

Mediant™ 800 MSBG

Mediant™ 1000 MSBG

SIP Protocol

CLI Reference Guide

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Notice

This document describes the release of the AudioCodes Mediant 1000 Multi-Service Business Gateway (MSBG) Voice-over-IP (VoIP) SIP media gateway.

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Related Documentation

Manual Name
Product Reference Manual for SIP Gateways and Media Servers
Mediant 1000 MSBG SIP Installation Manual
Mediant 1000 MSBG SIP User's Manual



Note: Throughout this manual, unless otherwise specified, the term device refers to the Mediant 1000 MSBG.

1 Introduction

This document provides a reference for all the device's Command Line Interface (CLI) commands.



Note: CLI configuration is currently applicable only to Data-Routing functionality (not VoIP functionality).

Reader's Notes

2 Working with CLI

2.1 Connecting to the CLI

MSBG's CLI can be accessed via RS232 interface or by Telnet or SSH protocols via the Ethernet interface.

2.1.1 RS232

The MSBG can be accessed via RS232 by connecting a VT100 terminal to the device or using a terminal emulation program with a PC. Most Windows® PCs come with a program called HyperTerminal®, which is located under **Programs>Accessories>Communications**.

2.1.1.1 Emulation Settings

Once you have connected via a VT100 terminal or have found the HyperTerminal program, set the program settings as follows:

- 115200 baud rate
- 8 data bits
- No parity
- 1 stop bit
- No flow control

If you are using a HyperTerminal program, name your new connection and then set up the new connection via the resulting dialog box. The box allows you to determine the type of connection you are using. Verify COM1 and select **OK**.

Another dialogue box appears for entering the COM1 properties. Enter the program settings in this box; select **APPLY** and then **OK**. You should then be presented with a terminal window in which you can interface with your device.

2.1.2 SSH

The MSBG can be accessed by SSH protocol using SSH client software.

One of the most popular and freeware SSH client software is Putty, which can be downloaded from the following URL:

<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>

By default the SSH access is disabled. In order to enable the SSH access, the '*SSHServerEnable*' ini parameter should be set to '1'.

By default the SSH connection is done using Port Number 22. The port can be changed by setting the '*SSHServerPort*' ini parameter.

2.1.3 Telnet

The MSBG can be accessed by Telnet protocol using Telnet client software. Most Windows® PCs come with a program called 'Telnet', which can be activated via the Windows command-line.

By default, the Telnet access is disabled. In order to enable the Telnet access, the '*TelnetServerEnable*' ini parameter should be set to '1'.

By default, the Telnet connection is done using Port Number 23. The port can be changed by setting the '*TelnetServerPort*' ini parameter.

2.2 CLI Structure

2.2.1 Authentication

When the device is accessed, the user is prompted to enter the device administrator's Username and Password.

The device administrator's credentials are common to all AudioCodes management interfaces (e.g. Web).

The default username and password are 'Admin', 'Admin' respectively.

2.2.2 Understanding Configuration Modes

As you begin communication, you should understand the command modes. Each command mode enables the user to access more commands and to make more changes in the unit's configuration.

The CLI has two command modes:

- Basic
- Enable

The two command modes are organized in a two-tiered hierarchy with Basic at the bottom and Enable at the top.

2.2.2.1 Basic Command Mode

Interaction with your unit begins at the Basic Command Mode. The commands supported by this command tier are limited, as is interaction with the unit itself. The Basic Mode is for users without access to the higher-tiered commands, to keep them from changing the preferred configurations of the unit.

The Basic Mode is accessed by beginning a CLI session (after successful authentication) and it enables the user to display system information and activate several debugging facilities.

The Basic Mode prompt is '>'.

2.2.2.2 Enable Command Mode

Enable Command Mode is the high-level tier in the command hierarchy, basically one step up from the Basic Mode. A password ('Admin' by default) is required to access the Enable Mode.

From the Enable Mode, you can access the configurations of your product as well as handle how your unit boots and runs, among other things.

The Enable Mode is accessed by entering **enable** while in the Basic Command Mode.

The Enable Mode prompt is '#'.

2.2.2.3 Understanding Configurations

Configurations are the means by which you set up your unit and system according to your personal requirements and preferences.

All configurations are accessed through the Enable Command Mode. The configuration is divided into three main configuration-sets:

- `configure system`
- `configure data`
- `configure voip`

By typing ***configure xxx*** at the Enable Mode prompt, you are ready to specify the configuration you want to access. Each configuration-set contains a different set of the command.

The ***configure system*** set contains the general and system oriented configuration command of the device - for example, Syslog configuration.

The ***configure data*** set contains the Data Network Configuration command. This configuration set also can be reached by typing ***configure terminal***.

The ***configure voip*** set contains VoIP-oriented configuration commands - for example SIP, VoIP network interfaces and VoIP Media configurations.

The configuration command sets are broken down into categories of similar functions. For example, all commands dealing with configuring the Ethernet interface are grouped together, as are configuration commands dealing with hardware, virtual network, and so on.



Note: *Configure voip* is presently not supported.

2.2.3 Using CLI Shortcuts

The MSBG CLI provides several shortcuts to help you configure your MSBG product more easily. See the following table for descriptions.

Table 2-1: CLI Shortcuts

Shortcut	Description
Up arrow key	To re-display a previously entered command, use the Up arrow key. Continuing to press the Up arrow key cycles through all commands entered, starting with the most recent command.
<Tab> key	Pressing the <Tab> key after entering a partial (but unique) command will complete the command, display it on the command prompt line, and wait for further input. Pressing the <Tab> key after entering a partial and not unique command will display all completing options
?	<p>The MSBG CLI contains help to guide you through the configuration process. Using the question mark, do one of the following:</p> <p>Displays a list of all subcommands in the current mode. For example:</p> <pre>(config)# interface ? BVI bridge interface GigabitEthernet GigabitEthernet vlan Vlan interface</pre> <p>Displays a list of available commands beginning with certain letter(s). For example:</p> <pre>(config)# interface G? GigabitEthernet GigabitEthernet</pre> <p>Obtains syntax help for a specific command by entering the command, a space, and then a question mark (?). The MSBG CLI displays the range of values and a brief description of the next parameter expected for that particular command. For example:</p> <pre>(config)# interface vlan ? [1-3999] Vlan ID</pre> <p>In case there is a command can be invoked (all its arguments are inserted), using the question mark at its end will display <cr>. For example:</p> <pre>(config)# logging host 10.1.1.1 ? <cr></pre>
<Ctrl + A>	Jump to the beginning of the displayed command line. This shortcut is helpful when using the no form of commands (when available).
<Ctrl + E>	Jump to the end of the displayed command line.
<Ctrl + U>	Clears the current displayed command line.

auto finish	You need only enter enough letters to identify a command as unique. For example, entering int G 0/0 at the configuration prompt provides you access to the configuration parameters for the specified Gigabit-Ethernet interface. Entering interface GigabitEthernet 0/0 would work as well, but is not necessary.
-------------	--

2.2.4 Common CLI Functions

The following table contains descriptions of common CLI commands.

Table 2-2: Common CLI Commands

Command	Description
do	The do command provides a way to execute commands in other command sets without taking the time to exit the current command set. The following example shows the do command, used to view the GigabitEthernet interface configuration while in the virtual-LAN interface command set: <pre>(config)# interface vlan 1 (conf-if-VLAN 1)# do show interfaces GigabitEthernet 0/0</pre>
no	To undo an issued command or to disable a feature, enter no before the command: <pre>no debug log</pre>
exit	Leave the current command-set and return one level up. If issued on the top level, the session will end: <pre>(config)# exit # exit (session closed)</pre>
help	Shows a short help how-to string.
history	Shows a list of previously run commands.
list	Shows the available command list of the current command-set.
 <filter>	A display filter can be applied on a command output. The filter should be typed after the command with a pipe mark () Supported filters: include <word> – filter (print) lines which contain <word> exclude <word> – filter lines which does not contain <word> grep <options> - filter lines according to <i>grep</i> common Unix utility options egrep <options> - filter lines according to <i>egrep</i> common Unix utility options begin <word> – filter (print) lines which begins with <word> between <word1> <word2> – filter (print) lines which are placed between <word1> and <word2> count – show the output's line count Example: <pre># show version grep Number ;Serial Number: 2239835 ;Slot Number: 1</pre>

2.2.5 Understanding CLI Error Messages

The following table lists and defines some of the more common error messages given in the CLI.

Table 2-3: CLI Error Messages

Message	Helpful Hints
Invalid command	The command may not be valid in the current command mode, or you may not have entered enough correct characters for the command to be recognized. Try using '?' to determine your error.
Incomplete command	You may not have entered all of the pertinent information required to make the command valid. Try using '?' to determine your error.



Note: Optional arguments in commands are marked in square brackets [].

3 Command Descriptions

3.1 `configure system`

This command switches the user to the System configuration command-set

Syntax

```
configure system
```

Defaults

NA

Command Modes

Enable

Examples

The following switches to system configuration command-set

```
# configure system  
(config-system)#
```

3.2 configure data

This command switches the user to the Data configuration command-set

Syntax

```
configure data
```

Defaults

NA

Command Modes

Enable

Examples

The following switches to data configuration command-set

```
# configure data
(config-data)#
```

3.3 copy (auxiliary file)

This command copies an auxiliary file from a URL source to the device.

Syntax

The syntax of this command can include the following variations:

```
copy <aux-file> from <URL>
```

The command's syntax format is described below:

Arguments	Description
<aux-file>	The auxiliary file type can be one of the following: call_progress_tones - Call progress call file cas_table – CAS table file coder_table – Coder table file dial_plan – Dial plan file tls_cert – TLS certificate file tls_private_key – TLS private key file tls_root_cert – TLS trusted root certificate file voice_prompts – Voice prompt file user_info – User info file web_logo – WEB logo file
from	Copy the auxiliary file from URL.
<URL>	File source URL. Can be one of the following: http,https,nfs,ftp,ftps.

Defaults

NA

Functional notes

1. CAS table auxiliary file copy is supported only on MSBG products.
2. A copied file must be burned (via the 'write' command) in order to stay persistent.
3. Please refer to the user manual in order to learn about AudioCodes Auxiliary Files format and roles.

Command Modes

Enable

Related commands

erase, dir, write

Examples

The following example copies a voice prompt auxiliary file (*voice_prompt.dat*) to the device from *www.exmaple.com*.

```
# copy voice_prompts from http://www.exmaple.com/voice_prompt.dat
```

3.4 copy (configuration file)

This command copies a configuration file from a URL source to the device and from the device to a destination URL or CLI console.

Syntax

The syntax of this command can include the following variations:

```
copy <configuration-file> from <URL>
copy <configuration-file> to <URL>
copy <configuration-file> to console
```

The command syntax format is described below:

Arguments	Description
< configuration-file >	Configuration file type. Can be one of the following: data_configuration – data (router's) configuration file voice_configuration – voice configuration file (i.e. <i>ini</i> file)
<URL>	When copying from a URL, the file source URL can be one of the following: http, https, nfs, ftp, ftps. When copying to a URL, the file destination URL can be one of the following: http, https.
from	Copy the configuration file from URL file source.
to	Copy the current running configuration (file) to a destination.
console	Copy the configuration file to the CLI console.

Defaults

NA

Functional notes

1. When copying the configuration file to a URL destination, the device uses the PUT HTTP command in order to transfer the file.
2. Please refer to the User Manual in order to learn about AudioCodes data and voice configuration files format and roles

Command Modes

Enable

Related commands

copy firmware

Examples

The following example copies the date configuration file to the CLI console.

```
# copy data_configuration to console
```

3.5 copy firmware

This command upgrades the device's firmware.

Syntax

The syntax of this command can include the following variations:

```
copy firmware from <URL>
```

The command's syntax format is described below:

Arguments	Description
from	Copy the firmware file from URL file source
<URL>	File source URL. Can be one of: http, https, nfs, ftp or ftps.

Defaults

NA

Functional notes

Upon invoking this command, the following will happen:

1. The new firmware will be copied and burned to the non-volatile (NV) memory of the device.
2. The current running configuration (voice and data) will be saved on the NV memory as well.
3. The device will automatically be reloaded with the new firmware.

Command Modes

Enable

Related commands

copy (configuration)

Examples

The following example upgrades the device's firmware from a source URL file.

```
# copy firmware from http://www.example.com/MSBG_firmware.cmp
```

3.6 debug log

This command starts the debug log facility.

Syntax

The syntax of this command can include the following variations:

```
debug log
```

Defaults

NA

Functional notes

1. Activating the debug log facility will redirect the device error messages (e.g. Syslog messages) to the CLI console as well as their original destination.
2. A 'no' command is supported for this command (*no debug log*), which disables the logging facility

Command Modes

Enable

Related commands

NA

Examples

The following example upgrades and activates the logging facility redirection.

```
# debug log
```


3.7 **dir**

This command displays the device's current auxiliary files directory information.

Syntax

The syntax of this command can include the following variations:

```
dir
```

Defaults

NA

Functional notes

NA

Command Modes

Enable

Related commands

erase, copy (auxiliary file), write

3.8 disable

This command switches the device back to Basic mode from Enable mode.

Syntax

The syntax of this command includes the following:

```
disable
```

Defaults

NA

Functional notes

NA

Command Modes

Enable

Related commands

enable, enable password

3.9 enable

This command switches the device to Enable Mode from Basic mode.

Syntax

The syntax of this command includes the following:

```
enable
```

Defaults

The default password for switching to Enable Mode is 'Admin'.

Functional notes

1. When switching to Enable Mode, the user will be prompted to enter the Enable Mode password.
2. This password can be changed via the *enable password* command.

Command Modes

Basic

Related commands

disable, enable password

3.10 enable password

This command sets the Enable Mode password for switching to Enable Mode from Basic mode.

Syntax

The syntax of this command can include the following variations:

```
enable password <password>
```

The command's syntax format is described below:

Arguments	Description
<password>	New password

Defaults

NA

Functional notes

NA

Command Modes

Enable

Related commands

disable, enable

3.11 erase

This command erases a device's auxiliary file.

Syntax

The syntax of this command can include the following variations:

```
erase <file>
```

The command's syntax format is described below:

Arguments	Description
<file>	File name to erase

Defaults

NA

Functional notes

1. The file name should be copied from the 'dir' command output.
2. The file is being erased from RAM (and from the current device's run usage). In order to erase the file completely from the NV memory, a 'write' command should be issued as well

Command Modes

Enable

Related commands

dir, copy (auxiliary file), write

Examples

The following example prints the directory listing of the device and then erases one of the files.

```
# erase voice_prompts
```

3.12 reload

This command reloads the device, with or without data configuration burn.

Syntax

The syntax of this command can include the following variations:

```
reload [no]
```

The command's syntax format is described below:

Arguments	Description
no	Reloads the device without burning the configuration.

Defaults

Burns the configuration upon reload.

Functional notes

1. By default, when the device is reloaded, the configuration and the auxiliary files are burned to NV memory.
2. Activating the 'reload' command is equivalent to activating the 'write' command followed by the 'reload no' command.

Command Modes

Enable

Related commands

write

3.13 telnet

This command invokes a Telnet session towards a remote host.

Syntax

The syntax of this command can include the following variations:

```
telnet <remote-host> <remote-port>
```

The command's syntax format is described below:

Arguments	Description
< remote-host >	Remote host IP address
< remote-port >	Remote host port number. This argument is not mandatory.

Defaults

Default remote port is 23 (if not entered otherwise by the user).

Functional notes

The Telnet command is used mainly for remote management proposes.

A remote administrator can access the MSBG device' CLI from the WAN leg while performing the full authentication process.

The user can then invoke Telnet sessions towards other devices in the LAN in order to manage them.

That way, no special pin-holes or forwarding rules should be declared in order to manage the LAN devices.

Command Modes

Enable

Related commands

NA

3.14 write

This command writes the current configuration set and auxiliary files to the NV memory.

Syntax

The syntax of this command can include the following variations:

```
write
```

Defaults

NA

Functional notes

This command should be invoked in the following scenarios in order to save the configuration set and auxiliary files to the NV memory:

- After completing a configuration set (i.e. after invoking one or more of the commands in the **'config'** mode command-set)
- After copying a new auxiliary file ('copy' command)
- After copying a new configuration file ('copy' command)
- After erasing an auxiliary file ('erase' command)

Command Modes

Enable

Related commands

reload, copy, erase, write factory

3.15 write factory

This command restores the factory settings of the device.

Syntax

The syntax of this command can include the following variations:

```
write factory
```

Defaults

NA

Functional notes

1. When this command is invoked, current configuration will be lost. Auxiliary files will also be erased. The device will then reload with its factory setting configuration.
2. Please refer to the user manual in order to learn about AudioCodes Factory Settings.

Command Modes

Enable

Related commands

write

3.16 Configuration Data Commands

3.16.1 interface

This command enters a specific interface configuration. Use the **no** form of this command to delete a specific interface.

Syntax

The syntax of this command can include the following variations:

```
interface GigabitEthernet <slot/port [.vlanID]>
interface GigabitEthernet <slot/port>
interface FastEthernet <slot/port>
interface vlan <vlanID>
```

The command's syntax format is described below:

Arguments	Description
slot	Module slot index as shown on the front panel.
port	Port index within the selected module.
vlanID (VLAN interface)	VLAN ID for Layer3 interfaces available via the LAN switch.
vlanID	Assign VLAN ID for a Layer3 sub interface.

Defaults

NA

Command Modes

Enable

Examples

The following example enters a specific interface configuration for the WAN Interface menu

```
(config)#interface GigabitEthernet 0/0
```

The following example enters a specific interface configuration for the Sub Interface 3 menu

```
(config)#interface GigabitEthernet 0/0.3
```

The following example enters a specific interface configuration for the GigabitEthernet Physical Port 3 menu

```
(config)#interface GigabitEthernet 4/3
```

```
(config)#interface GigabitEthernet 4/3
```

The following example enters a specific interface configuration for the FastEthernet Physical Port 3 menu

```
(config)#interface FastEthernet 5/3
```

```
(config)#interface FastEthernet 5/3
```

The following example enters a specific interface configuration for the VLAN 6 menu

```
(config)#interface vlan 6
```

```
(config)#interface vlan 6
```

3.16.1.1 ip address

This command defines the primary IP address on the specified Layer 3 interface. Use the **no** form of this command to remove a configured IP address.

Syntax

```
ip address <ip address> <subnet mask>
```

The command's syntax format is described below:

Arguments	Description
<ip address>	Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).
<subnet mask>	Specifies the subnet mask that corresponds to a range of IP addresses. Subnet masks should be expressed in dotted decimal notation (e.g., 255.255.255.0).

Defaults

NA

Command Modes

Enable

Examples

The following example configures the IP address of 10.4.2.3 255.255.0.0 on VLAN 6.

```
(conf-if-VLAN 6)#ip address 10.4.2.3 255.255.0.0
```

3.16.1.2 ip address dhcp

This command enables a DHCP client on the specified interface. Use the **no** form of this command to disable DHCP client functionality.

Syntax

```
ip address dhcp
```

No arguments for this command.

Defaults

NA

Functional notes

The interface's IP address will be acquired via DHCP.

Command Modes

Enable

Examples

The following example configures a DHCP client on VLAN 6.

```
(conf-if-VLAN 6)# ip address dhcp
```

3.16.1.3 shutdown

This command disables the specified interface. Use the **no** form of this command to enable the interface.

Syntax

```
shutdown
```

No arguments for this command.

Defaults

When creating a new interface, it is disabled by default.

Command Modes

Enable

Examples

The following example enables VLAN 6.

```
(conf-if-VLAN 6)# no shutdown
```

3.16.1.4 description

This command sets the description on the specified interface.

Syntax

```
description <string>
```

The command's syntax format is described below:

Arguments	Description
<string>	Specifies the interface description using an alphanumerical string (up to 255 characters).

Defaults

NA

Functional notes

Use inverted commas when using the space character as part of the description.

The string is limited to 255 characters.

Command Modes

Enable

Examples

The following example sets the description on VLAN 6.

```
(conf-if-VLAN 6)# description "vlan 6 interface"
```

3.16.1.5 mtu

This command configures the interface Maximum Transmission Unit (MTU) on the specified interface.

Syntax

The syntax of this command can include the following variations:

```
mtu auto
mtu dhcp
mtu <mtu value>
```

The command's syntax format is described below:

Arguments	Description
auto	Sets MTU automatically.
dhcp	Sets MTU by DHCP.
<value>	Sets MTU value. Range is 68 to 1500.

Defaults

By default, MTU is set to auto (usually 1500).

Command Modes

Enable

Examples

The following example sets the MTU value to 770 bytes on VLAN 6.

```
(conf-if-VLAN 6)# mtu 770
```

3.16.1.6 speed

This command configures the speed on the specified switch port interface.

Syntax

The syntax of this command can include the following variations:

```
speed 10
speed 100
speed auto
```

The command's syntax format is described below:

Arguments	Description
10	Force 10 Mbps operation
100	Force 100 Mbps operation
auto	Automatically detects switchport speed

Defaults

By default speed is set to auto

Command Modes

Enable

Examples

The following example sets the speed to 100 on GigabitEthernet 4/2.

```
(conf-if-GE 4/2) # speed 100
```


3.16.1.7 duplex

This command configures the duplex mode on the specified Layer 2 interface.

Syntax

The syntax of this command can include the following variations:

```
duplex half
duplex full
duplex auto
```

The command's syntax format is described below:

Arguments	Description
half	Forces half duplex operation
full	Forces full duplex operation
auto	Enables AUTO duplex configuration

Defaults

By default, duplex is set to auto.

Command Modes

Enable

Examples

The following example forces full duplex operation on GigabitEthernet 4/2.

```
(conf-if-GE 4/2)# duplex full
```

3.16.1.8 access-list

Access lists are used in several system components for classifying IP traffic based on parameters such as addresses, protocols and ports. The primary usage of access lists is for filtering unwanted traffic on the system's interfaces.

Access list processing is sequential; for each traffic flow, the list is scanned from the top until a matching rule is found. When configuring an access list, rules should be entered in appropriate order.

To attach an access list to an IP interface, see the "**access-group**" command documentation.

To remove an access list, use the "**no**" format of the command.

Syntax

The syntax of this command can include the following variations:

```

access-list <acl-id> permit <protocol> <source-selector> <dest-selector> <options>
access-list <acl-id> deny <protocol> <source-selector> <dest-selector> <options>
ip access-list extended <acl-id>
    
```

The commands syntax format is described below:

Arguments	Description										
<acl-id>	Identifier for this access list can be a number or a name.										
permit	The specified traffic should be allowed.										
deny	The specified traffic should be rejected.										
<protocol>	ip, tcp, udp, icmp										
<source-selector> <dest-selector>	Selects traffic by IP addresses and ports, in one of the following formats: <table border="1" data-bbox="580 1193 1434 1382"> <tbody> <tr> <td>any</td> <td>All traffic</td> </tr> <tr> <td>host A.B.C.D</td> <td>Traffic to/from single host, specified by IP address</td> </tr> <tr> <td>A.B.C.D wildcard-bits</td> <td>Traffic to/from a subnet, specified by an IP address and a mask (e.g. 0.0.255.255)</td> </tr> </tbody> </table> <p>If the <protocol> field is tcp or udp, the host selector may be followed by a port selector:</p> <table border="1" data-bbox="580 1473 1434 1570"> <tbody> <tr> <td>eq <port></td> <td>Traffic to/from a single port</td> </tr> <tr> <td>range <start> <end></td> <td>Traffic to/from multiple ports, specified by range</td> </tr> </tbody> </table> <p>If the port selector is not defined, the rule will match all ports.</p>	any	All traffic	host A.B.C.D	Traffic to/from single host, specified by IP address	A.B.C.D wildcard-bits	Traffic to/from a subnet, specified by an IP address and a mask (e.g. 0.0.255.255)	eq <port>	Traffic to/from a single port	range <start> <end>	Traffic to/from multiple ports, specified by range
any	All traffic										
host A.B.C.D	Traffic to/from single host, specified by IP address										
A.B.C.D wildcard-bits	Traffic to/from a subnet, specified by an IP address and a mask (e.g. 0.0.255.255)										
eq <port>	Traffic to/from a single port										
range <start> <end>	Traffic to/from multiple ports, specified by range										
<options>	One or more of the following: <table border="1" data-bbox="580 1632 1434 1821"> <tbody> <tr> <td>established</td> <td>Traffic matching is stateful, i.e. keep track of the connection state and accept all packets related to the connection</td> </tr> <tr> <td>log</td> <td>Traffic matching this rule will be logged</td> </tr> </tbody> </table>	established	Traffic matching is stateful, i.e. keep track of the connection state and accept all packets related to the connection	log	Traffic matching this rule will be logged						
established	Traffic matching is stateful, i.e. keep track of the connection state and accept all packets related to the connection										
log	Traffic matching this rule will be logged										

Defaults

The default access list behavior is "deny", i.e. if a flow doesn't match any of the rules it is assumed to be unwanted traffic.

Command Modes

Enable

Examples

The following example defines an access list which allows all TCP connections originating in a full subnet, with the exception of a single host:

```
(configure)# access-list 2001 deny tcp host 10.31.4.50 any
(configure)# access-list 2001 permit tcp 10.31.0.0 255.255.0.0 any
established
```

3.16.1.9 ip access-group

This command associates an access list with an IP interface. Refer to the documentation for more information on "access list".

To remove an access list association, use the "no" format of the command.

Syntax

The syntax of this command can include the following variations:

```
ip access-group <acl-id> in
ip access-group <acl-id> out
```

The commands syntax format is described below:

Arguments	Description
<acl-id>	Identifies the access list to use (number or name).
in	The access list will control inbound traffic on the interface.
out	The access list will control outbound traffic on the interface.

Defaults

The default setting for IP interfaces is no access-group, i.e. unlimited traffic.

Command Modes

This command is issued in interface context.

Examples

The following example associates an access list with a VLAN interface:

```
(conf-if-VLAN 1)# ip access-group 2001 in
```

3.16.1.10 ip nat inside

NAT port-forwarding exposes a LAN service (IP address and port) to WAN users. The command creates a static translation rule, which maps a WAN port (on one or all WAN interfaces) to a LAN service.

To remove a port-forwarding rule, use the "no" format of the command.

Syntax

The syntax of this command can include the following variations:

```
ip nat inside source static <tcp|udp> <lan-ip> <lan-port> <wan-ip>
<wan-port>
ip nat inside source static <tcp|udp> <lan-ip> same <wan-ip> <wan-
port>
ip nat inside source static <tcp|udp> <lan-ip> same <wan-ip> range
<wan-port-start> <wan-port-end>
```

The commands syntax format is described below:

Arguments	Description
tcp	Define forwarding for a TCP port.
udp	Define forwarding for a UDP port.
<lan-ip>	IP address of LAN service host.
same	The LAN port is the same as the WAN port.
<lan-port>	Port number (1-65535) of the LAN service.
<wan-ip>	WAN interface for this rule. Specify IP address or 0.0.0.0 for all WAN interfaces.
<wan-port>	Port number on WAN interface.
range	Performs port forwarding on a range of ports, rather than a single port.

Defaults

By default, no port forwarding rules are defined.

Command Modes

Enable

Examples

The following example defines two port forwarding rules: one allowing access to a LAN web server on WAN port 8080, and another allowing RTP access to the voice component of the MSBG on ports 4000-6000:

```
(configure)# ip nat inside source static tcp 192.168.0.7 80
0.0.0.0 8080
(configure)# ip nat inside source static udp 192.168.0.2 same
0.0.0.0 range 4000 6000
```

3.16.1.11 switchport mode

This command configures the VLAN Trunking mode.

Syntax

The syntax of this command can include the following variations:

```
switchport mode access
switchport mode trunk
```

The command's syntax format is described below:

Arguments	Description
access	Sets the port to access mode.
trunk	Sets the port to trunk mode.

Defaults

By default, Switchport mode is set to trunk.

Command Modes

Enable

Examples

The following example sets the Switchport mode to static access on GigabitEthernet 4/2:

```
(conf-if-GE 4/2) # switchport mode access
```

3.16.1.12 **switchport access vlan**

This command configures the specified switch port interface as a static-access member of a VLAN.

Syntax

```
Switchport access vlan <vlan id>
```

The command's syntax format is described below:

Arguments	Description
<vlan id>	Specifies a valid VLAN interface ID. Range is 1 to 3999.

Defaults

By default, a single VLAN interface is available (VLAN 1).

Functional notes

If the port is in the trunk mode, this command will not alter the Switchport mode to 'Access'. Instead it will save the value to be applied when the port does switch to Access mode.

Command Modes

Enable

Related commands

switchport mode

Examples

The following example sets the switchport mode to static access and makes the GigabitEthernet interface 4/2 port a member of VLAN 3:

```
(conf-if-GE 4/2)# switchport access vlan 3
```

3.16.1.13 switchport trunk allowed vlan

This command is used to configure the VLANs available on the trunk (when the interface is in trunking mode).

Syntax

The syntax of this command can include the following variations:

```
switchport trunk allowed vlan add <vlan id>
switchport trunk allowed vlan remove <vlan id>
```

The command's syntax format is described below:

Arguments	Description
add	Add entry to the list of allowed VLANs.
remove	Remove entry from the list of allowed VLANs.
<vlan id>	Specifies a valid VLAN interface ID. Range is 1 to 3999.

Defaults

NA

Functional notes

VLAN ID values range from 1 to 3999.

Command Modes

Enable

Related commands

switchport mode

Examples

The following example adds VLAN 3 to the VLAN trunk defined for GigabitEthernet 4/2:

```
(conf-if-GE 4/2)# switchport trunk allowed vlan add 3
```


3.16.1.14 switchport trunk native vlan

This command sets the native VLAN to the interface when set to Trunking mode.

Syntax

```
Switchport trunk native vlan <vlan id>
```

The command's syntax format is described below:

Arguments	Description
<vlan id>	Specifies a valid VLAN interface ID. Range is 1 to 3999.

Defaults

By default, this is set to VLAN 1 (the default VLAN).

Functional notes

VLAN ID values range from 1 to 3999.

Configure which VLAN the interface uses as its native VLAN when in Trunking mode. Packets from this VLAN leaving the interface will not be tagged with the VLAN number. Any untagged packets received on the interface are considered to be tagged with VLAN ID.

Command Modes

Enable

Related commands

switchport mode

Examples

The following example sets the native VLAN on GigabitEthernet 4/2 to 3.

```
(conf-if-GE 4/2)# switchport trunk native vlan 3
```

Port monitoring allows the user to reflect traffic from each Ethernet LAN port to any other single LAN or microprocessor port. Monitoring of traffic is useful when trying to analyze the traffic or when debugging network problems. AudioCodes MSBG products allow monitoring of egress traffic, ingress traffic or both directions.

3.16.1.15 destination interface configuring

The destination interface is the interface where you located your network analyzer. Choose your interface in data configuration mode.

Syntax

The syntax of this command can include the following variations:

```
interface <type> <slot/port>
```

The commands syntax format is described below:

Arguments	Description
<type>	Destination Interface type FastEthernet/GigabitEthernet
<slot/port>	Destination Interface slot number and port number

Examples

The following example defines a key to a peer ip

```
(config)# interface GigabitEthernet 4/3
```



Note: There can be only one destination port. If you already configured a destination port you won't be able to change to another port. You will need first to remove the entire port monitoring configuration and only then you will be able to configure new port monitoring commands.

3.16.1.16 source interface configuring

After you choose your destination port, you can configure some source ports. This is done with the “port-monitor” command .

Syntax

The syntax of this command can include the following variations:

```
port-monitor <type> <slot/port> <direction>
```

Arguments	Description
<type>	Source Interface type FastEthernet/GigabitEthernet
<slot/port>	Source Interface slot number and port number
<direction>	Monitoring direction Ingress/Egress/Both

Examples

The following example defines a key to a peer ip

```
(conf-if-GE 4/3)# port-monitor GigabitEthernet 4/1 ingress
(conf-if-GE 4/3)# port-monitor FastEthernet 5/2 egress
(conf-if-GE 4/3)# port-monitor GigabitEthernet 4/4 both-direction
```

3.16.1.17 port monitoring status

To view the port monitoring status, use the “show data port-monitoring” command .

Syntax

The syntax of this command can include the following variations:

```
show data port-monitoring
```

Examples

The following example defines a key to a peer ip

```
# show data port-monitor
```

3.16.1.18 crypto map (interface IPsec)

To apply a previously defined crypto map set to an interface, use the **crypto map** command in *interface configuration* mode. To remove the crypto map set from the interface, use the **no form** of this command.

```
crypto map <map-name>
no crypto map <map-name>
```

Arguments	Description
<map-name>	Name that identifies the crypto map set

Defaults

No crypto maps are assigned to interfaces.

Command Modes

Interface configuration

Examples

The following example demonstrates how to apply a crypto map set to an interface.

```
(conf-if-GE 0/0)# crypto map WAN_VPN
```

3.16.2 ip dhcp pool

This command assigns a pool on a specified interface and enters the pool configuration.

Syntax

The syntax of this command can include the following variations:

```
ip dhcp pool <interface name>
```

The command's syntax format is described below:

Arguments	Description
<interface name>	Look for interface naming on the <i>interface</i> command.

Defaults

NA

Related commands

service dhcp

Command Modes

Enable

Examples

The following example enters IP DHCP POOL on VLAN 5.

```
(config)# ip dhcp pool vlan 5
```

3.16.2.1 network

This command defines the network address and mask for the DHCP pool. This command is mandatory for assigning dhcp pool on the interface.

Syntax

```
network <first ip> <last ip> <mask>
```

The command's syntax format is described below:

Arguments	Description
<first ip>	First IP address in the range for this pool. Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).
<last ip>	Last IP address in the range for this pool. Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).
<mask>	Specifies the subnet mask that corresponds to a range of IP addresses. Subnet masks should be expressed in dotted decimal notation (for example, 255.255.255.0).

Defaults

NA

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# network <first ip> <last ip> <mask>
```

Command Modes

Enable

Examples

The following example enters ip dhcp pool on VLAN 5 and sets the Network addresses and mask for the pool.

```
(dhcp-conf-VLAN 5)#network 10.4.60.1 10.4.60.5 255.255.0.0
```

3.16.2.2 dns-server

This command defines the DNS servers for the DHCP pool on the specified interface.

Syntax

```
dns-server <ip address>
```

The command's syntax format is described below:

Arguments	Description
<ip address>	Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).

Defaults

NA

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# ip dns-server <ip address>
```

Command Modes

Enable

Examples

The following example enters ip dhcp pool on VLAN 5 and set the DNS server to 10.1.2.3

```
(dhcp-conf-VLAN 5)#dns-server 10.1.2.3
```

3.16.2.3 netbios-name-server

This command defines a NetBIOS Windows Internet Naming Service (WINS) name servers assigned to the DHCP pool on the specified interface.

Syntax

```
netbios-name-server <ip address>
```

The command's syntax format is described below:

Arguments	Description
<ip address>	Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (e.g., 10.1.2.3).

Defaults

NA

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# netbios-name-server <ip address>
```

Command Modes

Enable

Examples

The following example enters ip dhcp pool on VLAN 5 and sets the NetBIOS name server to 10.1.2.3.

```
(dhcp-conf-VLAN 5)# netbios-name-server 10.1.2.3
```


3.16.2.4 lease

This command defines the address lease time assigned to the DHCP pool on the specified interface.

Syntax

```
lease <days> [hours] [minutes]
```

The command's syntax format is described below:

Arguments	Description
<days>	Sets the number of days (mandatory). Range is 0 to 365.
<hours>	Sets the number of hours. Range is 0 to 23.
<minutes>	Sets the number of minutes. Range is 0 to 59.

Defaults

By default, the lease time is set to 1 hour.

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# lease <days> <hours> <minutes>
```

Command Modes

Enable

Examples

The following example enters ip dhcp pool on VLAN 5 and sets the lease time to 5 hours and 15 minutes.

```
(dhcp-conf-VLAN 5)# lease 0 5 15
```

3.16.3 service dhcp

This command enables the DHCP server on the specified interface or on all Layer 3 interfaces. Use the **no** form of this command to disable DHCP server on a specific interface or on all Layer 3 interfaces.

Syntax

```
service dhcp all
service dhcp <interface name>
```

The command's syntax format is described below:

Arguments	Description
All	Enables/disables all interfaces.
<interface name>	Look for interface naming on the <i>interface</i> command. Enables/disables the specified interface.

Defaults

By default, all interfaces are disabled.

Functional notes

This commands enables/disables the DHCP server created via the "ip dhcp pool" command.

Related commands

ip dhcp pool

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# service dhcp
```

Command Modes

Enable

Examples

The following example enables the DHCP server on VLAN 5:

```
(config)# service dhcp vlan 5
```

3.16.4 ip dhcp-server

This command enables the specified address of the DHCP relay server to be used on the specified interface or on all Layer 3 interfaces. Use the **no** form of this command to disable the address of the DHCP relay server on a specific interface or on all Layer 3 interfaces.

Syntax

```
ip dhcp-server <ip address> all
ip dhcp-server <ip address> <interface name>
```

The command's syntax format is described below:

Arguments	Description
<ip address>	Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).
All	Enables/disables all interfaces.
<interface name>	Look for interface naming on the <i>interface</i> command. Enables/disables the specified interface.

Defaults

NA

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# ip dhcp-server <ip address>
```

Command Modes

Enable

Examples

The following example configures the DHCP relay address of 10.1.2.3 on VLAN 5:

```
(config)# ip dhcp-server 10.1.2.3 vlan 5
```

3.16.5 ip name-server

This command defines the DNS relay server's address on all Layer 3 interfaces. Use the **no** form of this command to the undefined DNS relay server's address on all Layer 3 interfaces.

Syntax

```
ip name-server <first ip address> all
ip name-server <first ip address> [second ip address] all
```

The command's syntax format is described below:

Arguments	Description
<first ip address>	Specifies the primary DNS server address. Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).
<second ip address>	Specifies the secondary DNS server address. This field is not required when specifying a single IP address. Specifies a valid IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).

Defaults

NA

Related commands

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# ip name-server <first ip> <second ip>
```

Command Modes

Enable

Examples

The following example defines DNS relay servers 10.4.1.1 and 10.4.1.2 for all Layer 3 interfaces:

```
(config)# ip name-server 10.4.1.1 10.4.1.2
```

3.16.6 ip dns server

This command enables the DNS server on all layer 3 interfaces. Use the **no** form of this command to disable dns server on all layer 3 interfaces.

Syntax

```
ip dns server all auto
ip dns server all static
```

The command's syntax format is described below:

Arguments	Description
auto	DNS server address is automatically set by the response from the DHCP server. The interface must be set to obtain IP addresses from DHCP.
static	DNS server address is set statically by the configuration.

Defaults

NA

Related commands

ip host

This command will be also available from the interface configuration sub-directory.

Syntax:

```
(conf-if-VLAN 5)# ip dns server auto/static
```

Command Modes

Enable

Examples

The following example enables a static DNS server for all Layer 3 interfaces:

```
(config)# ip dns server all static
```

3.16.7 ip host

This command adds an entry to the IP hostname table for all Layer 3 interfaces. Use the **no** form of this command to delete an entry from the IP Hostname table for all Layer 3 interfaces.

Syntax

```
ip host <name> <ip address>
```

The command's syntax format is described below:

Arguments	Description
<name>	Specifies the name of the host. Up to 63 characters.
<ip address>	Specifies the host's IPv4 address. IP addresses should be expressed in dotted decimal notation (for example, 10.1.2.3).

Defaults

NA

Related commands

ip dns server

Command Modes

Enable

Examples

The following example adds an entry with name 'abcd' and ip address '10.44.1.1' to the IP Hostname table for all Layer 3 interfaces:

```
(config)# ip host abcd 10.44.1.1
```

3.16.7.1 spanning-tree General Commands

3.16.7.1.1 spanning-tree

Enables/disables the spanning tree in the system.

Syntax

```
spanning-tree  
no spanning-tree
```

No arguments for this command.

Defaults

NA

Functional notes

Under configure terminal

Command Modes

Enable

Examples

To enable the spanning-tree:

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

To disable the spanning-tree:

```
(config)# no spanning-tree
```

3.16.7.1.2 spanning-tree priority

This command sets the priority of the unit.

Syntax

```
spanning-tree priority <value>
```

Arguments	Description
<value>	0 - 61440 in multiples of 4096

Defaults

32768

Functional notes

Under configure terminal.

Command Modes

Enable

Examples

This example sets the unit priority to 4096.

```
(config)# spanning-tree priority 4096
```


3.16.7.1.3 spanning-tree hello-time

This command sets the hello_time spanning-tree parameter of the unit.

Syntax

```
spanning-tree hello-time <value>
```

Arguments	Description
<value>	1-10 seconds - default is 2 seconds

Defaults

NA

Functional notes

Under configure terminal

Command Modes

Enable

Examples

This example sets the hello-time to 1 second:

```
(config)# spanning-tree hello-time 1
```

3.16.7.1.4 spanning-tree max-age

This command sets the maximum-age spanning-tree parameter of the unit.

Syntax

```
spanning-tree max-age <value>
```

Arguments	Description
<value>	6 - 40 seconds

Defaults

20 seconds

Functional notes

Under configure terminal
 (FORWARD_DELAY-1)X2 >= MAX_AGE

Command Modes

Enable

Examples

This example sets the unit max-age to 10:

```
(config)# spanning-tree max-age 10
```

3.16.7.1.5 spanning-tree forward-delay

This command sets the forward-delay spanning-tree parameter of the unit.

Syntax

```
spanning-tree forward-delay <value>
```

Arguments	Description
<value>	4 – 30 sec

Defaults

15 seconds

Functional notes

Under configure terminal
(FORWARD_DELAY-1)X2 >= MAX_AGE

Command Modes

Enable

Examples

To set the unit forward-delay to 5:

```
(config)# spanning-tree forward-delay 5
```

3.16.7.2 spanning tree Interface commands

3.16.7.2.1 spanning-tree

This command enables/disables the spanning tree on a specific interface.

Syntax

```
spanning-tree  
no spanning-tree
```

No arguments for this command.

Defaults

NA

Functional notes

Under configure terminal

Command Modes

Enable

Examples

To enable the spanning-tree on interface 5/1:

```
(conf-if-FE 5/1)# spanning-tree
```

To disable the spanning-tree on interface 5/1:

```
(conf-if-FE 5/1)# no spanning-tree
```

3.16.7.2 spanning-tree priority

This command sets the priority of the interface.

Syntax

```
spanning-tree priority <value>
```

Arguments	Description
<value>	0-240 multiple of 16

Defaults

NA

Functional notes

Under configure terminal

Command Modes

Enable

Examples

This example sets the unit priority to 16".

```
(conf-if-FE 5/1)# spanning-tree priority 16
```

3.16.7.2.3 spanning-tree cost

This command sets the cost of the interface.

Syntax

```
spanning-tree cost <value>
```

Arguments	Description
<value>	1-200,000,000

Defaults

NA

Functional notes

Under configure terminal.

Command Modes

Enable

Examples

This example sets the unit cost to 10000:

```
(conf-if-FE 5/1)# spanning-tree cost 10000
```

3.16.7.2.4 spanning-tree edge

This command sets the edge configuration of the interface.

Syntax

```
spanning-tree edge auto
spanning-tree edge enable
spanning-tree edge disable
```

Arguments	Description
auto/enable/disable	<ul style="list-style-type: none">▪ auto – auto detect▪ enable – enable edge▪ disable – disable edge

Defaults

NA

Functional notes

Under configure terminal

Command Modes

Enable

Examples

This example sets the unit edge to 'auto':

```
(conf-if-FE 5/1)# spanning-tree edge auto
```

3.16.7.2.5 spanning-tree point-to-point

This command sets the point-to-point configuration of the interface.

Syntax

```
spanning-tree point-to-point auto
spanning-tree point-to-point enable
spanning-tree point-to-point disable
```

Arguments	Description
auto/enable/disable	<ul style="list-style-type: none"> • auto – auto detect • enable – enable point-to-point • disable – disable point-to-point

Defaults

NA

Functional notes

Under configure terminal.

Command Modes

Enable

Examples

This example sets the unit point-to-point to auto:

```
(conf-if-FE 5/1)# spanning-tree point-to-point auto
```


3.16.8 Routing Commands

Each routing protocol is available only if it is included in the Feature key supplied with the system.

Border Gateway Protocol (BGP) is the main routing protocol of the Internet. It is used to distribute routing information among Autonomous Systems. (For more information, refer to the protocol's RFC at <http://www.ietf.org/rfc/rfc1771.txt>.)

Open Shortest Path First Protocol (OSPF) is an Interior Gateway Protocol (IGP) used to distribute routing information within a single Autonomous System. (For more information, refer to the protocol's RFC at <http://www.ietf.org/rfc/rfc2328.txt>.)

The feature's routing engine is based on the Quagga GNU routing software package. By using the BGP and OSPF protocols, this routing engine enables the Mediant 1000 MSBG to exchange routing information with other routers within and outside an Autonomous System.

3.16.8.1 ip route

This command configures routing rules.

Syntax

The syntax of this command can include several variations. The most common are:

```
ip route ip-address <ip address> <subnet mask>
    GigabitEthernet <slot/port.vlanId>
ip route ip-address <ip address> <subnet mask> ip-address
    <gw address>
ip route ip-address <ip address> <subnet mask> vlan
    <vlanId>
```

Note – The same syntax is repeated with “**network** <ip/prefix>” instead of the “**ip-address** <ip address> <subnet mask>” as described above.

The command’s syntax format is described below:

Arguments	Description
ip address	Destination IP address.
subnet mask	Destination subnet mask.
GigabitEthernet	Use specified GigabitEthernet interface.
gw address	Gateway IP address.
vlan	Use specified VLAN interface.

Defaults

NA

Command Modes

Enable

Examples

The following example adds a route to 10.20.0.0/16 through gateway 10.10.0.1:

```
(config)# ip route network 10.20.0.0/16 ip-address 10.10.0.1
```

The following example adds a direct route to 10.30.2.3/24 from interface VLAN 4:

```
(config)# ip route ip-address 10.30.2.3 255.255.255.0 vlan 4
```

3.16.8.2 BGP Protocol - General Configuration

BGP General Configuration includes the following commands:

3.16.8.2.1 router bgp asn

This command enables a BGP protocol process with the specified *asn*.

Syntax

The syntax of this command can include the following variations:

```
router bgp asn  
no router bgp asn
```

The command's syntax format is described below:

Arguments	Description
asn	Autonomous System Network

Defaults

NA

Command Modes

Enable

Example

The following example enables BGP router configuration mode.

```
>router bgp 1
```

3.16.8.2.2 ip as-path access-list word

This command defines a new as-path access list.

Syntax

The syntax of this command can include the following variations:

```
ip as-path access-list word {permit|deny} line
no ip as-path access-list word
no ip as-path access-list word {permit|deny} line
```

The command's syntax format is described below:

Arguments	Description
word	Regular expression access list name
permit	Specify packets to forward
deny	Specify packets to reject
line	Regular expression to match the BGP as-path

Defaults

NA

Command Modes

Enable

Example

This example defines a new as-path access list.

```
>ip as-path access-list xxxx permit line 1
```

3.16.8.2.3 ip community-list community-option {permit|deny} line

This command adds a community list entry.

Syntax

The syntax of this command can include the following variations:

```
ip community-list expanded name {permit|deny} line
ip community-list number-range-1 {permit|deny} [AA:NN]
ip community-list number-range-2 {permit|deny} line
ip community-list standard name {permit|deny} [AA:NN]
no ip community-list community-option
```

The command's syntax format is described below:

Arguments	Description
expanded	Adds an expanded community list entry
standard	Adds an standard community list entry
name	Community list name
line	An ordered list as a regular expression
permit	Specify community to accept
deny	Specify community to reject
number-range-1	Community number in AA:NN format or internet local-AS, no-advertise, no-export - (Range 1 - 99)
number-range-2	Community number in AA:NN format or internet local-AS, no-advertise, no-export - (Range 100 - 500)

Defaults

NA

Command Modes

Enable

Example

This example adds a community list entry.

```
>ip community-list standard comm1 permit
```

3.16.8.2.4 ip extcommunity-list standard

This command defines a new standard extcommunity-list.

Syntax

The syntax of this command can include the following variations:

```
ip extcommunity-list standard name {permit|deny}
no ip extcommunity-list name
no ip extcommunity-list standard name
```

The command's syntax format is described below:

Arguments	Description
name	Community list name
permit	Specify community to accept
deny	Specify community to reject

Defaults

NA

Command Modes

Enable

Example

This example defines a new standard extcommunity-list.

```
>ip extcommunity-list standard comm1 permit
```

3.16.8.2.5 ip extcommunity-list expanded

This command defines a new expanded extcommunity-list.

Syntax

The syntax of this command can include the following variations:

```
ip extcommunity-list expanded name {permit|deny} line
ip extcommunity-list number-range-1 {permit|deny}
ip extcommunity-list number-range-2 {permit|deny}
no ip extcommunity-list expanded name
```

The command's syntax format is described below:

Arguments	Description
name	Community list name
permit	Specify community to accept
deny	Specify community to reject
line	String expression of extended communities attribute.
number-range-1	Community number in AA:NN format or internet local-AS, no-advertise, no-export - (Range 1 - 99)
number-range-2	Community number in AA:NN format or internet local-AS, no-advertise, no-export - (Range 100 - 500)

Defaults

NA

Command Modes

Enable

Example

This example defines a new expanded extcommunity-list.

```
>ip extcommunity-list expanded commname permit
```

3.16.8.3 BGP Protocol - Router Configuration

BGP Router Configuration includes the following commands:

3.16.8.3.1 bgp router-id

This command specifies the router-ID.

Syntax

The syntax of this command can include the following variations:

```
bgp router-id A.B.C.D
no bgp router-id
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Router Identifier

Defaults

Default Router identifier value is selected as the largest IP address of the interfaces.

Command Modes

Enable

Example

The following example sets the Router Identifier as follows.

```
>bgp router-id 10.13.22.130
```


3.16.8.3.2 distance bgp

This command changes the distance value of BGP. Each argument refers to the distance value for external, internal and local routes.

Syntax

The syntax of this command can include the following variations:

```
distance bgp <1-255> <1-255> <1-255>
```

The command's syntax format is described below:

Arguments	Description
<1-255>	Distance value

Defaults

NA

Command Modes

Enable

Example

The following example changes the distance value of BGP.

```
>distance bgp 100 110 120
```

3.16.8.3.3 distance

This command sets the default BGP distance to the specified value when the router's source IP address matches the specified prefix.

Syntax

The syntax of this command can include the following variations:

```
distance <1-255> A.B.C.D/M
```

The command's syntax format is described below:

Arguments	Description
<1-255>	Distance value

Defaults

Distance 120

Command Modes

Enable

Example

The following example changes the distance value of BGP.

```
>distance 100 10.2.2.2/16
```

3.16.8.3.4bgp bestpath as-path

This command specifies that the length of confederation path sets and sequences should be taken into account during the BGP best path decision process.

Syntax

The syntax of this command can include the following variations:

```
bgp bestpath as-path confed | ignore
```

The command's syntax format is described below:

Arguments	Description
confed	Confederation
ignore	Ignore <i>as-path</i> length in selecting a router

Defaults

NA

Command Modes

Enable

Example

The following example ignores *as-path* length in selecting a router.

```
>bgp bestpath as-path ignore
```

3.16.8.3.5 aggregate-address

This command specifies an aggregate address.

Syntax

The syntax of this command can include the following variations:

```
aggregate-address ip-address A.B.C.D A.B.C.D
aggregate-address network A.B.C.D/M

aggregate-address ip-address A.B.C.D A.B.C.D as-set
aggregate-address network A.B.C.D/M as-set

aggregate-address ip-address A.B.C.D A.B.C.D summary-only
aggregate-address network A.B.C.D/M summary-only
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP Address or subnet mask
A.B.C.D/M	IP Address/network prefix
as-set	Resulting routes include AS set
summary-only	Aggregated routes are not announced

Defaults

NA

Command Modes

Enable

Example

The following example specifies an aggregate address.

```
>aggregate-address ip-address 10.21.3.150 255.255.0.0
```

3.16.8.3.6 redistribute kernel

This command redistributes the kernel route to the BGP process.

Syntax

The syntax of this command can include the following variations:

```
redistribute kernel
```

Defaults

NA

Command Modes

Enable

Example

The following example redistributes the kernel route to the BGP process.

```
>redistribute kernel
```

3.16.8.3.7 redistribute static

This command redistributes the static route to the BGP process.

Syntax

The syntax of this command can include the following variations:

```
redistribute static
```

Defaults

NA

Command Modes

Enable

Example

The following example redistributes the static route to the BGP process.

```
>redistribute static
```

3.16.8.3 redistribute connected

This command redistributes the connected route to the BGP process.

Syntax

The syntax of this command can include the following variations:

```
redistribute connected
```

Defaults

NA

Command Modes

Enable

Example

The following example redistributes the connected route to the BGP process.

```
>redistribute connected
```

3.16.8.3.9 redistribute ospf

This command redistributes the OSPF route to the BGP process.

Syntax

The syntax of this command can include the following variations:

```
redistribute ospf
```

Defaults

NA

Command Modes

Enable

Example

The following example redistributes the OSPF route to the BGP process.

```
>redistribute ospf
```


3.16.8.3.10 neighbor ip-address|word remote-as asn

This command creates a new neighbor whose remote -as is **asn**. This command must be the first command used when configuring a neighbor.



Note: In all **neighbor** commands the **neighbor ip-address|word** maybe described as *peer*.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D remote-as asn
neighbor word string remote-as asn
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP Address
string	Word string
remote-asn	Numeric <1-65535>
peer	Can be an IPv4 address.

Defaults

NA

Command Modes

Enable

Example

In the following example, the router in AS-1, is trying to peer with AS-2 at 10.0.0.1.

```
>neighbor 10.0.0.1 remote-as 2
```

3.16.8.3.11 neighbor ip-address|word shutdown

This command shuts down the peer.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D shutdown
neighbor word string shutdown
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP Address
string	word string

Defaults

NA

Command Modes

Enable

Example

In the following example, the peer is shutdown.

```
>neighbor ip-address 10.30.5.118 shutdown
```

3.16.8.3.12 neighbor ip-address|word ebgp-multihop

This command allows ebgp neighbors that are not on directly connected networks.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D ebgp-multihop
neighbor word string ebgp-multihop
no neighbor peer ebgp-multihop
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP Address
string	word string

Defaults

NA

Command Modes

Enable

Example

The following example allows an ebgp neighbor.

```
>neighbor ip-address 10.21.5.120 ebgp-multihop
```

3.16.8.3.13 neighbor ip-address|word description

This command sets the description of the peer.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D description string
neighbor word string description string
no neighbor peer description
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP address
string	Name string

Defaults

NA

Command Modes

Enable

Example

This following example sets the description of the peer

```
>neighbor ip-address 10.5.20.110 description main server
```

3.16.8.3.14 neighbor ip-address|word version version

This command sets the BGP version to match enable.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D version version  
neighbor word string version version
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	IP Address
string	Name string
version	Can be either 4 or 4-. BGP version 4- is similar but the neighbor speaks the old Internet-Draft revision 00's Multiprotocol Extensions for BGP-4.

Default

4

Command Modes

Enable

Example

In the following example, the BGP version is set.

```
>neighbor ip-address 10.5.20.110 version 4
```

3.16.8.3.15 neighbor ip-address|word interface ifname

This command sets up the ifname of the interface used for the connection. This command is deprecated and may be removed in a future release. Its use should be avoided.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D interface ifname
neighbor word string interface ifname
no neighbor peer interface ifname
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor IP address
string	Name string
Ifname	Interface name

Defaults

NA

Command Modes

Enable

Example

This example sets up the ifname of the interface used for the connection.

```
>neighbor ip-address 10.5.20.100 interface vlan 4
```

3.16.8.3.16 neighbor ip-address|word next-hop-self

This command specifies an announced route's next hop as being equivalent to the address of the bgp router.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D next-hop-self
neighbor word string next-hop-self
no neighbor peer next-hop-self
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor IP Address
string	name string

Defaults

NA

Command Modes

Enable

Example

This example specifies an announced route's next hop.

```
>neighbor ip-address 10.12.50.103 next-hop-self
```

3.16.8.3.17 neighbor ip-address|word update-source

This command specifies the IPv4 source address to use for the BGP session to this neighbor.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D update-source ip-address A.B.C.D
neighbor ip-address A.B.C.D update-source [ifname]
neighbor word string update-source ip-address A.B.C.D
neighbor word string update-source [ifname]
no neighbor peer update-source
```

The command's syntax format is described below:

Arguments	Description
ifname	Interface name
A.B.C.D	IP address
string	name string

Defaults

NA

Command Modes

Enable

Example

This example specifies the IPv4 source address to use.

```
>neighbor ip-address 192.168.0.1 update-source vlan2
```


3.16.8.3.18 neighbor ip-address|word default-originate

This command announces default routes to the peer. The bgpd's default is to not announce the default route (0.0.0.0/0) even it is in the routing table.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D default-originate
neighbor word string default-originate
no neighbor peer default-originate
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor IP address
string	Neighbor tag

Defaults

NA

Command Modes

Enable

Example

This example announces default routes to the peer.

```
>neighbor ip-address 10.14.3.118 default-originate
```

3.16.8.3.19 neighbor ip-address port port number

This command defines the neighbor's BGP port.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D port port number
no neighbor ip-address A.B.C.D port port number
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor ip address
port number	0 - 65535

Defaults

NA

Command Modes

Enable

Example

This example defines the neighbor's BGP port.

```
>neighbor ip-address 10.14.3.118 port 100
```

3.16.8.3.20 neighbor ip-address|word send-community

This command sends the community attribute to this neighbor.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D send-community
neighbor word string send-community
no neighbor peer send-community
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	neighbor ip address
string	neighbor tag

Defaults

NA

Command Modes

Enable

Example

This example sends the community attribute to this neighbor.

```
>neighbor ip-address 10.15.3.111 send-community
```

3.16.8.3.21 neighbor ip-address|word weight weight

This command specifies a default weight value for the neighbor's routes.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D weight weight
neighbor word string weight weight
no neighbor peer weight weight
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor ip address
string	Neighbor tag
weight	0 - 65535

Defaults

NA

Command Modes

Enable

Example

This example specifies a default weight value for the neighbor's routes.

```
>neighbor ip-address 10.15.5.110 weight 1000
```

3.16.8.3.22 neighbor ip-address|word maximum-prefix number

This command specifies a maximum number of prefixes accepted from this peer.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D maximum-prefix number  
neighbor word string maximum-prefix number  
no neighbor peer maximum-prefix number
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor IP address
string	Neighbor tag
number	Maximum number of prefix limits 1 - 4294967295

Defaults

NA

Command Modes

Enable

Example

This example specifies the maximum number of prefixes accepted from this peer.

```
>neighbor ip-address 10.15.5.110 maximum-prefix 10000
```

3.16.8.3.24 neighbor ip-address|word route-map name

This command applies a route-map on the neighbor.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D route-map name [in|out] export|import
neighbor word string route-map name [in|out] export|import
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	Neighbor ip address
word	Neighbor tag
name	Name of route-map
in	Apply map to incoming routes
out	Apply map to outbound routes
export	Apply map to routes coming from the route-server client
import	Apply map to routes going into the client's table

Defaults

NA

Command Modes

Enable

Example

This example applies a route-map on the neighbor.

```
>neighbor ip-address 10.12.5.101 route-map routename in import
```

3.16.8.3.25 neighbor ip-address|word peer-group word

This command joins a specific peer to peer group word.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D peer-group word
neighbor word string peer-group word
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	neighbor ip address
string	neighbor tag
word	Peer-group name

Defaults

NA

Command Modes

Enable

Example

This example joins a specific peer to group1.

```
>neighbor ip-address 10.12.5.101 peer-group group1
```

3.16.8.3.26 neighbor peer strict-capability-match

This command strictly compares negotiation match.

Syntax

The syntax of this command can include the following variations:

```
neighbor peer strict-capability-match  
no neighbor peer strict-capability-match
```

Defaults

NA

Command Modes

Enable

Example

This example strictly compares negotiation match.

```
>neighbor ip-address 1.1.1.1 strict-capability-match
```


3.16.8.3.27 neighbor ip-address|word prefix-list name

This command specifies a prefix-list for the peer.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D prefix-list name [in|out]
neighbor word string prefix-list name [in|out]
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	neighbor ip address
string	neighbor tag
in	Filter incoming updates
out	Filter outgoing updates
name	Name of prefix list in string format.

Defaults

NA

Command Modes

Enable

Example

This example specifies a prefix-list for the peer.

```
>neighbor ip-address 10.15.5.110 prefix-list plist in
```

3.16.8.3.28 neighbor ip-address|word filter-list name

This command establishes BGP filters.

Syntax

The syntax of this command can include the following variations:

```
neighbor ip-address A.B.C.D filter-list name [in|out]
neighbor word string filter-list name [in|out]
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	neighbor ip address
string	neighbor tag
in	Filter incoming updates
out	Filter outgoing updates
name	as-path access list name

Defaults

NA

Command Modes

Enable

Example

This example establishes BGP filters.

```
>neighbor ip-address 10.15.5.100 filter-list flist in
```

3.16.8.4 BGP Protocol – Route Map Configuration

BGP Route Map Configuration includes the following commands:

3.16.8.4.1 match as-path word

This command defines the AS path access-list name.

Syntax

The syntax of this command can include the following variations:

```
match as-path word
```

The command's syntax format is described below:

Arguments	Description
word	As-path access-list name

Defaults

NA

Command Modes

Enable

Example

This example defines the AS path access-list name.

```
>match as-path YYYY
```

3.16.8.4.2 set as-path prepend as-path

This command sets the as-path prepend string for the BGP as-path attribute.

Syntax

The syntax of this command can include the following variations:

```
set as-path prepend as-path
```

The command's syntax format is described below:

Arguments	Description
as-path	as-number 1 - 65535

Defaults

NA

Command Modes

Enable

Example

This example sets the as-path prepend string for the BGP as-path attribute.

```
>set as-path prepend 1
```

3.16.8.5 OSPFv2 Protocol – General Configuration

OSPF (Open Shortest Path First) Version 2 is a routing protocol which is described in RFC 2328, OSPF Version 2. OSPF is an IGP (Interior Gateway Protocol). Compared with RIP, OSPF can provide scalable network support and faster convergence times. OSPF is widely used in large networks such as ISP (Internet Service Provider) backbone and enterprise networks.

OSPF General Configuration includes the following commands:

3.16.8.5.1 router ospf

This command enables or disables the OSPF process.

Syntax

The syntax of this command can include the following variations:

```
router ospf
no router ospf
```

Defaults

NA

Command Modes

Enable

Example

The following example enables the OSPF process.

```
>router ospf
```

3.16.8.5.2 debug ospf packet

This command shows the OSPF routing table, as determined by the most recent SPF calculation.

Syntax

The syntax of this command can include the following variations:

```
debug ospf packet (hello|dd|ls-request|ls-update|ls-ack|all)
(send|recv) [detail]
no debug ospf packet (hello|dd|ls-request|ls-update|ls-ack|all)
(send|recv) [detail]
```

Defaults

NA

Command Modes

Enable

Example

This example shows the OSPF routing table, as determined by the most recent SPF calculation.

```
>show ip ospf neighbor
```

3.16.8.5.3 debug ospf ism

This command debugs ISM Timer Information.

Syntax

The syntax of this command can include the following variations:

```
debug ospf ism
debug ospf ism (status|events|timers)
no debug ospf ism
no debug ospf ism (status|events|timers)
```

Defaults

NA

Command Modes

Enable

Example

This example debugs ISM Timer Information.

```
>debug ospf ism
```

3.16.8.5.4 debug ospf nsm

This command debugs NSM Timer Information.

Syntax

The syntax of this command can include the following variations:

```
debug ospf nsm
debug ospf nsm (status|events|timers)
no debug ospf nsm
no debug ospf nsm (status|events|timers)
```

Defaults

NA

Command Modes

Enable

Example

This example debugs NSM Timer Information.

```
>debug ospf nsm
```


3.16.8.5 debug ospf lsa

This command debugs OSPF Link State Advertisement.

Syntax

The syntax of this command can include the following variations:

```
debug ospf lsa
debug ospf lsa (generate|flooding|refresh)
no debug ospf lsa
no debug ospf lsa (generate|flooding|refresh)
```

Defaults

NA

Command Modes

Enable

Example

This example debugs the OSPF Link State Advertisement.

```
debug ospf lsa
```

3.16.8.6 OSPF Router Configuration

OSPF Router Configuration includes the following commands:

3.16.8.6.1 ospf router-id

This command sets the router-ID of the OSPF process.

Syntax

The syntax of this command can include the following variations:

```
ospf router-id A.B.C.D
no ospf router-id
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	The Router-ID in IP address format

Defaults

NA

Command Modes

Enable

Example

The following example sets router-ID of the OSPF process.

```
>ospf router-id 10.24.5.100
```

3.16.8.6.2ospf abr-type

This command sets the ospf abr-type.

Syntax

The syntax of this command can include the following variations:

```
ospf abr-type type
no ospf abr-type type
```

The command's syntax format is described below:

Arguments	Description
no	Disables the router-ID of the OSPF process.
type	Refers to abr-type <ul style="list-style-type: none">▪ cisco (according to cisco implementation)▪ ibm (according to IBM implementation)▪ shortcut (shortcut abr)▪ standard (standard behavior RFC 2328) Note: The "Cisco" and "IBM" types are equivalent.

Defaults

NA

Command Modes

Enable

Example

The following example sets the ospf abr-type according to the IBM implementation.

```
>ospf abr-type ibm
```

3.16.8.6.3 ospf rfc1583compatibility

This command enables the rfc1583compatibility flag.

Syntax

The syntax of this command can include the following variations:

```
ospf rfc1583compatibility  
no ospf rfc1583compatibility
```

Defaults

NA

Command Modes

Enable

Example

The following example enables the rfc1583compatibility flag.

```
>ospf rfc1583compatibility
```

3.16.8.6.4 log-adjacency-changes

This command configures ospfd to log changes in adjacency.

Syntax

The syntax of this command can include the following variations:

```
log-adjacency-changes [detail]
no log-adjacency-changes [detail]
```

Defaults

NA

Command Modes

Enable

Example

The following example configures ospfd to log changes in adjacency.

```
>log-adjacency-changes detail
```

3.16.8.6.5 passive-interface

This command suppresses routing updates on an interface.

Syntax

The syntax of this command can include the following variations:

```
passive-interface GigabitEthernet <slot/port [.vlanID] >
passive-interface GigabitEthernet <slot/port>
passive-interface vlan <vlanID>
no passive-interface interface
```

The command's syntax format is described below:

Arguments	Description
slot	Module slot index as shown on the front panel.
port	Port index within the selected module.
vlanID (VLAN interface)	VLAN ID for Layer3 interfaces available via the LAN switch.
vlanID	Assign VLAN ID for a Layer3 sub interface.

Defaults

NA

Command Modes

Enable

Example

The following example suppresses routing updates on an interface.

```
>passive-interface GigabitEthernet 0/0.4
```

3.16.8.6 timers throttle spf

This command sets the initial delay, the *initial-holdtime* and the *maximum-holdtime* between when SPF is calculated and the event which triggered the calculation.

Syntax

The syntax of this command can include the following variations:

```
timers throttle spf delay initial-holdtime max-holdtime  
no timers throttle spf
```

The command's syntax format is described below:

Arguments	Description
delay	Enter a number between 0 – 600000 delay in milliseconds from 1 st change received until SPF calculation.
initial-holdtime	Initial holdtime in milliseconds between consecutive SPF calculation. 0 – 600000
maximum-holdtime	0 – 600000 in milliseconds

Defaults

NA

Command Modes

Enable

Example

The following example sets the delay to 200 ms, the initial holdtime is set to 400 ms and the maximum holdtime is set to 10 seconds.

```
>timers throttle spf 200 400 10000
```

3.16.8.6.7 max-metric router-lsa

This command sets the time (seconds) to advertise self as stub-router.

Syntax

The syntax of this command can include the following variations:

```
max-metric router-lsa [on-startup|on-shutdown] number
max-metric router-lsa administrative
no max-metric router-lsa [on-startup|on-shutdown|administrative]
```

The command's syntax format is described below:

Arguments	Description
on-startup	Time (seconds) to advertise self as stub-router.
on-shutdown	Time (seconds) to wait till full shutdown.
number	Time (seconds) <5-86400>

Defaults

NA

Command Modes

Enable

Example

The following example sets the time (seconds) to advertise self as stub-router.

```
>max-metric router-lsa administrative
```


3.16.8.6.8 auto-cost reference-bandwidth

This command sets the reference bandwidth for cost calculations, where this bandwidth is considered equivalent to an OSPF cost of 1, specified in Mbits/s.

Syntax

The syntax of this command can include the following variations:

```
auto-cost reference-bandwidth number  
no auto-cost reference-bandwidth
```

The command's syntax format is described below:

Arguments	Description
number	Reference bandwidth in terms of megabits per second. <1-4294967>

Defaults

The default is 100Mbit/s (i.e. a link of bandwidth 100Mbit/s or higher will have a cost of 1. Cost of lower bandwidth links will be scaled with reference to this cost).

Command Modes

Enable

Example

The following example sets the reference bandwidth for cost calculations.

```
>auto-cost reference-bandwidth 1000
```

3.16.8.6.9network

This command specifies the OSPF enabled interface(s). If the interface has an address from range 192.168.1.0/24 then the command below enables ospf on this interface so the router can provide network information to the other ospf routers via this interface.

Syntax

The syntax of this command can include the following variations:

```
network A.B.C.D/M area ip-address A.B.C.D
network A.B.C.D/M area number number
no network A.B.C.D/M area ip-address A.B.C.D
no network A.B.C.D/M area number number
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D/M	OSPF network prefix
area A.B.C.D	OSPF area ID in IP address format
number	OSPF area ID as a decimal value <0-4294967295>

Defaults

NA

Command Modes

Enable

Example

If the interface has an address from range 192.168.1.0/24, then the command below enables ospf on this interface so that the router can provide network information to the other ospf routers via this interface.

```
>network 192.168.1.0/24 area ip-address 0.0.0.0
```

3.16.8.6.10 area

This command summarizes intra-area paths from specified area in one Type-3 summary-LSA announced to other areas.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D range A.B.C.D/M
area number number range A.B.C.D/M
no area A.B.C.D range A.B.C.D /M
no area number number range A.B.C.D/M
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
range	Summarizes routes matching address/mask (border routers only)
A.B.C.D/M	Area range prefix

Defaults

NA

Command Modes

Enable

Example

This example summarizes intra-area paths from the specified area in one Type-3 summary-LSA announced to other areas.

```
>area ip-address 0.0.0.10 range 10.0.0.0/8
```

3.16.8.6.11 area ip-address|number range A.B.C.D/M not-advertise

This command filters intra area paths and are not advertised into other areas.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D range A.B.C.D/M not-advertise
area number number range A.B.C.D/M not-advertise
no area peer range A.B.C.D/M not-advertise
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
A.B.C.D/M	Area range prefix
not-advertise	Do not advertise this range

Defaults

NA

Command Modes

Enable

Example

This example filters intra area paths and are not advertised into other areas.

```
>area ip-address 10.21.5.100 range 10.0.0.0/8 not-advertise
```

3.16.8.6.12 area ip-address|number range A.B.C.D/M substitute A.B.C.D/M

This command substitutes a summarized prefix with another prefix.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D range A.B.C.D/M substitute A.B.C.D/M
area number number range A.B.C.D/M substitute A.B.C.D/M
no area a.b.c.d range A.B.C.D/M substitute A.B.C.D/M
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
A.B.C.D/M	Area range prefix
substitute	Announce area range as another prefix.
A.B.C.D/M	Network prefix to be announced instead of range

Defaults

NA

Command Modes

Enable

Example

This example substitutes a summarized prefix with another prefix.

```
>area ip-address 10.5.10.105 range 10.0.0.0/8 substitute
11.0.0.0/8
```

3.16.8.6.13 area ip-address|number shortcut

This command configures the area as Shortcut capable.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D shortcut {default|enable|disable}
area number number shortcut
no area ip-address A.B.C.D shortcut
no area number number shortcut
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
default	Sets the default shortcutting behavior
enable	Enables shortcutting through the area
disable	Disables shortcutting through the area

Defaults

NA

Command Modes

Enable

Example

This example configures the area as Shortcut capable.

```
>area number 1000 shortcut enable
```

3.16.8.6.15 area ip-address|number stub

This command configures the area to be a stub area.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D stub
area number number stub
no area ip-address A.B.C.D stub
no area number number stub
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>

Defaults

NA

Command Modes

Enable

Example

This example configures the area to be a stub area.

```
>area number 1000 stub
```

3.16.8.6.16 **area ip-address|number stub no-summary**

This command prevents an OSPFD ABR from injecting inter-area summaries into the specified stub area.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D stub no-summary
area number number stub no-summary
no area ip-address A.B.C.D stub no-summary
no area number number stub no-summary
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
no-summary	Do not inject inter-area routes into stub

Defaults

NA

Command Modes

Enable

Example

This example prevents an OSPFD ABR from injecting inter-area summaries into the specified stub area.

```
>area number 1000 stub no-summary
```


3.16.8.6.17 area ip-address|number default-cost

This command sets the cost of default-summary LSAs announced to stubby areas.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D default-cost <0-16777215>
area number number default-cost <0-16777215>
no area ip-address A.B.C.D default-cost <0-16777215>
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	OSPF area ID as a decimal value <0-4294967295>
<0-16777215>	Stub's advertised default summary cost

Defaults

NA

Command Modes

Enable

Example

This example sets the cost of default-summary LSAs announced to stubby areas.

```
>area number 2000 default-cost 1000
```

3.16.8.6.18 area ip-address|number filter-list prefix NAME in/out

This command filters Type-3 summary-LSAs to/from area using prefix lists. This command is applicable to ABR only.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D filter-list prefix NAME in
area ip-address A.B.C.D filter-list prefix NAME out
area number number filter-list prefix NAME in
area number number filter-list prefix NAME out
no area ip-address A.B.C.D filter-list prefix NAME in
no area ip-address A.B.C.D filter-list prefix NAME out
no area number number filter-list prefix NAME in
no area number number filter-list prefix NAME out
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	<0-4294967295>
prefix	Filter prefixes between OSPF areas
NAME	IP prefix list name
in	Filter networks – sent out to this area
out	Filter networks – sent out from this area

Defaults

NA

Command Modes

Enable

Example

This example filters Type-3 summary-LSAs to/from area using prefix lists.

```
>area number 1000 filter-list prefix NAME in
```

3.16.8.6.19 area ip-address|number authentication

This command specifies that simple password authentication should be used for the given area.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D authentication
area number number authentication
no area ip-address A.B.C.D authentication
no area number number authentication
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	<0-4294967295>

Defaults

NA

Command Modes

Enable

Example

This example specifies that simple password authentication should be used for the given area.

```
>area number 1000 authentication
```

3.16.8.6.20 area ip-address|number authentication message-digest

This command specifies that OSPF packets must be authenticated with MD5 HMACs within the given area.

Syntax

The syntax of this command can include the following variations:

```
area ip-address A.B.C.D authentication message-digest
area number number authentication message-digest
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	OSPF area in IP address format
number	<0-4294967295>

Defaults

NA

Command Modes

Enable

Example

This example specifies that OSPF packets must be authenticated with MD5 HMACs within the given area.

```
>area number 1000 authentication message-digest
```

3.16.8.6.21 redistribute

This command redistributes routes of the specified protocol or kind into OSPF.

Syntax

The syntax of this command can include the following variations:

```
redistribute (kernel|connected|static|bgp)
redistribute (kernel|connected|static|bgp) route-map
redistribute (kernel|connected|static|bgp) metric-type (1|2)
redistribute (kernel|connected|static|bgp) metric-type (1|2)
route-map word
redistribute (kernel|connected|static|bgp) metric <0-16777214>
redistribute (kernel|connected|static|bgp) metric-type (1|2)
metric <0-16777214> metric <0-16777214> route-map word
no redistribute (kernel|connected|static|bgp)
```

The command's syntax format is described below:

Arguments	Description
metric	Metric for redistributed routes
Metric-type	OSPF exterior metric type for registered routes
1 2	Set OSPF exterior type 1- metric, 2-metrics
word	Pointer to route-map entries

Defaults

NA

Command Modes

Enable

Example

This example redistributes routes of the specified protocol or kind into OSPF.

```
>redistribute kernel
```

3.16.8.6.22 default-information originate

This command originates an AS-External (type-5) LSA describing a default route into all external routing capable areas, of the specified metric and metric type.

Syntax

The syntax of this command can include the following variations:

```

default-information originate
default-information originate metric <0-16777214>
default-information originate metric <0-16777214> metric-type
(1|2)
default-information originate metric <0-16777214> metric-type
(1|2) route-map word
default-information originate always
default-information originate always metric <0-16777214>
default-information originate always metric <0-16777214> metric-
type (1|2)
default-information originate always metric <0-16777214> metric-
type (1|2) route-map word
no default-information originate
    
```

The command's syntax format is described below:

Arguments	Description
always	Always advertise default route

Defaults

NA

Command Modes

Enable

Example

This command distributes a default route.

```
>default-information originate
```

3.16.8.6.23 default-metric

This command sets the metric of redistributed routes.

Syntax

The syntax of this command can include the following variations:

```
default-metric <0-16777214>  
no default-metric
```

The command's syntax format is described below:

Arguments	Description
<0-16777214>	Default metric

Defaults

NA

Command Modes

Enable

Example

This example sets the metric of redistributed routes to 1000.

```
>default-metric 1000
```

3.16.8.6.24 distance

This command defines an OSPF administrative distance.

Syntax

The syntax of this command can include the following variations:

```
distance <1-255>
no distance <1-255>
distance ospf (intra-area|inter-area|external) <1-255>
no distance ospf
```

The command's syntax format is described below:

Arguments	Description
<1-255>	Administrative distance

Defaults

NA

Command Modes

Enable

Example

This example defines an OSPF administrative distance of 100.

```
>distance 100
```


3.16.8.7 OSPF Interface Configuration

OSPF Interface Configuration includes the following commands:

3.16.8.7.1 ip ospf authentication-key AUTH_KEY

This command sets the OSPF authentication key to a simple password. After setting AUTH_KEY, all OSPF packets are authenticated.

Syntax

The syntax of this command can include the following variations:

```
ip ospf authentication-key AUTH_KEY  
no ip ospf authentication-key
```

The command's syntax format is described below:

Arguments	Description
AUTH_KEY	OSPF password (key)

Defaults

NA

Command Modes

Enable

Example

This example sets the OSPF authentication key to a simple password.

```
>ip ospf authentication-key passx
```

3.16.8.7.2ip ospf authentication message-digest

This command specifies that MD5 HMAC authentication must be used on this interface.

Syntax

The syntax of this command can include the following variations:

```
ip ospf authentication message-digest
```

Defaults

NA

Command Modes

Enable

Example

This example specifies that MD5 HMAC authentication must be used on this interface.

```
>ip ospf authentication message-digest
```

3.16.8.7.3 ip ospf message-digest-key KEYID md5 KEY

This command sets the OSPF authentication key to a cryptographic password.

Syntax

The syntax of this command can include the following variations:

```
ip ospf message-digest-key KEYID md5 KEY
no ip ospf message-digest-key
```

The command's syntax format is described below:

Arguments	Description
KEYID	1 – 255 number
KEY	OSPF password

Defaults

NA

Command Modes

Enable

Example

This example sets the OSPF authentication key to a cryptographic password.

```
>ip ospf message-digest-key 100 md5 XXXX
```

3.16.8.7.4 ip ospf cost

This command sets the link cost for the specified interface.

Syntax

The syntax of this command can include the following variations:

```
ip ospf cost number
no ip ospf cost
```

The command's syntax format is described below:

Arguments	Description
number	Cost <1-65535>

Defaults

NA

Command Modes

Enable

Example

This example sets the link cost for the specified interface.

```
>ip ospf cost 1000
```

3.16.8.7.5 ip ospf dead-interval

This command sets the number of seconds for RouterDeadInterval timer value used for Wait Timer and Inactivity Timer.

Syntax

The syntax of this command can include the following variations:

```
ip ospf dead-interval number
ip ospf dead-interval minimal hello-multiplier <2-20>
no ip ospf dead-interval
```

The command's syntax format is described below:

Arguments	Description
number	Seconds <1-65535>
<2-20>	Number of hellos to send each second

Defaults

NA

Command Modes

Enable

Example

This example sets the number of seconds for RouterDeadInterval timer value to 1000.

```
>ip ospf dead-interval 1000
```

3.16.8.7.6 ip ospf hello-interval

This command sets the number of seconds for HelloInterval timer value.

Syntax

The syntax of this command can include the following variations:

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

The command's syntax format is described below:

Arguments	Description
number	Seconds <1-65535>

Defaults

NA

Command Modes

Enable

Example

This example sets HelloInterval timer value to 1000 seconds.

```
>ip ospf hello-interval 1000
```

3.16.8.7.7 ip ospf network

This command explicitly sets the network type for the specified interface.

Syntax

The syntax of this command can include the following variations:

```
ip ospf network (broadcast | non-broadcast | point-to-  
multipoint | point-to-point)  
no ip ospf network
```

The command's syntax format is described below:

Arguments	Description
broadcast	Specify OSPF broadcast multi-access network
non-broadcast	Specify OSPF NMBA network
point-to-multipoint	Specify OSPF point-to-multipoint network
point-to-point	Specify OSPF point-to-point network

Defaults

NA

Command Modes

Enable

Example

This example explicitly sets the network type for the specified interface.

```
>ip ospf network point-to-point
```

3.16.8.7.8 ip ospf priority

This command sets the RouterPriority integer value.

Syntax

The syntax of this command can include the following variations:

```
ip ospf priority number
no ip ospf priority
```

The command's syntax format is described below:

Arguments	Description
number	Priority value <0-255>

Defaults

1

Command Modes

Enable

Example

This example sets the RouterPriority integer value to 100.

```
>ip ospf priority 100
```


3.16.8.7.9 ip ospf retransmit-interval

This command sets the number of seconds for RxmtInterval timer value. This value is used when retransmitting Database Description and Link State Request packets.

Syntax

The syntax of this command can include the following variations:

```
ip ospf retransmit-interval <1-65535>  
no ip ospf retransmit interval
```

The command's syntax format is described below:

Arguments	Description
<1-65535>	Seconds

Defaults

5 seconds

Command Modes

Enable

Example

This example sets the number of seconds for RxmtInterval timer value to 1000.

```
>ip ospf retransmit-interval 1000
```

3.16.8.7.10 ip ospf transmit-delay

This command sets the number of seconds for InfTransDelay value.

Syntax

The syntax of this command can include the following variations:

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

The command's syntax format is described below:

Arguments	Description
number	Seconds <1-65535>

Defaults

1 second

Command Modes

Enable

Example

This example sets the number of seconds for InfTransDelay value to 1000.

```
>ip ospf transmit-delay 1000
```

3.16.9 T1 WAN Commands



Note: T1 WAN commands are NOT supported on the Mediant 800 MSBG.

T1 WAN is the AudioCodes WAN interface for the Mediant 1000 MSBG. This device has a number of different WAN interfaces: Ethernet, SHDSL and T1.

3.16.9.1 channel-group

This command specifies active TDM slots within the T1 frames.

Syntax

The syntax of this command can include the following variations:

```
channel-group <slot number>,<slot number>
```

```
channel-group <slot number>-<slot number>
```

The command's syntax format is described below:

Arguments	Description
<slot number>	Specifies the slot number within the range 1-24.

Defaults

By default all slots are active → 1-24.

Command Modes

Enable

Example

The following example sets active slots 2, 4 and 17, 18, 19.

```
(conf-if-t1 0/0)#channel-group 2,4,17-19
```

3.16.9.2 clock-source

This command specifies the clock source on the current T1 interface.

Syntax

The syntax of this command is:

```
clock-source <source>
```

The command's syntax format is described below:

Arguments	Description
<source>	Specifies the source of the clock: <ul style="list-style-type: none"> ▪ 'internal' – clock is taken locally from WIC itself ▪ 'line' – clock is taken from the line i.e., from the remote side

Defaults

By default, the clock source is 'line'.

Command Modes

Enable

Example

The following example sets clock source to internally generated:

```
(conf-if-t1 0/0)#clock-source internal
```

3.16.9.3 framing-method

This command specifies the framing method on the current T1 interface.

Syntax

The syntax of this command is:

```
framing-method <framing mode>
```

The command's syntax format is described below:

Arguments	Description
<framing mode>	Specifies the framing method: <ul style="list-style-type: none">▪ 'esf' – extended super frame (F24)▪ 'sf' – superframe (D4)

Defaults

By default, the framing method is 'esf'.

Command Modes

Enable

Example

The following example sets the framing method to superframe (D4):

```
(conf-if-t1 0/0)#framing-method sf
```

3.16.9.4 line-code

This command specifies the line coding on the current T1 interface.

Syntax

The syntax of this command is:

```
line-code <line code>
```

The command's syntax format is described below:

Arguments	Description
<line code>	Specifies the line code: <ul style="list-style-type: none"> ▪ 'ami' – Alternate Mark Inversion encoding ▪ 'b8zs' – Bipolar Eight Zero Substitution encoding

Defaults

By default, the framing method is 'bz8s'.

Command Modes

Enable

Example

The following example sets the line code to 'ami':

```
(conf-if-t1 0/0)#line-code ami
```

3.16.9.5 line-buildout-loss

This command specifies the buildout loss on the current T1 interface.

Syntax

The syntax of this command is:

```
line-buildout-loss <loss>
```

The command's syntax format is described below:

Arguments	Description
<loss>	Specifies line buildout loss [dB]: <ul style="list-style-type: none">▪ 0 dB▪ -7.5 dB▪ -15 dB▪ -22.5 dB

Defaults

By default, the line buildout loss is 0 dB.

Command Modes

Enable

Example

The following example sets the line buildout loss to -7.5 dB:

```
(conf-if-t1 0/0)#line-buildout-loss -7.5
```

3.16.9.6 max-cable-loss

This command specifies the loss due to cable length on the current T1 interface.

Syntax

The syntax of this command is:

```
max-cable-loss <loss>
```

The command's syntax format is described below:

Arguments	Description
<loss>	Specifies cable loss [dB]: <ul style="list-style-type: none"> ▪ 0.6 dB – Cable length 0-133ft ▪ 1.2 dB – Cable length 134-266ft ▪ 1.8 dB – Cable length 267-399ft ▪ 2.4 dB – Cable length 400-533ft ▪ 3 dB – Cable length 534-655ft

Defaults

By default, the maximum cable loss is 0.6 dB.

Command Modes

Enable

Example

The following example sets the cable loss to 3 dB:

```
(conf-if-t1 0/0)#max-cable-loss 3
```


3.16.9.7 loopback

This command specifies loopback on the current T1 WAN interface.

Syntax

The syntax of this command is:

```
loopback <traffic source> <loopback location>
loopback <traffic source> <loopback location> <timeout>
```

The command's syntax format is described below:

Arguments	Description
<traffic source>	Specifies the traffic source to be looped back: <ul style="list-style-type: none"> ▪ 'remote' – loopback ingress traffic. ▪ 'local' – loopback egress traffic.
<loopback location>	Specifies where the loop is performed in the T1 WAN Interface: <ul style="list-style-type: none"> ▪ 'line' – loop is done in the csu.
<timeout>	On the local loopback only. Specifies the timeout (in seconds) after the local loopback releases. Default timeout is 180 seconds.

Defaults

By default, there is no loopback.

Command Modes

Enable

Example

The following example set the remote line loopback.

```
(conf-if-t1 0/0)#loopback remote line
```

3.16.9.8 ber-test

This command specifies the Bit Error Rate test on the current T1 WAN interface.

Syntax

The syntax for this command includes several variations:

```
ber-test <channels group> <error rate> <pattern type>
ber-test <channels group> <error rate> <pattern type> <timeout>
ber-test <channels group> <error rate> <pattern type> forever
```

The command's syntax format is described below:

Arguments	Description
<channels group>	<ul style="list-style-type: none"> Specifies the slot number within the range 1-24, on which the BER test runs. (See channel-group command for examples).
<error rate>	Specifies the rate of injected errors to the BER interface: <ul style="list-style-type: none"> 0 – no errors injected. 1 – inject errors in rate of 10^{-1}. 2 – inject errors in rate of 10^{-2}. 3 – inject errors in rate of 10^{-3}. 4 – inject errors in rate of 10^{-4}. 5 – inject errors in rate of 10^{-5}. 6 – inject errors in rate of 10^{-6}. 7 – inject errors in rate of 10^{-7}.
<pattern type>	<ul style="list-style-type: none"> '1-2' - select 01 Sequence as BER pattern '1-4' - select 0001 Sequence as BER pattern '1-8' - select 00000001 Sequence as BER pattern '3-24' - select 3 '1's with 21 '0's Sequence as BER pattern 'all-0' - select all 0 Sequence as BER pattern 'all-1' - select all 1 Sequence as BER pattern 'qrss' - select Quasi-Random Signal Sequence as BER pattern
<timeout>	Specifies the time that the BER test will run for, in seconds. The default value is 180 seconds. For running the BER test with no time limitation, select the <i>'forever'</i> value for this field.

Defaults

By default, the BER test is not active.

Functional notes

1. This command is supported on the T1-WAN interface only.
2. The user needs to make a loopback at the FarEnd, in order to have synchronous BER test patterns.
3. Running the BER test with an error rate of 10^{-1} might cause the data not to synchronize. So the BER won't count bits or errors.

Command Modes**Related commands**

Examples

The following example starts the BER test for Channels 1-20 and Channel 22, with error rate of 10^{-3} and pattern type QRSS, which has no timeout:

```
(conf-if-t1 0/0)#ber-test 1-20,22 3 qrss forever
```

The following example starts the BER test for Channels 1,2 and 10-15, no errors injected, pattern type 3-24, and default timeout (180 seconds):

```
(conf-if-t1 0/0)#ber-test 1,2,10-15 0 3-24
```

3.16.10 shdsl

3.16.10.1 interface shdsl 0/0

Symmetric High-speed Digital Subscriber Line (SHDSL, sometimes called G.shdsl) is a popular WAN access technology using copper wire pairs.

The purpose of this command is to configure physical-layer properties of SHDSL, such as the number of wire-pairs in use. See the sub-commands "**mode**" and "**group**" for additional information.

Once the physical layer is configured, proceed to ATM interfaces using the command "**interface atm**".

Syntax

The syntax of this command is:

```
interface shdsl <slot>/<port>
```

The commands syntax format is described below:

Arguments	Description
<slot>	Location of the SHDSL hardware mezzanine. Must be 0.
<port>	Location of the SHDSL hardware mezzanine. Must be 0.

Defaults

The system will attempt to detect the correct configuration automatically, by sensing line connectivity and negotiating connection parameters with the Internet Service Provider.

Command Modes

Enable.

Examples

The following example defines the SHDSL interface:

```
(configure)# interface shdsl 0/0
```

3.16.10.2 mode

This command selects the SHDSL mode of operation (ATM or EFM).

Syntax

The syntax of this command is:

```
interface shdsl 0/0
  mode <atm|efm>
```

The commands syntax format is described below:

Arguments	Description
atm	Selects ATM mode of operation.
efm	Selects Ethernet-in-the-First-Mile (EFM) operation. Currently not supported.

Defaults

The default setting is ATM.

Command Modes

Enable

Examples

The following example defines ATM on the SHDSL interface:

```
(conf-shdsl) # mode atm
```

3.16.10.3 group

This command defines an SHDSL group of wires. Use the "no" form of this command to delete a previously-defined group.

Syntax

The syntax of this command is:

```
interface shdsl 0/0
  [no] group <group-id>
```

The commands syntax format is described below:

Arguments	Description
<group-id>	0 to 3

Defaults

By default, four SHDSL groups are defined, each with a single wire-pair; the system will attempt to detect changes on the physical medium and adapt configuration accordingly.

Command Modes

Enable

Examples

The following example defines one group:

```
(conf-shdsl)# group 0
```

3.16.10.4 pairs

This command selects the wire-pairs which participate in an SHDSL group.

Syntax

The syntax of this command is:

```
interface shdsl 0/0
  group <group-id>
    pairs <list of wire-pair numbers>
```

The commands syntax format is described below:

Arguments	Description
<list of wire-pair numbers>	Wire-pair numbers (0 to 3), separated by commas. Examples:
<code>pairs 0</code>	Defines a simple two-wire connection using the first wire pair.
<code>pairs 0,1</code>	Defines a multiple pair (m-pair) connection using wire-pairs 0 and 1. Pair 0 is the master pair for this group.
<code>pairs 0,1,2,3</code>	Defines a multiple pair (m-pair) connection using all four wire-pairs. Pair 0 is the master pair for this group.

Defaults

By default, four SHDSL groups are defined, each with a single wire-pair; the system will attempt to detect changes on the physical medium and adapt configuration accordingly.

Command Modes

Enable

Examples

The following example defines a group of two wire-pairs:

```
(conf-shdsl-0)# pairs 0,1
```

3.16.10.5 termination

This command selects the type of line termination on an SHDSL group.

Syntax

The syntax of this command is:

```
interface shdsl 0/0
  group <group-id>
    termination <cpe|co>
```

The commands syntax format is described below:

Arguments	Description
cpe	Selects STU-R mode (SHDSL Remote Terminal)
co	Selects STU-C mode (SHDSL Central Office Terminal) Note that CO mode is unsupported and available for diagnostic purposes only; the system cannot be used as a DSLAM.

Defaults

The default is CPE mode.

Command Modes

Enable

Examples

The following example defines CPE mode:

```
(conf-shdsl-0)# termination cpe
```


3.16.10.6 **linerate**

This command selects the line rate of each wire-pair in an SHDSL group.

Syntax

The syntax of this command can include the following variations:

```
interface shdsl 0/0
  group <group-id>
    linerate auto
    linerate kbps <min-rate> <max-rate>
```

The commands syntax format is described below:

Arguments	Description
auto	Line rate is negotiated automatically, up to 5696 Kbps per wire-pair.
<min-rate>	Minimum line rate in kilobits per second. The lowest supported rate is 432 Kbps.
<max-rate>	Maximum line rate in kilobits per second. The highest supported rate is 5696 Kbps.

Defaults

The default setting is **auto**.

Command Modes

Enable

Examples

The following example selects automatic line rate:

```
(conf-shdsl-0)# linerate auto
```

3.16.10.7 annex

This command selects the regional annex (as defined in ITU-T recommendation G.991.2) for an SHDSL group.

Note that annex F is identical to annex A, with extended line rates up to 5696 Kbps. Similarly, annex G is identical to annex B with extended line rates up to 5696 Kbps.

Syntax

The syntax of this command is:

```
interface shdsl 0/0
  group <group-id>
    annex <a | b>
```

The commands syntax format is described below:

Arguments	Description
a	Selects G.991.2 regional annex A / F
b	Selects G.991.2 regional annex B / G

Defaults

The default is setting is **annex a**.

Command Modes

Enable

Examples

The following example selects regional annex A:

```
(conf-shdsl-0)# annex a
```

3.16.10.8 interface atm

Defines an ATM sub-interface for Internet access over SHDSL.

An ATM sub-interface provides IP services over a Permanent Virtual Circuit (PVC) defined by the ATM network administrator.

Syntax

The syntax of this command is:

```
interface atm <group-id>/<sub-id>
```

The commands syntax format is described below:

Arguments	Description
<group-id>	Number of the SHDSL group (0-3) defined by the "group" command.
<sub-id>	Sub-interface number (0 to 7). Note that the system supports up to a total of eight ATM interfaces in all SHDSL groups.

Defaults

By default, no ATM interfaces are defined.

Command Modes

Enable

Examples

The following example defines an ATM interface:

```
(configure)# interface atm 0/0
```

3.16.10.9 pvc

This command defines the Permanent Virtual Circuit (PVC) associated with an ATM sub-interface.

Syntax

The syntax of this command is:

```
interface atm <group-id>/<sub-id>
  pvc <vpi>/<vci>
```

The commands syntax format is described below:

Arguments	Description
<vpi>	Virtual Path Identifier code (0 to 256)
<vci>	Virtual Connection Identifier code (32 to 65535)

Defaults

By default, no ATM interfaces are defined.

Command Modes

Enable

Examples

The following example defines an ATM interface with VPI 8, VCI 48:

```
(conf-atm0/0) # pvc 8/48
```

3.16.10.10 encapsulation

Defines the type of IP encapsulation used on an ATM sub-interface.

Syntax

The syntax of this command includes the following variations:

```
interface atm <group-id>/<sub-id>
  encapsulation <ipoa | ethoa | pppoa> - <mux | snap>
  encapsulation pppoe
```

The commands syntax format is described below:

Arguments	Description
ipoa	Selects IP-over-ATM , in RFC 2684 " <i>Routed</i> " mode
ethoa	Selects Ethernet-over-ATM , in RFC 2684 " <i>Bridged</i> " mode
pppoa	Selects PPP over ATM client (defined in RFC 2364)
snap	AAL5 LLC/SNAP mode, an LLC header is used to describe the type of payload transmitted
mux	AAL5 VC-multiplexed mode, data is not prepended with an LLC header
pppoe	Selects PPPoE over ATM (i.e., PPPoE client on top of ethoa-snap encapsulation)

Defaults

By default, no ATM interfaces are defined.

Command Modes

Enable

Examples

The following example defines an ATM interface with RFC 2684 "*Routed*" encapsulation, with LLC/SNAP headers:

```
(conf-atm0/0) # encapsulation ipoa-snap
```

3.16.10.11 ubr / cbr / vbr

This command defines the ATM service class for an ATM sub-interface.

Syntax

The syntax of this command includes the following variations:

```
interface atm <group-id>/<sub-id>
  ubr <peak-kbps>
  cbr <peak-kbps>
  vbr <peak-kbps> <sustained-kbps> <burst-cells>
```

The commands syntax format is described below:

Arguments	Description
ubr	Unspecified Bit Rate ; no bandwidth is reserved for this interface. Traffic may be limited by a peak rate.
cbr	Constant Bit Rate ; bandwidth is reserved according to the specified rate. Traffic cannot exceed the specified rate.
vbr	Variable Bit Rate ; bandwidth is reserved according to the configured sustained rate. Traffic may exceed the sustained rate up to the peak rate, but is further limited by a maximum number of burst cells.
<peak-kbps>	Maximum data rate in kilobits per second
<sustained-kbps>	Sustained data rate in kilobits per second
<burst-cells>	Maximum number of cells allowed in excess of the sustained rate

Defaults

The default setting is **UBR** with unlimited traffic rate.

Command Modes

Enable

Examples

The following example defines an ATM interface with a constant bit-rate traffic class, allowing bandwidth of 4 megabits per second:

```
(conf-atm0/0) # cbr 4096
```

3.16.10.12 ppp user

This command defines the PPPoA / PPPoE username and password for an ATM sub-interface.

Syntax

The syntax of this command is:

```
interface atm <group-id>/<sub-id>  
ppp user <username> pass <password>
```

The commands syntax format is described below:

Arguments	Description
<username>	PPP user name
<password>	PPP password

Defaults

This command has no defaults.

Command Modes

Enable

Examples

The following example defines a PPPoA ATM interface:

```
(conf-atm0/0) # ppp user admin pass 12345
```

3.16.11 Serial Interfaces

The Serial interfaces commands include the following:

3.16.11.1 serial-protocol

This command specifies the encapsulating protocol on the serial interface.

Syntax

The syntax of this command is:

```
serial-protocol <protocol>
```

The command's syntax format is described below:

Arguments	Description
<protocol>	Specifies the encapsulating protocol: <ul style="list-style-type: none"> ▪ 'hdlc' – set hdlc protocol ▪ 'ppp' – set ppp protocol

Defaults

By default, there is no protocol set on the serial interface.

Command Modes

Enable

Example

The following example sets PPP as the encapsulating protocol on the serial interface 0/0. (To remove the protocol simply type 'no' at the prefix of the command.):

```
(conf-if-serial 0/0)#serial-protocol ppp
```

The following example sets HDLC as the encapsulating protocol on serial interface 0/0 (To remove the protocol simply type 'no' at the prefix of the command.):

```
(conf-if-serial 0/0)#serial-protocol hdlc
```


3.16.11.2 ip address (HDLC over T1)

This command specifies the IP address and subnet mask of the HDLC serial interface.

Syntax

The syntax of this command is:

```
ip address <A.B.C.D> <E.F.G.H>
```

The command's syntax format is described below:

Arguments	Description
<A.B.C.D>	Specifies the static local IP address set on this HDLC serial interface.
<E.F.G.H>	Specifies the static subnet mask set on this HDLC serial interface.

Defaults

By default, the IP address is 1.1.1.1 and the subnet mask is 255.255.255.0.

Command Modes

Enable

Example

The following example sets IP address 223.4.5.6 on HDLC encapsulated serial interface 0/0:

```
(conf-if-serial-hdlc 0/0)#ip address 223.4.5.6 255.255.255.252
```

3.16.11.3 ip dns-server (HDLC over T1)

This command specifies the primary and secondary DNS servers to be used by this HDLC serial interface.

Syntax

The syntax of this command is

```
ip dns-server <A.B.C.D> [E.F.G.H]
```

The command's syntax format is described below:

Arguments	Description
<A.B.C.D>	Specifies the IP address of the primary DNS server.
[E.F.G.H]	Specifies the IP address of the secondary DNS server.

Defaults

By default, no DNS servers are defined for the HDLC serial interface.

Command Modes

Enable

Example

The following example sets IP address 223.4.5.6 on HDLC encapsulated serial interface 0/0:

```
(conf-if-serial-hdlc 0/0)#ip dns-server 10.1.1.10 10.1.1.11
```

3.16.11.4 ip mtu (HDLC over T1)

This command specifies the maximum transfer unit value to be used by this HDLC serial interface.

Syntax

The syntax of this command is:

```
ip mtu <mode> <value>
```

The command's syntax format is described below:

Arguments	Description
<mode>	Specifies the mtu mode to be used: <ul style="list-style-type: none">▪ 'automatic' – set to default value 1500 bytes.▪ 'manual' – set manually according to following value.
<value>	Specifies the mtu in manual mode (68-1500).

Defaults

By default the mtu is set to 1500 bytes.

Command Modes

Enable

Example

The following example sets the mtu to 1400 bytes:

```
(conf-if-serial-hdlc 0/0)#ip mtu manual 1400
```

3.16.11.5 ip address (PPP over T1)

This command specifies the IP addressing mode of the PPP serial interface.

Syntax

The syntax of this command is:

```
ip address <mode> <A.B.C.D> <E.F.G.H>
```

The command's syntax format is described below:

Arguments	Description
<mode>	The PPP IP addressing modes are: <ul style="list-style-type: none"> ▪ 'automatic' – IP address will be accepted from peer during IPCP negotiation. ▪ 'manual' – set local static IP address and optional subnet mask. ▪ 'unnumbered' – use unnumbered mode (PPP serial interface uses LAN interface ip address).
<A.B.C.D>	Specifies the static local IP address set on this PPP serial interface – relevant for manual mode only.
<E.F.G.H>	Specifies the optional static subnet mask set on this PPP serial interface - relevant for manual mode only.

Defaults

By default the IP addressing is automatic.

Command Modes

Enable

Example

The following example sets IP address 223.4.5.6 on PPP encapsulated serial interface 0/0:

```
(conf-if-serial-ppp 0/0)#ip address manual 223.4.5.6
```

The following example sets IP addressing mode to automatic on PPP encapsulated serial interface 0/0:

```
(conf-if-serial-ppp 0/0)#ip address automatic
```

3.16.11.6 ip dns-server (PPP over T1)

This command specifies the primary and secondary DNS servers to be used by this PPP serial interface.

Syntax

The syntax of this command is

```
ip dns-server <mode> <A.B.C.D> <E.F.G.H>
```

The command's syntax format is described below:

Arguments	Description
<mode>	The DNS servers addressing modes are: <ul style="list-style-type: none"> ▪ 'automatic' – DNS servers' IP addresses will be accepted from peer during PPP negotiation. ▪ 'manual' – set static DNS servers' IP address
<A.B.C.D>	Specifies the IP address of the primary DNS server - relevant only for manual mode.
<E.F.G.H>	Specifies the IP address of the optional secondary DNS server- relevant only for manual mode.

Defaults

By default no DNS servers are defined for the PPP serial interface.

Command Modes

Enable

Example

The following example sets static DNS servers' IP addresses on PPP encapsulated serial interface 0/0:

```
(conf-if-serial-ppp 0/0)#ip manual dns-server 10.1.1.10 10.1.1.11
```

3.16.11.7 ip mtu (PPP over T1)

This command specifies the maximum transfer unit value to be used by this PPP serial interface.

Syntax

The syntax of this command is:

```
ip mtu <mode> <value>
```

The command's syntax format is described below:

Arguments	Description
<mode>	Specifies the mtu mode to be used: <ul style="list-style-type: none"> ▪ 'automatic' – set to default value 1500 bytes. ▪ 'manual' – set manually according to following value.
<value>	Specifies the mtu in manual mode (68-1500).

Defaults

By default, the mtu is set to 1500 bytes.

Command Modes

Enable

Example

The following example sets the mtu to 1400 bytes:

```
(conf-if-serial-ppp 0/0)#ip mtu manual 1400
```

3.16.11.8 napt

This command sets the NAPT (Network Address Port Translation) at the HDLC/PPP/MLP interface.

Syntax

The syntax of this command is:

```
napt
```

Defaults

By default T1 interfaces use NAPT.

Command Modes

Enable

Example

The following example sets the NAPT:

```
(conf-if-serial-hdlc 0/0)#napt
```

3.16.11.9 authentication chap

This command enables Challenge Handshake Authentication Protocol (CHAP) to be used by this PPP serial interface.

Syntax

The syntax of this command is:

```
authentication chap
```

The command's syntax format is described below:

Arguments	Description
'no' at prefix of command	Disables CHAP on this PPP serial interface.

Defaults

By default CHAP is enabled

Command Modes

Enable

Example

The following example enables CHAP.

```
(conf-if-serial-ppp 0/0)#authentication chap
```


3.16.11.10 authentication pap

This command enables Password Authentication Protocol (PAP) to be used by this PPP serial interface

Syntax

The syntax of this command is

```
authentication pap
```

The command's syntax format is described below:

Arguments	Description
'no' at prefix of command	Disables PAP on this PPP serial interface.

Defaults

By default, PAP is enabled.

Command Modes

Enable

Example

The following example enables CHAP on the PPP serial interface 0/0.

```
(conf-if-serial-ppp 0/0)#authentication pap
```

3.16.11.11 authentication ms-chap

This command enables Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) to be used by this PPP serial interface

Syntax

The syntax of this command is

```
authentication ms-chap
```

The command's syntax format is described below:

Arguments	Description
'no' at prefix of command	Disables MS-CHAP on this PPP serial interface.

Defaults

By default, MS-CHAP is enabled.

Command Modes

Enable

Example

The following example enables CHAP:

```
(conf-if-serial-ppp 0/0)#authentication ms-chap
```

3.16.11.12 authentication ms-chap2

This command enables Microsoft Challenge Handshake Authentication Protocol Version 2 (MS-CHAP2) to be used by this PPP serial interface.

Syntax

The syntax of this command is:

```
authentication ms-chap2
```

The command's syntax format is described below:

Arguments	Description
'no' at prefix of command	Disables MS-CHAP2 on this PPP serial interface.

Defaults

By default, MS-CHAP2 is enabled.

Command Modes

Enable

Example

The following example enables CHAP2:

```
(conf-if-serial-ppp 0/0)#authentication ms-chap2
```

3.16.11.13 authentication username

This command sets the username to be used by this PPP serial interface during the authentication phase of the PPP negotiation.

Syntax

The syntax of this command is

```
authentication username <username>
```

The command's syntax format is described below:

Arguments	Description
<username>	username string

Defaults

By default, the username is set to 'user'.

Command Modes

Enable

Example

The following example enables CHAP on PPP serial interface 0/0.

```
(conf-if-serial-ppp 0/0)#authentication username JohnA
```

3.16.11.14 authentication password

This command sets the password to be used by this PPP serial interface during the authentication phase of the PPP negotiation.

Syntax

The syntax of this command is:

```
authentication password <password>
```

The command's syntax format is described below:

Arguments	Description
<password>	password string

Defaults

By default, password is set to 'password'.

Command Modes

Enable

Example

The following example enables CHAP on PPP serial interface 0/0.

```
(conf-if-serial-ppp 0/0)#authentication password qwerty
```

3.16.12 QoS Configuration

The QoS Configuration commands include the following:

3.16.12.1 qos match-map

This command enters a specific match-map configuration. Use the **no** form of this command to delete a specific match-map.

Syntax

The syntax of this command can include the following variations:

```
qos match-map input <match-map name>
qos match-map output <match-map name>
qos match-map input <match-map name> <interface name>
qos match-map output <match-map name> <interface name>
```

The command's syntax format is described below:

Arguments	Description
match-map name	Name of the match map to configure
<interface name>	Look for interface naming on the <i>interface</i> command. If not chosen, match-map will apply to all interfaces

Defaults

NA

Command Modes

Enable

Examples

The following example enters a specific match-map input configuration that will apply to all interfaces.

```
(config)# qos match-map input sip_incoming
```

The following example enters a specific match-map input configuration that will apply only to vlan 7 interface.

```
(config)# qos match-map output sip_outgoing vlan 7
```

3.16.12.2 match access-list

This command defines the access-list to match on the specified match-map. Use the **no** form of this command to remove a match access list.

Syntax

```
match access-list <access-list name>
```

The command's syntax format is described below:

Arguments	Description
< access-list >	The name of the access-list this match-map should match.

Defaults

NA

Command Modes

Enable

Example

The following example configures the sip_incoming match-map to match traffic from access-list acl_sip.

```
(conf-m-map) # match access-list acl_sip
```

3.16.12.3 match dscp

This command defines the dscp to match on the specified match-map. Use the **no** form of this command to remove a match dscp.

Syntax

```
match dscp <dscp value> <dscp mask>
```

The command's syntax format is described below:

Arguments	Description
< dscp value>	Dscp value to match (0-63)
< dscp mask>	Dscp mask to match (0-63)

Defaults

NA

Command Modes

Enable

Example

The following example configures the dscp7 match-map to match traffic with dscp value 7 dscp mask 63.

```
(conf-m-map) # match dscp 7 63
```


3.16.12.4 match priority

This command defines the priority to match on the specified match-map. Use the **no** form of this command to remove a match priority.

Syntax

```
match priority <priority value>
```

The command's syntax format is described below:

Arguments	Description
< priority value>	priority value to match (0-7)

Defaults

NA

Command Modes

Enable

Example

The following example configures the priority5 match-map to match traffic with priority value 5.

```
(conf-m-map) # match priority 5
```

3.16.12.5 match any

This command configures the specified match-map to match any packet.

Syntax

```
match any
```

The command's syntax format is described below:

--	--

Defaults

NA

Command Modes

Enable

Example

The following example configures the match-map to match any packet.

```
(conf-m-map) # match any
```

3.16.12.6 set queue

This command defines the queue to set on the specified match-map. Use the **no** form of this command to remove a set queue.

Syntax

```
set queue <queue name>
```

The command's syntax format is described below:

Arguments	Description
< queue name >	The queue name that all traffic that matches this match-map belongs to.

Defaults

NA

Command Modes

Enable

Example

The following example configures the sip_incoming match-map to belong to the sip_queue queue.

```
(conf-m-map)# set queue sip_queue
```

3.16.12.7 set dscp

This command defines the dscp to set on the specified match-map. Use the **no** form of this command to remove a set dscp.

Syntax

```
set dscp <dscp value> <dscp mask>
```

The command's syntax format is described below:

Arguments	Description
< dscp value>	Dscp value to set (0-63)
< dscp mask>	Dscp mask to set (0-63)

Defaults

NA

Command Modes

Enable

Example

The following example configures the dscp7 match-map to set traffic that matches this match-map to the dscp value 7 and dscp mask 63.

```
(conf-m-map) # set dscp 7 63
```

3.16.12.8 set priority

This command defines the priority to set on the specified match-map. Use the **no** form of this command to remove a set priority.

Syntax

```
set priority <priority value>
```

The command's syntax format is described below:

Arguments	Description
< priority value>	Priority value to set (0-7).

Defaults

NA

Command Modes

Enable

Example

The following example configures the priority5 match-map to set traffic that matches this match-map priority value to 5.

```
(conf-m-map) # set priority 5
```

3.16.12.9 qos service-map

This command enters a specific service-map configuration.

Syntax

The syntax of this command can include the following variations:

```
qos service-map wan output
qos service-map lan output
```

Defaults

NA

Command Modes

Enable

Examples

The following example enters a wan output service map.

```
(config)# qos service-map wan output
```

The following example enters a lan output service map.

```
(config)# qos service-map lan output
```

3.16.12.10 bandwidth

This command sets the maximum bandwidth of a service-map.

Syntax

```
bandwidth <bandwidth in kbps>
```

The command's syntax format is described below:

Arguments	Description
< bandwidth in kbps >	The maximum bandwidth of the service-map

Defaults

NA

Command Modes

Enable

Example

The following example configures the wan output service map maximum bandwidth to 100000 kbps.

```
(conf-s-map) # bandwidth 100000
```

3.16.12.11 queue

This command enters a specific queue configuration. Use the **no** form of this command to delete a specific queue.

Syntax

```
queue <queue name>
queue default
```

The command's syntax format is described below:

Arguments	Description
< queue name >	The name of the queue to configure
default	The behavior of traffic when no it doesn't match any queue.

Defaults

NA

Command Modes

Enable

Examples

The following example enters a wan output service map queue called sip_wan_outgoing configuration menu.

```
(conf-s-map) # queue sip_wan_outgoing
```

The following example enters a lan output service map default queue configuration menu.

```
(conf-s-map) # queue default
```


3.16.12.12 bandwidth

This command sets the maximum bandwidth of a queue.

Syntax

```

bandwidth <minimum bandwidth in kbps>
bandwidth <minimum bandwidth in kbps> <maximum bandwidth in kbps>
bandwidth percent <minimum bandwidth in percent>
bandwidth percent <minimum bandwidth in percent> <maximum
bandwidth in percent>

```

The command's syntax format is described below:

Arguments	Description
< minimum bandwidth in kbps >	The minimum bandwidth of the queue in kbps
< maximum bandwidth in kbps >	The maximum bandwidth of the queue in kbps
< minimum bandwidth in percent >	The minimum bandwidth of the queue in percent (0-100)
< maximum bandwidth in percent >	The maximum bandwidth of the queue in percent (0-100)

Defaults

NA

Command Modes

Enable

Example

The following example configures the wan output service map default queue minimum bandwidth to 60 percent of bandwidth and maximum bandwidth to 80 percent of bandwidth.

```
(conf-s-map-q) # bandwidth percent 60 80
```

3.16.12.13 priority

This command defines the priority to set on the specified queue.

Syntax

```
priority <priority value>
```

The command's syntax format is described below:

Arguments	Description
< priority value>	Priority value to set (0-7).

Defaults

NA

Command Modes

Enable

Example

The following example configures the wan output service map priority to 4.

```
(conf-s-map-q) # priority 4
```

3.16.12.14 policy

This command defines the policy of the specified queue.

Syntax

```
policy fairness
policy fifo
policy random-detect
policy strict-priority
```

The command's syntax format is described below:

Arguments	Description
fairness	The queue is configured with fairness policy.
fifo	The queue is configured with first in first out policy.
random-detect	The queue is configured with random early detection policy.
strict-priority	The queue is configured with strict scheduling priority policy.

Defaults

NA

Command Modes

Enable

Example

The following example configures the wan output service map policy to fifo.

```
(conf-s-map-q)# policy fifo
```

3.16.13 crypto Commands

3.16.13.1 crypto isakmp key

This command, when used in global configuration mode, configures a preshared authentication key. To delete a preshared authentication key, use the **no form** of this command.

Syntax

The syntax of this command can include the following variations:

```
crypto isakmp key <key-string> address <peer-address>
no crypto isakmp key <key-string> address <peer-address>
```

The command's syntax format is described below:

Arguments	Description
<key-string>	Specifies the preshared key. Use any combination of alphanumeric characters up to 20 bytes. This preshared key must be identical at both peers.
address	Use this keyword if the remote peer Internet Security Association Key Management Protocol (ISAKMP) identity was set with its IP address.
<i>peer-address</i>	Specifies the IP address of the remote peer.

Defaults

There is no default preshared authentication key.

Command Modes

crypto isakmp key are defined in enabled configuration mode.

Examples

The following example defines a key to a peer ip.

```
(configure)# crypto isakmp key 123456 address 100.100.100.2
```

3.16.13.1.1 `crypto isakmp policy`

This command, when used in global configuration mode, defines an Internet Key Exchange (IKE) policy. IKE policies define a set of parameters to be used during the IKE negotiation. To delete an IKE policy, use the **no form** of this command.

This command invokes the Internet Security Association Key Management Protocol (ISAKMP) policy configuration (`config-isakmp`) command mode. While in the ISAKMP policy configuration command mode, some of the commands for which you can specify parameters, are as follows:

- `encryption`
- `hash`
- `authenticaion`
- `group`
- `lifetime`

To exit the `config-isakmp` command mode, type 'exit'.

You can configure multiple IKE policies on each peer participating in IPSec. When the IKE negotiation begins, it tries to find a common policy configured on both peers.

Syntax

The syntax of this command can include the following variations:

```
crypto isakmp policy <id>
no crypto isakmp policy <id>
```

The commands syntax format is described below:

Arguments	Description
<id>	Uniquely identifies the IKE policy

This command puts you into the *config-isakmp command mode*.

```
(config-isakmp)# authentication <pre-share>
(config-isakmp)# encryption <enc-alg>
(config-isakmp)# hash <auth-alg>
(config-isakmp)# lifetime <second>
(config-isakmp)# group <1 | 2 | 3>
```

Arguments	Description
<pre-share>	Specifies the authentication method.
<enc-alg>	Specifies the encryption algorithm within an IKE policy. Accepted transform values are described in the "algorithms table".
<auth-alg>	Specifies the hash algorithm within an IKE policy. Accepted transform values are described in the "algorithms table".
<second>	Specifies the lifetime of an IKE SA.
<1 2 3>	Specifies the Diffie-Hellman group identifier within an IKE policy.

Table 3-1: Algorithms Table

Algorithms type	Arguments	Description
enc-alg	<esp-des>	ESP with the 56-bit DES encryption algorithm
	<esp-3des>	ESP with the 168-bit DES encryption algorithm (3DES or Triple DES)
	<esp-aes 128>	ESP with the 128-bit AES encryption algorithm
	<esp-aes 192>	ESP with the 192-bit AES encryption algorithm
	<esp-aes 256>	ESP with the 256-bit AES encryption algorithm
auth-alg	<esp-sha-hmac>	ESP with the SHA (HMAC variant) authentication algorithm
	<esp-md5-hmac>	ESP with the MD5 (HMAC variant) authentication algorithm

Defaults

This command has no defaults.

Command Modes

crypto isakmp key are defined in enabled configuration mode.

Examples

The following example demonstrates how to configure an IKE policy:

```
(config)# crypto isakmp policy 50
```

3.16.13.2 crypto ipsec transform-set

This command, when used in global configuration mode, defines a transform set as acceptable combination of security protocols and algorithms. To delete a transform set, use the no form of this command.

The syntax of this command can include the following variations:

```
crypto ipsec transform-set <transform-set-name>
<transform> <transform>
no crypto ipsec transform-set <transform-set-name>
```

The commands syntax format is described below:

Arguments	Description
<transform-set-name>	Specifies the name of the transform set to create (or modify).
<transform>	Specifies two "transforms" These transforms define the IPSec security protocols and algorithms. Accepted transform values are described in the "transform table".

Table 3-2: Transform Table

Transform type	Transform	Description
ESP Encryption Transform	<esp-des>	ESP with the 56-bit DES encryption algorithm
	<esp-3des>	ESP with the 168-bit DES encryption algorithm (3DES or Triple DES)
	<esp-aes 128>	ESP with the 128-bit AES encryption algorithm
	<esp-aes 192>	ESP with the 192-bit AES encryption algorithm
	<esp-aes 256>	ESP with the 256-bit AES encryption algorithm
	<esp-nul>	Null encryption algorithm
ESP Authentication Transform	<esp-md5-hmac>	ESP with the MD5 (HMAC variant) authentication algorithm
	<esp-sha-hmac>	ESP with the SHA (HMAC variant) authentication algorithm
AH Transform	<ah-md5-hmac>	AH with the MD5 (HMAC variant) authentication algorithm
	<ah-sha-hmac>	AH with the SHA (HMAC variant) authentication algorithm

This command puts you into the **cfg-crypto-trans** command mode

```
(cfg-crypto-trans) # mode <encapsulation-type>
```

Arguments	Description
<encapsulation-type>	Specifies the mode for a transform set: either tunnel or transport mode. If neither tunnel nor transport is specified, the default (tunnel mode) is assigned.

Defaults

This command has no defaults.

Command Modes

crypto ipsec transform-set are defined in enabled configuration mode.

Examples

The following example demonstrates how to configure a transform set:

```
(config)# crypto ipsec transform-set abc esp-3des esp-sha-hmac
```


3.16.13.3 crypto map

To create or modify a crypto map entry and enter the crypto map configuration mode, use the crypto map global configuration command. To delete a crypto map entry or set, use the no form of this command.

```
crypto map <map-name> <index> ipsec-isakmp
no crypto map <map-name> <index> ipsec-isakmp
```

Arguments	Description
<map-name>	Name that identifies the crypto map set
<index>	Uniquely number assigned to a crypto map entry

This command puts you into the config-crypto-map command mode

```
(config-crypto-map)# set peer <peer-ip>
(config-crypto-map)# set transform-set <set-name>
(config-crypto-map)# set pfs <group1|group2|group5|same>
(config-crypto-map)# set security-association lifetime seconds <#>
(config-crypto-map)# match address <acl-name>
```

Arguments	Description
<peer-ip>	Specifies an IPsec peer in a crypto map entry.
<set-name>	Specifies which transform sets can be used with the crypto map entry. The set-name will be compare with all transform-sets prefix
<group1 group2 group5 same>	Specifies that IPsec should ask for PFS when requesting new SAs for this crypto map entry, or that IPsec requires PFS when receiving requests for new SAs. group1 Diffie-Hellman group 1 group2 Diffie-Hellman group 2 group5 Diffie-Hellman group 5 same Same Diffie-Hellman group as phase 1
<#>	Specifies the lifetime of an IPSEC SA.
<acl-name>	Specifies an extended access list for a crypto map entry. Only the first entry in the access list will be considered.

Defaults

IPSEC SA lifetime default is 28800 seconds.

Command Modes

crypto map defined in enabled configuration mode.

Examples

The following example demonstrates how to configure a crypto map:

```
(config)# crypto map LAN_VPN 20 ipsec-isakmp
```

3.17 Configuration System Commands

3.17.1 username administrator

This command configures the device's administrator credentials.

Syntax

The syntax of this command can include the following variations:

```
username administrator name <name>
username administrator password <password>
```

The command's syntax format is described below:

Arguments	Description
name	The command will set the administrator's name.
<name>	The new administrator's name.
password	The command will set the administrator's password.
<password>	The new administrator's password.

Defaults

NA

Functional notes

The administrator's credentials are device wide. i.e., setting the administrator's credentials will take effect in the Web as well as the CLI authentication and vice-versa.

Command Modes

Enable

Related commands

NA

4 Show Commands

4.1 Show System Commands

4.1.1 show system version

This command shows the current running software and hardware version.

Syntax

The syntax of this command can include the following variations:

```
show system version
```

Defaults

NA

Functional notes

NA

Command Modes

Basic

Related commands

NA

4.1.2 show system power

This command displays the system PoE information.

Syntax

The syntax of this command can include the following variations:

```
show system power
```

Defaults

NA

Command Modes

Enable

Example

This example displays the system PoE information,

```
show system power
```

4.2 Show Data Commands

4.2.1 show data shdsl status

This command displays configured SHDSL groups and their connectivity status.

Syntax

The syntax of this command is:

```
show data shdsl status
```

Defaults

This command has no defaults.

Command Modes

Enable

Examples

The following example demonstrates how to view configured SHDSL groups:

```
# show data shdsl status
```

4.2.2 show data interfaces shdsl

Display detailed information about SHDSL connectivity.

Syntax

The syntax of this command is:

```
show data interfaces shdsl
```

Defaults

This command has no defaults.

Command Modes

Enable

Examples

The following example demonstrates how to view current SHDSL status:

```
# show data interfaces shdsl
```

4.2.3 show data interfaces

This command displays configuration parameters and statistics for a group of interfaces or a specific interface.

Syntax

The syntax of this command can include the following variations:

```
show data interfaces
show data interfaces description
show data interfaces status
show data interfaces switchport
show data interfaces [interface name]
```

The command's syntax format is described below:

Arguments	Description
description	Displays information such as name, status, protocol and description for all the interfaces.
status	Displays information such as name, description, status, VLAN, speed and duplex for all the switch port interfaces only.
switchport	Displays information such as name, status, administrative mode, access mode VLAN, trunking native mode VLAN and trunking VLANs enabled for all the switch port interfaces only.
[interface name]	Look for interface naming on the <i>interface</i> command. Displays detailed information such as name, description, status, hardware address, IP address, state time, mtu and statistics for the specified interface.
No argument	Displays detailed information such as name, description, status, hardware address, IP address, state time, mtu and statistics for the all the interfaces.

Defaults

NA

Command Modes

Enable

4.2.4 show data ip interface brief

This command displays a brief summary such as name, IP address, status and protocol for all Layer 3 interfaces.

Syntax

```
show data ip interface brief
```

No arguments for this command.

Defaults

NA

Command Modes

Basic

4.2.5 show data ip dhcp pool

This command displays DHCP pool information such as name, status, IP addresses and lease time for a specified interface or all Layer 3 interfaces.

Syntax

```
show data ip dhcp pool
show data ip dhcp pool <interface name>
```

The command's syntax format is described below:

Arguments	Description
<interface name>	Look for interface naming on the <i>interface</i> command.

Defaults

NA

Command Modes

Basic

4.2.6 show data ip dhcp binding

This command displays all Layer 3 interfaces that receive addresses from the DHCP server.

Syntax

```
show data ip dhcp binding
```

No arguments for this command.

Defaults

NA

Command Modes

Basic

4.2.7 **show data hosts**

This command displays the configured DNS server addresses and current name/address list in cache for all Layer 3 interfaces.

Syntax

```
show data hosts
```

No arguments for this command.

Defaults

NA

Command Modes

Basic

4.2.8 show data crypto status

This command displays the configured crypto sa status.

Syntax

The syntax of this command can include the following variations:

```
show data crypto status
```

Defaults

This command has no defaults.

Command Modes

Crypto configuration can be viewed in enabled mode.

Examples

```
(Data-Status) # show data crypto status
```

4.2.9 show data ip arp / show data arp

This command displays all the ARP entries in the cache.

Syntax

```
show data ip arp  
show data arp
```

No arguments for this command.

Defaults

NA

Command Modes

Basic

4.2.9.1 show data access-lists

Display configured access lists.

Syntax

The syntax of this command can include the following variations:

```
show data access-lists
show data ip access-list <name>
```

The commands syntax format is described below:

Arguments	Description
<name>	Name or number of access-list to display.

Defaults

This command has no defaults.

Command Modes

Enable

Examples

The following example demonstrates how to view configured access lists:

```
# show data access-lists
# show data ip access-list 155
```

4.2.9.2 **show dataip nat**

This command displays configured port-forwarding rules.

Syntax

The syntax of this command can include the following variations:

```
show data ip nat
```

Defaults

This command has no defaults.

Command Modes

Enable

Examples

The following example displays the current port-forwarding rules:

```
# show data ip nat
```

4.2.10 Show Data Spanning-tree Commands

4.2.10.1 show data spanning-tree info

This command displays the status and parameters of the spanning tree in the system.

Syntax

The syntax of this command is:

```
show spanning-tree info
```

The command's syntax format is described below:

Arguments	Description
NA	

Defaults

NA

Command Modes

Enable

Examples

This example displays the status and parameters of the spanning tree in the system:

```
# show spanning-tree info
```


4.2.10.2 show data spanning-tree interface-info

This command displays the status and parameters of the spanning tree for a specific interface.

Syntax

```
show spanning-tree interface-info GigabitEthernet <slot/port>  
show spanning-tree interface-info FastEthernet <slot/port>
```

The command's syntax format is described below:

Arguments	Description
<slot/port>	The interface you want to see.

Defaults

NA

Command Modes

Enable

Examples

The following example shows the status of interface 4/1.

```
# show spanning-tree interface-info GigabitEthernet 4/1
```

4.2.10.3 show data spanning-tree

This command displays the status and parameters of the spanning tree include system status and all the relevant interfaces.

Syntax

```
Show spanning-tree
```

No arguments for this command

Defaults

NA

Command Modes

Enable

Examples

The following example shows the **show spanning-tree** command plot.

```
# show spanning-tree
```

4.2.10.4 show data interfaces spanning-tree

This command shows the description for a specified interface.

Syntax

```
show interfaces GigabitEthernet <slot/port> spanning-tree
show interfaces FastEthernet <slot/port> spanning-tree
```

The command's syntax format is described below:

Arguments	Description
<slot/port>	The interface you want to see.

Defaults

NA

Command Modes

Enable

Examples

This example shows the description for a specified interface.

```
# show spanning-tree interface-info GigabitEthernet 4/1
```

4.2.11 Show Data Routing Commands

4.2.11.1 show data ip route

This command displays the existing routing rules.

Syntax

The syntax of this command can include several variations. The most common are:

```
show data ip route
show data ip route bgp
show data ip route ospf
show data ip route static
```

The command's syntax format is described below:

Arguments	Description
bgp	Displays the Border Gateway Protocol routes.
ospf	Displays the Open Shortest Path First protocol routes.
static	Displays static routes.

Defaults

NA

Command Modes

Basic

4.2.11.2 show data ip extcommunity-list

This command displays the current extcommunity-list information. When *name* is specified the community list's information is shown.

Syntax

The syntax of this command can include the following variations:

```
show data ip extcommunity-list  
show data ip extcommunity-list word
```

The command's syntax format is described below:

Arguments	Description
word	Extcommunity-list name

Defaults

NA

Command Modes

Enable

Example

This example displays the current extcommunity-list information.

```
>show data ip extcommunity-list name
```

4.2.11.3 show data ip community-list

This command display current community list information. When *name* is specified, the specified community list's information is shown.

Syntax

The syntax of this command can include the following variations:

```
show data ip community-list
show data ip community-list word
```

The command's syntax format is described below:

Arguments	Description
word	Community-list name

Defaults

NA

Command Modes

Enable

Example

This command displays current community list information. When *name* is specified, the specified community list's information is shown.

```
# show data ip community-list
```

4.2.11.4 show data ip bgp

This command displays BGP routes.

Syntax

The syntax of this command can include the following variations:

```
show data ip bgp
```

Defaults

NA

Command Modes

Enable

Example

This example displays BGP routes.

```
show data ip bgp
```

4.2.11.5 show data ip bgp ip-address

This command clears peers which have an address of X.X.X.X.

Syntax

The syntax of this command can include the following variations:

```
show data ip bgp ip-address A.B.C.D
```

The command's syntax format is described below:

Arguments	Description
A.B.C.D	ip address

Defaults

NA

Command Modes

Enable

Example

This example clears peers which have an address of 10.5.10.100.

```
show data ip bgp ip-address 10.5.10.100
```


4.2.11.6 show data ip ospf

This command shows information on a variety of general OSPF and area state and configuration information.

Syntax

The syntax of this command can include the following variations:

```
show data ip ospf
```

Defaults

NA

Command Modes

Enable

Example

This example shows information on a variety of general OSPF and area state and configuration information.

```
show data ip ospf
```

4.2.11.7 show data ip ospf interface [INTERFACE]

This command shows the state and configuration of OSPF the specified interface, or all interfaces if no interface is given.

Syntax

The syntax of this command can include the following variations:

```
show data ip ospf interface [INTERFACE]
```

Defaults

NA

Command Modes

Enable

Example

This example shows the state and configuration of OSPF the specified interface,

```
show data ip ospf interface [INTERFACE]
```

4.2.11.8 show data ip ospf neighbor

This command shows the OSPF routing table, as determined by the most recent SPF calculation.

Syntax

The syntax of this command can include the following variations:

```
show data ip ospf neighbor
show data ip ospf neighbor INTERFACE
show data ip ospf neighbor detail
show data ip ospf neighbor INTERFACE detail
show data ip ospf database
show data ip ospf database (asbr-
summary|external|network|router|summary)
show data ip ospf database (asbr-
summary|external|network|router|summary) link-state-id

show data ip ospf database (asbr-
summary|external|network|router|summary) link-state-id adv-router
adv-router

show data ip ospf database (asbr-
summary|external|network|router|summary) adv-router adv-router

show data ip ospf database (asbr-
summary|external|network|router|summary) link-state-id self-
originate

show data ip ospf database (asbr-
summary|external|network|router|summary) self-originate

show data ip ospf database max-age
show data ip ospf database self-originate
show data ip ospf route
```

Defaults

NA

Command Modes

Enable

Example

This example shows the OSPF routing table, as determined by the most recent SPF calculation.

```
>show data ip ospf neighbor
```

4.2.12 Show Data QoS Commands

4.2.12.1 show data qos match-map

This command displays configuration parameters for a group of match-maps or a specific mach-map.

Syntax

The syntax of this command can include the following variations:

```
show data qos match-map
show data qos match-map [input/ output]
show data qos match-map [interface name]
show data qos match-map [input/ output] [interface name]
```

The command's syntax format is described below:

Arguments	Description
Input/ output	Displays detailed information about all match and set rules of all match-maps of the selected direction (either input or output).
[interface name]	Displays detailed information about all match and set rules of all match-maps of the selected interface. Look for interface naming on the <i>interface</i> command.
No argument	Displays detailed information about all match and set rules of all match-maps (for input and output of all the interfaces).

Defaults

NA

Command Modes

Enable

4.2.12.2 show data qos service-map

This command displays configuration parameters for a group of service-maps or a specific service-map.

Syntax

The syntax of this command can include the following variations:

```
show data qos service-map  
show data qos service-map [LAN/ WAN]
```

The command's syntax format is described below:

Arguments	Description
[LAN/ WAN]	Displays detailed information such as minimum and maximum bandwidth, list of queues, queue policy and queue priority for either LAN or WAN service-map.
No argument	Displays detailed information such as minimum and maximum bandwidth, list of queues, queue policy and queue priority for all the service-maps.

Defaults

NA

Command Modes

Enable

4.2.12.3 show data qos queue

This command displays statistics for a group of queues or a specific queue.

Syntax

The syntax of this command can include the following variations:

```
show data qos queue
show data qos queue [LAN/ WAN]
show data qos queue [LAN/ WAN] [queue name]
```

The command's syntax format is described below:

Arguments	Description
[LAN/ WAN]	Displays detailed statistics such as sent/ delayed/ dropped packets and rate for all the output LAN or WAN queues.
[queue name]	Displays detailed statistics such as sent/ delayed/ dropped packets and rate for a selected queue.
No argument	Displays detailed statistics such as sent/ delayed/ dropped packets and rate for all the output queues.

Defaults

NA

Command Modes

Enable

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