are mirrored.

With the port mirroring function, you copy the data stream of one or more ports to another interface to be able to analyze this data stream without disturbing operation.

Note

Mirroring a port does not work beyond switch core boundaries.

Note

You need to disable port mirroring if you want to connect a normal end device to the monitor port.

Note the data rate

If the maximum data rate of the mirrored port is higher than that of the monitor port, data may be lost and the monitor port no longer reflects the data traffic at the mirrored port. Several ports can be mirrored to one monitor port at the same time.

Several source ports from the same VLAN

If in a VLAN you select more than one source port for the port-based egress mirroring, unknown unicast and multicast frames as well as broadcast frames are forwarded only once to the destination port. With several sessions, the corresponding frames are only visible in one session. They are only mirrored on the one destination port with the lowest hardware index.

12.4.1 The "show" commands

This section describes commands with which you display various settings.

12.4.1.1 show monitor

Description

This command shows the status of the port mirroring function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show monitor
```

Result

The status of the port mirroring function is displayed.

12.4.1.2 show monitor barrier

Description

This command shows the status of the communication via the monitor port. If you enable this option, management of the switch via the monitor port is no longer reachable.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameter assignment:

```
show monitor barrier
```

Result

The settings are displayed.

12.4.1.3 show monitor session

Description

This command shows the settings used for mirroring ports.

You obtain information about the ports from which incoming and/or outgoing data traffic is mirrored and the port at which the mirrored data is output.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show monitor {session <session-id(1-7)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
session	Keyword for a session whose settings are displayed	-
session-id	Number of the session	1 ... 7

Result

The settings for mirroring ports are displayed.

12.4.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

12.4.2.1 monitor

Description

With this command, you enable the port mirroring function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
monitor
```

As default the function is "disabled".

Result

The port mirroring function is enabled.

Further notes

You can display the status of this function with the `show monitor` command.

You disable the function with the `no monitor` command.

12.4.2.2 no monitor

Description

With this command, you disable the port mirroring function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no monitor
```

Result

The port mirroring function is disabled.

Further notes

You can display the status of this function with the `show monitor` command.

You enable the function with the `monitor` command.

12.4.2.3 monitor barrier enabled

Description

With this command, you disable the communication via the monitor port.

Note

Effects of monitor barrier enabled

If you enable this option, management of the switch via the monitor port is no longer reachable. The following port-specific functions are changed:

- DCP forwarding is turned off
- LLDP is turned off
- Unicast, multicast and broadcast blocking is turned on

The previous statuses of these functions are no longer restored after disabling monitor barrier again. They are reset to the default values and may need to be reconfigured.

You can reconfigure these functions manually even if monitor barrier is turned on. The data traffic on the monitor port is also allowed again. If you do not require this, make sure that only the data traffic you want to monitor is forwarded to the interface.

If mirroring is disabled, the listed port-specific functions are reset to the default values. This reset takes place regardless of whether the functions were configured manually or automatically by enabling monitor barrier.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
monitor barrier enabled
```

Result

Communication via the monitor port is disabled.

Further notes

You enable the communication with the `no monitor barrier enabled` command.

You display the configuration settings with the `show monitor barrier` command.

12.4.2.4 no monitor barrier enabled

Description

With this command, you enable the communication via the monitor port.

Requirement

You are in the Global Configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameters:

```
no monitor barrier enabled
```

Result

Communication via the monitor port is enabled.

Further notes

You disable the communication with the `monitor barrier enabled` command.

You display the configuration settings with the `show monitor barrier` command.

12.4.2.5 monitor session destination

Description

With this command, you configure the destination for mirroring a port.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
monitor session <session-id(1-7)> destination  
  {interface <interface-type><interface-id> | remote vlan <vlan-id (1-4094)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
session-id	Number of the session 7 parallel sessions are possible only with port-based mirroring and their ports must not overlap.	1 ... 7
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	If you connect a BUS ANALYZER Agent XM-400 with a SCALANCE XM-400 basic device as of firmware version 5.1, you can select up to four ports of the BUS ANALYZER Agent XM-400 as destination ports. The BUS ANALYZER Agent XM-400 supports port-based and VLAN-based mirroring.
remote vlan	Keyword for a RSPAN session With RSPAN (Remote Switched Port Analyzer) you can forward the data traffic of a mirroring session to the monitor port via a VLAN. On the RSPAN VLAN, the mirrored data traffic is not disturbed by other data.	Frames addressed directly to the mirroring source cannot be mirrored on the RSPAN destination port.
vlan-id	Number of the VLAN for the RSPAN session	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Note

Selecting the destination port

A port that is part of a port channel cannot be configured as the destination port for a monitor session.

Note

VLAN and ACL mirroring

Tx mirroring is not supported with VLAN or ACL mirroring.

Result

As soon as you have configured the settings for the port to be monitored and the destination port, the session is complete and active.

Note

If you change the settings for an existing session, all previous configurations of this session are lost.

Further notes

You delete the destination for mirroring a port with the `no monitor session ... destination` command.

You end and delete a session with the `no monitor session` command.

You display the configuration settings with the `show monitor session` command.

12.4.2.6 no monitor session destination

Description

With this command, you delete the destination for mirroring a port.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no monitor session <session-id(1-7)> destination
    {interface <interface-type><interface-id> | remote vlan <vlan-id (1-4094)>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
session-id	Number of the session 7 parallel sessions are possible only with port-based mirroring and their ports must not overlap.	1 ... 7
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	If you connect a BANY Agent XM-400 with a SCALANCE XM-400 basic device as of firmware version 5.1, you can select up to four ports of the BANY Agent XM-400 as destination ports. The BANY Agent XM-400 supports port-based and VLAN-based mirroring.
remote vlan	Keyword for a RSPAN session	-
vlan-id	Number of the VLAN for the RSPAN session	1 ... 4094

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The destination for the mirroring of a port is deleted.

Further notes

You configure the destination for mirroring a port with the `monitor session ... destination` command.

You end and delete a session with the `no monitor session` command.

You display the configuration settings with the `show monitor session` command.

12.4.2.7 monitor session source

Description

With this command, you configure the source for mirroring a port or a VLAN.

Requirement

- Monitoring is enabled.
- You are in the Global configuration mode
.The command prompt is:

```
cli(config)#
```

Syntax

Call up the command for the port to be monitored with the following parameter assignment:

```
monitor session<session-id(1-7)> source
  {interface {<interface-type><interface-id> | port-channel <port-channel-id (1-8)>}
  [{rx|tx|both}]}
```

or

Call up the command for the VLAN to be monitored with the following parameter assignment:

```
monitor session <session-id (1-1)> source
  {vlan <vlan-id> | mac-acl <acl-id>} | ip-acl <acl-id>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
session-id	Number of the session 7 parallel sessions are possible only with port-based mirroring and their ports must not overlap.	1 ... 7
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	

Parameter	Description	Range of values / note
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
rx	Received data traffic will be mirrored (received)	-
tx	Transmitted data traffic will be mirrored (transmitted)	-
both	Received and sent data traffic will be mirrored	-
vlan	Keyword for a VLAN connection	It can happen that data packets are visible on the monitor port that were not received in the defined VLAN. These data packets come from functions that are enabled on the device, e.g. SIMATIC time client. To avoid these data packets when VLAN mirroring, disable the relevant functions on the device before a recording.
vlan-id	Number of the VLAN	1 ... 4094
mac-acl	Keyword for a MAC access control list	-
ip-acl	Keyword for an IP access control list	-
acl-id	Number of the Access Control List	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value (both) is used.

Note

VLAN and ACL mirroring

Tx mirroring is not supported with VLAN or ACL mirroring.

Result

As soon as you have configured the settings for the port to be monitored and the destination port, the session is complete and active.

Further notes

You delete the source for mirroring a port with the `no monitor session ... source` command.

You end and delete a session with the `no monitor session` command.

You display the configuration settings with the `show monitor session` command.

12.4.2.8 no monitor session source

Description

With this command, you delete the source for mirroring a port or a VLAN.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command for the port to be monitored with the following parameter assignment:

```
no monitor session <session-id(1-7)> source
  {interface {<interface-type><interface-id> | port-channel <port-channel-id (1-8)>}
  [{rx|tx|both}]}
```

or

Call up the command for the VLAN to be monitored with the following parameter assignment:

```
no monitor session <session-id (1-1)> source
  {vlan <vlan-id> | mac-acl <acl-id>} | ip-acl <acl-id>}
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
session-id	Number of the session 7 parallel sessions are possible only with port-based mirroring and their ports must not overlap.	1 ... 7
interface	Keyword for a an interface description	-
interface-type	Type or speed of the interface	Enter a valid interface.
interface-id	Module no. and port no. of the interface	
port-channel	Keyword for a port channel connection	-
port-channel-id	Number of the addressed port channel	1 ... 8
rx	Received data traffic will be mirrored (received)	-
tx	Transmitted data traffic will be mirrored (transmitted)	-
both	Received and sent data traffic will be mirrored	-
vlan	Keyword for a VLAN connection	-
vlan-id	Number of the VLAN	1 ... 4094
mac-acl	Keyword for a MAC access control list	-

Parameter	Description	Range of values / note
ip-acl	Keyword for an IP access control list	-
acl-id	Number of the Access Control List	-

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value (both) is used.

Result

The source for the mirroring of a port is deleted.

Further notes

You configure the source for mirroring a port with the `monitor session ... source` command.

You end and delete a session with the `no monitor session` command.

You display the configuration settings with the `show monitor session` command.

12.4.2.9 no monitor session

Description

With this command, you delete the monitor session.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no monitor session<session-id(1-7)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
session-id	Number of the session 7 parallel sessions are possible only with port-based mirroring and their ports must not overlap.	1 ... 7

Result

The monitor session is deleted.

Further notes

You display the configuration settings with the `show monitor session` command.

You configure and start mirroring of a port with the `monitor session` command.

12.5 RMON

The RMON function provides commands with which variables of the Management Information Base (MIB) can be monitored for violation of limit values and to store or forward these events in the following ways:

- Entry in the local log
- Sending as SNMP trap
- Transfer to the Syslog server
- Transfer to a network management station using SNMP

12.5.1 The "show" commands

This section describes commands with which you display various settings.

12.5.1.1 show rmon

Description

This command shows the settings of the remote monitoring function.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> or cli#
```

Syntax

Call up the command with the following parameters:

```
show rmon [statistics [<stats-index (1-65535)>]] [alarms] [events] [history [history-index (1-65535)]] [overview]]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
statistics	Shows counts for various packet characteristics and sizes.	-
stats-index	Index number for the statistical values	1 ... 65535
alarms	Shows the threshold values and event assignments for alarms.	-
events	Shows the status and the actions that are triggered.	-
history	Shows the stored statistical values for earlier transmission periods.	-
history-index	Index number for the previous statistical values	1 ... 65535
overview	Displays an overview.	-

With this command, you can display several parameters with one call.

If you do not select any parameters from the parameter list, only the `enabled` or `disabled` status is shown.

Result

The settings of the remote monitoring function are displayed.

12.5.2 Commands in the global configuration mode

This section describes commands that you can call up in the Global configuration mode.

In Privileged EXEC mode, enter the `configure terminal` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

You exit the Global configuration mode with the `end` or `exit` command and are then in the Privileged EXEC mode again.

12.5.2.1 rmon

Description

With this command, you enable the Remote Monitoring function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call the command without parameter assignment:

```
rmon
```

Default: disabled

Result

The Remote Monitoring function is enabled.

Further notes

You disable this function with the `no rmon` command.

You can display the status of this function and other information with the `show rmon` command.

12.5.2.2 no rmon

Description

With this command, you disable the Remote Monitoring function.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call the command without parameter assignment:

```
no rmon
```

Default: disabled

Result

The Remote Monitoring function is disabled.

Further notes

You enable this function with the `rmon` command.

You can display the status of this function and other information with the `show rmon` command.

12.5.2.3 rmon alarm

Description

With this command, you configure an alarm for monitoring a MIB variable. The variable is checked at specific intervals to determine whether or not it has exceeded or fallen below threshold values. Events are assigned to these occurrences.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
rmon alarm <alarm-number><mib-object-id(255)>
  <sample-interval-time(1-65535)>
  {absolute|delta}
  rising-threshold<value(0-2147483647)>[risingevent-number(1-65535)]
  falling-threshold<value(0-2147483647)>[fallingevent-number(1-65535)]
  [owner<ownername(127)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
alarm-number	Number of the alarm	1 ... 250
mib-object-id	Name of the MIB variable	max. 255 characters
sample-interval-time	Interval for the check [s]	1 ... 65535
absolute	The current absolute value of the monitored MIB is evaluated	-
delta	The difference between the current and the previous value of the monitored MIB is evaluated	-
rising-threshold	Keyword for threshold value for rising or high variable values	-
value	Relevant threshold value	0 ... 2147483647
risingevent-number	Event number for this	1 ... 65535
falling-threshold	Keyword for threshold value for falling or low variable values	-
value	Relevant threshold value	0 ... 2147483647
fallingevent-number	Event number for this	1 ... 65535
owner	User to which the alarm is assigned	-
ownername	User name of the user	max. 127 characters

If you do not select a parameter from the parameter list, the events for high and low threshold values are assigned the lowest event number available in the event table.

Note

MIB variables that can be monitored

With the RMON function, only MIB variables of the Ethernet interfaces can be monitored.

Note

Magnitude of the threshold values

The threshold value for falling or low variable values should be less than the threshold value for rising or high variable values.

Note

Conditions for working with alarms

The events assigned to the alarms are configured.

The Remote monitoring function is started with the `rmon` command.

Result

The alarm for monitoring a MIB variable is configured.

Further notes

You delete an alarm with the `no rmon alarm` command.

You display the list of configured RMON alarms with the `show rmon alarms` command.

12.5.2.4 no rmon alarm

Description

With this command, you delete an alarm for monitoring a MIB variable.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no rmon alarm <number (1-250)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
number	Number of the alarm to be deleted	1 ... 250

Result

The entry for monitoring a MIB variable is deleted.

12.5.2.5 rmon event

Description

With this command, you configure an event in the RMON Event Table.

You specify its name and the owner and whether or not an SNMP trap is generated.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli (config) #
```

Syntax

Call up the command with the following parameters:

```
rmon event <number(1-500)>[description<event-description(127)>]
      [owner<ownername(127)>][trap<notify(127)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
number	Number of the event	1 ... 500
description	Title of the event	-
event-description	Description of the event	max. 127 characters
owner	User to which the event is assigned	-
ownername	User name of the user	max. 127 characters
trap	Specifies whether an SNMP trap should be sent	-
notify	Name of the community to which the SNMP trap will be sent	max. 127 characters

Result

The event is configured.

Further notes

You delete an entry with the `no rmon event` command.

You display the RMON Event Table with the `show rmon events` command.

You show the details of the SNMP community with the `show snmp community` command.

12.5.2.6 no rmon event**Description**

With this command, you delete an entry from the RMON event table.

Requirement

You are in the Global configuration mode.

The command prompt is as follows:

```
cli(config)#
```

Syntax

Call up the command with the following parameters:

```
no rmon event <number (1-500)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
number	Number of the event entry to be deleted	1 ... 500

Result

The entry is deleted from the RMON event table.

12.5.3 Commands in the interface configuration mode

This section describes commands that you can call up in the interface configuration mode. Depending on the Interface selected, various command sets are available.

In the Global configuration mode, enter the `interface` command to change to this mode.

Commands relating to other topics that can be called in the interface configuration mode can be found in the relevant sections.

- If you exit the Interface configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the Interface configuration mode with the `end` command, you return to the Privileged EXEC mode.

12.5.3.1 rmon collection stats

Description

With this command, you start the recording of statistical data of an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
rmon collection stats <index (1-52)>[owner<ownername(127)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
index	Number of the recording	1 ... 52
owner	User to which the event is assigned	-
ownername	User name of the user	max. 127 characters

Result

The recording of statistical data is started.

Further notes

You can display the content of a recording with the `show rmon statistics` command.

12.5.3.2 no rmon collection stats

Description

With this command, you end the recording of statistical data of an interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no rmon collection stats <index (1-52)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
index	Number of the recording	1 ... 52

Result

The recording of statistical data is ended.

12.5.3.3 rmon collection history**Description**

With this command, you configure the collection of statistical data of the interface in a selectable number of recording intervals ("Buckets ") with a specified period.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
rmon collection history<index(1-52)>
  [buckets<bucket-number (1-65535)>]
  [interval<seconds (1-3600)>]
  [owner<ownername (127)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
<code>index</code>	Number of the recording	1 ... 65535
<code>buckets</code>	Maximum number of recording intervals	-
<code>bucket-number</code>	Number of recording intervals	1 ... 65535 Default: 50
<code>interval</code>	Duration of an individual recording interval	-
<code>seconds</code>	Time in seconds	1 ... 3600 Default: 1800
<code>owner</code>	User to which the event is assigned	-
<code>ownername</code>	User name of the user	max. 127 characters Default: monitor

If you do not select any parameter from the parameter list, the default values are used.

Result

The data is recorded.

Further notes

You can display the content of a recording with the `show rmon history` command.

12.5.3.4 no rmon collection history

Description

With this command, you end the recording of statistical data of the interface.

Requirement

You are in the Interface configuration mode.

The command prompt is as follows:

```
cli(config-if-$$$)#
```

Syntax

Call up the command with the following parameters:

```
no rmon collection history <index(1-52)>
```

The parameter has the following meaning:

Parameter	Description	Range of values / note
index	Number of the recording	1 ... 52

Result

The data recording is ended.

12.6 Syslog Client

With the commands in this section, the following settings are configured:

- Transfer of the messages to the Syslog server
- Local buffering and storage of messages
- Receipt and forwarding of messages from other devices (relay mode)

12.6.1 The "show" commands

This section describes commands with which you display various settings.

12.6.1.1 show events syslogserver

Description

This command shows the entries of the configured Syslog server.

Requirement

You are in the User EXEC mode or in the Privileged EXEC mode.

The command prompt is as follows:

```
cli> OR cli#
```

Syntax

Call the command without parameters:

```
show events syslogserver
```

Result

The entries of the configured Syslog server are displayed.

12.6.2 Commands in the Events configuration mode

This section describes commands that you can call up in the EVENTS configuration mode.

In the Global configuration mode, enter the `events` command to change to this mode.

Commands relating to other topics that can be called in the Global configuration mode can be found in the relevant sections.

- If you exit the EVENTS configuration mode with the `exit` command, you return to the Global configuration mode.
- If you exit the EVENTS configuration mode with the `end` command, you return to the Privileged EXEC mode.

12.6.2.1 syslogserver

Description

With this command, you configure the Syslog server.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
syslogserver { ipv4 <uicast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr>} [<port(1-65535)>]
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
uicast_addr	IPv4 unicast address of the Syslog server	Enter a valid IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the Syslog server	Enter a valid IPv6 address.
port	Port of the Syslog server on which the messages are received	0 ... 65535 Default: 514

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

If you do not select any parameters from the parameter list, the default value is used.

Result

The settings for the Syslog server are configured. The Syslog server was entered in the table.

Further notes

You delete the entry with the `no syslogserver` command.

You can display the status of this function and other information with the `show events config` command.

12.6.2.2 no syslogserver**Description**

With this command, you delete a Syslog server.

Requirement

You are in the EVENTS configuration mode.

The command prompt is as follows:

```
cli(config-events)#
```

Syntax

Call up the command with the following parameters:

```
no syslogserver { ipv4 <ucast_addr> | fqdn-name <FQDN> | ipv6 <ip6_addr> }
```

The parameters have the following meaning:

Parameter	Description	Range of values / note
ipv4	Keyword for an IPv4 address	-
ucast_addr	IPv4 unicast address of the Syslog server	Enter a valid IPv4 address.
fqdn-name	Keyword for a domain name	-
FQDN	Domain name (Fully Qualified Domain Name)	Maximum of 100 characters
ipv6	Keyword for an IPv6 address	-
ip6_addr	IPv6 address of the Syslog server	Enter a valid IPv6 address.

For information on names of addresses and interfaces, refer to the section "Interface identifiers and addresses (Page 42)".

Result

The Syslog server is deleted.

Further notes

You add a Syslog server with the `syslogserver` command.

Appendix A

A.1 Supported RFCs

RFC	
1035	Domain names - implementation and specification
1191	Path MTU discovery
1981	Path MTU Discovery for IP version 6
2068	Hypertext Transfer Protocol - HTTP/1.1
2460	Internet Protocol, Version 6 (IPv6) Specification
2464	Transmission of IPv6 Packets over Ethernet Networks
2617	HTTP Authentication: Basic and Digest Access Authentication
2710	Multicast Listener Discovery (MLD) for IPv6
2711	IPv6 Router Alert Option
3164	The BSD Syslog Protocol
3315	Dynamic Host Configuration Protocol for IPv6 (DHCPv6)
3484	Default Address Selection for Internet Protocol version 6 (IPv6)
3587	IPv6 Global Unicast Address Format
3633	IPv6 prefix options Dynamic Host Configuration Protocol (DHCP) version 6
3768	Virtual Router Redundancy Protocol (VRRP)
3810	Multicast Listener Discovery Version 2 (MLDv2) for IPv6
4007	IPv6 Scoped Address Architecture
4213	Basic Transition Mechanisms for IPv6 Hosts and Routers
4250	The Secure Shell (SSH) Protocol Assigned Numbers
4251	The Secure Shell (SSH) Protocol Architecture
4252	The Secure Shell (SSH) Authentication Protocol
4253	The Secure Shell (SSH) Transport Layer Protocol
4254	The Secure Shell (SSH) Connection Protocol
4256	Generic Message Exchange Authentication for the Secure Shell Protocol (SSH)
4291	IP Version 6 Addressing Architectur
4330	Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI
4443	Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
4604	Using Internet Group Management Protocol Version 3 (IGMPv3) and Multicast Listener Discovery Protocol Version 2 (MLDv2) for Source-Specific Multicast
4861	Neighbor Discovery for IP version 6 (IPv6)
4862	IPv6 Stateless Address Autoconfiguration
5095	Deprecation of Type 0 Routing Headers in IPv6
6603	Prefix exclude option for DHCPv6-based prefix delegation

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