Aruba MeshOS 4.6

ARUBA networks

CLI Configuration Guide

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About this Guide

The MeshOS command line interface (CLI) allows you to configure and manage your wireless mesh routers as well as the mesh network.

This guide describes the MeshOS command syntax. The following information is provided for each command:

- Command Syntax — The complete syntax of the command.
- Description — A brief description of the command.
- Syntax — A description of the command parameters, including license requirements for specific parameters if needed. The applicable ranges and default values, if any, are also included.
- Usage Guidelines — Information to help you use the command, including: prerequisites, prohibitions, and related commands.
- Example — An example of how to use the command.
- Command History — The version of MeshOS in which the command was first introduced. Modifications and changes to the command are also noted
- Command Information — This table describes any licensing requirements, command modes and platforms for which this command is applicable.

NOTE

The command examples and outputs are for demonstration purposes only. The exact output of the commands may vary depending on the product model and its firmware version.

What's New In MeshOS 4.6

The following commands have been added in the MeshOS 4.6 command line interface.

Command	Description
`antenna-type` `no antenna-type`	This command is used to select the antenna type in the case of MSR2000, and MSR4000
`pse-mode {at|af|off}`	This command is used to configure the Power Sourcing Equipment (PSE) mode.
`show pse status`	This command is used to show the PSE status.
`enable-password WORD` `no enable-password`	This command is used to enable/disable the password for the EXEC mode.

Connecting to the CLI Interface

A wireless mesh router offers two methods of connecting to the CLI interface:

- Serial console port
- Wireless connection via the default SSID.
- Via the Web Management Interface (WMI)

Serial Console Port Connection

The console connection is the most reliable method to connect to the CLI configuration interface of the wireless mesh router. This serial console port connects to a local management console and can be used to access the CLI to configure, manage, and troubleshoot the router. Aruba wireless mesh routers have a USB port serving as the console port. Download and install a USB to Console conversion software before you connect a terminal or PC workstation running a terminal emulation program to the USB console port on a wireless mesh router. This software commonly known as the CP210x USB to UART Bridge Virtual COM Port (VCP) Driver is available for download for both Linux and Windows operating systems at the URL — http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx. After installing the software, configure your terminal or terminal emulation program to use the communication settings specified in Table 1, based on the Serial Number of the router.

Table 1 *Terminal Communication Settings*

Serial Number of the Router	Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
14 characters (for example, 26A02110500467)	115200	8	None	1	None
9 characters (for example, AZ1234567)	9600	8	None	1	None

After the console connection is established, press **Enter** on your keyboard to bring up the CLI login prompt. The default CLI username is **root** and default password is **public**.

Wireless Connection

The wireless connection is another method of accessing a wireless mesh router. Do not connect anything to the device's Ethernet port and power it on. The default SSID of the BSS of the wireless mesh router is a hidden SSID "ArubaDefault". The default configuration of this BSS is shown in the table below.

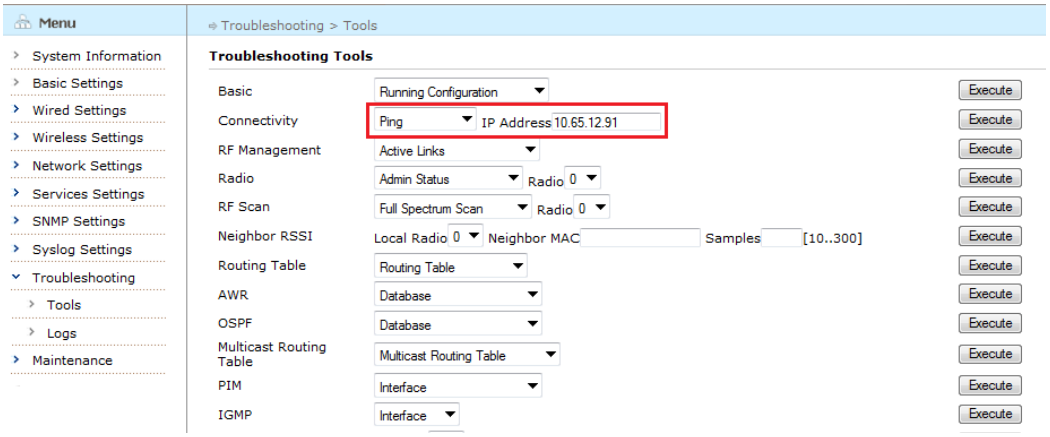
SSID	802.11 mode	Channel	Country/Region Code	Authentication/ Encryption	DHCP
ArubaDefault	802.11ng	1	US	None	Disabled

This default SSID is hidden and the DHCP service is not available. A wireless laptop has to be manually configured using a static IP address on the 192.168.216.0/24, to associate to this default BSS on the wireless mesh router. Once this is done, the CLI can be accessed using SSH to connect to 192.168.216.1 by using the default user name and password.

Via the WMI

Certain CLI commands used for troubleshooting can also be accessed via the WMI. These commands are available at the **Troubleshooting** > **Tools** page. Figure 1 shows the use of a `ping` command and its result.

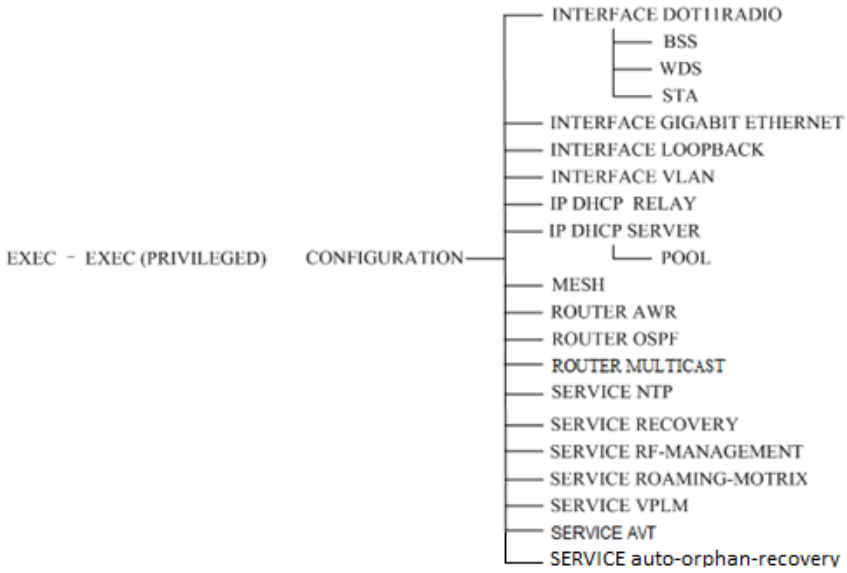
Figure 1 *xttLTTMoysivAstn dorTsaMdsgfLs A*



CLI Modes

The CLI is organized into multiple modes that allow navigation between different protocols and interfaces. The CLI modes and structures that are available are shown in Figure 2.

Figure 2 *CLI Modes*



The list of the CLI modes with descriptions are listed in the table below:.

Mode	Description
`user` **EXEC**	Login to the CLI will take you to this mode. This mode allows you to execute a limited set of commands which are mostly `show` commands. The **enable** command switches the mode to the *lMaMeLy***EXEC** mode.
`Privileged` **EXEC**	This mode has commands to view configuration, manage configuration files, run diagnostics, enable or disable debug operations, and reboot the router. To configure MSR series products, use **configure terminal** command to enter the CONFIGURATION mode.

Mode	Description
CONFIGURATION	Enables you to configure security features, setup various services and SNMP functions. Configure static routes, enter protocol, interfaces, and CLI modes to configure settings, and save the configuration.
ACL Extended	Enables you to configure extended ACL by source/destination IP address, protocol type, and port number.
ACL Mac	Enables you to configure MAC ACL by MAC address.
ACL Standard	Enables you to configure Standard ACL by source/destination IP address.
INTERFACE DOT11RADIO	Enables you to configure wireless and IP layer settings for each radio card.
INTERFACE GIGABIT-ETHERNET	Enables you to configure settings for each Ethernet interface.
INTERFACE LOOPBACK	Enables you to configure loopback Interface.
INTERFACE VLAN	Enables you to configure VLAN interface.
IP DHCP RELAY	Enables you to configure global DHCP relay.
IP DHCP SERVER	Enables you to configure global DHCP server.
LOCATION INFO	Enables you to configure the location information of wireless mesh routers.
MESH	Enables you to configure the files containing mesh features and the mesh ID in each file.
NAT	Enables you to configure the NAT function of wireless mesh routers.
QOS POLICY	Enables you to configure QoS policies, including packet classification and tagging policies.
ROUTER AWR	Enables you to configure the Aruba patented Adaptive Wireless Routing (AWR) protocol.
ROUTER OSPF	Enables you to configure the OSPF routing services for the MSR routers.
ROUTER MULTICAST	Enables you to configure the multicast services for the wireless mesh routers.
SERVICE NTP	Enables you to configure clock synchronization function of the MSR routers.
SERVICE RECOVERY	Enables you to configure the fault recovery service provided by the MSR routers.
SERVICE ROAMING-MOTRIX	Enables you to configure the global roaming service.
SERVICE RF-MANAGEMENT	Enables you to configure the global radio frequency management service and debugging level provided by the MSR routers.
SERVICE VPLM	Enables you to configure VPLM function of the MSR routers
SERVICE AVT	Enables you to configure AVT function of the MSR routers
SERVICE AUTO-ORPHAN-RECOVERY	Enables you to configure the auto orphan recovery feature.

CLI Access

When you connect to the router using the CLI, the system displays its host name followed by the login prompt. Log in using the default user account and the password. For example:

```
(host)
User: root
Password: ******
```

When you are logged in, the *user* EXEC mode CLI prompt displays. For example:

```
(host) >
```

User EXEC mode provides only limited access for basic operational testing such as **show** commands, running **ping** and **traceroute** commands.

Certain management functions are available in *privileged* EXEC (EXEC) mode. Use the **enable** command to move from user mode to EXEC mode. For example:

```
(host) > enable
```

When you are in the EXEC mode, the > prompt changes to a pound sign (#):

```
(host) #
```

Configuration commands are available in CONFIGURATION (CONFIG) mode. Move from EXEC mode to CONFIG mode by entering **configure terminal** at the # prompt:

```
(host) # configure terminal
```

When you are in CONFIG mode, (config) appears before the # prompt:

```
(host) (config) #
```

You can configure a password for the EXEC mode in the CONFIG mode. Once the password is configured, the CLI prompts the user for the password to enter the EXEC mode.

```
(host)> enable
Password:
(host)#
```

Command Help

You can use the question mark (**?**) to view various types of command help.

When typed at the beginning of a line, the question mark lists all the commands available in your current mode or sub-mode. A brief explanation follows each command. For example:

```
(host)(config-eth)# ?
  access-category  Set access category
  description      Set interface description
  dhcp             DHCP (Dynamic Host Configuration Protocol)
  end              End
  exit             Exit
  help             Description of the interactive help system
  ip               Set IP configuration
  link             Set link type
  list             Print command list
  mac              Set MAC configuration
  management       Set as management interface
  mode             Set usage of this interface
  mtu              Set the interface's Maximum Transmission Unit (MTU)
  no               Negate a command or set its defaults
  qos-policy       Configure QOS policy
  quit             Quit
  router-id        Set router ID
```

```
  show             Show running system information
  shutdown         Shutdown this interface
  switchport       Configure an interface to be a VLAN switch port
  write            Write running configuration to file
(host)(config-eth)#
```

When typed at the end of a possible command or abbreviation, the question mark lists the commands that match (if any). For example:

```
(host)(config)# s?
   service
   set
   show
   snmp-server
(host)(config)#
(host)(config)# sn?
   snmp-server
```

If more than one item is shown, type more of the keyword characters to distinguish your choice. However, if only one item is listed, the keyword or abbreviation is valid and you can press tab or the spacebar to advance to the next keyword.

When typed in place of a parameter, the question mark lists the available options. For example:

```
(host)(config)# snmp-server ?
  community    Create a SNMP community
  host         Create a trap receiver
  syscontact   Set syscontact
  syslocation  Set syslocation
  sysname      Set sysname
  trap         Trap
  v3user       Create a SNMP v3user
(host)(config)# snmp-server
```

Deleting Configuration Settings

Use the **no** command to delete or negate previously-entered configurations or parameters.

- To view a list of no commands, type **no** at the enable or config prompt followed by the question mark. For example:

  ```
  (host) (config) # no?
  ```

- To delete a configuration, use the no form of a configuration command. For example, the following command deletes a configured static route:

  ```
  (host) (config) # no ip route 10.2.2.0/24 1.1.1.1
  ```

- To negate a specific configured parameter, use the **no** parameter within the command. For example, the following commands show how a default lease time configuration for a DHCP server lease can be deleted:

  ```
  (host)(config-dhcp)# default-lease-time 14400
  (host)(config-dhcp)# no default-lease-time
  ```

Saving Configuration Changes

Each Aruba controller contains two different types of configuration images.

- The *running config* holds the current controller configuration, including all pending changes which have yet to be saved. To view the running-config, use the following command:

  ```
  (host) # show running-config
  ```

- The *startup config* holds the configuration which will be used the router is rebooted. It contains all the options last saved using the **write memory** command. To view the startup-config, use the following command:

  ```
  (host) # show startup-config
  ```

When you make configuration changes via the CLI, those changes affect the current running configuration only. If the changes are not saved, they will be lost after the router reboots. To save your configuration changes so they are retained in the startup configuration after the router reboots, use the following command in enable mode:

```
(host) # write memory
Saving Configuration...
Saved Configuration
```

Both the startup and running configurations can also be saved to a file, sent to a TFTP server for backup, or transferred to another system.

Command Line Editing

The system records your most recently entered commands. You can review the history of your actions, or reissue a recent command easily, without having to retype it.

To view items in the command history, use the *up* arrow to move back through the list and the *down* arrow key to forward. Only the unique commands are listed in the reverse order (last one first) of their usage. To reissue a specific command, press **Enter** when the command appears in the command history. You can even use the command line editing feature to make changes to the command prior to entering it.

The command line editing feature allows you to make corrections or changes to a command without retyping. Table 1 lists the editing controls: To use key shortcuts, press and hold the **Ctrl** button while you press a letter key.

Table 2 *Line Editing Keys*

Key	Effect	Description
Ctrl A	Home	Move the cursor to the beginning of the line.
Ctrl B or the left arrow	Back	Move the cursor one character left.
Ctrl D	Delete Right	Delete the character to the right of the cursor.
Ctrl E	End	Move the cursor to the end of the line.
Ctrl F or the right arrow	Forward	Move the cursor one character right.
Ctrl K	Delete Right	Delete all characters to the right of the cursor.
Ctrl L	Previous	Re-enter the previous command.

Table 2 *Line Editing Keys*

Key	Effect	Description
Ctrl N or the down arrow	Next	Return to more recent commands in the history buffer after recalling commands with CRTL-P or the up arrow key.
Ctrl P or up arrow	Previous	Display the previous commands in the command history.
Ctrl U	Clear	Clear the line.
Ctrl W	Delete Word	Delete the characters from the cursor up to and including the first space encountered.
Ctrl Z	End Scrolling	End continuous scrolling of command output.
Esc B	Cursor Back	Move the cursor back one word.
Esc F	Cursor Forward	Move the cursor forward one word.
Esc D	Delete Right all	Deletes all characters form the cursor to the end of the word.

Filter Output

Reduces the output by configuring the filter rules such as **grep** and **begin**.

- **[Command] | grep mode**

Output lines accord with certain mode

```
(host)(config)# show running-config | grep service
service avt
service ntp
service recovery
service rf-management
service roaming-motrix
service vplm
(host)(config)#
```

- **[Command] | begin mode**

Output contents begin with the first line matching a pattern.

```
(host)(config)# show running-config | begin interface
interface dot11radio 0
 beacon-interval 100
 bss 2
  access-list
  description Import SSID List
  max-station-allowed 240
  ssid abc
  switchport access vlan 1000
  wmm
 bss 1
  access-list
  authentication open key-management wpa2
   encryption-mode-cipher aes
   preauth
```

```
   wpa-type psk ascii 12345678
  description Import SSID List
  max-station-allowed 240
  ssid zy6
  switchport access vlan 100
  wmm
 channel-list a 112
 channel-list bg 9
 cts-protection disable
 distance 1
 txpower 50
 wireless-mode na
interface dot11radio 1
 beacon-interval 100
 channel-list bg 6
 cts-protection disable
 short-gi
 txpower 5
 wds auto
 wireless-mode na
interface dot11radio 2
 beacon-interval 100
 channel-list a 149
 channel-list bg 6
 cts-protection disable
 short-gi
 txpower 50
 wireless-mode g
interface dot11radio 3
 beacon-interval 100
 channel-list a 149
 channel-list bg 6
 cts-protection disable
 short-gi
 txpower 50
 wireless-mode g
interface gigabit-ethernet 0
 mode gateway
 switchport trunk allowed-vlan 1,100,1000
 switchport site-id 100
interface loopback 0
 ip address 192.168.200.91/32
 router-id
interface vlan 1
 ip address 10.65.12.91/24
 management
 mtu 1500
interface vlan 2
 dhcp server 01
 ip address 91.1.1.1/24
 mtu 1500
interface vlan 201
 ip address 111.91.201.1/24
 mtu 1500
interface vlan 202
 ip address 111.91.202.1/24
 mtu 1500
interface vlan 203
```

```
 ip address 111.91.203.1/24
 mtu 1500
interface vlan 204
 ip address 111.91.204.1/24
 mtu 1500
interface vlan 205
 ip address 111.91.205.1/24
 mtu 1500
interface vlan 206
 ip address 111.91.206.1/24
 mtu 1500
interface vlan 207
 ip address 111.91.207.1/24
 mtu 1500
interface vlan 208
 ip address 111.91.208.1/24
 mtu 1500
interface vlan 209
 ip address 111.91.209.1/24
 mtu 1500
interface vlan 210
 ip address 111.91.210.1/24
 mtu 1500
interface vlan 211
 ip address 111.91.211.1/24
 mtu 1500
interface vlan 212
 ip address 111.91.212.1/24
 mtu 1500
interface vlan 213
 ip address 111.91.213.1/24
 mtu 1500
interface vlan 214
 ip address 111.91.214.1/24
 mtu 1500
interface vlan 215
 ip address 111.91.215.1/24
 mtu 1500
interface vlan 216
 ip address 111.91.216.1/24
 mtu 1500
ip route 10.0.0.0/8 10.65.12.1
ip telnet server
local-ip 192.168.216.1/24
logging 10.64.147.218
logging facility kern severity debug
logging facility local0 severity debug
logging facility local1 severity debug
logging facility local2 severity debug
logging facility local3 severity debug
logging facility local4 severity debug
logging facility local5 severity debug
logging facility local6 severity debug
logging facility local7 severity debug
mesh installation outdoor
snmp-server syscontact support@arubanetworks.com
snmp-server syslocation BeiJing
snmp-server community public ro
```

```
snmp-server community private rw
snmp-server trap open client_online
snmp-server trap open client_offline
(host)(config)#
```

Typographic Conventions

The following conventions are used throughout this manual to emphasize important concepts:

Table 3 *Text Conventions*

Type Style	Description
Italics	This style is used to emphasize important terms and to mark the titles of books.
Boldface	This style is used to emphasize command names and parameter options when mentioned in the text.
`Commands`	This fixed-width font depicts command syntax and examples of commands and command output.
`<angle brackets>`	In the command syntax, text within angle brackets represents items that you should replace with information appropriate to your specific situation. For example: ping <ipaddr> In this example, you would type “ping” at the system prompt exactly as shown, followed by the IP address of the system to which ICMP echo packets are to be sent. Do not type the angle brackets.
`[square brackets]`	In the command syntax, items enclosed in brackets are optional. Do not type the brackets.
`{Item_A|Item_B}`	In the command examples, single items within curled braces and separated by a vertical bar represent the available choices. Enter only one choice. Do not type the braces or bars.
`{ap-name <ap-name>}|{ipaddr <ip-addr>}`	Two items within curled braces indicate that both parameters must be entered together. If two or more sets of curled braces are separated by a vertical bar, like in the example to the left, enter only one choice Do not type the braces or bars.

The following informational icons are used throughout this guide:

NOTE

Indicates helpful suggestions, pertinent information, and important things to remember.

CAUTION

Indicates a risk of damage to your hardware or loss of data.

WARNING

Indicates a risk of personal injury or death.

Specifying Addresses and Identifiers in Commands

This section describes addresses and other identifiers that you can reference in CLI commands.

Table 4 *Addresses and Identifiers*

Address/Identifier	Description
IP address	For any command that requires entry of an IP address to specify a network entity, use IPv4 network address format in the conventional dotted decimal notation (for example, 10.4.1.258). For subnetwork addresses, specify a netmask in dotted decimal notation (for example, 255.255.255.0).
Netmask address	For subnetwork addresses, specify a netmask in dotted decimal notation (for example, 255.255.255.0).
Media Access Control (MAC) address	For any command that requires entry of a device's hardware address, use the hexadecimal format (for example, 00:05:4e:50:14:aa).
Service Set Identifier (SSID)	A unique character string (sometimes referred to as a network name), consisting of no more than 32 characters. The SSID is case-sensitive and should not contain spaces (for example, WLAN-01).
Basic Service Set Identifier (BSSID)	This entry is the unique hard-wireless MAC address of the router. A unique BSSID applies to each frequency— 802.11a and 802.11g—used from the router. Use the same format as for a MAC address.
Gigabit Ethernet interface	Any command that references a Gigabit Ethernet interface requires that you specify the port as 0. All routers have one Gigabit Ethernet port with value 0.

Contacting Support

Main Site	arubanetworks.com
Support Site	support.arubanetworks.com
Airheads Social Forums and Knowledge Base	community.arubanetworks.com
North American Telephone	1-800-943-4526 (Toll Free) 1-408-754-1200
International Telephones	arubanetworks.com/support-services/aruba-support-program/contact-support/
Software Licensing Site	licensing.arubanetworks.com/login.php
Wireless Security Incident Response Team (WSIRT)	arubanetworks.com/support/wsirt.php
Support Email Addresses	
Americas and APAC	support@arubanetworks.com
EMEA	emea_support@arubanetworks.com
WSIRT Email Please email details of any security problem found in an Aruba product.	wsirt@arubanetworks.com

Chapter 1

Basic Commands

The following commands are used for basic configuration:

country-code

```
country-code <country code>
```

Description

This command is used to manually configure the country/regulatory domain code.

Syntax

Parameter	Description	Default
`<country code>`	The country code for the regulatory domain. **(AE|AU|BH|BR|CA|CN|CY|D1|EG|EU|GB|HK|ID|IE|IL|IN|JP|KR|KW|LB|MX|MY|NZ|OM|PH|PR|QA|RU|SA|SG|TH|TW|US)**	US

Usage Guidelines

The wireless mesh routers are shipped with the default country/regulatory domain code US in the factory setting.

Example

The following example changes the country/regulatory domain code:

```
(host)(config)# country-code ?
  AE  Set code for United Arab Emirates
  AU  Set code for Australia
  BH  Set code for Bahrain
  BR  Set code for Brazil
  CA  Set code for Canada
  CN  Set code for China
  CY  Set code for Cyprus
  D1  Set code for debug purpose only
  EG  Set code for Egypt
  EU  Set code for European Union country
  GB  Set code for United Kingdom
  HK  Set code for Hong Kong
  ID  Set code for Indonesia
  IE  Set code for Ireland
  IL  Set code for Israel
  IN  Set code for India
  JP  Set code for Japan
  KR  Set code for Republic of Korea
  KW  Set code for Kuwait
  LB  Set code for Lebanon
  MX  Set code for Mexico
  MY  Set code for Malaysia
  NZ  Set code for New Zealand
  OM  Set code for Oman
  PH  Set code for Philippines
  PR  Set code for Puerto Rico
  QA  Set code for Qatar
  RU  Set code for Russia
  SA  Set code for Saudi Arabia
  SG  Set code for Singapore
  TH  Set code for Thailand
  TW  Set code for Taiwan, Province of China
  US  Set code for United States
```

```
(host)(config)# country-code CN
(host)(config)#
```

NOTE

You cannot change the country/regulatory domain for certain countries, such as the U.S. Improper country code assignment can disrupt wireless transmissions. Most countries impose penalties and sanctions on operators of wireless networks with devices set to improper country codes.

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

public-safety

`public-safety`

Description

This command is used to configure 4.9G channels on devices shipping to the US and Japan (JP).

Syntax

Parameter	Description
none	-

Usage Guidelines

The U.S. Federal Government has reallocated the 4.9G spectrum for use in the public safety domain for wide bandwidth data systems on a primary basis and fixed links on a secondary basis. Agencies that wish to operate in this band should obtain the necessary licenses from the regulatory authorities. The 4.9G spectrum option is enabled for the **US** and **JP** country codes and disabled for all other countries.

NOTE

This feature is not supported in the MSR1200 router.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# public-safety
(13453)%%Warning: Need reboot for this change to take effect! Make sure you are
authorized to use 4.9G!
(host)(config)# write memory
(host)(config)# end
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	License to operate in the 4.9G band must be obtained from the regulatory authorities. Applicable only for US and JP regulatory domains.	CONFIG

mesh installation

```
mesh installation <indoor|outdoor>
```

Description

This command is used to specify the installation mode of a mesh network.

Syntax

Parameter	Description	Default
`<indoor|outdoor>`	Specifies the mode of the mesh installation.	The default for MSR1200 is **Indoor** and the default for MSR2000, MSR4000, and MST200 is **Outdoor**.

Usage Guidelines

A wireless mesh router works in the indoor or outdoor installation mode. A router working in the indoor mode cannot use the *outdoor-only* channel, likewise, a router working in the outdoor mode can not use *indoor-only* channel. MST200\MSR2000\MR4000 routers working in indoor mode cannot use both indoor-only and outdoor-only channels. The router needs a reboot when the installation mode is changed.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# mesh installation outdoor
(13451)%%Warning: Need reboot for this change to take effect!
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

hostname

`hostname <name>`

Description

This command is used to configure the hostname of the wireless mesh router.

Syntax

Parameter	Description	Default
`<name>`	Hostname of the router.	The default host name includes the model number and the last three octets of the MAC address, for example MSR4000-11:70:1a.

Usage Guidelines

A host name should be a character string which must begin with a letter and the length should be no more than 32 characters. Use the `no hostname` command to go back to the default hostname.

Example

The following command configures a hostname of a MSR2000 router:

```
MSR2000-2a:6c:77(config)# hostname Office-1
Office-1(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

router-user password

`router-user password`

Description

This command is used to change the password for the root account.

Syntax

Parameter	Description	Default
none	-	public

Usage Guidelines

The **root** account has a default password **public**. It is strongly recommended that this password is changed in order to prevent unauthorized access to the router.

Example

The following example changes the password for the root account:

```
(host)# router-user password
Changing password for root
New password:
Retype password:
Changing password for root
Password for user root have been changed.
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

enable-password

`enable-password <WORD>`

Description

This command is used to set a password for the EXEC mode.

Syntax

Parameter	Description	Default
`<WORD>`	The password for the EXEC mode.	-

Usage Guidelines

The password is disable by default. Use the **`no enable-password`** to disable the password for the EXEC mode.

Example

The following example sets the password **aaaa** for the EXEC mode:

```
(host)> enable
(host)# configure terminal
(host)(config)# enable-password aaaa
(host)(config)# exit
(host)# exit
(host)> enable
Password:
(host)#
```

Command History

Release	Modification
MeshOS 4.6	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

location-info

`location-info`

Description

This command is used to switch to the LOCATION INFO mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

This mode is used to configure the GPS location information for the mesh router, including the longitude, latitude, and altitude.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# location-info
(host)(config-location-info)#
  altitude   Set device location altitude
  end        End
  exit       Exit
  help       Description of the interactive help system
  latitude   Set device location latitude
  list       Print command list
  longitude  Set device location longitude
  no         Negate a command or set its defaults
  quit       Quit
  show       Show running system information
  write      Write running configuration to file
(host)(config-location-info)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

longitude

`Longitude LONGITUDE(DDD MM SS.SS D)`

Description

This command is used to set the longitude of the router.

Syntax

Parameter	Description
`(DDD MM SS.SS D)`	Longitude of the router in DMS (Degrees, Minutes, Seconds), format. Example: "122 02 34.29 W"

Usage Guidelines

This parameter is set during the initial configuration of the router and is not changed unless the router is physically relocated to a different location.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# location-info
(host)(config-location-info)#
  altitude   Set device location altitude
  end        End
  exit       Exit
  help       Description of the interactive help system
  latitude   Set device location latitude
  list       Print command list
  longitude  Set device location longitude
  no         Negate a command or set its defaults
  quit       Quit
  show       Show running system information
  write      Write running configuration to file
(host)(config-location-info)# longitude 122 02 34.29 W
(host)(config-location-info)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	LOCAL INFO

latitude

`Latitude LATITUDE(DDD MM SS.SS D)`

Description

This command is used set the latitude of the router.

Syntax

Parameter	Description
`(DDD MM SS.SS D)`	Latitude of the router in DMS (Degrees,Minutes,Seconds), format. Example: "37 22 08.75 N" (DD MM SS.SS D)

Usage Guidelines

This parameter is set during the initial configuration of the router and is not changed unless the router is physically relocated to a different location.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# location-info
(host)(config-location-info)#
  altitude   Set device location altitude
  end        End
  exit       Exit
  help       Description of the interactive help system
  latitude   Set device location latitude
  list       Print command list
  longitude  Set device location longitude
  no         Negate a command or set its defaults
  quit       Quit
  show       Show running system information
  write      Write running configuration to file
(host)(config-location-info)# latitude 37 22 08.75 N
(host)(config-location-info)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	LOCAL INFO

altitude

```
Altitude <VALUE>
```

Description

This command is used to specify the altitude of the router.

Syntax

Parameter	Description
<VALUE>	Altitude of the router in decimal format. [-10000-10000] meter

Usage Guidelines

This parameter is set during the initial configuration of the router and is not changed unless the router is physically relocated to a different location.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# location-info
(host)(config-location-info)#
  altitude   Set device location altitude
  end        End
  exit       Exit
  help       Description of the interactive help system
  latitude   Set device location latitude
  list       Print command list
  longitude  Set device location longitude
  no         Negate a command or set its defaults
  quit       Quit
  show       Show running system information
  write      Write running configuration to file
(host)(config-location-info)# altitude 44
(host)(config-location-info)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	LOCAL INFO

local-ip

`local-ip A.B.C.D/M`

Description

This command is used to change the default local IP of the router.

Syntax

Parameter	Description	Default
`A.B.C.D/M`	The local IP address/Mask of the router.	192.168.216.1/24

Usage Guidelines

This IP address is accessible only through the local LAN that connects the router by Ethernet and the BSS in the management VLAN. By default, the local IP is a fixed private IP — 192.168.216.1/24. If this IP address conflicts with the IP address of any one of the interfaces on the device, the local IP address of the router is changed to an inactive state. Use this command to change the local IP address of the router

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# local-ip 1.1.1.1/24
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

write memory

`write memory`

Description

This command is used to write the current/running configuration to a startup-config file.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

It is highly recommended that you periodically save the configuration of your routers. The `show running-config` and `show startup-config` commands can be used to view the startup-config file.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# write memory
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Interface

```
Interface <interface> <index>
```

Description

This command is used to configure a physical or logical interface on the routers.

Syntax

Parameter	Description
`<interface>`	The name of the interface. • dot11radio • gigabit-Ethernet • VLAN • loopback
`<index>`	• <0-3> - Dot11radio Interface index • 0 - Gigabit-ethernet Interface index • <0-3> - Loopback Interface index • <1-4094> - VLAN ID

Usage Guidelines

A interface should be configured before it can be used. All interfaces required you to specify the interface index during the configuration.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)#
  antenna-gain        Set antenna gain
  beacon-interval     Set beacon interval
  bss                 BSS
  channel-list        Set preferred channel list
  cts-protection      Set CTS protection
  disable-amsdu       Disable AMDSU
  distance            Set distance
  end                 End
  exit                Exit
  help                Description of the interactive help system
  list                Print command list
  no                  Negate a command or set its defaults
  preamble-short      Set preamble mode to short
  quit                Quit
  short-gi            Set 802.11n guard interval mode to short
  show                Show running system information
  shutdown            Shutdown the radio
  sta                 Sta
  tx-power-reduction  Reduce txpower in dbm
  txpower             Set maximal txpower in dbm
  txretry             Set maximal tx retry times
  wds                 Configure WDS
  wireless-mode       Set wireless mode
  write               Write running configuration to file
```

```
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

upgrade

```
upgrade url <url> [reboot]
upgrade ftp A.B.C.D FILENAME USERNAME PASSWORD [reboot]
```

Description

This command is used to upgrade the software image on the wireless mesh router using an FTP or HTTP server.

Syntax

Parameter	Description
`<url>`	URL of image file (Example: http://192.168.1.1/images/image.bin).
`[reboot]`	Optional parameter used to reboot the router.
`A.B.C.D`	IP address of FTP server.
`FILENAME`	Name of the image file
`USERNAME PASSWORD`	Username and password.

Usage Guidelines

All wireless mesh routers are shipped with the latest firmware installed. Use this command to upgrade the firmware on existing routers.

Example

The following example shows an upgrade process:

```
(host)# upgrade ftp 10.64.146.120 4.3.0.0.img upimg upimg
% Start downloading image

    [               <=>                     ] 11,756,485   966.09K/s

% Start upgrading image, this will take several minutes
Checking   OK
Upgrading
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!OK
Verifying
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!OK
% Upgrade successful, please reboot the router to activate the new image

(host)# upgrade url http://10.64.246.248/tftpboot/twin_peak/4.3.0.0.img
% Start downloading image

100%[====================================>] 11,756,485     1.05M/s    ETA 00:00

% Start upgrading image, this will take several minutes
Checking   OK
Upgrading
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!OK
```

```
Verifying
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!OK
% Upgrade successful, please reboot the router to activate the new image
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

list

`list`

Description

This command allows a user to list all available commands for the current mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command can be used in all modes. The commands are listed along with their parameter (s).

Example

The following are examples of using the list command:

```
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# list
  access-category ( be|bk|st|ee|cl|vi|vo|nc )
  description .LINE
  dhcp relay
  dhcp relay option circuit-id NAME
  dhcp server NAME
  end
  exit
  help
  ip access-group NAME (in|out)
  ip address A.B.C.D/M
  ip address dhcp
  ip address dhcp option 60 ascii WORD
  link auto-negotiate
  link speed (10|100|1000) duplex (full|half)
  list
  mac access-group NAME in
  management
  mode (none|access|gateway|backhaul)
  mtu <256-1500>
  no access-category
  no description
  no dhcp
  no ip access-group
  no ip access-group NAME (in|out)
  no ip address
  no link
  no mac access-group NAME in
  no mac access-group in
  no management
  no mtu
  no qos-policy
  no qos-policy NAME (in|out)
  no router-id
  no shutdown
```

```
    no switchport
    no switchport site-id
    no switchport trunk allowed-vlan WORD
    no switchport trunk native vlan
    qos-policy NAME (in|out)
    quit
    router-id
    show configuration
    show configuration | (grep|begin) PATTERN
    show running-config
    show running-config | (grep|begin) PATTERN
    shutdown
    switchport access vlan <1-4094>
    switchport site-id <1-255>
    switchport trunk allowed-vlan WORD
    switchport trunk native vlan <1-4094>
    write memory
  (host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	All modes

https-redirect

`https-redirect`

Description

This command is used to redirect the WMI to the secure HTTPS mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

Run this command on the router to enable the HTTPS redirect feature. You will be redirected to the secure HTTPS page when you try to access the router using HTTP.

Example

The following command shows the use of the command:

```
(host)(config)# https-redirect
  https-redirect  WEB UI redirect to security mode
(host)(config)# https-redirect
(36864)%%Warning: when https-redirect is enabled, if MeshConfig is managing the
AP, some operations for the AP on MeshConfig will not work normally, such as, I
mport/Audit/Backup/WMI the AP.
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

Chapter 2

Ethernet Interface

Wireless mesh routers are provided with one Ethernet interface - Gigabit Ethernet Interface. This chapter covers the following commands that configure the Ethernet interface on the mesh routers:

interface gigabit-ethernet

```
interface gigabit-ethernet <0>
```

Description

This command is used to configure the Ethernet interface.

Syntax

Parameter	Description
<0>	Interface index

Usage Guidelines

Wireless mesh routers have one physical Gigabit-Ethernet interface that can connect the wireless mesh network to a wired network or device. The interface supports auto-negotiation on 10Mbps, 100Mbps and 1000Mbps as well as half-duplex and full-duplex modes.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

access-category

`access-category {be|bk|cl|ee|nc|st|vi|vo}`

Description

This command is used to configure the priority of 802.1e mapping of the Ethernet interface.

Syntax

Parameter	Description
`{be|bk|cl|ee|nc|st|vi|vo}`	• **be** 0 - best effort (data) • **bk** 1 - background (data) • **cl** 4 - control load • **ee** 3 - excellent effort • **nc** 7 - Network control • **st** 2 - standard • **vi** 5 - video traffic • **vo** 6 - voice traffic

Usage Guidelines

Use the `no access-category` command to remove the priority configuration of the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# access-category vi
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

description

```
description <LINE>
```

Description

This command is used to specify the description of Ethernet interface.

Syntax

Parameter	Description
`<LINE>`	Interface description (maximum of 128 characters).

Usage Guidelines

Use the `no description` command to remove the description of the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# description interface1
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

ip address

```
ip address <A.B.C.D/M|dhcp>
```

Description

This command is used to set IP address of Ethernet interface.

Syntax

Parameter	Description
`<A.B.C.D/M |dhcp>`	• **A.B.C.D/M**—Interface IP address • **dhcp**—Set IP address to DHCP

Usage Guidelines

Use the `no ip address` command to remove the IP address from the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# ip address dhcp
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

link auto-negotiate

`link auto-negotiate`

Description

This command is used to configure the Ethernet interface at link auto-negotiate mode.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

The `no link` command is used to restore the configuration of the Ethernet interface to the default (link auto-negotiate) mode.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# link auto-negotiate
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

link speed...duplex

`link speed (10|100|1000) duplex (full|half)`

Description

This command is used to configure the Ethernet interface at a specific speed and duplex mode.

Syntax

Parameter	Description	Default
`10|100|1000`	The Ethernet speed in Mbps	auto-negotiate
`full|half`	Full duplex or half duplex	auto-negotiate

Usage Guidelines

The `no link` command is used to restore the configuration of the Ethernet interface to the default (link auto-negotiate) mode.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# link speed 100 duplex full
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

management

`management`

Description

This command is used to configure the Ethernet interface as management interface.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

The `no management` command is used to cancel the configuration of the Ethernet interface as management interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# management
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

mtu

```
mtu <256-1500>
```

Description

This command is used to set the Maximum Transmission Unit (MTU) size.

Syntax

Parameter	Description	Default
`<256-1500>`	The MTU size	1500

Usage Guidelines

MTU is the threshold at which single layer-3 IP packets are fragmented into multiple, smaller-size packets. Setting of MTU is optional and should be done with care. Do not set a value below 1500 for the MTU. Use the `no mtu` command to reset the MTU to the default value.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# mtu 1500
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

shutdown

`shutdown`

Description

This command is used to shutdown an interface.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use the `no shutdown` command to activate an interface that has been shutdown.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# shutdown
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET, INTERFACE DOT11RADIO INTERFACE VLAN

switchport access vlan

```
switchport access vlan <1-4094>
```

Description

This command is used to configure the Ethernet interface as an access port and add it to a VLAN.

Syntax

Parameter	Description
`<1-4094>`	The range of the VLAN ID.

Usage Guidelines

Use the `no switchport` command to delete the access mode configuration of the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport access vlan 100
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

switchport trunk allowed-vlan

```
switchport trunk allowed-vlan <vlan-id-list>
```

Description

This command is used to configure the Ethernet interface as a trunk port and add it to a specified VLAN.

Syntax

Parameter	Description	Range
`<vlan-id-list>`	Specifies the range of VLAN for the current trunk.	1-4094

Usage Guidelines

Use commas to separate multiple VLAN ID and "-" to show a VLAN range (For example, 10,20,30,40-50). Use the `no switchport trunk allowed-vlan <vlan-id-list>` command to remove the trunk port from the specified VLAN. Use the `no switchport` command to delete the trunk mode configuration of the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport trunk allowed-vlan 10,20,30,40-50
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

switchport trunk native vlan

`switchport trunk native vlan <vlan-id>`

Description

This command is used to configure the default VLAN of the trunk port.

Syntax

Parameter	Description	Default
`<vlan-id>`	VLAN ID	1

Usage Guidelines

Use the `no switchport trunk native vlan` command to restore the default VLAN ID as 1.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport trunk native vlan 10
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

exit, quit, and end

```
exit
quit
end
```

Description

The `exit` and the `quit` commands are used to leave the Interface mode and commit the changes, while the `end` command is used to directly go back to the EXEC mode.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

These commands can also be run by typing in the first two characters. For example, `ex` in place of `exit`. Similarly, `en` for `end` and `qu` for `quit`.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport trunk native vlan 10
(host)(config-eth)# exit
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# mtu 1500
(host)(config-eth)# end
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

show running-config

`show running-config`

Description

This command is used to display a specific configuration of the interface.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command along with the `show interface gigabit-ethernet 0` is very useful to troubleshoot the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# show running-config
ip nat
ip dhcp relay
ip dhcp server
 dns 10.1.1.50
 pool 01
  gateway 91.1.1.1
  network 91.1.1.0/24
  range 91.1.1.2 91.1.1.4
location-info
 altitude 44
 latitude 12 58 13 N
 longitude 77 33 37 W
mesh
 neighbor-list
 authentication open key-management wpa2
  psk ascii  wdsshouldworkwell
 mesh-id Do-not-change-zhiyuan-conf
 neighbor-list-type inactive
 preferred-link 0
  neighbor host zhiyuan-5
  preferred channel 100
 preferred-link 1
  neighbor host zhiyuan-6
  preferred channel 104
 preferred-link 2
  neighbor host zhiyuan-3
  preferred channel 108
router awr
 debug error
 enable
router multicast
 debug information
```

```
 enable
 rp-address 192.168.200.91
router ospf
 debug all
 disable
 network 10.65.12.0/24 area 1234
 router-priority 1
service avt
 mode disabled
service ntp
 clock timezone bj8 8
 enable
 server 10.64.147.195
service recovery
 debug-level info
 enable
service rf-management
 debug process
service roaming-motrix
 debug-level info
 disable
service vplm
 allowed-vlan auto
 enable
client-list 1.1.1.1/24
country-code EU
hostname zhiyuan-1
interface dot11radio 0
 beacon-interval 100
 bss 1
  access-list
  authentication open key-management wpa2
   encryption-mode-cipher aes-tkip
   preauth
   wpa-type psk ascii abcdefgh
  ignore-broadcast-ssid
  max-bw-per-client in 172.16.100.101 1024 100
  max-bw-per-client out 172.16.100.102 512 100
  ssid zy1
  switchport access vlan 100
  wmm
 channel-list bg 9
 cts-protection disable
 distance 1
 txpower 5
 wireless-mode ng
interface dot11radio 1
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface dot11radio 2
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
```

```
interface dot11radio 3
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface gigabit-ethernet 0
 mode gateway
 switchport trunk allowed-vlan 1
 switchport site-id 100
interface loopback 0
 ip address 192.168.200.91/32
 router-id
interface vlan 1
 ip address 10.65.12.91/24
 management
 mtu 1500
interface vlan 2
 dhcp server 01
 ip address 91.1.1.1/24
 mtu 1500
interface vlan 201
 ip address 111.91.201.1/24
 mtu 1500
interface vlan 202
 ip address 111.91.202.1/24
 mtu 1500
interface vlan 203
 ip address 111.91.203.1/24
 mtu 1500
interface vlan 204
 ip address 111.91.204.1/24
 mtu 1500
interface vlan 205
 ip address 111.91.205.1/24
 mtu 1500
interface vlan 206
 ip address 111.91.206.1/24
 mtu 1500
interface vlan 207
 ip address 111.91.207.1/24
 mtu 1500
interface vlan 208
 ip address 111.91.208.1/24
 mtu 1500
interface vlan 209
 ip address 111.91.209.1/24
 mtu 1500
interface vlan 210
 ip address 111.91.210.1/24
 mtu 1500
interface vlan 211
 ip address 111.91.211.1/24
 mtu 1500
interface vlan 212
 ip address 111.91.212.1/24
 mtu 1500
interface vlan 213
```

```
 ip address 111.91.213.1/24
 mtu 1500
interface vlan 214
 ip address 111.91.214.1/24
 mtu 1500
interface vlan 215
 ip address 111.91.215.1/24
 mtu 1500
interface vlan 216
 ip address 111.91.216.1/24
 mtu 1500
ip route 10.0.0.0/8 10.65.12.1
ip telnet server
local-ip 192.168.216.1/24
mesh installation outdoor
public-safety
snmp-server syscontact support@arubanetworks.com
snmp-server syslocation BeiJing
snmp-server community public ro
snmp-server community private rw
snmp-server trap open client_online
snmp-server trap open client_offline
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET, INTERFACE DOT11RADIO

show interface gigabit-ethernet

`show interface gigabit-ethernet 0`

Description

This command is used to display the current state of the gigabit-ethernet interface.

Syntax

Parameter	Description
`0`	Interface gigabit-ethernet index.

Usage Guidelines

This command along with the `show running-config` command is very useful to troubleshoot the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)# show interface gigabit-ethernet 0
interface gigabit-ethernet 0 status
  mode: gateway
  admin status: up  physical status: up
  DHCP: disable
  DHCP client: disable
  VLAN type: none
  link type: auto-negotiate, speed: 100M, duplex: full-duplex
  index 1 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  HWaddr: 00:17:7b:00:0b:94
input packets 24255, bytes 1600934, dropped 0, multicast packets 246
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    input rate 0.92 Kb/s
    output packets 1243, bytes 135301, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    output rate 0.00 Kb/s
    collisions 0
    up/down count 2
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 3

Wireless Interfaces

Wireless mesh routers are provided with Dot11 Radio interfaces.

This chapter covers the following commands that configure the wireless interfaces on the mesh routers:

interface dot11radio

```
interface dot11radio <r>
```

Description

This command is used to configure the wireless dot11radio interface.

Syntax

Parameter	Description	Range
<r>	Radio index	0-3

Usage Guidelines

This command is incomplete without the radio index <r>.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

wireless-mode

```
wireless-mode <mode>
```

Description

This command is used to manually configure the physical wireless settings of the radio interface.

Syntax

Parameter	Description	Default
`<mode>`	Wireless settings of the radio interface: • **a**—Uses 802.11a • **b**—Uses 802.11b • **g**—Uses 802.11g, compatible with 802.11b • **g-only**—Uses 802.11g, not compatible with 802.11b • **na**—Uses 802.11na and the bandwidth of each channel is 20MHz • **na-ht40plus**—Uses 802.11na, combining two neighboring 20MHz channels into one 40MHz channel. The control channel is the configured channel, and the frequency of the extension channel is higher than that of the control channel. • **na-ht40minus**—Uses 802.11na, combining two neighboring 20MHz channels into one 40MHz channel. The control channel is the configured channel, and the frequency of the extension channel is lower than that of the control channel. • **ng**—Uses 802.11ng and the bandwidth of each channel is 20MHz • **ng-ht40plus**—Uses 802.11ng, combining two neighboring 20MHz channels into one 40MHz channel. The control channel is the configured channel, and the frequency of the extension channel is higher than that of the control channel. • **ng-ht40minus**—Uses 802.11ng, combining two neighboring 20MHz channels into one 40MHz channel. The control channel is the configured channel, and the frequency of the extension channel is lower than that of the control channel.	Radio0: **ng** Radio1: **na**

Usage Guidelines

The radio interfaces in the wireless mesh routers support different types of hardware modes based on the types of built-in radio interface cards. Each mode is associated with country codes and specific radio channels. The channel settings on the wireless device correspond to the frequencies available in the regulatory domain. Mode **g** is compatible with **802.11b** mode. **g-only** mode is not compatible with the **802.11b** mode. The **ng**, **ng-ht40plus**, and **ng-ht40minus** modes are compatible with **802.11g**. The **na**, **na-ht40plus**, and **na-ht40minus** modes are compatible with **802.11a**.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# wireless-mode ng
(host)(config-dot11radio)# channel-list bg 1,6,11
(host)(config-dot11radio)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	Command modified.

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

antenna-type

`antenna-type <name>`

Description

This command is used to set the antenna type of the device radios.

Syntax

Parameter	Description	Default
<name>	The name of the Omni or directional antenna.	third-party-Omni

Usage Guidelines

This is a new feature in the MeshOS 4.6 release and only applies to the MSR2000 and MSR4000 series of routers including the AC/DC/POE versions. MST200 uses an internal direction antenna which cannot be changed. MSR1200 is an indoor product. Although this feature is enabled in the CLI of the MSR1200, it will not have any additional EIRP benefit when using directional antenna. This feature is available only in the United States and Canada at the moment and does not apply to the 4.9G band.

In the factory default setting, MeshOS assumes that the Antenna Type is general-Omni with Antenna Gain value 0. When you configure an Aruba certified antenna for a radio, MeshOS assigns the Antenna Gain value based on the Aruba certified antenna selected. If a third party antenna is configured, you need to specify both the Antenna Type (Omni or Directional) and the Antenna Gain value.

Use the `no antenna-type` command to remove the antenna type configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# antenna-type
  ANT-2x2-2005             2.4-2.5 GHz Omnidirectional Antenna 5dBi
  ANT-2x2-2714             2.4-2.483 GHz 70 Degree Antenna 14 dBi
  ANT-2x2-5005             4.9-5.875 GHz Vpol and Hpol Antenna 5dBi
  ANT-2x2-5010             4.9-5.875 GHz Vpol and Hpol Antenn 10dBi
  ANT-2x2-5614             4.9-5.875 GHz 60 Degree Antenna 14dBi
  ANT-2x2-5614L            4.9-5.5 GHz 60 Degree Antenna 14dBi
  ANT-2x2-5614U            5.5-5.9 GHz 60 Degree Antenna 14dBi
  ANT-2x2-D607             2.4-2.5 and 4.9-5.875 GHz Dual-Band Sector Antenna 7dBi
  ANT-2x2-D805             Dual-Band Two-Element 120-Degree Sector 5dBi
  AP-ANT-13B               Indoor, downtilt omni, dual-band 4dBi
  AP-ANT-16                Indoor, Triple Element Downtilt Omni, Dual-Band 4dBi
  AP-ANT-17               Indoor/Outdoor, Triple Element 120 Degree Sector, Dual-band
6dBi
  AP-ANT-18               Indoor/Outdoor, Triple Element 60 Degree Sector, Dual Band
7dBi
  AP-ANT-19                Indoor/Outdoor, Dual Band Omnidirectional 6dBi
  AP-ANT-1B               2.4-2.5GHz/5GHz, 5.0dBi Tri-Band, Omni-Directional Antenna
  AP-ANT-90                Dual-Band, Down-Tilt Omni-Directional Antenna 3dBi
  third-party-Omni         third party Omni antenna
  third-party-directional  third party dirctional antenna
(host)(config-dot11radio)# antenna-type third-party-Omni
```

```
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.6	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

antenna-gain

```
antenna-gain <1-255>
```

Description

This command is used to set the antenna gain as per the type of the antenna.

Syntax

Parameter	Description	Default
`<1-255>`	Antenna gain in db.	0

Usage Guidelines

Ensure that the Effective Isotropic Radiated Power (EIRP) does not exceed the MAX EIRP allowed by the regulation in your country. Use the `no antenna-gain` command to delete the antenna gain setting on the radio interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# antenna-gain 14
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

beacon-interval

`beacon-interval <interval>`

Description

This command is used to set the beacon sending interval of radio interface.

Syntax

Parameter	Description	Range	Default
`<interval>`	Value of the beacon interval.	100 -1000 ms	100 ms

Usage Guidelines

Use the `no beacon-interval` command to delete the beacon sending interval setting of the radio interface and restore the default (100 ms).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# beacon-interval 150
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

cts-protection

```
cts-protection <enable/disabled>
```

Description

This command is used to enable or disable CTS protection on the radio interface.

Syntax

Parameter	Description	Default
`<enable/disabled>`	Enables or disables the CTS protection.	`disabled`

Usage Guidelines

This setting enables the CTS protection when a BSS interface of the current radio has both 802.11g and 802.11b clients associated with it or when an Overlapping Legacy BSS Condition (OLBC) is detected. The CTS protection setting is optional and should be configured with caution.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# cts-protection enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

short-gi

`short-gi`

Description

This command is used to set the 802.11n guard interval mode to short.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

This feature needs to be licensed. When the effect of multipath is not significant, this command can be used to adjust the transmission interval from 800ns to 400ns, increasing the throughput. Use the `no short-gi` command to disable the short interval.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# short-gi
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	This feature needs additional license.	INTERFACE DOT11RADIO

txpower

`txpower <1-50>`

Description

This command is used to set maximal transmission power (txpower) in dBm.

Syntax

Parameter	Description	Default
`<1-50>`	Maximal txpower value (dBm).	0 : Uncontrolled transmission

Usage Guidelines

Transmission power settings should only be changed with extreme caution. When the value is set to 10, the power output is 10 dBm. The `no txpower` command is used to reset the txpower to the default value.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# txpower 10
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

tx-power-reduction

`tx-power-reduction <1-50>`

Description

This command is used to reduce the output value of the radio interface that is transmitting the power.

Syntax

Parameter	Description	Default
`<1-50>`	Maximal tx power value (dBm)	0

Usage Guidelines

Transmission power settings should only be changed with extreme caution. The power is reduced by 1 dBm at a time. Use the `no tx-power-reduction` command to reset the power reduction to the default value.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# tx-power-reduction 10
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

channel-list

`channel-list <a|bg> <WORD>`

Description

This command is used to set the preferred channel list.

Syntax

Parameter	Description
`<a|bg>`	The frequency band and channel list • **a**—Set preferred 5GHz channel list • **bg**—Set preferred 2.4GHz channel list
`<WORD>`	Channel list separated by comma, e.g. 1, 3-5, 7.

Usage Guidelines

This command is applicable in the client, access, and WDS modes. Use the `no channel-list <a|bg>` command to delete the preferred channel list.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# wireless-mode ng
(host)(config-dot11radio)# channel-list bg 1,6,11
(host)(config-dot11radio)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

preamble

```
preamble
preamble-short
```

Description

This command is used to set the length of the preamble.

Syntax

Parameter	Description	Default
`short`	Short preamble.	long

Usage Guidelines

Preamble is the part of the data frame head that includes the information on the AP and clients receiving or sending data frames. Use the `no preamble-short` command to support the long preamble. A short preamble increases throughput.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# preamble-short
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

disable-amsdu

`disable-amsdu`

Description

This command is used to disable the aggregation of MAC service data unit (MSDU) on the radio.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

A-MSDU is a structure containing multiple MSDUs, transported within a single (unfragmented) data medium access control (MAC) protocol data unit (MPDU). Aggregation of MSDUs is enabled by default. The frame aggregation technology in 802.11n networks can significantly increase the transmission efficiency. With this method, a 802.11n network can use the access overhead of one frame to transmit multiple frames. The frame aggregation technology is really beneficial for file transfer, but not for real-time services such as voice service, since the frame aggregation of voice frames may cause unnecessary latency.

Use the `no disable-amsdu` to enable the AMSDU function on a radio.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# disable-amsdu
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

txretry

`txretry <1-50>`

Description

This command is used to configure the maximum number of transmission retries for hardware.

Syntax

Parameter	Description	Default
`<1-50>`	Maximal number of transmission retries.	0

Usage Guidelines

Use the `no txretry` command to delete the configuration of the maximum number of transmission retries for hardware.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# txretry 10
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

distance

`distance <distance>`

Description

This command is used to configure transmission distance.

Syntax

Parameter	Description	Range	Default
`<distance>`	The transmission distance in meters.	`1-57000`	0

Usage Guidelines

The 802.11 MAC layer protocol is specially designed for short distance LAN data transmission (tens to hundreds of meters). Therefore you may not achieve the desired results when the 802.11 protocol is used for the long-distance transmission due to the standard MAC layer parameter settings. In order to achieve a good long-distance throughput, you must enable the distance order to enhance the MAC layer performance. Use the `no distance` command to delete the configuration of the transmission distance and restore to the default configuration (0 meter).

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# distance
  <1-57000>  Set distance from 1 to 57000 meter
(host)(config-dot11radio)# distance 1
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	The range for the distance parameter was increased to 57000 meters.

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

mesh

`mesh`

Description

This command is used to switch from the CONFIG mode to the CONFIG-MESH mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

MESH mode enables you to configure the mesh feature.

Example

The following example shows the use of a command:

```
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)#
  authentication      Configure authentication
  default-max-bw      Configure maximum bandwidth gotten by each WDS link
  end                 End
  exit                Exit
  frag-threshold      Set fragmentation threshold
  help                Description of the interactive help system
  list                Print command list
  mesh-id             Configure mesh ID of the mesh
  neighbor-list       Configure neighbor access control list
  neighbor-list-type  Configure neighbor access control list type
  no                  Negate a command or set its defaults
  preferred-link      Configure preferred link
  quit                Quit
  rssi-limit          Configure rssi limit to create WDS
  rts-threshold       Set mesh RTS threshold
  show                Show running system information
  unicast-rate        Set unicast rate
  wds-ip-pool         Configure WDS IP pool
  write               Write running configuration to file
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

mesh-id

```
mesh-id <string>
```

Description

This command is used to set a mesh ID string that uniquely identifies a mesh network.

Syntax

Parameter	Description	Default
`<string>`	Mesh ID string	DefaultMesh

Usage Guidelines

All routers in a mesh network should be assigned the same mesh-ID.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config)(config-mesh)# rssi-limit
(host)(config)(config-mesh)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

rssi-limit

```
rssi-limit <0-50>
```

Description

This command is used to configure the RSSI limit to create WDS.

Syntax

Parameter	Description	Default
`<0-50>`	`Limit value`	15

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config)(config-mesh)# rssi-limit 15
(host)(config)(config-mesh)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

wds-ip-pool

`wds-ip-pool`

Description

This command is used to configure the WDS IP pool.

Syntax

Parameter	Description
`A.B.C.D/M`	Pool value, recommend to set mask length (M) to 25
`from-mac`	Generate WDS IP pool from MAC address

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config)(config-mesh)# wds-ip-pool 1.1.1.1/25
(host)(config)(config-mesh)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

shutdown

`shutdown`

Description

This command is used to shutdown an interface.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

The `no shutdown` command is used to activate an interface that has been shutdown.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# shutdown
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET, INTERFACE DOT11RADIO

show mesh

```
show mesh <option>
```

Description

This command is used to display information on the mesh.

Syntax

Parameter	Description
`<option>`	• **candidates**—Displays the candidate routers, which meet the conditions to build a link with this router. • **links**—Displays the backhaul links. • **neighbors**—Displays the neighbor routers. • **node-list**—Displays the mesh node list. • **portals**—Displays information on the mesh portals. • **route**—Displays the router table using the Hostnames.

Usage Guidelines

This command is similar to the `show rf-management` command.

Example

The following examples shows the use of the command:

```
(host)> enable
(host)#
(host)# show mesh links
Radio 1 Wireless mode:na, Wireless channel:100
InterfaceName       PeerMAC           PeerHostName     PeerRadio State Time
LinkQuality DataRate RSSI SNR InputRate  OutputRate
dot11radio 1/wds 0  00:17:7b:2a:6c:77 zhiyuan-2      1       up   0:0:34   10%
26M      37   37  37.06 Kbps 555.95 Kbps
dot11radio 1/wds 7  00:17:7b:2a:6c:a1 zhiyuan-4      1       up   0:1:31   5%
13M      36   36  688.25 Kbps 0.51 Kbps
dot11radio 1/wds 8  00:17:7b:00:0b:96 zhiyuan-5      1       up   2:10:7   4%
6M       35   35  36.53 Kbps 22.17 Kbps
dot11radio 1/wds 9  00:17:7b:2a:6b:b6 zhiyuan-3      0       up   0:0:33   8%
19M      33   33  35.17 Kbps 7.93 Kbps
(host)#
(host)# show mesh links detail
Radio 1 Wireless mode:na, Wireless channel:100
Link 0: Peer hostname: zhiyuan-2,
        Peer radio index: 1, Peer MAC: 00:17:7b:2a:6c:77,
        Local role: ap, Local interface name: dot11radio 1/wds 0,
        Local IP: 8.184.13.9, Peer IP: 8.184.13.10,
        Link state: physical up, Physical up time: 0:0:8,
        Link quality: 14%, Data rate: 19M, RSSI: 37, SNR: 37,
        Input rate: 27.99 Kbps, Output rate: 2.78 Kbps.
Link 1: Peer hostname: zhiyuan-4,
        Peer radio index: 1, Peer MAC: 00:17:7b:2a:6c:a1,
        Local role: sta, Local interface name: dot11radio 1/wds 7,
        Local IP: 21.54.79.130, Peer IP: 21.54.79.129,
        Link state: physical up, Physical up time: 0:2:57,
        Link quality: 4%, Data rate: 19M, RSSI: 36, SNR: 36,
        Input rate: 407.67 Kbps, Output rate: 26.45 Kbps.
```

```
Link 2: Peer hostname: zhiyuan-5,
        Peer radio index: 1, Peer MAC: 00:17:7b:00:0b:96,
        Local role: sta, Local interface name: dot11radio 1/wds 8,
        Local IP: 129.5.202.42, Peer IP: 129.5.202.41,
        Link state: physical up, Physical up time: 2:11:34,
        Link quality: 4%, Data rate: 13M, RSSI: 35, SNR: 35,
        Input rate: 46.35 Kbps, Output rate: 8.68 Kbps.
Link 3: Peer hostname: zhiyuan-3,
        Peer radio index: 0, Peer MAC: 00:17:7b:2a:6b:b6,
        Local role: sta, Local interface name: dot11radio 1/wds 9,
        Local IP: 21.53.218.174, Peer IP: 21.53.218.173,
        Link state: physical down, Physical down time: 0:0:0,
        Link quality: 3%, Data rate: 19M, RSSI: 33, SNR: 33,
        Input rate: 40.35 Kbps, Output rate: 401.48 Kbps.
(host)#
(host)# show mesh neighbors
Column name abbreviation
  R - Radio index
  C - Mesh Links Available
  Time - Time since last update
  Q - Whether a neighbor is qualified
Reasons flag abbreviation
  S - Signal lower than limit;
  M - Mode not backhaul;
  I - Mesh ID mismatch;
  A - Authentication type mismatch;
  C - Denied by my channel-list;
  N - Denied by my neighbor-list;
Total neighbors: 29
Radio 0 neighbors:
RadioMAC         Hostname        R MeshID          AuthType C Mode Chan RSSI     Time
Q(Reasons)
00:17:7b:11:70:eb MSR4000-11:70:e7 3 CampusMesh       WPA2     4 na    165   44
0:0:0 Y
00:17:7b:2b:c0:b5 MSR2000-2b:c0:b3 1 CampusMesh       WPA2     4 na    165   19
0:0:0 Y
00:17:7b:2c:50:e3 M47_H92_baiwang  1 CampusMesh       WPA2     3 na    165   15
0:0:0 N([N])
00:17:7b:2b:c1:dd M44_Campus2BWS   0 CampusMesh       WPA2     3 na    165   50
0:0:0 N([N])
00:17:7b:11:71:26 MSR4000-11:71:23 2 CampusMesh       Open     4 na    116   18
0:7:29 N([A][N])
00:17:7b:11:70:cb MSR4000-11:70:c9 1 CampusMesh       WPA2     2 na     36   11
0:13:29 Y
00:17:7b:11:70:ca MSR4000-11:70:c9 0 CampusMesh       WPA2     6 na    165   10
0:0:6 Y
00:17:7b:11:70:e9 MSR4000-11:70:e7 1 CampusMesh       WPA2     4 na     36   29
0:19:58 Y
00:17:7b:2c:6d:08 MSR2000-2c:6d:06 1 CampusMesh       Open     5 na    140   16
0:16:29 N([A][N])
00:17:7b:27:65:74 MST200-65:73     0 CampusMesh       WPA2     3 na     36   18
0:19:58 Y
00:17:7b:2c:6c:ff MSR2000-2c:6c:fd 1 CampusMesh       WPA2     0 na     36   10
0:13:29 Y
00:17:7b:27:84:bd MST200-84:bc     0 CampusMesh       WPA2     0 na     36    9
0:19:59 Y
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show interface dot11radio

```
show interface dot11radio <r> [option]
```

Description

This command is used to show the current status of the dot11radio interface.

Syntax

Parameter	Description	Range
`<r>`	The radio for the interface.	0-3
`[option]`	The following are the options: • **bss**—List of all BSSs. • **ap-list**—List of all APs • **channel-list**—List of all the channels • **sta**—List of all station interfaces • **station**—List of all STAs • **stats**—Radio Statistics • **wireless-mode**—The wireless mode.	-

Usage Guidelines

This command along with the `show running-config` command is very useful to troubleshoot the dot11radio interface. Use the `clear interface dot11radio <r> stats` to clear the radio statistics.

Example

The following examples shows the use of the command:

Example 1:

```
(host)> enable
(host)# show interface dot11radio 0
interface radio 0 status
distance: 1, country or regulatory code: EU
MAC address: 00:17:7b:11:70:1b
admin status: up, physical status: up
operating wireless mode: ng, operating channel:   9
tx power: 5dbm
noise floor: -95dBm
radio card type: DNMA-H92
  input packets  607470, bytes  111589105, dropped 0, multicast packets 0
  input errors 0, fifo error 0
  input rate 95.88 Kbps
  output packets 12,  bytes 552,  dropped 0
  output errors 0
  output rate 0.00 Kbps
  collisions 0

(host)#
```

Example 2:

```
(host)# show interface dot11radio 0 stats
Now Diff with Last CMD(1w0d ago)
Tx Success 12110948 12110948
```

```
Tx Retry 351030 351030
Tx Fail 40010 40010
Tx Data Frames 11971102 11971102
Tx Mgmt Frames 179457 179457
Tx Mcast Frames 84672 84672
Tx Drop Total 53741 53741
Tx Drop Nobuffer 0 0
Tx Drop After Retry 53741 53741
Tx Timeout 1960 1960
Lost Carrier Event 0 0
Rx Frames 200691001 200691001
Rx Data Frames 18646700 18646700
Rx Mgmt Frames 182044181 182044181
Rx Mcast Frames 180552638 180552638
Rx Retry Frames 164 164
Rx CRC Error 10211943 10211943
Rx PLCP Error 3761849063 3761849063
Rx Decrypt Error 37 37
Rx MIC Error 0 0
Beacon Success 6172824 6172824
Beacon Fail 3261 3261
Beacon Miss 0 0
Beacon Stuck 4 4
Tx EAPOL 8 8
Rx EAPOL 8 8
Radar Events 0 0
Tx Rate 1M 10 10
Tx Rate 6M 175766 175766
Tx HT Rate 13.5M 46570 46570
Tx HT Rate 27M 41559 41559
Tx HT Rate 40.5M 85059 85059
Tx HT Rate 54M 173436 173436
Tx HT Rate 81M 11561274 11561274
Tx HT Rate 108M 3402 3402
Tx HT Rate 162M 860 860
Tx HT Rate 216M 652 652
Tx HT Rate 243M 151 151
Tx HT Rate 270M 3 3
Rx Rate 1M 618 618
Rx Rate 2M 17 17
Rx Rate 5.5M 10 10
Rx Rate 6M 179890246 179890246
Rx Rate 12M 13 13
Rx Rate 24M 2172710 2172710
Rx HT Rate 13M 1 1
Rx HT Rate 13.5M 67243 67243
Rx HT Rate 19.5M 6 6
Rx HT Rate 26M 13 13
Rx HT Rate 27M 56338 56338
Rx HT Rate 39M 33 33
Rx HT Rate 40.5M 74904 74904
Rx HT Rate 52M 5 5
Rx HT Rate 54M 158206 158206
Rx HT Rate 65M 10 10
Rx HT Rate 78M 61 61
Rx HT Rate 81M 18265563 18265563
Rx HT Rate 108M 836 836
Rx HT Rate 117M 16 16
```

```
Rx HT Rate 130M 271 271
Rx HT Rate 162M 1648 1648
Rx HT Rate 216M 2229 2229
Rx HT Rate 243M 2 2
RxAckRSSI0 43
RxAckRSSI1 68
RxDataRSSI0 18
RxDataRSSI1 30
Channel Busy Percent 26%
Tx Time Percent 0%
Tx Retry Percent 2%
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	• Noise floor information has been added • The `station all` option has been changed to `channel-list`.
MeshOS 4.5	Additional parameters have been added to the radio statistics information.

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show running-config

`show running-config`

Description

This command is used to display a specific configuration of the interface.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# show running-config
ip nat
ip dhcp relay
ip dhcp server
 dns 10.1.1.50
 pool 01
  gateway 91.1.1.1
  network 91.1.1.0/24
  range 91.1.1.2 91.1.1.4
location-info
 altitude 44
 latitude 12 58 13 N
 longitude 77 33 37 W
mesh
 neighbor-list
 authentication open key-management wpa2
  psk ascii  wdsshouldworkwell
 mesh-id Do-not-change-zhiyuan-conf
 neighbor-list-type inactive
 preferred-link 0
  neighbor host zhiyuan-5
  preferred channel 100
 preferred-link 1
  neighbor host zhiyuan-6
  preferred channel 104
 preferred-link 2
  neighbor host zhiyuan-3
  preferred channel 108
router awr
 debug error
 enable
router multicast
 debug information
 enable
```

```
 rp-address 192.168.200.91
router ospf
 debug all
 disable
 network 10.65.12.0/24 area 1234
 router-priority 1
service avt
 mode disabled
service ntp
 clock timezone bj8 8
 enable
 server 10.64.147.195
service recovery
 debug-level info
 enable
service rf-management
 debug process
service roaming-motrix
 debug-level info
 disable
service vplm
 allowed-vlan auto
 enable
client-list 1.1.1.1/24
country-code EU
hostname zhiyuan-1
interface dot11radio 0
 beacon-interval 100
 bss 1
  access-list
  authentication open key-management wpa2
   encryption-mode-cipher aes-tkip
   preauth
   wpa-type psk ascii abcdefgh
  ignore-broadcast-ssid
  max-bw-per-client in 172.16.100.101 1024 100
  max-bw-per-client out 172.16.100.102 512 100
  ssid zy1
  switchport access vlan 100
  wmm
 channel-list bg 9
 cts-protection disable
 distance 1
 txpower 5
 wireless-mode ng
interface dot11radio 1
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface dot11radio 2
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface dot11radio 3
```

```
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface gigabit-ethernet 0
 mode gateway
 switchport trunk allowed-vlan 1
 switchport site-id 100
interface loopback 0
 ip address 192.168.200.91/32
 router-id
interface vlan 1
 ip address 10.65.12.91/24
 management
 mtu 1500
interface vlan 2
 dhcp server 01
 ip address 91.1.1.1/24
 mtu 1500
interface vlan 201
 ip address 111.91.201.1/24
 mtu 1500
interface vlan 202
 ip address 111.91.202.1/24
 mtu 1500
interface vlan 203
 ip address 111.91.203.1/24
 mtu 1500
interface vlan 204
 ip address 111.91.204.1/24
 mtu 1500
interface vlan 205
 ip address 111.91.205.1/24
 mtu 1500
interface vlan 206
 ip address 111.91.206.1/24
 mtu 1500
interface vlan 207
 ip address 111.91.207.1/24
 mtu 1500
interface vlan 208
 ip address 111.91.208.1/24
 mtu 1500
interface vlan 209
 ip address 111.91.209.1/24
 mtu 1500
interface vlan 210
 ip address 111.91.210.1/24
 mtu 1500
interface vlan 211
 ip address 111.91.211.1/24
 mtu 1500
interface vlan 212
 ip address 111.91.212.1/24
 mtu 1500
interface vlan 213
 ip address 111.91.213.1/24
```

```
 mtu 1500
interface vlan 214
 ip address 111.91.214.1/24
 mtu 1500
interface vlan 215
 ip address 111.91.215.1/24
 mtu 1500
interface vlan 216
 ip address 111.91.216.1/24
 mtu 1500
ip route 10.0.0.0/8 10.65.12.1
ip telnet server
local-ip 192.168.216.1/24
mesh installation outdoor
public-safety
snmp-server syscontact support@arubanetworks.com
snmp-server syslocation BeiJing
snmp-server community public ro
snmp-server community private rw
snmp-server trap open client_online
snmp-server trap open client_offline
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET, INTERFACE DOT11RADIO

Chapter 4

VLAN Configuration

This chapter covers the following VLAN commands:

bss

`bss <0-15>`

Description

This command is used to configure a new or existing BSS on a radio.

Syntax

Parameter	Description
`<0-15>`	Interface index

Usage Guidelines

The BSS index cannot be reduplicate. Use the `no bss <0-15>` command to delete the existing BSS from the radio.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss
  <0-15>  Interface index
(host)(config-dot11radio)# bss 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

interface gigabit-Ethernet 0

`interface gigabit-Ethernet 0`

Description

This command is used to configure the gigabit Ethernet interface.

Syntax

Parameter	Description
`0`	BSS Interface index

Usage Guidelines

This interface is used to configure BSS as a VLAN access port, or Ethernet as a VLAN trunk port and a VLAN access port, and add these to the VLAN.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-Ethernet 0
(host)(config-eth)# ?
  access-category  Set access category
  description      Set interface description
  dhcp             DHCP (Dynamic Host Configuration Protocol)
  end              End
  exit             Exit
  help             Description of the interactive help system
  ip               Set IP configuration
  link             Set link type
  list             Print command list
  mac              Set MAC configuration
  management       Set as management interface
  mode             Set usage of this interface
  mtu              Set the interface's Maximum Transmission Unit (MTU)
  no               Negate a command or set its defaults
  qos-policy       Configure QOS policy
  quit             Quit
  router-id        Set router ID
  show             Show running system information
  shutdown         Shutdown this interface
  switchport       Configure an interface to be a VLAN switch port
  write            Write running configuration to file
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIGURATION

switchport access vlan

```
switchport access vlan <1-4094>
```

Description

This command is used to configure BSS as a VLAN access port and add the port to a VLAN.

Syntax

Parameter	Description
`<1-4094>`	The range for the VLAN ID

Usage Guidelines

In the context of VLAN, access refers to a host-to-switch link. An Access port refers to a special port which must be connected to only one VLAN. This port cannot receive VLAN information from other VLANs or send out information to other VLANS. The VLAN information must first go through Layer-3 route process before it is sent to the port. A host does not belong to any particular VLAN and the host hardware does not support frames tagged by a VLAN. The frames sent and received by hosts are not tagged.

Use the `no switchport` command to delete the VLAN access point.

Example

The following example shows the use of the command:

```
(host) # configure terminal
(host)(config) # interface dot11radio 0
(host)(config-dot11radio) # bss 0
(host)(config-bss) # switchport access vlan 20
(host)(config-bss) # exit
(host)(config-dot11radio) # bss 1
(host)(config-bss) # switchport access vlan 30
(host)(config-bss) # exit
(host)(config-dot11radio) # bss 15
(host)(config-bss) # switchport access vlan 10
(host)(config-bss) # end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE ETHERNET

switchport trunk allowed-vlan

`switchport trunk allowed-vlan <vlan-id-list>`

Description

This command is used to configure the Ethernet as VLAN trunk port and add the port to a VLAN.

Syntax

Parameter	Description	Range
`<vlan-id-list>`	The VLAN range of the current trunk port	1-4094

Usage Guidelines

Use a comma (,) to separate different VLAN-IDs or use "-" to specify a VLAN range (for example, 10,20,30, 40-50). Use the `no switchport trunk allowed-vlan <vlan-id-list>` command to delete the trunk port from the specified VLAN and the `no switchport` command to delete VLAN Trunk port itself.

Example

The following example shows the use of the command:

```
(host) # configure terminal
(host)(config) # interface gigabit-ethernet 0
(host)(config-eth)# switchport trunk allowed-vlan 10,20,30
(host)(config-eth) switchport trunk native vlan 10
(host)(config-eth) end
(host)(config) # write memory
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE ETHERNET

switchport trunk native vlan

`switchport trunk native vlan <vlan-id-list>`

Description

This command is used to configure the default VLAN for the VLAN trunk port.

Syntax

Parameter	Description	Range	Default
`<vlan-id-list>`	The VLAN range of the current trunk port	1-4094	1

Usage Guidelines

VLAN Trunk (Trunk) is a package technology which uses the IEEE802.1Q method. The Trunk port supports switch-to-switch and switch-to-router links as well as 802.1Q standard host-to-switch and router-to-router links. The main function of the Trunk port is to connect several VLANs via one link. The messages are identified at the Trunk port by their VLAN ID. The switch (host or router) that receives the message uses the Trunk port to identify the message by its VLAN ID and forwards it to the corresponding port.

Use the `no switchport trunk native vlan` command to restore the VLAN to the default.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport trunk native vlan 10
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE ETHERNET

interface vlan

```
interface vlan <VLAN-ID>
```

Description

This command is used to configure the VLAN interface.

Syntax

Parameter	Description	Range
`<VLAN-ID>`	The ID of the VLAN interface	1-4094

Usage Guidelines

Use the `no interface vlan <1-4094>` command to delete the VLAN interface and its configuration.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface vlan 1
(host)(config-vlan)#
  description  Set interface description
  dhcp         DHCP (Dynamic Host Configuration Protocol)
  end          End
  exit         Exit
  help         Description of the interactive help system
  ip           Set IP configuration
  isolation    Set interface isolation
  list         Print command list
  management   Set as management interface
  mtu          Set the interface's Maximum Transmission Unit (MTU)
  no           Negate a command or set its defaults
  qos-policy   Configure QOS policy
  quit         Quit
  router-id    Set router ID
  show         Show running system information
  shutdown     Shutdown this interface
  write        Write running configuration to file
(host)(config-vlan)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

ip address

`ip address A.B.C.D/M`

Description

This command is used to manually configure the VLAN Interface IP address.

Syntax

Parameter	Description
`A.B.C.D/M`	IP address/mask for the VLAN interface

Usage Guidelines

Use the `no ip address` command to delete the VLAN interface IP address.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface vlan 1
(host)(config-vlan)# ip address 10.65.12.91/24
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE VLAN

ip address dhcp option 60 ascii

```
ip address dhcp [option 60 ascii <string>]
```

Description

This command is used to configure the VLAN interface to obtain IP address from DHCP.

Syntax

Parameter	Description
`option 60`	DHCP vendor class identifier option
`ascii <string>`	ASCII string for the Vendor class identifier

Usage Guidelines

Use the `no ip address` command to delete the VLAN interface IP address.

Example

The following example shows the use of the command:

```
(host) # configure terminal
(host)(config) # interface vlan10
(host)(config-vlan) #
(host)(config-vlan) # ip address dhcp option 60 ascii ARUBA
(host)(config-vlan) # end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE VLAN

management

`management`

Description

This command is used to configure VLAN Interface as management interface.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use the `no management` command to cancel the configuration of the VLAN interface as the management interface.

Example

The following example shows the use of the command:

```
(host) # configure terminal
(host)(config) # interface vlan 10
(host)(config-vlan) # management
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE VLAN

show interface vlan

```
show interface vlan <1-4094>[table]
```

Description

This command is used to show the specified or all VLAN Interface information.

Syntax

Parameter	Description
`<1-4094>`	Range for VLAN ID.
`[table]`	Show interface VLAN table

Usage Guidelines

You can view information for a specific VLAN using the VLAN ID or view information on all VLANs via the `table` option.

Example

The following example shows the use of the command:

```
(host)# show interface vlan 1
interface VLAN 1 status
  admin status: up  physical status: up
  DHCP: disable
  DHCP client: disable
  index 541 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
HWaddr: 00:17:7b:34:e0:10
  inet 100.6.106.1/28 broadcast 100.6.106.15
    input packets 0, bytes 0, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    input rate 0.00 Kb/s
    output packets 3, bytes 258, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    output rate 0.00 Kb/s
    collisions 0
    up/down count 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show vlan

```
show vlan [<1-4094>|forwarding-table]
```

Description

This command is used to show the specified VLAN Interface information or MAC address list.

Syntax

Parameter	Description
`<1-4094>`	Range for VLAN ID.
`forwarding-table`	Shows the forwarding-table for all the VLANs that are configured.

Usage Guidelines

Use this command with the VLAN ID option to view details on a specific VLAN or use the `forwarding-table` option to view all the VLANs that are configured.

Example

The following example shows the use of the command:

```
(host) # show vlan 1

Vlan Ports:      interface Name                    Dynamic Type:
  Access port     eth0
  Access port     ath0
  Access port     ath1
  Access port     ath2
 Access port      ath3
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 5

DHCP

This chapter covers the following DHCP commands:

ip dhcp server

`ip dhcp server`

Description

This command is used to switch to the DHCP CONFIGURATION mode for a DHCP server.

Syntax

Parameter	Description
none	-

Usage Guidelines

Each BSS configured on the MSR device has its own private subnet. Each STA associated with a BSS obtains an IP address from the DHCP server.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)#
  default-lease-time  Configure default lease time
  dns                 Configure DNS servers
  end                 End
  exit                Exit
  help                Description of the interactive help system
  list                Print command list
  max-lease-time      Configure max lease time
  no                  Negate a command or set its defaults
  pool                Create or configure one subnetwork address pool
  quit                Quit
  show                Show running system information
  write               Write running configuration to file
(host)(config-dhcp)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

default-lease-time

`default-lease-time <0-31536000>`

Description

This command is used to set the time (in seconds) for each DHCP lease request that is not associated with a lease time.

Syntax

Parameter	Description	Default
`<0-31536000>`	DHCP lease time. Maximum value is 31536000 seconds (1 year).	7200 seconds

Usage Guidelines

Use the `no default-lease-time` command to set this parameter to the default value of 7200 seconds.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# default-lease-time 14400
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER

dns

`dns [IP-LIST]`

Description

This command is used to specify the DNS addresses that will be included in a DHCP lease.

Syntax

Parameter	Description
`[IP-LIST]`	The DNS IP addresses (separated by ',')

Usage Guidelines

Multiple DNS servers may be specified by separating them with commas (,). Use the `no dns` command to clear the DNS list, the DNS information will not be included in the lease

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# dns 10.1.1.4, 10.1.1.5
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER

max-lease-time

`max-lease-time <0-31536000>`

Description

This command is used to set the maximum allowed lease time in seconds.

Syntax

Parameter	Description	Default
`<0-31536000>`	DHCP lease time. Maximum value is 31536000 seconds (1 year).	86400 seconds (1day)

Usage Guidelines

Use the `no max-lease-time` command to set this parameter to the default value of 86400 seconds (one day).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# max-lease-time 172800
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER

pool

`pool [NAME]`

Description

This command is used to configure a new or existing DHCP pool.

Syntax

Parameter	Description
`[NAME]`	An alphanumeric string that identifies the DHCP pool

Usage Guidelines

A DHCP server configured on the MSR router supports multiple DHCP pools. Each DHCP pool is a separate IP address space that the DHCP server uses to respond to lease requests for specific pools. Each pool may be on different networks or use different gateways and domain-names. The pool-specific configuration controls the IP address, gateway, and domain-name information the client devices obtain through their DHCP requests. Pools are bound to specific interfaces. DHCP requests received from clients associated to these interfaces are responded to from within the pool.

Manual configuration of an IP prefix DHCP pool is also possible. Manual address pool supports basic configuration as well as the DHCP configuration options. MSR routers support three types of manual configuration options - option7, option66, and option151.

The DHCP pool IP address prefix should not be a duplicate or conflict with any other IP addresses in the network.

Use the `no pool [NAME]` command to remove an existing DHCP pool.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)#
  domain-name  Specify the domain name for the client
  end          End
  exit         Exit
  gateway      Specifies the IP address of the default gateway for a DHCP client
  help         Description of the interactive help system
  host         Allocate a fixed IP address for a DHCP client
  list         Print command list
  network      Specifies the subnet network number and mask of the DHCP address pool
  no           Negate a command or set its defaults
  option       Specify DHCP option for the pool
  pool-dns     Configure the pool specific DNS servers
  quit         Quit
  range        Specify the IP address range assinged to DHCP clients
  show         Show running system information
  write        Write running configuration to file
(host)(config-pool)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER

domain-name

`domain-name[name]`

Description

This command is used to set the domain name to be included in DHCP leases for this pool.

Syntax

Parameter	Description
`[name]`	A domain name such as “arubanetworks.com".

Usage Guidelines

Use the `no domain-name` command to remove any domain name information in DHCP leases for the pool.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# domain-name arubanetworks.com
(host)(config-pool)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

gateway

`gateway <A.B.C.D>`

Description

This command is used to set the gateway IP to be included in DHCP leases for this pool.

Syntax

Parameter	Description	Range
`<A.B.C.D>`	A gateway IP address that conforms to an IPv4 unicast address	**A** 1-223 **B & C** 0-254 **D** 1-254

Usage Guidelines

Use the `no gateway` command to remove the gateway IP information in DHCP lease requests.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# gateway 10.1.1.1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

host

`host <HH:HH:HH:HH:HH:HH> <A.B.C.D>`

Description

This command is used to add a fixed DHCP IP address entry for a client host.

Syntax

Parameter	Description
`<HH:HH:HH:HH:HH:HH>`	MAC address of this DHCP client
`A.B.C.D`	The IP address permanently allocated to this host

Usage Guidelines

Use the `no host` command to remove a fixed DHCP IP address entry.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host) (config)# ip dhcp server
(host) (config-dhcp)# pool Aa_b-123
(host) (config-pool)# show configuration
gateway 91.1.1.1
network 91.1.1.0/24
range 91.1.1.2 91.1.1.4
(host) (config-pool)# host 00:17:7b:2a:6b:b5 91.1.1.5
(host) (config-pool)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

network

`network <A.B.C.D/M>`

Description

This command specifies the subnet network number and mask of the DHCP address pool.

Syntax

Parameter	Description
`<A.B.C.D/M>`	Subnet/netmask prefix length Example: 10.1.1.0/24

Usage Guidelines

IP addresses should be unique within any specific network. The DHCP pool IP address prefix should be selected carefully so that it does not duplicate or conflict with any other IP addresses in the network.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# network 10.1.1.0/24
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

option 7

```
option 7 <IP-list>
```

Description

This command is used to set the IP address list of the log server.

Syntax

Parameter	Description
`<IP-list>`	IP address list of the Log server.

Usage Guidelines

Up to four IP addresses are supported. Each address is separated from the next by a comma without space. Use the `no option 7` command to delete the option 7 configuration.

Example

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# option 7 10.65.12.97,10.65.12.98
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

option 66

```
option 66 <NAME>
```

Description

This command is used to set the IP address of the TFTP server.

Syntax

Parameter	Description
<NAME>	The string name of TFTP server

Usage Guidelines

Use the `no option 66` command to delete the option 66 configuration.

Example

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# option 66 TFTP1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

option 151

```
option 151 <IP-LIST>
```

Description

This command is used to set the SVP address list of the log server.

Syntax

Parameter	Description
`<IP-LIST>`	List of IP address of the netlink SVP server.

Usage Guidelines

Up to four IP addresses are supported. Each address is separated from the other by a comma without space. Use the `no option 151` command to delete the option 151 configuration.

Example

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# option 151 10.65.12.96,10.65.12.99
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

pool-dns

`pool-dns [Pool-DNS-list]`

Description

This command is used to specify the addresses of the DNS pool.

Syntax

Parameter	Description
`[Pool-DNS-list]`	IP addresses of the DNS pool

Usage Guidelines

You can configure up to 8 addresses. These addresses will be included in the range allowed by DHCP. Use the comma (,) to separate the IP addresses.

Use the `no pool-dns` command to clear the Pool-DNS list. The DNS pool information will not be included in the DHCP.

Example

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# pool-dns 10.1.1.4, 10.1.1.5, 10.1.1.6, 10.1.1.7
(host)(config-pool)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

range

```
range <begin IP> <end IP>
```

Description

This command is used to add a range of IP addresses to the DHCP pool.

Syntax

Parameter	Description
`<begin IP>`	The first IP address of the range
`<end IP>`	The last IP address of the range

Usage Guidelines

Both the begin and end IP addresses should be valid IPv4 unicast addresses. Use the `no range` command to remove a range from the DHCP pool.

Example

```
(host)# configure terminal
(host)(config)# ip dhcp server
(host)(config-dhcp)# pool test
(host)(config-pool)# range 10.1.1.1 10.1.1.9
(host)(config-pool)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP SERVER POOL

dhcp server

```
dhcp server <POOL-NAME>
```

Description

This command is used to bundle a manual DHCP address pool with the current BSS.

Syntax

Parameter	Description
`<POOL-NAME>`	DHCP pool name

Usage Guidelines

Clients behind an Ethernet interface will not be able to get IP addresses from the DHCP server on the BSS interface. Use the `no dhcp` command to separate the DHCP service from the current BSS.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface gigabit-ethernet
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# dhcp server test
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS, INTERFACE GIGABIT-ETHERNET, INTERFACE VLAN

show dhcp server lease

`show dhcp server lease`

Description

This command is used to show the current lease information of the DHCP server.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays DHCP server lease information such as *lease expiration* and *binding state* along with the IP and MAC addresses of the hardware.

Example

The following example shows the use of the command:

```
(host)# show dhcp server lease
      #   IP address        Hardware address    Lease expiration      Binding State
Type         Interface
      1   143.1.1.102       00:17:7b:00:0b:94   2010/06/26 15:36:03   active
automatic   radio0bss0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show dhcp server status

```
show dhcp server status
```

Description

This command is used to show the current status of the DHCP server.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays DHCP server status information such as *Pool Name*, *Interface*, and *State* which is useful to troubleshoot the DHCP server.

Example

The following example shows the use of the command:

```
(host)# show dhcp server status
      #   Pool Name                          Interface           State
      1   02                                 radio0bss0          active
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

ip dhcp relay

`ip dhcp relay`

Description

This command is used to configure DHCP relay.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

DHCP relay transponder (DHCP Relay) for the DHCP request client is initiated from the DHCP client and the DHCP response from the server. The DHCP Relay allows BSSs with terminals connected to the MSR routers to get IP address from the DHCP address pool defined by the outside DHCP server. A BSS can use either a DHCP address pool or a DHCP relay. If a DHCP relay is enabled in a BSS, the DHCP address pool will be disabled.

Use the `no ip dhcp relay` command to stop DHCP relay services, and remove the configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip dhcp relay
(host)(config-dhcp)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

dhcp-servers

`dhcp-servers [IP-LIST]`

Description

This command is used to configure DHCP target server list.

Syntax

Parameter	Description
`[IP-LIST]`	The DHCP server IP addresses (separated by ',')

Usage Guidelines

Use a comma (,) to separate and designate multiple servers. Use the `no dhcp-servers` to remove DHCP service lists.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip dhcp relay
(host)(config-dhcp)# dhcp-servers 10.1.1.2,10.1.1.3
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	IP DHCP RELAY

dhcp relay

`dhcp relay`

Description

This command is used to open DHCP relay service on a specific BSS, Ethernet port, or VLAN interface.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Either DHCP address pool or DHCP relay can be used on the same BSS/Ethernet port/VLAN interface. If the DHCP address pool is enabled on the BSS/Ethernet port/VLAN interface, the DHCP relay is disabled. Use the `no dhcp` command to close the current BSS/Ethernet port/VLAN interface DHCP service.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# dhcp relay
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS, INTERFACE GIGABIT-ETHERNET, INTERFACE VLAN

show dhcp relay status

```
show dhcp relay status
```

Description

This command is used to display the DHCP relay status.

Syntax

Parameter	Description
none	-

Usage Guidelines

DHCP should be enabled before using this command.

Example

The following example shows the use of the command:

```
(host)# show dhcp relay status
      #   Interface          Circuit-id                        State
      1   radio0bss15                                        active
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

dhcp relay option circuit-id

```
dhcp relay option circuit-id <NAME>
```

Description

This command is used to configure the DHCP relay circuit-id option (option 82) for the BSS interface.

Syntax

Parameter	Description
<NAME>	The circuit-id name.

Usage Guidelines

This command allows a DHCP relay agent to insert circuit specific information (about the AP and SSID) into a request that is being forwarded to a DHCP server. Use the `no dhcp` command to remove the related DHCP configuration for the BSS interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# dhcp relay option circuit-id Aruba
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

Chapter 6

NAT

This chapter covers the following NAT commands:

ip nat

`ip nat`

Description

This command is used to switch to the Network Address Translation configuration mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

Network Address Translation (NAT) is an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. A NAT box located where the LAN meets the Internet makes all necessary IP address translations.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip nat
(host)(config-nat)# list
  access-group NAME global A.B.C.D out-interface gigabit-ethernet 0
  access-group NAME global pool NAME out-interface gigabit-ethernet 0
  access-group NAME out-interface gigabit-ethernet 0
  end
  exit
  help
  list
  max-connection access-group NAME number <1-10000> out-interface gigabit-ethernet 0
  no access-group NAME global A.B.C.D out-interface gigabit-ethernet 0
  no access-group NAME global pool NAME out-interface gigabit-ethernet 0
  no access-group NAME out-interface gigabit-ethernet 0
  no max-connection access-group NAME number <1-10000> out-interface gigabit-ethernet
0
  no pool NAME
  no server protocol (tcp|udp) inside A.B.C.D <1-65535> outside A.B.C.D <1-65535>
out-interface gigabit-ethernet 0
  no static inside A.B.C.D outside A.B.C.D out-interface gigabit-ethernet 0
  no static outside A.B.C.D inside A.B.C.D out-interface gigabit-ethernet 0
  pool NAME A.B.C.D A.B.C.D
  quit
  server protocol (tcp|udp) inside A.B.C.D <1-65535> outside A.B.C.D <1-65535> out-
interface gigabit-ethernet 0
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  static inside A.B.C.D outside A.B.C.D out-interface gigabit-ethernet 0
  static outside A.B.C.D inside A.B.C.D out-interface gigabit-ethernet 0
  write memory
(host)(config-nat)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

pool

```
pool <pool-name> <start-ip> <end-ip>
```

Description

This command is used to add a NAT pool based on the multi-to-multi address translation as per ACL.

Syntax

Parameter	Description
`<pool-name>`	Pool name.
`<start-ip>`	Starting IP address of address range for the pool.
`<end-ip>`	Ending IP address of address range for the pool.

Usage Guidelines

The multi-to-multi address translation allows the mapping from multiple internal IP addresses to multiple public IP addresses defined in the NAT address pool. This address translation is used in the gigabit-ethernet interface. Use the `no pool <pool-name>` command to remove a NAT address pool.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip nat
(host)(config-nat)# pool public 10.64.147.161 10.64.147.171
(host)(config-nat)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

access-group...global...out-interface gigabit-ethernet

```
access-group <access-list-name> global <global-ip|pool> out-interface gigabit-ethernet
<ethernet-index>
```

Description

This command is used to add masquerade multi-to-one address translation based on ACL.

Syntax

Parameter	Description
`<access-list-name>`	Name of IP access list.
`<global-ip|pool>`	Global IP address.
`<ethernet-index>`	Ethernet interface index 0.

Usage Guidelines

This multi-to-one address translation allows the mapping from multiple internal IP addresses to one public IP address at the gigabit-Ethernet interface. Use the `no access-group <access-list-name> global<global-ip|pool> out-interface gigabit-ethernet <ethernet-index>` command to remove multi-to-one address translation and the `no access-group <access-list-name> global pool <pool-name> out-interface gigabit-ethernet <ethernet-index>` command to remove multi-to-multi address translation. To remove masquerade multi-to-one address translation use the `no access-group <access-list-name> out-interface gigabit-ethernet <ethernet-index>` command.

Example

The following examples show the use of the command:

Example 1:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip access-list standard acl-nat
(host)(config-acl-ip-std)# rule 10 permit 192.168.12.0 0.0.0.255
(host)(config-acl-ip-std)# rule 20 permit 192.168.13.0 0.0.0.255
(host)(config-acl-ip-std)# rule 30 permit 192.168.14.0 0.0.0.255
(host)(config-acl-ip-std)# quit
(host)(config)# in gigabit-ethernet 0
(host)(config-eth)# ip address 10.64.147.161/23
(host)(config-eth)# mode gateway
(host)(config-eth)# quit
(host)(config)# ip nat
(host)(config-nat)# static outside 10.64.147.162
(host)(config-nat)# access-group acl-nat global 10.64.147.162 out-interface gigabit-
ethernet 0
```

Example 2:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip access-list standard acl-nat
(host)(config-acl-ip-std)# rule 10 permit 192.168.12.0 0.0.0.255
(host)(config-acl-ip-std)# rule 20 permit 192.168.13.0 0.0.0.255
(host)(config-acl-ip-std)# rule 30 permit 192.168.14.0 0.0.0.255
(host)(config-acl-ip-std)# quit
(host)(config)# in gigabit-ethernet 0
```

```
(host)(config-eth)# ip address 10.64.147.161/23
(host)(config-eth)# mode gateway
(host)(config-eth)# quit
(host)(config)# ip nat
(host)(config-nat)# pool public 10.64.147.161 10.64.147.171
(host)(config-nat)# access-group acl-nat global pool public out-interface gigabit-
ethernet 0
```

In the above example a host in the mesh network with IP address of 192.168.12.0/24, 192.168.13.0/24, 192.168.14.0/24 needs access to the Internet via MSR router. The MSR device accesses Internet with 10 public IP addresses: 10.64.147.161/23-10.64.147.171/23.

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

static inside...outside...out-interface gigabit-ethernet

```
static inside <inside-ip> outside <global-ip> out-interface gigabit-ethernet <ethernet-index>
```

Description

This command is used to configure static mapping of one internal IP to one external IP.

Syntax

Parameter	Description
`<inside-ip>`	NAT internal IP.
`<global-ip>`	NAT global IP.
`<ethernet-index>`	Ethernet Interface Index 0.

Usage Guidelines

The static one-to-one address translation allows the mapping from one internal IP address to one public IP address. This address translation is used at the gigabit-Ethernet interface. Use the `no static inside <inside-ip> outside <global-ip> out-interface gigabit-ethernet <ethernet-index>` command to remove the static mapping of one internal IP to one external IP.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip nat
(host)(config-nat)# static outside 10.64.147.162
(host)(config-nat)# static inside 10.65.50.211 outside 10.64.147.162 out-interface
gigabit-ethernet 0
(host)(config-nat)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

static outside...inside...out-interface gigabit-ethernet

```
static outside <outside-ip> inside <inside-ip> out-interface gigabit-ethernet
<ethernet-index>
```

Description

This command is used to configure static mapping of one external IP to one internal IP.

Syntax

Parameter	Description
`<outside-ip>`	NAT global IP.
`<inside-ip>`	NAT internal IP.
`<ethernet-index>`	Ethernet interface index 0.

Usage Guidelines

The static one-to-one address translation allows the mapping from one public IP address to one internal IP address. This address translation is used at the gigabit-Ethernet interface. Use the no `static outside <outside-ip> inside <inside-ip> out-interface gigabit-ethernet <ethernet-index>` command to remove static mapping of one external IP to one internal IP.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip nat
(host)(config-nat)# static outside 10.64.147.162 inside 10.65.50.211 out-interface
gigabit-ethernet 0
(host)(config-nat)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

server protocol...inside...outside...out-interface gigabit-ethernet

```
server protocol <tcp|udp> inside <inside-ip inside port> outside <global-ip global-port> out-interface gigabit-ethernet <ethernet-index>
```

Description

This command is used to add an internal server.

Syntax

Parameter	Description	Range
`<tcp|udp>`	• **tcp**—TCP protocol • **udp**—UDP protocol	-
`<inside-ip inside port>`	• **inside-ip**–NAT internal IP • **inside-port**–Internal port	- <1-65535>
`<global-ip global-port>`	• **global-ip**—NAT global IP • **global-port**—Global port <1-65535>	- <1-65535>
`<ethernet-index>`	Ethernet interface index	0

Usage Guidelines

To allow access to an internal server using an external IP address, map one external IP address and TCP/UDP port to one internal IP address and TCP/UDP port. This address translation is used at the gigabit-ethernet interface. Use the `no server protocol <tcp|udp> inside <inside-ip inside port> outside <global-ip global-port> out-interface gigabit-ethernet <ethernet-index>` command to remove an internal server configuration.

Example

The following example shows the configuration of an internal server:

```
(host)(config)# in gigabit-ethernet 0
(host)(config-eth)# ip address 10.64.147.161/23
(host)(config-eth)# mode gateway
(host)(config-eth)# quit
(host)(config)# ip nat
(host)(config-nat)# server protocol tcp inside 192.168.12.20 8080 outside
10.64.147.161 80 out-interface gigabit-ethernet 0
```

In the example above mesh provides a Web Server hosting the internal IP address: 192.168.12.20, TCP port number: 8080, from Internet via NAT to access Web Server. MSR has the IP address 10.64.147.161 and TCP port 80

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

max-connection access-group...number...out-interface gigabit-ethernet

```
max-connection access-group <access-list-name> number <number> out-interface gigabit-
ethernet <ethernet-index>
```

Description

This command is used to add the maximum TCP connection limit to an interface.

Syntax

Parameter	Description	Range
`<access-list-name>`	Name of IP access list.	-
`<number>`	Max connection number.	<1-10000>
`<ethernet-index>`	Ethernet interface index 0.	-

Usage Guidelines

Use the `no max-connection access-group <access-list-name> number <number> out-interface gigabit-ethernet <ethernet-index>` command to remove the max TCP connection limit of an interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip nat
(host)(config-nat)# max-connection access-group acl-nat number 5 out-interface
gigabit-ethernet 0
(host)(config-nat)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NAT

show data-path session-table

```
show data-path session-table
```

Description

This command is used to display all the sessions in the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

The data-path session-table displays all sessions that the router is tracking.

Example

The following example shows the use of the command:

```
(host)> enable
(host)#
(host)# show data-path session-table
unknown  2 559 src=111.92.207.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.207.1 use=1
unknown  2 559 src=111.92.208.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.208.1 use=1
udp      17 26 src=10.64.149.174 dst=10.65.50.216 sport=58971 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58971 use=1
udp      17 178 src=21.51.87.57 dst=21.51.87.58 sport=654 dport=654 src=21.51.87.58
dst=21.51.87.57 sport=654 dport=654 [ASSURED] use=1
udp      17 177 src=21.51.87.50 dst=21.51.87.49 sport=654 dport=654 src=21.51.87.49
dst=21.51.87.50 sport=654 dport=654 [ASSURED] use=1
unknown  2 564 src=111.92.210.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.210.1 use=1
unknown  2 564 src=111.92.211.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.211.1 use=1
unknown  2 559 src=111.92.205.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.205.1 use=1
unknown  2 564 src=111.92.215.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.215.1 use=1
udp      17 25 src=10.64.149.174 dst=10.65.50.216 sport=58962 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58962 use=1
unknown  2 494 src=111.91.216.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.216.1 use=1
udp      17 26 src=10.64.149.174 dst=10.65.50.216 sport=58965 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58965 use=1
unknown  2 559 src=111.92.206.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.206.1 use=1
udp      17 29 src=10.65.50.240 dst=10.65.50.216 sport=55328 dport=161
src=10.65.50.216 dst=10.65.50.240 sport=161 dport=55328 use=1
unknown  47 597 src=192.168.200.92 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.92 use=1
udp      17 28 src=10.64.149.174 dst=10.65.50.216 sport=58975 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58975 use=1
unknown  2 484 src=111.91.206.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.206.1 use=1
unknown  47 599 src=192.168.200.95 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.95 use=1
```

```
unknown  2 554 src=111.92.202.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.202.1 use=1
unknown  2 564 src=111.92.209.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.209.1 use=1
unknown  2 489 src=111.91.207.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.207.1 use=1
udp     17 157 src=10.2.32.3 dst=10.65.50.216 sport=60833 dport=161 src=10.65.50.216
dst=10.2.32.3 sport=161 dport=60833 [ASSURED] use=1
unknown  2 479 src=111.91.201.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.201.1 use=1
tcp     6 431999 ESTABLISHED src=10.64.149.174 dst=10.65.50.216 sport=60460 dport=22
src=10.65.50.216 dst=10.64.149.174 sport=22 dport=60460 [ASSURED] use=1
unknown  2 564 src=111.92.214.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.214.1 use=1
unknown  2 484 src=111.91.204.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.204.1 use=1
unknown  2 564 src=111.92.213.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.213.1 use=1
unknown  2 570 src=111.92.216.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.216.1 use=1
unknown  2 489 src=111.91.213.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.213.1 use=1
unknown  2 484 src=111.91.202.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.202.1 use=1
unknown  2 559 src=111.92.204.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.204.1 use=1
unknown  2 554 src=111.92.201.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.201.1 use=1
unknown  2 489 src=111.91.208.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.208.1 use=1
unknown  2 494 src=111.91.215.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.215.1 use=1
unknown  2 489 src=111.91.209.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.209.1 use=1
unknown  2 484 src=111.91.203.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.203.1 use=1
unknown  2 489 src=111.91.210.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.210.1 use=1
unknown  2 554 src=111.92.203.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.203.1 use=1
unknown  47 599 src=192.168.200.91 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.91 use=1
udp      17 27 src=10.64.149.174 dst=10.65.50.216 sport=58973 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58973 use=1
udp      17 142 src=10.64.149.174 dst=10.65.50.216 sport=54123 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=54123 [ASSURED] use=1
unknown  2 484 src=111.91.205.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.205.1 use=1
unknown  2 489 src=111.91.212.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.212.1 use=1
unknown  2 564 src=111.92.212.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.212.1 use=1
unknown  47 599 src=192.168.200.95 dst=192.168.200.92 src=192.168.200.92
dst=192.168.200.95 use=1
unknown  2 494 src=111.91.214.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.214.1 use=1
unknown  2 489 src=111.91.211.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.211.1 use=1
unknown  2 479 src=10.65.50.211 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=10.65.50.211 use=1
udp      17 175 src=21.51.87.53 dst=21.51.87.54 sport=654 dport=654 src=21.51.87.54
dst=21.51.87.53 sport=654 dport=654 [ASSURED] use=1
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show debug nat

```
show debug nat
```

Description

This command is used to display the contents of the NAT log.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the current log information of the NAT service.

Example

The following example shows the use of the command:

```
(host)> enable
(host)#
(host)# show debug nat
unknown  2 502 src=111.92.207.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.207.1 use=1
unknown  2 502 src=111.92.208.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.208.1 use=1
udp      17 9 src=10.64.149.174 dst=10.65.50.216 sport=49784 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49784 use=1
udp      17 177 src=21.51.87.57 dst=21.51.87.58 sport=654 dport=654 src=21.51.87.58
dst=21.51.87.57 sport=654 dport=654 [ASSURED] use=1
udp      17 179 src=21.51.87.50 dst=21.51.87.49 sport=654 dport=654 src=21.51.87.49
dst=21.51.87.50 sport=654 dport=654 [ASSURED] use=1
udp      17 7 src=10.65.50.240 dst=10.65.50.216 sport=56095 dport=161
src=10.65.50.216 dst=10.65.50.240 sport=161 dport=56095 use=1
unknown  2 507 src=111.92.210.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.210.1 use=1
unknown  2 507 src=111.92.211.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.211.1 use=1
unknown  2 502 src=111.92.205.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.205.1 use=1
unknown  2 507 src=111.92.215.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.215.1 use=1
udp      17 10 src=10.64.149.174 dst=10.65.50.216 sport=49790 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49790 use=1
unknown  2 562 src=111.91.216.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.216.1 use=1
unknown  2 502 src=111.92.206.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.206.1 use=1
unknown  47 599 src=192.168.200.92 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.92 use=1
udp      17 1 src=10.64.149.174 dst=10.65.50.216 sport=58975 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=58975 [ASSURED] use=1
unknown  2 552 src=111.91.206.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.206.1 use=1
udp      17 15 src=10.65.50.241 dst=10.65.50.216 sport=63106 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63106 use=1
unknown  47 599 src=192.168.200.95 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.95 use=1
```

```
unknown  2 497 src=111.92.202.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.202.1 use=1
unknown  2 507 src=111.92.209.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.209.1 use=1
udp      17 15 src=10.65.50.241 dst=10.65.50.216 sport=63105 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63105 use=1
udp      17 16 src=10.65.50.241 dst=10.65.50.216 sport=63108 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63108 use=1
udp      17 8 src=10.64.149.174 dst=10.65.50.216 sport=49783 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49783 use=1
unknown  2 557 src=111.91.207.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.207.1 use=1
udp      17 15 src=10.65.50.241 dst=10.65.50.216 sport=63103 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63103 use=1
udp      17 14 src=10.64.149.174 dst=10.65.50.216 sport=49798 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49798 use=1
unknown  2 547 src=111.91.201.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.201.1 use=1
udp      17 13 src=10.65.50.241 dst=10.65.50.216 sport=63088 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63088 use=1
tcp      6 431999 ESTABLISHED src=10.64.149.174 dst=10.65.50.216 sport=60460 dport=22
src=10.65.50.216 dst=10.64.149.174 sport=22 dport=60460 [ASSURED] use=1
unknown  2 507 src=111.92.214.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.214.1 use=1
unknown  2 552 src=111.91.204.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.204.1 use=1
udp      17 17 src=10.65.50.241 dst=10.65.50.216 sport=63109 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63109 use=1
unknown  2 507 src=111.92.213.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.213.1 use=1
udp      17 105 src=10.65.50.241 dst=10.65.50.216 sport=49915 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=49915 [ASSURED] use=1
unknown  2 512 src=111.92.216.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.216.1 use=1
unknown  2 557 src=111.91.213.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.213.1 use=1
unknown  2 552 src=111.91.202.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.202.1 use=1
unknown  2 502 src=111.92.204.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.204.1 use=1
unknown  2 497 src=111.92.201.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.201.1 use=1
unknown  2 557 src=111.91.208.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.208.1 use=1
udp      17 9 src=10.64.149.174 dst=10.65.50.216 sport=49789 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49789 use=1
unknown  2 562 src=111.91.215.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.215.1 use=1
unknown  2 557 src=111.91.209.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.209.1 use=1
udp      17 15 src=10.65.50.241 dst=10.65.50.216 sport=63104 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63104 use=1
udp      17 8 src=10.64.149.174 dst=10.65.50.216 sport=49780 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49780 use=1
udp      17 12 src=10.64.149.174 dst=10.65.50.216 sport=49795 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49795 use=1
unknown  2 552 src=111.91.203.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.203.1 use=1
unknown  2 557 src=111.91.210.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.210.1 use=1
udp      17 11 src=10.64.149.174 dst=10.65.50.216 sport=49792 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49792 use=1
udp      17 6 src=10.64.149.174 dst=10.65.50.216 sport=49772 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49772 use=1
```

```
udp      17 7 src=10.64.149.174 dst=10.65.50.216 sport=49776 dport=161
src=10.65.50.216 dst=10.64.149.174 sport=161 dport=49776 use=1
udp      17 16 src=10.65.50.241 dst=10.65.50.216 sport=63107 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63107 use=1
unknown  2 497 src=111.92.203.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.203.1 use=1
unknown  47 599 src=192.168.200.91 dst=192.168.200.96 src=192.168.200.96
dst=192.168.200.91 use=1
udp      17 14 src=10.65.50.241 dst=10.65.50.216 sport=63101 dport=161
src=10.65.50.216 dst=10.65.50.241 sport=161 dport=63101 use=1
unknown  2 552 src=111.91.205.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.205.1 use=1
unknown  2 557 src=111.91.212.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.212.1 use=1
udp      17 12 src=10.65.50.241 dst=10.65.50.255 sport=138 dport=138 [UNREPLIED]
src=10.65.50.255 dst=10.65.50.241 sport=138 dport=138 use=1
unknown  2 507 src=111.92.212.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.92.212.1 use=1
unknown  47 599 src=192.168.200.95 dst=192.168.200.92 src=192.168.200.92
dst=192.168.200.95 use=1
unknown  2 562 src=111.91.214.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.214.1 use=1
unknown  2 557 src=111.91.211.1 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=111.91.211.1 use=1
unknown  2 547 src=10.65.50.211 dst=224.0.0.1 [UNREPLIED] src=224.0.0.1
dst=10.65.50.211 use=1
udp      17 177 src=21.51.87.53 dst=21.51.87.54 sport=654 dport=654 src=21.51.87.54
dst=21.51.87.53 sport=654 dport=654 [ASSURED] use=1
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 7

Access Control Lists

Access control lists (ACLs) are a common way of restricting certain types of traffic on a physical port. This chapter covers the following ACL commands:

ip access-list standard

```
ip access-list standard <access-list-name>
```

Description

This command is used to create a new IP standard ACL with the given name.

Syntax

Parameter	Description
`<access-list-name>`	Name of IP access list

Usage Guidelines

This command is used to create a ACL list of type IP Standard ACL. This list filters packets based on the source IP address of the packet. Use the `no ip access-list standard <access-list-name>` to remove a access-list with the given name.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip access-list standard OFFICE
(host)(config-acl-ip-std)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

rule...source

`rule <rule-id> <deny|permit> <A.B.C.D|any|host> source [log]`

Description

This command is used to add or edit a rule in the IP standard ACL with the given name.

Syntax

Parameter	Description	Range
`<rule-id>`	ID of a rule	<1-999>
`<deny|permit>`	• **permit**—Specify packets to forward • **deny**—Specify packets to reject	-
`<A.B.C.D|any|host>`	• **A.B.C.D**—Source address • **any**—Any host • **host**—A single host address	-
`[log]`	log	-

Usage Guidelines

Use the no rule `<rule-id>` command to remove a rule from the access list and the no rule command to remove all rules from the access list.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip access-list standard OFFICE
(host)(config-acl-ip-std)# rule 99 permit any
(host)(config-acl-ip-std)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACL standard

rule...remark

`rule <rule-id> remark <WORD>`

Description

This command is used to add or edit a description of a rule in the IP standard ACL and MAC ACL.

Syntax

Parameter	Description	Range
`<rule-id>`	ID of a rule	<1-999>
`<WORD>`	Comment up to 32 characters	-

Usage Guidelines

Use `no rule <rule-id> remark` command to remove the description of the rule and the `no rule remark` to remove all descriptions of all rules from an ACL.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip access-list standard OFFICE
(host)(config-acl-ip-std)# rule 99 remark This is a general rule
(host)(config-acl-ip-std)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACL standard, ACL MAC

ip access-group

`ip access-group <access-list-name> <in|out>`

Description

This command is used to add an IP standard ACL with the specified name to an interface.

Syntax

Parameter	Description
`<access-list-name>`	Name of IP access list
`<in|out>`	• **in**—Inbound packets • **out**—Outbound packets

Usage Guidelines

Use the `no ip access-group <access-list-name> <in|out>` command to remove the specified access group from an interface and the `no ip access-group` command to remove all access group from an interface.

Example

The following example shows the configuration of a IP standard ACL:

```
(host)# configure terminal
(host)(config)# ip access-list standard OFFICE
(host)(config-acl-ip-std)# rule 10 deny host 192.168.10.111
(host)(config-acl-ip-std)# rule 10 remark not_allow_111
(host)(config-acl-ip-std)# rule 20 permit 192.168.10.0 0.0.0.255
(host)(config-acl-ip-std)# rule 20 remark allow_other_192_168_10
(host)(config-acl-ip-std)# rule 30 deny any
(host)(config-acl-ip-std)# rule 30 remark deny_any_other
(host)(config-acl-ip-std)# quit
(host)(config)# in gigabit-ethernet 0
(host)(config-eth)# ip access-group OFFICE in
(host)(config-eth)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS, INTERFACE ETHERNET, INTERFCACE VLAN

ip access-list extended

```
Ip access-list extended <access-list-name>
```

Description

This command is used to create a new extended ACL with the given name.

Syntax

Parameter	Description
`<access-list-name>`	Name of the access list.

Usage Guidelines

Extended ACLs provide more flexible filtering methods such as:

- IP information
- ICMP information
- TCP information
- UDP information

Use the `no ip access-list extended` to remove the extended ACL with the given name.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# ip access-list extended OFFICE_1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

rule...ip source destination

```
rule <rule-id> <permit|deny|remark> <ip|icmp|udp|tcp> <source A.B.C.D|any|host>
<destination A.B.C.D|any|host> <tos|dscp> <value> [log]
```

Description

This command is used to add an IP/ICMP/UDP/TCP rule to an extended ACL.

Syntax

Parameter	Description	Range
`<rule-id>`	ID of a rule	<1-999>
`<deny|permit>`	• **permit**—Specify packets to forward • **deny**—Specify packets to reject • **remark**—Access list entry comment	-
`<ip|icmp|udp|tcp>`	• **ip**—Internet Protocol • **icmp**—ICMP Protocol • **udp**—UDP Protocol • **tcp**—TCP Protocol	-
`<source A.B.C.D| any|host>`	• **A.B.C.D**—Source address • **any**—Any host • **host**—A single host address	-
`<destination A.B.C.D| any|host>`	• **A.B.C.D**—Destination address • **any**—Any host • **host**—A single host address	-
`tos`	IP TOS field	-
`dscp`	IP DSCP field	-
`tos-value`	TOS/DSCP value	• **DSCP**—valid values are 0~63 • **TOS**—valid values are 0, 2, 4, 8, 16
`[log]`	Enable log	-

Usage Guidelines

Use the `no rule <rule-id>` command to remove a rule from the access list and the `no rule` command to remove all rules from the access list.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip access-list extended OFFICE_1
(host)(config-acl-ip-ext)# rule 99 permit ip any any tos 0
(host)(config-acl-ip-ext)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACL EXTENDED

mac access-list standard

`mac access-list standard <access-list-name>`

Description

This command is used to create a new MAC based access list with the given name.

Syntax

Parameter	Description
`<access-list-name>`	Name of MAC access list

Usage Guidelines

A MAC based ACL uses source MAC address to filter the traffic. Use the `no mac access-list standard <access-list-name>` to remove the MAC access list with the given name.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mac access-list standard OFFICE_2
(host)(config-acl-mac-std)# list
  end
  exit
  help
  list
  no rule
  no rule <1-999>
  no rule <1-999> remark
  no rule remark
  quit
  rule <1-999> (permit|deny) source-mac HH:HH:HH:HH:HH:HH
  rule <1-999> remark WORD
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-acl-mac-std)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

rule... source-mac

`rule <rule-id> (permit|deny) source-mac HH:HH:HH:HH:HH:HH`

Description

This command is used to add a rule to a MAC access list.

Syntax

Parameter	Description	Range
`<rule-id>`	ID of a rule	`1-999`
`<deny|permit>`	• **permit**—Specify packets to forward • **deny**—Specify packets to reject • **remark**—Access list entry comment	-
`HH:HH:HH:HH:HH:HH`	Source mac address	-

Usage Guidelines

Use the `no rule <rule-id>` or the `no rule <rule-id> remark` commands to remove a rule from the MAC access list and the `no rule` command to remove all rules from the MAC access list.

Example

The following example shows the use of the command:

```
(host)(config)# mac access-list standard MAC_LIST1
(host)(config-acl-mac-std)# rule 10 permit source-mac 00:13:ce:31:2f:1f
(host)(config-acl-mac-std)# rule 10 deny source-mac  00:13:ce:31:2f:22
(host)(config-acl-mac-std)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACL MAC

mac access-group...in

```
mac access-group <access-list-name> in
```

Description

This command is used to add the specified MAC ACL to an interface.

Syntax

Parameter	Description
`<access-list-name>`	Name of the MAC access list.

Usage Guidelines

The interface should be a layer 2 port and only incoming packets can be filtered. Use the `no mac access-group` command to remove the specified access group from an interface and the `no mac access-group in` command to remove all access groups from an interface.

Example

The following example shows the configuration of a MAC ACL:

```
(host)(config)# mac access-list standard MAC_LIST1
(host)(config-acl-mac-std)# rule 10 permit source-mac 00:13:ce:31:2f:1f
(host)(config-acl-mac-std)# rule 10 deny source-mac  00:13:ce:31:2f:22
(host)(config-acl-mac-std)# qu
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# mac access-group MAC_LIST1 in
(host)(config-bss)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS, INTERFACE ETHERNET

ip receive access-group

```
ip receive access-group <access-list-name>
```

Description

This command is used to apply the IP receive access list with the given name to an interface.

Syntax

Parameter	Description
`<access-list-name>`	Name of the IP receive access list.

Usage Guidelines

Use the `no ip receive access-group` command to remove the receive access-list with the given name from an interface.

Example

The following example shows the configuration of an IP receive access ACL:

```
MSR2000_161(config)# ip access-list extended MANAGEMENT
MSR2000_161(config-acl-ip-ext)# rule 10 permit udp host 192.168.8.8 any eq 161
MSR2000_161(config-acl-ip-ext)# rule 20 permit tcp 192.168.8.0 0.0.0.255 any eq 80
MSR2000_161(config-acl-ip-ext)# rule 30 deny icmp any any
MSR2000_161(config-acl-ip-ext)# rule 40 deny ip any any
MSR2000_161(config-acl-ip-ext)# qu
MSR2000_161(config)# ip receive access-group MANAGEMENT
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

Chapter 8

Access Mode Configuration

This chapter covers the following access mode, BSS, and access-list commands:

bss

```
bss <0-15>
```

Description

This command is used to create a new BSS or configure an existing BSS on the radio interface.

Syntax

Parameter	Description
`<0-15>`	Interface index

Usage Guidelines

Use the `no bss` command to remove an existing BSS from the radio interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

ssid

```
ssid <SSID>
```

Description

This command is used to configure a SSID string for the BSS.

Syntax

Parameter	Description
<SSID>	802.11 Service Set ID (SSID) that identifies a BSS on this radio interface.

Usage Guidelines

The SSID does not support spaces or other special characters.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# ssid Aruba
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

ignore-broadcast-ssid

`ignore-broadcast-ssid`

Description

This command is used to disable SSID broadcast.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

The broadcast of the SSID is enabled by default. Use the `no ignore-broadcast-ssid` to enable SSID broadcast.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# ignore-broadcast-ssid
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

max-station-allowed

`max-station-allowed <1-255>`

Description

This command is used to configure the maximum number of stations that are allowed to associate with the BSS.

Syntax

Parameter	Description	Default
`<1-255>`	the maximum number of stations allowed to associate with the BSS.	255

Usage Guidelines

Use the `no max-station-allowed` command to allow up to 255 stations (default) to associate with the BSS.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# max-station-allowed 10
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

sta-inactivity-limit

```
sta-inactivity-limit <15-65535>
```

Description

This command is used to configure the client inactivity time-out (in seconds).

Syntax

Parameter	Description	Default
<15-65535>	Maximum amount of time a station/client is allowed to be inactive before the inactivity policy takes effect.	300

Usage Guidelines

If the BSS does not receive any data from the client for the specified time, the BSS disassociates from the client. Use the `no sta-inactivity-limit` command to set the client inactivity time out to the default 300 seconds.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# sta-inactivity-limit 600
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

max-bw-per-client

```
max-bw-per-client in|out <rate> A.B.C.D unlimited
```

Description

This command is used to enable dynamic and static bandwidth control on the BSS for each station.

Syntax

Parameter	Description	Range	Default
`in|out`	• **`in`**— Direction from the station to the BSS. • **`out`**— Direction from the BSS to the station.	-	-
`A.B.C.D`	The static IP address.	-	-
`<rate>`	The traffic rate.	1-100000 kbps	-
`unlimited`	No limit on the rate.	-	-

Usage Guidelines

Wireless mesh routers support bandwidth control on the BSS for each station. This bandwidth control is used to manage the bandwidth distribution for each client and limit the bandwidth usage of each client by configuring the bandwidth control policy at the BSS interface. This ensures steady and reliable data transmission.

The bandwidth control of each BSS can independently apply a bandwidth control policy for each station. The bandwidth control policy includes two directions - in and out. The *in* direction refers to the direction from the station (STA) to the BSS. The *out* direction refers to the direction from the BSS to the station.

The bandwidth control at BSS includes dynamic bandwidth control and static bandwidth control. Dynamic bandwidth control refers to the bandwidth control policy applied to all stations associated to the BSS. Static bandwidth control refers to the bandwidth control applied to a specific station with a specified IP address.

If a BSS configures both dynamic and static bandwidth control for the in/out direction, or a station associated with the BSS configures both dynamic and static bandwidth control, the static bandwidth control policy overrides the dynamic bandwidth control policy.

Examples

The following example configures dynamic in/out bandwidth control at the BSS for each station:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# max-bw-per-client in 128
(host)(config-bss)# max-bw-per-client out 256
(host)(config-bss)# end
(host)#
```

The following example configures static in/out bandwidth control at the BSS for each station:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# max-bw-per-client in 172.16.1.100 128
(host)(config-bss)# max-bw-per-client out 172.16.1.101 256
(host)(config-bss)# end
```

```
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

unicast-rate

`unicast-rate <rate>`

Description

This command is used to force the BSS to operate on the specified unicast rate.

Syntax

Parameter	Description	Range
`<rate>`	The rate is specified in units of Mbps.	Available rates (in 1000 kbps): 1, 2, 5.5, 6, 9, 11,12, 18, 24, 36, 48, 54, and mcs0 -mcs15.

Usage Guidelines

The BSS will attempt to only apply the specified rate between clients and the AP. This setting also prevents clients that do not support the specified rate from associating with the BSS. Use the `no unicast-rate` command to disable force unicast rate setting for the BSS. The radio interface automatically selects the transmission rates (default).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# unicast-rate 2
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

multicast-rate

`multicast-rate <rate>`

Description

This command is used to force the BSS to operate on a specified multicast rate.

Syntax

Parameter	Description	Range
`<rate>`	The rate is specified in units of Mbps.	Available rates (in 1000 kbps): 1, 2, 5.5, 6, 9, 11,12, 18, 24, 36, 48, 54, and mcs0 -mcs15.

Usage Guidelines

The BSS will attempt to only apply the specified rate between clients and the AP. Use the `no multicast-rate` command to disable force multicast rate setting for the BSS. The radio interface automatically selects the transmission rate (default).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# multicast-rate 6
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

multicast-optimization

`multicast-optimization`

Description

This command is used to enable multicast enhanced features.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no multicast-optimization` command to disable the enhanced multicast features.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# multicast-optimization
(host)(config-bss)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

dtim-interval

`dtim-interval <1-255>`

Description

This command is used to set the Delivery Traffic Indication Message (DTIM) interval.

Syntax

Parameter	Description	Default
`<1-255>`	The DTIM interval measured in beacons.	1

Usage Guidelines

The AP sends out buffered multicast and broadcast frames to clients in power-saving mode at each DTIM interval. Use the `no dtim-interval` command to restore the default value of DTIM interval (1). A high value of the DTIM interval may affect the multicast performance.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# dtim-interval 2
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

wmm

`wmm`

Description

This command is used to enable the Wireless Multimedia (WMM) service.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no wmm` command to disable WMM service.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# wmm
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

force-sta-wmm

`force-sta-wmm`

Description

This command is used to allow station access to only clients that support WMM.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use the `no force-sta-wmm` command to allow the access of clients that do not support WMM.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# wmm
(host)(config-bss)# force-sta-wmm
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

rts-threshold

`rts-threshold <0-2347>`

Description

This command is used to configure the threshold value for sending the RTS frame.

Syntax

Parameter	Description	Default
`<0-2347>`	The value 0 enables RTS and 2347 disables RTS.	2347

Usage Guidelines

When the length of a frame exceeds the threshold value, a RTS frame will be sent out before the next frame is sent. Use the `no rts-threshold` command to restore the default setting (disable RTS).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# rts-threshold 500
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

frag-threshold

`frag-threshold <256-2346>`

Description

This command is used to configure the threshold value for frame fragmentation.

Syntax

Parameter	Description	Default
<256-2346>	The value 2346 disables fragmentation.	2346

Usage Guidelines

When the length of a frame exceeds the threshold value, the frame will be fragmented before it is sent out. Use the `no frag-threshold` command to restore the default setting (disable fragmentation).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# frag-threshold 256
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

access-category

`access-category <be|bk|cl|ee|nc|st|vi|vo>`

Description

This command is used to set the 802.11e mapping priority on the BSS.

Syntax

Parameter	Description
be	Mapping priority on BSS. Corresponds to the DSCP value 0.
bk	Mapping priority on BSS. Corresponds to the DSCP value 8.
c1	Mapping priority on BSS. Corresponds to the DSCP value 16.
ee	Mapping priority on BSS. Corresponds to the DSCP value 24.
nc	Mapping priority on BSS. Corresponds to the DSCP value 32.
st	Mapping priority on BSS. Corresponds to the DSCP value 40.
vi	Mapping priority on BSS. Corresponds to the DSCP value 48.
vo	Mapping priority on BSS. Corresponds to the DSCP value 56.

Usage Guidelines

When a station (that supports 802.11e) connects to a BSS configured with the access category, the frames forwarded by the BSS from the station will take the corresponding DSCP value. The frame with the highest DSCP is sent on highest priority. The frames from the BSS to this station will be sent from the corresponding forwarding queues based on this mapping. Use the `no access-category` command to remove the priority setting on the BSS.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# access-category bk
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

authentication

`authentication <open|shared> <key-management|wep> <wpa/wpa2>`

Description

This command is used to apply a security profile to the BSS interface.

Syntax

Parameter	Description
`<open|shared>`	• **open**—Open key system • **shared**—Shared key system
`<key-management|wep>`	• **key-management**—key management • **wep**—WEP algorithm
`<wpa/wpa2>`	Key management algorithm: • **wpa**—WPA algorithm • **wpa2**—WPA2 algorithm

Usage Guidelines

Open authentication allows any wireless client to be authenticated by the router. Shared key authentication looks for the clients that know the shared key and is only using with Wired Equivalent Privacy (WEP).

WEP is the wireless security solution based on equivalent key and uses the RC4 encryption algorithm. The two ends use the same key for encryption and decipher. To enhance security WEP uses four different sequence keys with three different key lengths — 40 bits, 104bits, and 128 bits.

WPA (Wi-Fi protected access) and WPA2 are created in response to several serious weaknesses found in the WEP protocol. WPA supports pre-shared key mode (also known as the Personal mode) and EAP extension mode (also known as Enterprise mode). Pre-shared key is the encryption which achieves data communications through a symmetric approach. The main difference between WPA and WPA2 is the encryption algorithm. WPA uses TKIP (RC4), while WPA2 uses AES. WPA and WPA2 also work with the 802.1x security protocol to strengthen the wireless data communications security. In order to associate with the BSS, the clients should have the latest WPA/WPA2 authentication and encryption setting specified by the WPA/WPA2 security profile.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open key-management wpa2
(host)(config-auth-wpa2)# wpa-compatible
(host)(config-auth-wpa2)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

wep-key

`wep-key <1-4> {ascii | hex} <key-string>`

Description

This command is used to configure the WEP key string.

Syntax

Parameter	Description
`<1-4>`	WEP key index.
`{ascii | hex}`	• **ascii**—Ascii key valid length 5,13,16 • **hex**—Hex key valid length 10,26,32
`<key-string>`	ASCII/Hexadecimal key string.

Usage Guidelines

Use the `default-key <1-4>` command to specify the default key serial number for transmission.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open wep
(host)(config-auth-open-wep)# wep-key 1 ascii 12345
(host)(config-auth-open-wep)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	BSS WEP

encryption-mode-cipher

`encryption-mode-cipher {aes | aes-tkip | tkip}`

Description

This command is used to configure the WPA/WPA2 encryption mode in the BSS.

Syntax

Parameter	Description	Default
`{aes | aes-tkip | tkip}`	WPA/WPA2 encryption modes: • **aes**—AES cipher mode • **aes-tkip**—Auto cipher mode • **tkip**—TKIP cipher mode	`aes-tkip`

Usage Guidelines

Use the `no authentication` command to delete the security encryption configuration on the BSS.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open key-management wpa
(host)(config-auth-wpa)# encryption-mode-cipher aes
(host)(config-auth-wpa)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	BSS WPA, BSS WPA2

radius-server

```
radius-server <A.B.C.D> {auth-port | acct-port} <port> key <key-string>
```

Description

This command is used to configure the Radius server information.

Syntax

Parameter	Description
`<A.B.C.D>`	Radius IP address
`{auth-port | acct-port}`	• **auth-port**—Authentication server • **acct-port**—Accounting server
`<port>`	Port number
`<key-string>`	Radius secret key string

Usage Guidelines

Use the `no radius-server <A.B.C.D> {auth-port | acct-port} <port>` command to delete the specified radius server information and the `no radius-server` command to delete all radius server information.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open key-management wpa
(host)(config-auth-wpa)# radius-server 192.168.10.69 auth-port 1812 key 123456
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	BSS WPA, BSS WPA2

wpa-compatible

`wpa-compatible`

Description

This command is used to set the WPA/WPA2 mixed mode for the BSS.

Syntax

Parameter	Description
none	-

Usage Guidelines

WPA (Wi-Fi protected access) and WPA2 are created in response to several serious weaknesses found in the WEP protocol. WPA supports pre-shared key mode (also known as the Personal mode) and EAP extension mode (also known as Enterprise mode). Pre-shared key is the encryption which achieves data communications through a symmetric approach. The main difference between WPA and WPA2 is the encryption algorithm. WPA uses TKIP (RC4), while WPA2 uses AES. WPA and WPA2 also work with the 802.1x security protocol to strengthen the wireless data communications security. In order to associate with the BSS, the clients should have the latest WPA/WPA2 authentication and encryption setting specified by the WPA/WPA2 security profile.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open key-management wpa2
(host)(config-auth-wpa2)# wpa-compatible
(host)(config-auth-wpa2)#
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	BSS WPA, BSS WPA2

wpa-type

```
wpa-type psk {ascii | hex} <KEY>
wpa-type 8021x
```

Description

This command is used to set the WPA key mode.

Syntax

Parameter	Description
`psk`	Sets WPA pre-shared key in ascii mode or hex mode
`{ascii | hex}`	• **ascii**—Key string is ascii mode and 8-63 characters • **hex**—Key string is 64 hex characters
`<KEY>`	Key string
`8021x`	8021x authentication

Usage Guidelines

Use the `no authentication` command to delete the security encryption configuration on the BSS.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# authentication open key-management wpa2
(host)(config-auth-wpa2)# wpa-type
  psk    Set WPA pre-shared key in ascii mode or hex mode
  8021x  8021x authentication
(host)(config-auth-wpa2)# wpa-type 8021x
(host)(config-auth-wpa2)# wpa-type psk ascii 100101010
(host)(config-auth-wpa2)# exit
(host)(config-bss)# authentication open key-management wpa
(host)(config-auth-wpa)# wpa-type psk ascii 100101010
(host)(config-auth-wpa)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	BSS WPA, BSS WPA2

access-list

`access-list`

Description

This command is used to switch to the MAC ACL mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

Wireless mesh routers allow MAC address-based access control. You can allow or deny a client association request for each BSS based on a pre-configured MAC address list.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# access-list
(host)(config-mac-acl)# list
  end
  exit
  help
  list
  list-type ( open |accept |deny )
  mac  HH:HH:HH:HH:HH:HH
  no list-type
  no mac
  no mac  HH:HH:HH:HH:HH:HH
  quit
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-mac-acl)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

list-type

`list-type (accept|deny|open)`

Description

This command is used to set the MAC ACL type.

Syntax

Parameter	Description
`accept`	Accepts the client association from the specified MAC address and denys requests from all other clients
`deny`	Denys the client association from the specified MAC address and allows requests from all other clients.
`open`	This is the default configuration. Allows the requests from any MAC address

Usage Guidelines

Use the `no list-type` command to remove the MAC ACL type.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# access-list
(host)(config-mac-acl)# list-type open
(host)(config-mac-acl)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACCESS-LIST

mac

`mac <HH:HH:HH:HH:HH:HH>`

Description

This command is used to add the specified MAC address to the ACL.

Syntax

Parameter	Description
`<HH:HH:HH:HH:HH:HH>`	MAC address

Usage Guidelines

Use the `no mac <HH:HH:HH:HH:HH:HH>` command to remove a specific MAC address from the ACL or the `no mac` command to remove all MAC addresses from the ACL.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# access-list
(host)(config-mac-acl)# mac 00:17:7b:00:0b:94
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ACCESS-LIST

sta-isolation

`sta-isolation`

Description

This command is used to enable the station isolation feature.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Station isolation feature is used to prevent the stations under the same BSS from communicating with each other. Use the `no sta-isolation` command to disable the station isolation feature.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# sta-isolation
(host)(config-bss)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

Chapter 9

Multicast

This chapter describes the commands used to configure and troubleshoot multicast in a network.

This chapter includes the following configuration commands:

This chapter includes the following `show` and `debug` commands

router multicast

`router multicast`

Description

This command is used to switch to the multicast configuration mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

The main purpose of Multicast Routing Protocol is to establish a multicast distribution tree, so as to transmit the multicast packet to the corresponding multicast group member. The Multicast Routing Protocol is classified into two types — Protocol Independent Multicast Dense Mode (PIM-DM) and Protocol Independent Multicast-Sparse Mode (PIM-SM). Use the `no router multicast` command to exit the multicast configuration mode.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# router multicast
(host)(config-multicast)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the multicast routing protocol.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# router multicast
(host)(config-multicast)# rp-address 10.3.3.3
(host)(config-multicast)# enable
(host)(config-multicast)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER MULTICAST

disable

`disable`

Description

This command is used to disable the multicast routing protocol.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# router multicast
(host)(config-multicast)# rp-address 10.3.3.3
(host)(config-multicast)# enable
(host)(config-multicast)# disable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER MULTICAST

rp-address

`rp-address <A.B.C.D>`

Description

This command is used to configure the static IP address of the RP (Rendezvous Point).

Syntax

Parameter	Description
`<A.B.C.D>`	Static IP address

Usage Guidelines

Each router (including the RP router) enabling multicast should configure the RP address for PIM. The RP address must be configured before enabling multicast. Use the `no rp-address` command to remove the static RP address.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# router multicast
(host)(config-multicast)# rp-address 10.3.3.3
(host)(config-multicast)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER MULTICAST

multicast-optimization

`multicast-optimization`

Description

This command is used to enable multicast enhanced features.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use the `no multicast-optimization` command to disable the enhanced multicast features.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# multicast-optimization
(host)(config-bss)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

multicast-rate

`multicast-rate <rate>`

Description

This command is used to configure the transmission rate of the multicast data transmission.

Syntax

Parameter	Description
`<rate>`	The multicast data transmission rate

Usage Guidelines

Use the `no multicast-rate` command to restore to the default rate.

Example

The following example shows the use of the command:

```
(host)(config)#
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# bss 0
(host)(config-bss)# multicast-rate ?
  1      1 Mbps (11b|g)
  2      2 Mbps (11b|g)
  5.5    5.5 Mbps (11b|g)
  6      6 Mbps (11a|g)
  9      9 Mbps (11a|g)
  11     11 Mbps (11b|g)
  12     12 Mbps (11a|g)
  18     18 Mbps (11a|g)
  24     24 Mbps (11a|g)
  36     36 Mbps (11a|g)
  48     48 Mbps (11a|g)
  54     54 Mbps (11a|g)
  mcs0   mcs0 (11n)
  mcs1   mcs1 (11n)
  mcs10  mcs10 (11n)
  mcs11  mcs11 (11n)
  mcs12  mcs12 (11n)
  mcs13  mcs13 (11n)
  mcs14  mcs14 (11n)
  mcs15  mcs15 (11n)
  mcs2   mcs2 (11n)
  mcs3   mcs3 (11n)
  mcs4   mcs4 (11n)
  mcs5   mcs5 (11n)
  mcs6   mcs6 (11n)
  mcs7   mcs7 (11n)
  mcs8   mcs8 (11n)
  mcs9   mcs9 (11n)
(host)(config-bss)# multicast-rate 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO BSS

show ip pim interface

```
show ip pim interface
```

Description

This command is used to display PIM interface status.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the current status of the multicast protocol. This information can be used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip pim interface
Address          Interface           Mode  Priority  Neighbor  Query    DR
                                                       Count     Interval
21.53.218.202    dot11radio 3/wds 7  SM    1         1         30       21.53.218.202
10.65.50.211     vlan 1              SM    1         2         30       10.65.50.213
91.1.1.1         vlan 2              SM    1         0         30       91.1.1.1
111.91.201.1     vlan 201            SM    1         0         30       111.91.201.1
111.91.202.1     vlan 202            SM    1         0         30       111.91.202.1
111.91.203.1     vlan 203            SM    1         0         30       111.91.203.1
111.91.204.1     vlan 204            SM    1         0         30       111.91.204.1
111.91.205.1     vlan 205            SM    1         0         30       111.91.205.1
111.91.206.1     vlan 206            SM    1         0         30       111.91.206.1
111.91.207.1     vlan 207            SM    1         0         30       111.91.207.1
111.91.208.1     vlan 208            SM    1         0         30       111.91.208.1
111.91.209.1     vlan 209            SM    1         0         30       111.91.209.1
111.91.210.1     vlan 210            SM    1         0         30       111.91.210.1
111.91.211.1     vlan 211            SM    1         0         30       111.91.211.1
111.91.212.1     vlan 212            SM    1         0         30       111.91.212.1
111.91.213.1     vlan 213            SM    1         0         30       111.91.213.1
111.91.214.1     vlan 214            SM    1         0         30       111.91.214.1
111.91.215.1     vlan 215            SM    1         0         30       111.91.215.1
111.91.216.1     vlan 216            SM    1         0         30       111.91.216.1
21.51.87.78      dot11radio 2/wds 7  SM    1         0         30       21.51.87.78
21.54.58.154     dot11radio 3/wds 8  SM    1         0         30       21.54.58.154
8.184.13.1       dot11radio 3/wds 0  SM    1         0         30       8.184.13.1
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip pim neighbor

`show ip pim neighbor`

Description

This command is used to display PIM neighbor status.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the current status of the multicast protocol. This information can be used to check if the PIM-SM neighbor is established correctly.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip pim neighbor
Neighbor Address  Interface           Uptime    Expires   Mode  Prio/DR
21.53.218.201     dot11radio 3/wds 7  49:43:13  0:1:25    SM    1 /
10.65.50.213      vlan 1              5:48:45   0:1:40    SM    1 / DR
10.65.50.212      vlan 1              2:6:38    0:1:37    SM    1 /
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip mroute

`show ip mroute`

Description

This command is used to display multicast routing table.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the current status of the multicast protocol. This information can be used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip mroute
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip igmp

`show ip igmp {groups|interface}`

Description

This command is used to display group member or interface status.

Syntax

Parameter	Description
`{groups|interface}`	• **groups**—IGMP group membership information • **interface**—IGMP interface information

Usage Guidelines

This command displays the current status of the multicast protocol. This information can be used to check the version of the IGMP sent by the multicast client.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip igmp interface | grep 216
vlan 216 (111.91.216.1):
  IGMP querying router is 111.91.216.1 (this system)
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show multicast-optimization dot11radio...bss...

```
show multicast-optimization dot11radio <0-3> bss <0-15>
```

Description

This command is used to display multicast optimization information.

Syntax

Parameter	Description
<0-3>	Radio index
<0-15>	BSS index

Usage Guidelines

This command displays the current status of the multicast protocol. This information can be used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show multicast-optimization dot11radio 0 bss 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

debug

`debug {none|error|state|information|dump}`

Description

This command is used to display PIM/IGMP debug log level.

Syntax

Parameter	Description
`{dump|error|information|none|state}`	The debug log level: • **dump** —Debug-level=4 • **error**—Debug-level=1 • **information**—Debug-level=3 • **none**—Debug-level=0 • **state**—Debug-level=2

Usage Guidelines

The log displays the current status of the multicast protocol. This information can be used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# router multicast
(host)(config-multicast)# debug dump
(host)(config-multicast)
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER MULTICAST

show debug

```
show debug {pim|igmp}
```

Description

This command is used to display log message of PIM and IGMP.

Syntax

Parameter	Description
pim	Shows pim debug
igmp	Show igmp debug

Usage Guidelines

The information displayed in the log can be used to troubleshoot the interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show debug pim
12/11/11 12:41:01.413050 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.210.1
12/11/11 12:41:01.495576 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.209.1
12/11/11 12:41:01.519516 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.207.1
12/11/11 12:41:01.519875 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.216.1
12/11/11 12:41:01.520533 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.215.1
12/11/11 12:41:01.534987 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.211.1
12/11/11 12:41:01.535831 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.213.1
12/11/11 12:41:01.536376 PIM: Err: Ignoring HELLO from non-neighbor router
111.92.212.1
--More--
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 10

Configuring Routing

This chapter describes the commands used to configure routing. Included in this chapter are the following routing protocols:

- Static Routing
- Adaptive Wireless Routing (AWR)
- OSPF

Static Routing:

This chapter includes the following configuration commands for static routing:

AWR Protocol:

This chapter includes the following AWR configuration commands:

This chapter includes the following AWR `show` commands:

OSPF:

This chapter includes the following OSPF configuration commands:

This chapter includes the following OSPF `debug` and `show` commands:

- show ip ospf database on page 242
- show ip ospf interface on page 244
- show ip ospf neighbor on page 245

Other commands:

- show mesh route on page 246

ip route

```
ip route <A.B.C.D/M> <A.B.C.D>
```

Description

This command is used to add a static route.

Syntax

Parameter	Description
`<A.B.C.D/M>`	IP destination prefix (e.g. 10.0.0.0/8)
`<A.B.C.D>`	Gateway IP Address

Usage Guidelines

Static routing allows the network administrator to have full control over the layer-3 topology and network data forwarding. The administrator constructs the routing table by manually configuring routes for the various network destinations. A configured static route is installed in the routing table only when the route is active (the next hop in the route should be bound to an operational interface).

Use the `no ip route` command to remove a static route.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# ip route 10.0.0.0/8 10.0.0.1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

router-id

`router-id`

Description

This command is used to set the router ID.

Syntax

Parameter	Description
none	-

Usage Guidelines

A router ID uniquely identifies a router in a mesh network. The router ID can be configured under loopback, VLAN, or Ethernet interfaces

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# router-id
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET, INTERFACE DOT11RADIO, INTERFACE VLAN, INTERFACE LOOPBACK

router awr

`router awr`

Description

This command is used to start the configuration of the AWR routing protocol.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no router awr` command to exit the AWR routing protocol.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# list
  debug (none|error|state|information|dump)
  enable
  end
  exit
  hello-on-wds
  help
  list
  no hello-on-wds
  no primary-gateway-election
  primary-gateway-election
  quit
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-awr)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to activate the AWR routing protocol.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

none.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# enable
(host)(config-awr)# exit
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.5	The `disable` command has been removed

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER AWR

primary-gateway-election

`primary-gateway-election`

Description

This command is used to enable the AWR Primary Gateway Election (APGE) protocol.

Syntax

Parameter	Description
none	-

Usage Guidelines

The APGE protocol is designed to support the gateway redundancy for an AWR mesh network. APGE chooses the primary (active) gateway according to the router-id. If the primary gateway encounters a problem, one of the other gateways which are in standby can turn into a primary gateway in a very short time. Use the `no primary-gateway-election` command to disable the primary-gateway-election protocol.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# enable
(host)(config-awr)# primary-gateway-election
(host)(config-awr)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER AWR

hello-on-wds

`hello-on-wds`

Description

This command is used to enable the hello-on-wds protocol.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use hello-on-wds to maintain neighbor status. This protocol has the following applications:

- Neighbor discovery
- Neighbor failure detection
- Calculation of dynamic metric transmission rate

Use the `no hello-on-wds` command to disable the hello-on-wds protocol.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# enable
(host)(config-awr)# hello-on-wds
(host)(config-awr)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER AWR

debug

`debug{dump|error|information|none|state}`

Description

This command is used to set the AWR debug log level.

Syntax

Parameter	Description
`{dump|error|information|none|state}`	• **none**—Disables AWR debug log • **error**—Sets the AWR debug log to record errors • **state**—Sets the AWR debug log to record errors and state changes • **information**—Sets the AWR debug log to record errors, state, and other detailed information • **dump**—Sets the AWR debug log to record all AWR debug information

Usage Guidelines

The AWR log can be used to troubleshoot the AWR protocol settings. Use the `show debug awr` command to view the log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# enable
(host)(config-awr)# debug error
(host)(config-awr)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER AWR

show ip route

`show ip route`

Description

This command is used to display the current routing table.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to view the routing information for AWR represented by the code `A`.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip route
Codes: K - kernel route, C - connected, S - static, H - host, O - OSPF,
       A - AWR, d - DHCP, > - selected route, * - FIB route

A>* 0.0.0.0/0 [50/2] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 1.1.1.0/24 [50/6] via 21.53.218.129, dot11radio 0/wds 0, 00:00:58
A>* 1.2.3.0/24 [50/3] via 21.53.218.129, dot11radio 0/wds 0, 00:00:59
A>* 10.1.2.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.3.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.4.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.5.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.6.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.7.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.8.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.9.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.10.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.1.15.0/24 [50/3] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
A>* 10.7.2.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.3.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.4.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.5.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.6.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.7.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.8.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.9.0/24 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.10.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.11.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.7.15.0/28 [50/2] via 21.98.116.134, dot11radio 1/wds 1, 00:48:12
A>* 10.16.81.0/30 [50/6] via 21.53.218.129, dot11radio 0/wds 0, 00:00:58
A>* 10.16.81.4/30 [50/6] via 21.53.218.129, dot11radio 0/wds 0, 00:00:58
A>* 10.16.82.0/30 [50/5] via 21.98.116.142, dot11radio 1/wds 2, 00:00:58
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip forwarding

`show ip forwarding`

Description

This command is used to display the IP forwarding status.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the current Layer-3 forwarding information.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip forwarding
IP forwarding is on
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show debug awr

`show debug awr`

Description

This command is used to display the AWR debug log.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `debug` command in the ROUTER AWR mode to set the AWR debug log level.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router awr
(host)(config-awr)# enable
(host)(config-awr)# debug error
(host)(config-awr)# exit
(host)(config)# exit
(host)# show debug awr
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip awr database

```
show ip awr database
```

Description

This command is used to display the routing database currently tracked by the AWR protocol.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays the AWR internal routing table and other information that can be used to troubleshoot the AWR protocol.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip awr database
AWR internal routing table:
Prefix: 192.168.200.91/32,  AdvRouter 192.168.200.91
    flag 0x3, net_cnt 23 clone_cnt 0
    Least Metric:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
    Highest Sequence:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
Prefix: 0.0.0.0/0,  AdvRouter 192.168.200.91
    flag 0x4, net_cnt 0 clone_cnt 0
    Least Metric:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
    Highest Sequence:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
Prefix: 8.184.13.0/30,  AdvRouter 192.168.200.91
    flag 0x4, net_cnt 0 clone_cnt 0
    Least Metric:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
    Highest Sequence:
        Metric 1, Nexthop 192.168.200.91, SeqNo 3016335395, Age 351320
--More--
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip awr neighbor

`show ip awr neighbor`

Description

This command is used to display the list of IP addresses of neighboring MSR routers.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to identify if the AWR neighbors are correctly established. If no AWR neighbors exist, AWR cannot pick up routes from other routers.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip awr neighbor
AWR internal neighbor table:
Nbr 21.53.218.129   ,metric 1   ,bw   NA  Kbps, state 2WAY ,uptime 0:0:15
Nbr 21.98.116.134   ,metric 1   ,bw   NA  Kbps, state 2WAY ,uptime 0:47:26
Nbr 21.98.116.142   ,metric 1   ,bw   NA  Kbps, state 2WAY ,uptime 0:0:13
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

router ospf

`router ospf`

Description

This command is used to switch to Open Shortest Path First (OSPF) mode from the CONFIG mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

OSPF is developed by the IETF organization and is based on the Link State Algorithm (LSA). Every router running OSPF protocol advertises information on the local network connection (available interface information, reachable neighbor information and such other information) through LSA. Each OSPF router broadcasts and receives information through the LSAs in the autonomous system. This information forms the Link State Database (LSDB) which represents the entire OSPF network topology. Based on the information in the LSDB, each router independently runs the SPF (Shortest Path First) algorithm.

The MSR router enables OSPF protocol at the mesh gateway, which allows routes from AWR routing domain to be redistributed into OSPF routing domain.

Use the `no router ospf` command to close OSPF and also remove the configuration.

Example

The following example shows the use of the command at a mesh gateway:

```
(host)> enable
(host)# configure terminal
(host)(config)# router ospf
(host)(config-ospf)#
(host)(config-ospf)# list
  debug (pkt|ipc|all|none)
  disable
  enable
  end
  exit
  help
  list
  network A.B.C.D/M area <0-4294967295>
  network A.B.C.D/M area A.B.C.D
  no network A.B.C.D/M
  no network A.B.C.D/M area <0-4294967295>
  no network A.B.C.D/M area A.B.C.D
  no network all
  no redistribute (awr|connected)
  no redistribute all
  no router-priority
  no summary-address A.B.C.D/M
  no summary-address all
  quit
  redistribute (awr|connected)
  redistribute (awr|connected) metric <0-16777214>
  redistribute (awr|connected) metric <0-16777214> metric-type (1|2)
```

```
  redistribute (awr|connected) metric-type (1|2)
  redistribute (awr|connected) metric-type (1|2) metric <0-16777214>
  router-priority <1-255>
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  summary-address A.B.C.D/M
  write memory
(host)(config-ospf)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable OSPF.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example of the use of the command on a mesh gateway:

```
(host)(config)#router ospf
(host)(config-ospf)#enable
(host)(config-ospf)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

disable

`disable`

Description

This command is used to disable OSPF.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example of the use of the command on a mesh gateway:

```
(host)(config)#router ospf
(host)(config-ospf)#disable
(host)(config-ospf)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

router-priority

`router-priority <0-255>`

Description

This command is used to configure the OSPF priority.

Syntax

Parameter	Description	Default
`<0-255>`	OSPF priority	0

Usage Guidelines

The priority will determine which router will serve as the OSPF Designated Router (DR). When the value is "0", the router can not participate in the DR election process. Use the `no router-priority` command to restore the default value for the router priority

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router ospf
(host)(config-ospf)#enable
(host)(config-ospf)# router-priority 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

network...area

`network <A.B.C.D/M> area {<0-4294967295>|A.B.C.D}`

Description

This command is used to configure the designated OSPF interfaces.

Syntax

Parameter	Description
`<A.B.C.D/M>`	OSPF network prefix
`<0-4294967295>|A.B.C.D`	• **<0-4294967295>** —OSPF area ID as a decimal value • **A.B.C.D**—OSPF area ID in IP address format

Usage Guidelines

Use the `no network <A.B.C.D/M> area <area-id>` command to remove the configuration of a OSPF interface.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router ospf
(host)(config-ospf)# enable
(host)(config-ospf)# network 220.110.1.0/24 area 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

redistribute

`redistribute {awr|connected} [metric {0~16777214}] [metric-type {1|2}]`

Description

This command is used to redistribute the AWR and connected routes to OSPF.

Syntax

Parameter	Description	Range	Default
`{awr|connected}`	• **awr**—The AWR routes • **connected**—The connected routes	-	-
`metric`	Metric for redistributed routes	`0~16777214`	20
`metric-type`	Exterior metric type for redistributed routes	1-2	2

Usage Guidelines

Use the `no redistribute {awr|connected}` command to remove the configuration.

Example

The following example shows the use of the command on a mesh gateway:

```
(host)> enable
(host)# configure terminal
(host)(config)#router ospf
(host)(config-ospf)# enable
(host)(config-ospf)# network 220.110.1.0/24 area 0
(host)(config-ospf)# redistribute awr
(host)(config-ospf)# redistribute connected
(host)(config-ospf)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

summary-address

`summary-address A.B.C.D/M`

Description

This command is used to enable the routing summary for the specified IP address.

Syntax

Parameter	Description
`A.B.C.D/M`	IP address/mask

Usage Guidelines

Use the `no summary-address A.B.C.D/M` command to disable the routing summary for the specified IP address.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)#router ospf
(host)(config-ospf)# enable
(host)(config-ospf)# summary-address 220.110.1.1/24
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

debug

`debug {all|ipc|none|pkt}`

Description

This command is used to set the OSPF debug log level.

Syntax

Parameter	Description
`{all|ipc|none|pkt}`	• **all**— Debug the ipc and packets • **ipc**—Debug the ipc • **none**—Debug none • **pkt**—Debug the packets

Usage Guidelines

Use the `show debug ospf` command to view the log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router ospf
(host)(config-ospf)# enable
(host)(config-ospf)# debug all
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	ROUTER OSPF

show ip route

`show ip route`

Description

This command is used to display the current routing table.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to view the routing information for AWR represented by the code o.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ip route
Codes: K - kernel route, C - connected, S - static, H - host, O - OSPF,
       A - AWR, d - DHCP, > - selected route, * - FIB route

O>* 1.1.1.0/24 [110/25] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 1.2.3.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.2.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.3.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.4.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.5.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.6.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.7.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.8.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.9.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.10.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.1.15.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.2.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.3.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.4.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.5.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.6.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.7.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.8.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.9.0/24 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.10.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.11.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.7.15.0/28 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.81.0/30 [110/24] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.81.4/30 [110/25] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.82.0/30 [110/24] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.82.4/30 [110/24] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.82.8/30 [110/23] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.83.0/30 [110/23] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.83.4/30 [110/23] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.16.91.0/30 [110/24] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
```

```
O>* 10.193.76.0/24 [110/23] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O>* 10.193.112.0/24 [110/25] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
O   21.53.218.128/30 [110/22] via 192.168.15.96, gigabit-ethernet 0, 00:02:36
C>* 21.53.218.128/30 is directly connected, dot11radio 0/wds 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show debug ospf

`show debug ospf`

Description

This command is used to display the OSPF debug log.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `debug` command in the ROUTER OSPF mode to set the OSPF debug log level.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# router ospf
(host)(config-ospf)# enable
(host)(config-ospf)# debug all
(host)(config-ospf)# exit
(host)(config)# exit
(host)# show debug ospf
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip ospf database

```
show ip ospf database
```

Description

This command is used to display the current routing data in the OSPF database.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to display the OSPF database information that can be used to troubleshoot the OSPF interface.

Example

The following example shows the use of the command:

```
(host)# show ip ospf database
            OSPF Router with ID (192.168.200.4) (Process ID 0)
                Router (Area 0.0.4.210)
Link ID         ADV Router        Age     Seq#          Checksum    Link count
192.168.200.4   192.168.200.4     321     0x80000002    0x45e7          1
192.168.200.6   192.168.200.6     317     0x80000003    0x45de          1
                Network (Area 0.0.4.210)
Link ID         ADV Router        Age     Seq#          Checksum
192.168.15.96   192.168.200.6     322     0x80000001    0x31a9
                Type-5 AS External
Link ID         ADV Router        Age     Seq#          Checksum  Tag
1.1.1.0         192.168.200.6     321     0x80000002    0x0a73    0
1.2.3.0         192.168.200.6     321     0x80000002    0xc9b3    0
10.1.2.0        192.168.200.6     321     0x80000002    0x6b0b    0
10.1.3.0        192.168.200.6     321     0x80000002    0x6015    0
10.1.4.0        192.168.200.6     321     0x80000002    0x551f    0
10.1.5.0        192.168.200.6     321     0x80000002    0x4a29    0
10.1.6.0        192.168.200.6     321     0x80000002    0x3f33    0
10.1.7.0        192.168.200.6     321     0x80000002    0x343d    0
10.1.8.0        192.168.200.6     321     0x80000002    0x2947    0
10.1.9.0        192.168.200.6     321     0x80000002    0x1e51    0
10.1.10.0       192.168.200.6     321     0x80000002    0x135b    0
10.1.15.0       192.168.200.6     321     0x80000002    0xdb8d    0
10.7.2.0        192.168.200.6     321     0x80000002    0xc8b6    0
10.7.3.0        192.168.200.6     321     0x80000002    0xbdc0    0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip ospf interface

`show ip ospf interface`

Description

This command is used to display the current OSPF interface information.

Syntax

Parameter	Description
none	-

Usage Guidelines

The OSPF interface information can be used to troubleshoot any issues in the interface.

Example

The following example shows the use of the command:

```
(host)# show ip ospf interface
eth0 is up, line protocol is up
  Internet Address 192.168.15.94/24, Area 0.0.4.210
  Process ID 0, Router ID 192.168.200.4, Network Type BROADCAST, Cost: 10
  Transmit Delay is 1 sec, State DROTHER, Priority 0
  Designated Router (ID) 192.168.200.6, Interface address 192.168.15.96
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  Neighbor Count is 1, Adjacent neighbor count is 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ip ospf neighbor

`show ip ospf neighbor`

Description

This command is used to display the current OSPF neighbor routing information.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to identify if the OSPF neighbors are correctly established. If no OSPF neighbors exist, OSPF cannot pick up routes from other routers.

Example

The following example shows the use of the command:

```
(host)# show ip ospf neighbor
Neighbor ID    Pri      State        Dead Time Address        Interface Area
192.168.200.6   1       FULL/DR      00:00:38 192.168.15.96   eth0      0.0.4.210
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show mesh route

`show mesh route`

Description

This command is used to display the routing table using the hostname of the routers.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command combines the output of the commands `show mesh node-list`, `show ip routes`, and `show mesh links`.

Example

The following examples shows the use of the command:

```
(host)# show mesh route
local HostName -> zhiyuanz-1
zhiyuanz-6 is directly connected, dot11radio 1/wds 7, 00:06:36
(host)#

(host)# show mesh route
local HostName -> MSR2000-2c:6d:24
MSR2000-2b:c0:b3 is directly connected, dot11radio 0/wds 8, 3d01h22m
MSR2000-2d:ca:98 [50/3] via MSR4000-11:70:e7, dot11radio 0/wds 7, 01:52:04
MSR2000-2c:6c:fd is directly connected, dot11radio 1/wds 1, 01:48:51
MST200-65:73 is directly connected, dot11radio 1/wds 7, 01:48:52
MSR4000-11:70:c9 is directly connected, dot11radio 1/wds 8, 01:48:52
MSR4000-11:70:e7 is directly connected, dot11radio 0/wds 7, 22:27:08
MST200-84:bc is directly connected, dot11radio 1/wds 0, 01:48:16
MST200-84:d0 is directly connected, dot11radio 1/wds 2, 01:48:51
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 11

Active Video Transport

This chapter covers the following Active Video Transport (AVT) configuration and troubleshooting commands:

This chapter includes the following configuration commands:

This chapter includes the following `debug` commands

The following command may be used to view the camera database:

The following command may be used to view the status of the Network Camera Fingerprinting:

service avt

`service avt`

Description

This command is used to switch to the SERVICE AVT mode from the CONFIG mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

none.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# list
  buffer_time  <100-10000>
  encoder (generic|tycosun|visiondig)
  end
  exit
  help
  ingress-interface gigabit-ethernet 0
  ingress-ip A.B.C.D
  list
  mode (disabled|ingress|egress)
  no buffer_time
  no encoder
  no ingress-interface
  no ingress-ip
  no ingress-ip A.B.C.D
  quit
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-avt)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

mode

```
mode <disabled|egress|ingress>
```

Description

This command is used to configure the router as an ingress, egress, or to disable the AVT service.

Syntax

Parameter	Description
`<disabled|egress|ingress>`	• **Ingress**—MSR routers that directly connect to a camera/encoder. The video traffic enters the mesh network via these routers. • **Egress**—The MSR router from which the video traffic exits the mesh network. Usually it is the gateway of the mesh network with direct connection to the video surveillance center.

Usage Guidelines

Ingress and egress should not be configured on the same router.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# mode ingress
(host)(config-avt)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AVT

encoder

`encoder <generic|tycosun|visiondigi>`

Description

This command is used to set the encoder type (video server).

Syntax

Parameter	Description	Default
`<generic|tycosun|visiondigi>`	**generic**—Used for generic encoders. **tycosun**—Used for the tycosun encoder. **visiondigi**—Used for the visiondigi encoder.	**generic**

Usage Guidelines

High throughput High Definition (HD) cameras from major vendors such as Panasonic, Sony, AXIS, Pelco, and Hikvision are supported under the generic category. Use the generic option to enable the encoder for these cameras. Use the `no encoder` command to go back to the default encoder type, **generic**.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# encoder
  generic    Set the generic manufacturer
  tycosun    Set the tycosun manufacturer
  visiondig  Set the visiondig manufacturer
(host)(config-avt)# encoder generic
(host)(config-avt)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	Command modified. More cameras supported.

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AVT

ingress-ip

`ingress-ip A.B.C.D`

Description

This command is used to set the IP addresses of the encoders at the ingress.

Syntax

Parameter	Description
`A.B.C.D`	IP address of the ingress encoders

Usage Guidelines

Up to four IP addresses can be set. Use the `no ingress-ip A.B.C.D` or the `no ingress-ip` commands to delete the IP addresses of the encoders at the ingress side.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# mode ingress
(host)(config-avt)# ingress-ip 192.168.11.11
(host)(config-avt)# exit
```

The ethernet 0 of the AVT ingress router is connected to a video encoder, whose IP address is 192.168.11.11.

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AVT

ingress-interface gigabit-ethernet

`ingress-interface gigabit-ethernet <0>`

Description

This command is used to set the ingress ethernet interface of the encoder at the ingress side.

Syntax

Parameter	Description
`<0>`	Interface index

Usage Guidelines

Ensure that only video encoders are connected to the ingress-interface. Use the `no ingress-interface` to remove the ingress interface of the encoders at the ingress.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# ingress-interface gigabit-ethernet 0
(32777)%% Warning: make sure no more than 4 ingress-IPs from this interface
(host)(config-avt)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AVT

buffer-time

`buffer-time <100-10000>`

Description

This command is used to set the buffer time for ingress.

Syntax

Parameter	Description	Default
`<100-10000>`	Buffer time for ingress in milliseconds (ms).	500

Usage Guidelines

This configuration is required only for the ingress side. Use the `no buffer-time` to remove the buffer time and restore the default value.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-if-ethernet)# mode access
(host)(config-if-ethernet)# switchport access vlan 10
(host)(config-if-ethernet)# exit
(host)(config)# service avt
(host)(config-avt)# mode ingress
(host)(config-avt)# ingress-interface gigabit-ethernet 0
(host)(config-avt)# buffer_time 3000
(host)(config-avt)# exit
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.2	Command changed

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AVT

show avt status

```
show avt status
```

Description

This command is used to display the runtime statistics of the AVT.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays both the ingress and egress statistics of AVT.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show avt status
mode: egress
number of streams: 2
total memory: 1814 KB

ingress-ip: 10.65.101.209
        up time: 0:4:10
        buffer time: 500 ms
        data rate: 2252 Kbit/s
        buffer memory: 548 KB
        input packets: 71963
        output packets: 71828
        input lost packets: 22
        output lost packets: 0
        retransmit requests: 22
        received retransmit packets: 22
ingress-ip: 10.65.101.214
        up time: 0:4:32
        buffer time: 500 ms
        data rate: 8190 Kbit/s
        buffer memory: 1266 KB
        input packets: 190794
        output packets: 190482
        input lost packets: 33
        output lost packets: 0
        retransmit requests: 33
        received retransmit packets: 33
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	Command modified

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

debug avt drop-forward-packets-probability

```
debug avt drop-forward-packets-probability <0-1000>
```

Description

This command is used to set the packet drop probability in X over one thousand.

Syntax

Parameter	Description	Default
`<0-1000>`	probability of packet drop	0, do not drop any AVT packets

Usage Guidelines

This CLI should only be used to evaluate the AVT effect over different packet drop ratios. Do not use this command in the normal operation mode.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service avt
(host)(config-avt)# debug avt drop-forward-packets-probability 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

debug avt show

`debug avt show`

Description

This command is used to display the drop probability of AVT packets.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `debug avt drop-forward-packets-probability <0-1000>` command to set the packet drop probability.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# debug avt show
drop-forward-packets-probability: 0
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show camera database

```
show camera database
```

Description

This command is used to view the camera database of the cameras that are connected on the network.

Syntax

Parameter	Description
none	-

Usage Guidelines

MeshOS automatically discovers the cameras in a mesh network once they are connected to the network and powered up.

The following information on the cameras is discovered:

- IP address
- MAC address
- Camera manufacturer and type.

The cameras from Axis, Sony, Pelco, Panasonic, D-Link, and Canon are supported.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# Show camera database
Camera              MAC                       Type
10.64.146.171   00:31:6e:4d:32:2f    Axis 221
10.64.146.125   00:31:2d:4d:7b:51   SONY SNC-RH164
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show nvd status

```
show nvd status
```

Description

This command is used to view the status of the Network Camera Fingerprinting feature.

Syntax

Parameter	Description
none	-

Usage Guidelines

MeshOS automatically discovers the cameras in a mesh network once they are connected to the network and powered up.

The following information on the cameras is discovered:

- IP address
- MAC address
- Camera manufacturer and type

The discovery methods include:

- OUI address discovery
- Multicast DNS
- Broadcast UDP (camera specific)

The cameras from Axis, Sony, Pelco, Panasonic, D-Link, and Canon have been tested and are supported by this feature.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show nvd status
(host)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 12

Client Mode Configuration

This chapter covers the client mode configuration and client roaming commands:

This chapter includes the following client mode configuration commands:

This chapter includes the following commands used to set and view client roaming parameters:

This chapter includes the following `show` commands

sta

```
sta <0>
```

Description

This command is used to configure a 802.11 client station on the radio interface specified.

Syntax

Parameter	Description
`<0>`	Radio index.

Usage Guidelines

Only one radio interface can be operated as a client mode on a wireless mesh router and only on station can be created on a Dot11Radio interface. Use the `no sta <0>` command to remove the 802.11 client station setting from the radio interface.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# no bss all
(host)(config-dot11radio)# no wds auto
(host)(config-dot11radio)# sta 0
(host)(config-sta)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

ip address

`ip address` [ip address/mask]
`ip address dhcp`

Description

This command is used to set the IP address of the client station.

Syntax

Parameter	Description
[ip address/mask]	Sets a static IP address specified for the client station
dhcp	The IP address will be automatically obtained by using the DHCP protocol. In this case a DHCP server must be reachable from the station.

Usage Guidelines

Use the `no ip address` command to remove the IP address from the client station.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# no bss all
(host)(config-dot11radio)# no wds auto
(host)(config-dot11radio)# sta 0
(host)(config-sta)# ip address 192.168.11.2/2
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

authentication open wep

`authentication open wep`

Description

This command is used to enable WEP security for the client.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no authentication` command to disable authentication for the client station.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-open-wep)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

authentication open key-management

```
authentication open key-management wpa
authentication open key-management wpa2
```

Description

This command is used to enable WPA and WPA2 security for the client.

Syntax

Parameter	Description
`wpa`	Enables WPA security for the client
`wpa2`	Enables WPA2 security for the client

Usage Guidelines

Use the `no authentication` command to disable authentication for the client station.

Example

The following examples show the use of the command:

Example 1:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open key-management
  wpa   Wpa algorithm
  wpa2  WPA2 algorithm
(host)(config-sta)# authentication open key-management wpa
```

Example 2:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open key-management
  wpa   Wpa algorithm
  wpa2  WPA2 algorithm
(host)(config-sta)# authentication open key-management wpa2
(host)(config-auth-wpa2)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

authentication shared wep

`authentication shared wep`

Description

This command is used to enable shared WEP security for the client.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no authentication` command to disable authentication for the client station.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication shared wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-shared-wep)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

wep-key

```
wep-key <1-4> {ascii | hex} <key-string>
```

Description

This command is used to configure a WEP key list.

Syntax

Parameter	Description
`<1-4>`	WEP key index
`{ascii | hex}`	• **ascii**—Ascii key valid length 5,13,16 • **hex**—Hex key valid length 10,26,32
`<key-string>`	ASCII/Hexadecimal key string

Usage Guidelines

This key list can be configured for both open and shared WEP authentication.

Example

The following examples show the use of the command:

Example 1:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-open-wep)# wep-key
  <1-4>  WEP key index
(host)(config-auth-open-wep)# wep-key 1
  ascii  Ascii key valid length 5,13,16
  hex    Hex key valid length 10,26,32
(host)(config-auth-open-wep)# wep-key 1 ascii 12345
```

Example 2:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-open-wep)# wep-key
  <1-4>  WEP key index
(host)(config-auth-open-wep)# wep-key 1
  ascii  Ascii key valid length 5,13,16
  hex    Hex key valid length 10,26,32
(host)(config-auth-open-wep)# wep-key 1 hex 1234567890
```

Example 3:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication shared wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
```

```
(host)(config-auth-shared-wep)# wep-key
  <1-4>  WEP key index
(host)(config-auth-shared-wep)# wep-key 1
  ascii  Ascii key valid length 5,13,16
  hex    Hex key valid length 10,26,32
(host)(config-auth-shared-wep)# wep-key 1 ascii 12345
```

Example 4:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication shared wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-shared-wep)# wep-key
  <1-4>  WEP key index
(host)(config-auth-shared-wep)# wep-key 1
  ascii  Ascii key valid length 5,13,16
  hex    Hex key valid length 10,26,32
(host)(config-auth-shared-wep)# wep-key 1 hex 1234567890
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	STA WEP

default-key

```
default-key <1-4>
```

Description

This command is used to specify the serial number of the default key.

Syntax

Parameter	Description
<1-4>	WEP key index

Usage Guidelines

The default key is used where the WEP key is not set.

Example

The following examples show the use of the command:

Example 1:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-open-wep)# default-key
  <1-4>  WEP key index
(host)(config-auth-open-wep)# default-key 1
```

Example 2:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication shared wep
(13461)%%Warning: WEP/TKIP don't support 802.11n HT rate
(host)(config-auth-shared-wep)# default-key
  <1-4>  WEP key index
(host)(config-auth-shared-wep)# default-key 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	STA WEP

wpa-type psk

`wpa-type psk {ascii | hex} <KEY>`

Description

This command is used to specify WPA/WPA2 using PSK in ASCII or hexadecimal format and to configure the key-string.

Syntax

Parameter	Description
`{ascii | hex}`	• **ascii**—Ascii key with valid lengths 5,13, and 16 • **hex**—Hex key with valid lengths 10,26, and 32
<KEY>	ASCII/Hexadecimal key string

Usage Guidelines

Pre-shared key mode (PSK) is designed for home and small office networks that don't require the complexity of an 802.1X authentication server.Each wireless network device encrypts the network traffic using a 256 bit key. This key may be entered either as a string of 64 hexadecimal digits, or as a passphrase of 8 to 63 printable ASCII characters.

Example

The following examples show the use of the command:

Example1:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open key-management
  wpa   Wpa algorithm
  wpa2  WPA2 algorithm
(host)(config-sta)# authentication open key-management wpa
(host)(config-auth-wpa)# wpa-type psk ascii 12345678
(host)(config-auth-wpa)# wpa-type psk hex
1234567890123456789012345678901234567890123456789012345678901234
```

Example 2:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# authentication open key-management
  wpa   Wpa algorithm
  wpa2  WPA2 algorithm
(host)(config-sta)# authentication open key-management wp2
(host)(config-auth-wpa2)# wpa-type psk ascii 12345678
(host)(config-auth-wpa2)# wpa-type psk hex
1234567890123456789012345678901234567890123456789012345678901234
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	STA WPA, STA WPA2

access-point ssid

```
access-point ssid <SSID>
```

Description

This command is used to specify the SSID of the AP that the client is going to associate with.

Syntax

Parameter	Description
<SSID>	802.11 Service Set ID.

Usage Guidelines

By default, an AP is not associated with a SSID. Use the `no access-point ssid` command to remove the access-point SSID configuration.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# access-point ssid TEST
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

access-point bssid

`access-point bssid <HH:HH:HH:HH:HH:HH>`

Description

This command is used to specify the BSSID of the AP that the client is going to associate with.

Syntax

Parameter	Description
`<HH:HH:HH:HH:HH:HH>`	The MAC address of the BSSID.

Usage Guidelines

By default, an AP is not associated with a BSSID. Use the `no access-point bssid` command to remove the BSSID setting.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# access-point bssid 00:17:7b:00:0b:95
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

ap-inactivity-limit

`ap-inactivity-limit <1-60>`

Description

This command is used to specify the time interval (in seconds) to verify the activity on an AP after the last frame was received.

Syntax

Parameter	Description	Default
`<1-60>`	Time interval (in seconds) after which the AP is checked for inactivity.	2 seconds

Usage Guidelines

Use the `no ap-inactivity-limit` command to restore the default value of 2 seconds.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# ap-inactivity-limit 20
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

description

`description <string>`

Description

This command is used to configure the interface description of the station.

Syntax

Parameter	Description
`<string>`	Interface description

Usage Guidelines

Use the `no description` command to remove the interface description of the station.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# description clienttest
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

frag-threshold

`frag-threshold <256-2346>`

Description

This command is used to configure the threshold value for the fragments. When the length of the frame to be sent is longer than the configured threshold value, the frame will be fragmented before it is sent out.

Syntax

Parameter	Description	Default
<256-2346>	Threshold value for the fragments. The value 2346 means no fragments.	2346

Usage Guidelines

Use the `no frag-threshold` command to restore the default (no fragmentation).

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# frag-threshold 256
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

scanning cache lifetime

```
scanning cache lifetime <1-100>
```

Description

This command is used to specify the lifetime of the scanning cache set in seconds.

Syntax

Parameter	Description
<1-100>	The lifetime of the scanning cache.

Usage Guidelines

The lifetime of the scanning cache is set in seconds.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# scanning cache lifetime
  <1-100>
(host)(config-sta)# scanning cache lifetime 50
(host)(config-sta)#
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

scanning dwell time

```
scanning dwell time <10-100>
```

Description

This command is used to configure the scanning dwell time.

Syntax

Parameter	Description
<10-100>	Dwell time in seconds

Usage Guidelines

The scanning dwell time is set in seconds.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# scanning dwell time
  <10-100>
(host)(config-sta)# scanning dwell time 30
(host)(config-sta)#
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

scanning hardware-mode

`scanning hardware-mode <a|ag|g>`

Description

This command is used to configure the hardware modes that the client scans.

Syntax

Parameter	Description	Default
`<a|ag|g>`	**a**—Scans all channels supported in 802.11a mode. **g**—Scans all channels supported in 802.11g mode. **ag**—Scans all channels supported in both 802.11a and 802.11g modes.	ag

Usage Guidelines

Use the `no scanning hardware-modes` command to remove the scanning hardware-mode configuration and go back to the default configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# scanning hardware-mode ag
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

scanning interval

`scanning interval <seconds>`

Description

This command is used to configure the minimum time interval between two consecutive scans.

Syntax

Parameter	Description	Range	Default
`<seconds>`	Interval between each scan in seconds	0, 15 - 65535	0

Usage Guidelines

Use the `no scanning interval` command to restore the default setting for the minimum scan interval.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# scanning interval 200
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

scanning threshold rssi

`scanning threshold rssi <0-100>`

Description

This command is used to configure the RSSI threshold that triggers a new scan. If the current RSSI is lower than the configured threshold, the client will start a new scan.

Syntax

Parameter	Description	Default
`<0-100>`	RSSI threshold	20

Usage Guidelines

Use the `no scanning threshold rssi` command to restore the default RSSI threshold.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# scanning threshold rssi 12
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

switchport access vlan

```
switchport access vlan <1-4094>
```

Description

This command is used to configure a station interface in a VLAN.

Syntax

Parameter	Description
`<1-4094>`	The range for the VLAN ID.

Usage Guidelines

Use the `no switchport` command to remove the VLAN.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# switchport access vlan 1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

client-list

`client-list <A.B.C.D/M>`

Description

This command is used to create client-list entries for the auxiliary devices in client mode.

Syntax

Parameter	Description
`<A.B.C.D/M>`	IP address/mask for the auxiliary devices

Usage Guidelines

The purpose of the client-list is to facilitate the auxiliary devices that can perform well in the roaming scenario. When a radio works in the client mode, a variety of applications can be derived via the connection between the mesh network and the client. For example, up to four wired or wireless devices (such as camera encoder/decoder) can connect to the MSR router via Ethernet or radio interfaces. These devices can also connect to the mesh network via the client. Roaming support for the client also allows the auxiliary devices to roam within the mesh.

Client-list is only required if the customer uses static IP to configure the auxiliary devices and wants good performance from the these devices when the client roams within the mesh. Client-list is not required if there is no roaming requirement or the auxiliary devices use DHCP.

Use the `no client-list` or the `no client-list <A.B.C.D/M>` commands to remove all the client-list entries or a specific client-list entry.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# no bss all
(host)(config-dot11radio)# no wds auto
(host)(config-dot11radio)# ip address 192.168.11.2/2
(host)(config-dot11radio)# exit
(host)(config)# client-list 192.168.11.11/32
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

roam rssi diff

```
roam rssi diff X
```

Description

This command is used to set the RSSI difference of target BSS and current BSS.

Syntax

Parameter	Description	Default
x	RSSI difference of target BSS and current BSS	3 dB

Usage Guidelines

In the earlier versions of MeshOS, the client used to roam to a new BSS if the RSSI value of the BSS was 5 dB higher than the current RSSI. This difference was a fixed value. MeshOS 4.5 lets you set the RSSI difference parameter.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# roam rssi diff 5
(host)(config-sta)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

roam rssi confirm duration

```
roam rssi confirm duration x
```

Description

This command is used to set the confirm duration roam parameter.

Syntax

Parameter	Description	Range	Default
x	Confirm duration.	0-50000 ms	0 ms

Usage Guidelines

If the current BSS's RSSI drops below the roaming threshold for a certain time, the client will try to roam. This is to ensure that the RSSI value of the current BSS is definitely lower than the threshold.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# sta 0
(host)(config-sta)# roam rssi confirm duration 0
(host)(config-sta)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO STATION

disable-mimo

`disable-mimo`

Description

This command is used to disable the MIMO capability.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

MIMO rate behaves poorly in some scenarios, so this command has been added in MeshOS 4.5 to disable MIMO rates. Use the `no disable-mimo` command to enable MIMO.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# disable-mimo
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

disable-ampdu

`disable-ampdu`

Description

This command is used to disable AMPDU.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to disable AMPDU in the tx direction. If AMPDU is disabled, the radio will not transmit AMPDU frames, but it can still receive AMPDU frames. In frames that are dropped heavily, AMPDU may not bring benefit to performance. For example, if block ACK is dropped, all sub-frames need to retry. Use the `no disable-ampdu` command to enable AMPDU.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 0
(host)(config-dot11radio)# disable-ampdu
(host)(config-dot11radio)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

debug client

`debug client {none,roam}`

Description

This command is used to enable/disable the roam log.

Syntax

Parameter	Description
`{none,roam}`	**none**—Set client debug none. **roam**— Set client debug roam.

Usage Guidelines

Use the `show debug client` command to view the client log. The main purpose of this log is to trace roam behaviors, which may be used as a debug level log by developers, QA, and support engineers. Information such as scan trigger, scan result, and roam messages are recorded in this log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# debug client roam
(host)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show debug client

`show debug client`

Description

This command is used to view the client log.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

Use the `clear debug client` command to clear the client log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show debug client
(host)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show interface dot11radio 0 sta 0

```
show interface dot11radio 0 sta 0
```

Description

This command is used to display the station configuration status in a dot11radio interface.

Syntax

Parameter	Description
None	-

Usage Guidelines

This command shows all the parameters configured for the specified station in client mode. This information can be used to troubleshoot issues in the station configuration settings.

Example

The following example shows the use of the command:

```
(host)# show interface dot11radio 0 sta 0
State: Associated
SSID: video-1
RSSI: 45
Access Point: 00:17:7b:2a:6c:a0,
Previous Access Point: 00:00:00:00:00:00
Security: open wpa2
Description:
scanning threshold rssi11a 15
scanning threshold rssi11b 15
scanning threshold rssi11g 15
scanning interval 300
scanning hardware-mode ag
channel-list 1,2,3,4,5,6,7,8,9,10,11,12,13,149,153,157,161,165
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 13

VPLM

Virtual Private LAN over Mesh (VPLM) is a tunnel technology used to provide native Layer 2 access function over Layer 3 mesh network. This chapter covers the following VPLM commands:

This chapter includes the following configuration commands:

This chapter includes the following `show` commands

service vplm

`service vplm`

Description

This command is used to enter the VPLM service mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command.

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)#
  allowed-vlan    Allowed VLAN on VPLM
  disable         Disable VPLM service
  enable          Enable VPLM service
  end             End
  exit            Exit
  help            Description of the interactive help system
  list            Print command list
  no              Negate a command or set its defaults
  quit            Quit
  show            Show running system information
  stp-compatible  Enable stp compatible
  write           Write running configuration to file
(host)(config-vplm)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the VPLM service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command.

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE VPLM

disable

`disable`

Description

This command is used to disable the VPLM service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command.

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# disable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE VPLM

allowed-vlan

```
allowed-vlan auto
allowed-vlan manual <WORD>
```

Description

This command is used to specify the VLAN on which VPLM is allowed.

Syntax

Parameter	Description
`auto`	Auto management of VLAN by VPLM
`manual`	Manual management of VLAN by VPLM
`WORD`	A list of VLAN IDs (between 1-4094). Use comma (,) to separate two VLANs without space in between or use the '-" to specify a VLAN range. e.g. 10,20,30,40-50

Usage Guidelines

The VLAN can configured either as a access port or trunk port.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# enable
(host)(config-vplm)# allowed-vlan auto
(host)(config-vplm)# quit
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE VPLM

stp-compatible

`stp-compatible`

Description

This command is used to enable VPLM to be compatible with STP.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `no stp-compatible` to disable this setting.

Example

The following example shows the use of the command.

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# enable
(host)(config-vplm)# allowed-vlan auto
(host)(config-vplm)# quit
(host)(config)# interface vlan 22
(host)(config-vlan)# stp-compatible
(host)(config-vlan)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE VPLM

switchport access vlan

```
switchport access vlan <ID>
```

Description

This command is used to assign VLAN ID for Ethernet and BSS.

Syntax

Parameter	Description
`<ID>`	VLAN ID to be assigned

Usage Guidelines

Use the `no switchport` command to delete the VLAN access point.

Example

The following example shows the use of the command.

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# enable
(host)(config-vplm)# allowed-vlan auto
(host)(config-vplm)# quit
(host)(config)# interface vlan 22
(host)(config-vlan)# quit
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport access vlan 22
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET / DOT11RADIO BSS

switchport site-id

```
switchport site-id <1-255>
```

Description

This command is used to assign a site-ID for the Ethernet interface.

Syntax

Parameter	Description
<1-255>	Range for the interface site-ID

Usage Guidelines

A site is a network that is external to the VPLM enabled mesh network. Assign a unique site ID between 1-255 to each site manually to make it easy to select the sites. If multiple routers in a single VPLM mesh network connect to the same site, all mesh gateway routers need to be configured with this Site ID. If there is only one Ethernet interface connecting an external network (single gateway case), the site ID configuration is not required. If the VPLM enabled mesh networks have multiple gateways, the site-id has to be configured on all gateway routers.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host)(config)# service vplm
(host)(config-vplm)# enable
(host)(config-vplm)# allowed-vlan auto
(host)(config-vplm)# quit
(host)(config)# interface vlan 22
(host)(config-vlan)# quit
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# switchport access vlan 22
(host)(config-eth)# switchport site-id 3
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

show vplm membership-database

```
show vplm membership-database
```

Description

This command is used to display the VPLM membership table.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays information such as VLAN ID, Router-ID, Site-ID, and the association details which can be used for troubleshooting.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show vplm membership-database
VLAN      Router-ID       Site-ID         Assoc
1         192.168.200.91  100             0
1         192.168.200.95  100             1
1         192.168.200.92  0               0
201       192.168.200.91  0               0
201       192.168.200.92  0               0
202       192.168.200.91  0               0
202       192.168.200.92  0               0
203       192.168.200.91  0               0
203       192.168.200.92  0               0
204       192.168.200.91  0               0
204       192.168.200.92  0               0
205       192.168.200.91  0               0
205       192.168.200.92  0               0
206       192.168.200.91  0               0
206       192.168.200.92  0               0
207       192.168.200.91  0               0
207       192.168.200.92  0               0
208       192.168.200.91  0               0
208       192.168.200.92  0               0
209       192.168.200.91  0               0
209       192.168.200.92  0               0
210       192.168.200.91  0               0
210       192.168.200.92  0               0
211       192.168.200.91  0               0
211       192.168.200.92  0               0
212       192.168.200.91  0               0
212       192.168.200.92  0               0
213       192.168.200.91  0               0
213       192.168.200.92  0               0
214       192.168.200.91  0               0
214       192.168.200.92  0               0
215       192.168.200.91  0               0
```

```
215       192.168.200.92  0               0
216       192.168.200.91  0               0
216       192.168.200.92  0               0
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show vplm mac-address-table

`Show vplm mac-address-table`

Description

This command is used to display the MAC address table.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command displays information such as VLAN ID, MAC-ID, Router-ID, and Site-ID which can be used for troubleshooting.

Example

The following example shows the use of the command.

```
(host)> enable
(host)# show vplm mac-address-table
VLAN      MAC                 Router-ID       Site-ID
1         08:00:27:ba:71:85   192.168.200.95  100
1         00:12:cf:38:21:f6   192.168.200.95  100
1         00:12:cf:38:21:f3   192.168.200.95  100
202       06:17:7b:2a:6c:75   192.168.200.92  0
1         00:0f:e2:07:f2:e0   192.168.200.95  100
1         bc:30:5b:df:4a:55   192.168.200.95  100
1         00:12:cf:38:21:f1   192.168.200.95  100
1         00:17:7b:00:0b:a1   192.168.200.95  100
1         00:17:7b:11:70:88   192.168.200.95  100
1         00:25:90:2c:f8:a5   192.168.200.95  100
1         00:17:7b:11:70:b0   192.168.200.95  100
1         38:22:d6:6a:6c:01   192.168.200.95  100
1         bc:30:5b:e4:89:6d   192.168.200.95  100
1         00:17:7b:11:70:1a   192.168.200.91  0
1         00:17:7b:2c:61:33   192.168.200.95  100
1         00:17:7b:11:83:16   192.168.200.95  100
1         00:17:7b:11:82:a8   192.168.200.95  100
1         00:17:7b:2d:e2:05   192.168.200.95  100
206       06:17:7b:11:70:1a   192.168.200.91  0
1         06:17:7b:2a:66:ae   127.0.0.1       0
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show vplm site-id

```
show vplm site-id
```

Description

This command is used to view the VPLM Site-ID for the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

A site is a network that is external to the VPLM enabled mesh network. Assign a unique site ID between 1-255 to each site manually to make it easy to select the sites. If multiple routers in a single VPLM mesh network connect to the same site, all mesh gateway routers need to be configured with this Site ID. If there is only one Ethernet interface connecting an external network (single gateway case), the site ID configuration is not required. If the VPLM enabled mesh networks have multiple gateways, the site ID has to be configured on all gateway routers.

Auto Site-ID

If you do not configure the VPLM Site-ID for a MSR/MST using the WMI or CLI, MeshOS automatically generates the Site-ID as follows:

- If the site has only one AP, which is not configured with a Site-ID, the Site-ID is zero.
- If all the APs on a site are not configured with Site-IDs, all of them are assigned the same Site-ID.
- If an AP reboots or the Ethernet port status changes, the automatic Site-ID value generated may be different from the one before.

Limitations of Auto Site-ID

If there are multiple gateway APs on one site, some are not configured with Site-IDs, and others are configured with Site-IDs, the Site-IDs generated may be different from the Site-IDs that are manually configure although all the APs are on the same site. In this case, the APs on the same site may have different Site-IDs. This situation must be avoided.

If there are multiple sites in one mesh, the Site-ID generated by this protocol may be the same. In this case, you must configure the Site-ID manually through the CLI or WMI.

Example

The following example shows the use of the command.

```
(host)# show vplm site-id
Site-ID 0
(host)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 14

Motrix

Motrix is an Aruba designed, IEEE 802.11-based roaming protocol for wireless mesh networking. Motrix ensures that your communication is unaffected when a wireless client is roaming between different APs. This chapter covers the Motrix configuration and troubleshooting commands.

This chapter includes the following configuration commands:

This chapter includes the following `debug` and `show` commands

mode

`mode <mode>`

Description

This command is used to enable the roaming service.

Syntax

Parameter	Description
`<mode>`	• **access**—Mode for connecting with client device • **backhaul**—Mode for connecting with other mesh routers • **gateway**—Mode for connecting with an external routers • **none**—Default mode Roaming service will be enabled when the mode is set to *ydgL d*.

Usage Guidelines

In order to enable roaming inside a mesh network, at least one gateway node should been configured. The gateway node is the node which directly connects to the wired network and is configured with mode gateway on the Ethernet interface.

Example

The following example shows the use of the command:

```
(host)#
(host)# configure terminal
(host)(config)# interface gigabit-ethernet 0
(host)(config-eth)# mode
  access    Mode for connecting with client device
  backhaul  Mode for connecting with other mesh routers
  gateway   Mode for connecting with an external routers
  none      Default mode
(host)(config-eth)# mode gateway
(host)(config-eth)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE GIGABIT-ETHERNET

service roaming-motrix

`service roaming-motrix`

Description

This command is used to enter the Motrix service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# enable
(host)(config-mtx)#
  debug-level  Set debug level
  disable      Disable service motrix
  enable       Enable service motrix
  end          End
  exit         Exit
  help         Description of the interactive help system
  list         Print command list
  no           Negate a command or set its defaults
  quit         Quit
  show         Show running system information
  station      Configure a static IP station
  write        Write running configuration to file
(host)(config-mtx)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the Motrix service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# enable
(host)(config-mtx)#
  debug-level  Set debug level
  disable      Disable service motrix
  enable       Enable service motrix
  end          End
  exit         Exit
  help         Description of the interactive help system
  list         Print command list
  no           Negate a command or set its defaults
  quit         Quit
  show         Show running system information
  station      Configure a static IP station
  write        Write running configuration to file
(host)(config-mtx)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE ROAMING-MOTRIX

disable

`disable`

Description

This command is used to disable the Motrix service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# enable
(host)(config-mtx)#
  debug-level  Set debug level
  disable      Disable service motrix
  enable       Enable service motrix
  end          End
  exit         Exit
  help         Description of the interactive help system
  list         Print command list
  no           Negate a command or set its defaults
  quit         Quit
  show         Show running system information
  station      Configure a static IP station
  write        Write running configuration to file
(host)(config-mtx)# disable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE ROAMING-MOTRIX

station

`station <HH:HH:HH:HH:HH:HH> <A.B.C.D/M>`

Description

This command is used to create station entries for clients with static IP assigned.

Syntax

Parameter	Description
`<HH:HH:HH:HH:HH:HH>`	Station MAC address
`<A.B.C.D/M>`	Static IP address of the station.

Usage Guidelines

Use the `no station all` command to remove all the station entries and the `no station <HH:HH:HH:HH:HH:HH> to remove entries for a specific station.`

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# station 00:17:7b:2a:6c:9f 10.65.50.214/24
(host)(config-mtx)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE ROAMING-MOTRIX

debug-level

`debug-level <dump/error/event/frame/info/none>`

Description

This command is used to set the debug level for the Motrix log.

Syntax

Parameter	Description
`dump`	Sets the Motrix debug log to record all Motrix debug information
`error`	Sets the Motrix debug log to record errors
`event`	Sets the Motrix debug log to record events
`frame`	Sets the Motrix debug log to record errors and detailed information of the roaming events
`info`	Sets the Motrix debug log to record errors and basic information of the roaming events
`none`	Disables Motrix debug log

Usage Guidelines

Use the `show debug motrix` command to view the contents of the log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# debug-level dump
(host)(config-mtx)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE ROAMING-MOTRIX

show config

```
show config
```

Description

This command is used to display the Motrix configuration information.

Syntax

Parameter	Description
none	-

Usage Guidelines

The information displayed by the command is useful to troubleshoot the Motrix service.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service roaming-motrix
(host)(config-mtx)# show config
debug-level dump
enable
station 00:17:7b:2a:6c:9f 10.65.50.214/24
(host(config-mtx)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE ROAMING-MOTRIX

show debug motrix

`show debug motrix`

Description

This command is used to display the Motrix debug log.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `debug-level <dump/error/event/frame/info/none>` command to set the debug level for the Motrix log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show debug motrix
11/06/11 11:14:28.339121 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:28.348582 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:28.357683 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:48.415488 mtx: mtx_rcv_ip_event:408 Unknown cmd 76/
11/06/11 11:14:50.508427 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:50.556742 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:50.566678 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
11/06/11 11:14:50.576313 mtx: mtx_cmm_callback:2329 class 14, param 1098, opmode 2/
--More--
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show roaming-motrix

```
show roaming-motrix <option>
show roaming-motrix client HH:HH:HH:HH:HH:HH
show roaming-motrix client-list <lms|local|tgw>
show roaming-motrix interface
show roaming-motrix local summary
show roaming-motrix station <HH:HH:HH:HH:HH:HH|lms|local|tgw>
show roaming-motrix status
```

Description

This command is used to display the current status of the Motrix.

Syntax

Parameter	Description
`<option>`	• **client**—Internal client database • **client-list**—Internal client database • **interface**—Display roaming-motrix interface information • **local**—Display roaming-motrix ap information • **station**—Internal station database • **status**—Running status
`HH:HH:HH:HH:HH:HH`	MAC address of the client
`<lms|local|tgw>`	• **lms**—MotrixLMS • **local**—Motrix local • **tgw**—Motrix TGW

Usage Guidelines

You can view the current client information maintained by Motrix which is called the Motrix database, which records the client MAC address, IP address, and information of roaming status from the router. Motrix databases are of three types — Local, LMS, and TGW. The Local database includes association information for all clients currently connected to a node and is available on all nodes. LMS and TGW databases are only available on gateway nodes. The LMS database contains association information for clients within the entire mesh network. The TGW database contains forwarding information for these clients.

The `show roaming-motrix station <HH:HH:HH:HH:HH:HH>` displays information for matching clients in all available databases on a particular router. The output on the gateway nodes includes information from all the three databases. The output on the non-gateway nodes however will only include the local database.

Example

The following examples shows the use of the command:

```
(host)# show roaming-motrix client-list
  lms    Motrix lms
  local  Motrix local
  tgw    Motrix tgw
(host)# show roaming-motrix client
  HH:HH:HH:HH:HH:HH  Client MAC address
(host)#  show roaming-motrix interface
  Intf#   ifname    mode                vlan-id admin   physical
      1   ath2      layer2 access       1000    up      up
      2   ath1      layer2 access       100     up      up
```

```
(host)# show roaming-motrix local summary
    AP#   Local:                    LMS:
      1   192.168.200.94            192.168.200.91
(host)# show roaming-motrix status
 Router-ID IP address: 192.168.200.91
 local disable
  designated lms: 192.168.200.91
 lms enable
  traffic gateway: 192.168.200.91
 tgw enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	Command modified

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 15

Configuring SNMP

This chapter describes the following commands used to configure the Simple Network Management Protocol (SNMP) Agent on wireless mesh routers for the purposes of network monitoring and management:

snmp-server community

`snmp-server community [community] [ro|rw]`

Description

This command is used to add a SNMP community string for controlling access to the Management Information Base (MIB) on the SNMP Agent.

Syntax

Parameter	Description
`[community]`	SNMP community name
`[ro|rw]`	**ro**—Specifies read-only access. Authorized management stations are able to retrieve, but not modify, MIB objects. **rw**—Specifies read-write access. Authorized management stations are able to both retrieve and modify MIB objects.

Usage Guidelines

Use the `no snmp-server community [community]` command to remove a SNMP server community and the `no snmp-server community all` command to remove all SNMP communities.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# snmp-server community snmpcommunity ro
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server host

```
snmp-server host <ip-address> <community> <1-65535> <v1|v2c>
```

Description

This command is used to configure the IP address of the SNMP host to receive traps using the specified community string and the SNMP port.

Syntax

Parameter	Description
`<ip-address>`	IP address of the new trap receiver.
`<community>`	Trap receiver community.
`<1-65535>`	Trap receiver port. The port number is 162 If you are using Aruba NMS to manage the MSR series router.
`<v1|v2c>`	The version of the trap receiver. • **v1**—SNMPv1 version • **v2c**—SNMPv2c version

Usage Guidelines

Use the `snmp-server host` configuration command to specify the recipient of a SNMP trap (a mechanism used to notify the Network Management Servers (NMS) of a change in the network device state). SNMP INFORM trap supports retransmission of the messages sent to the NMS server which improves the reliability of traps. In a complex wireless environment where UDP packet loss is more common than a wired network, SNMP INFORM is recommended over the traditional trap. Use the `no snmp-server host <ip-address>` to remove a SNMP server host and the `no snmp-server host all` command to remove all hosts.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# snmp-server host 10.65.50.200 comm 162 v1
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server syscontact

```
snmp-server syscontact <SYSCONTACT>
```

Description

This command is used to configure the SNMP device system contact information.

Syntax

Parameter	Description
<SYSCONTACT>	System contact

Usage Guidelines

Use the `no snmp-server syscontact` command to delete the SNMP device contact information.

Example

The following example shows the use of the command:

```
(host)#configure terminal
(host)(config)# snmp-server syscontact 4565
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server syslocation

```
snmp-server syslocation <SYSLOC>
```

Description

This command is used to configure the SNMP device location information.

Syntax

Parameter	Description
SYSLOC	System location

Usage Guidelines

Use the `no snmp-server syslocation` command to delete the SNMP device location information.

Example

The following example shows how the use of the command:

```
(host)#configure terminal
(host)(config)# snmp-server
  community     create a SNMP community
  host          create a trap receiver
  syscontact    set system contact
  syslocation   set system location
  sysname       set router sysname
  trap         Trap
  v3user        create a SNMP USM user
  (host)(config)# snmp-server syslocation
  SYSLOC  Syslocation
(host)(config)# snmp-server syslocation China
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server sysname

```
snmp-server sysname <SYSNAME>
```

Description

This command is used to configure the SNMP device system name information.

Syntax

Parameter	Description
SYSNAME	System name

Usage Guidelines

Use the `no snmp-server sysname` command to delete the SNMP device system name information.

Example

The following example shows the use of the command:

```
(host)#configure terminal
(host)(config)# snmp-server sysname server1
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server trap

`snmp-server trap open|close`

Description

This command is used to configure the SNMP device system trap.

Syntax

Parameter	Description
`open`	Open the trap
`close`	Close the trap

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)#configure terminal
(host)(config)# snmp-server trap open
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

snmp-server v3user

```
snmp-server v3user <user name> <ro|rw> <md5|sha|MD5PWD> <AUTH-PWD> <des|aes> <enc-pass>
<auth|no-auth|priv>
```

Description

This command is used to configure a new or existing SNMPv3 user account.

Syntax

Parameter	Description	Default
`<user name>`	SNMPv3 user name	-
`<ro|rw>`	Specifies if the user is read-only or read-write	ro
`<md5|sha|MD5PWD>`	• **md5**—MD5 Authentication • **sha**—SHA Authentication • **MD5PWD**—MD5 password (8 - 16 characters)	md5
`<AUTH-PWD>`	Authentication password.	-
`<des|aes>`	• **des**—DES encryption • **aes**—AES encryption	des
`<ENC-PWD>`	Encryption password (8-16 characters)	-
`<auth|no-auth|priv>`	• **auth**—Authentication and no privacy • **noauth**—No authentication and no privacy • **priv**—Authentication and privacy	noauth

Usage Guidelines

The MSR and MSA series routers support SNMPv3. SNMPv3 users with different access rights can be configured on each of these routers. Use this command to create SNMP community, host, and v3user. The old command `snmp-server v3user <name> <ro|rw> <MD5-pass> <DES-pass> < auth|no-auth|priv>` is still supported but is not recommended for use. Use the `no snmp-server v3user` command to remove an existing SNMPv3 user account and the `no snmp-server v3user all` command to remove all SNMPv3 user accounts.

Example

Use the command as follows to add 4 new snmpv3 users account: aaa, bbb, ccc, and ddd, with the required authentication and encryption type:

```
(host)> enable
(host)# configure terminal
(host)(config)#snmp-server v3user aaa rw md5 12345678 des 12345678 priv
(host)(config)#snmp-server v3user bbb ro sha 12345678 aes 12345678 priv
(host)(config)#snmp-server v3user ccc rw md5 12345678 des 12345678 auth
(host)(config)#snmp-server v3user ddd rw md5 12345678 des 12345678 noauth
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced
MeshOS 4.3	Command modified

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

Chapter 16

Orphan Recovery

This chapter covers the following Orphan Node Recovery (ONR) and Auto Orphan Node (AOR) commands:

Orphan Node Recovery (ONR) Commands:

Auto Orphan Node (AOR) Commands:

orphan-recovery

```
orphan-recovery <MAC ADDR>
```

Description

This command is used to recover an orphan node.

Syntax

Parameter	Description
<MAC ADDR>	MAC address of the orphan node.

Usage Guidelines

The orphan node (ON) is a mesh node which has lost all links with the other nodes in a mesh network. A neighbor node is used to initiate the creation of a configuration file and the same is transferred to the orphan node. Check the settings on the recovered ON. The orphan node recovery feature may reset some of the configuration settings (Ethernet, SNMP, DHCP, NAT...) on the recovered ON to the default settings.

The following are the prerequisites for the orphan node recovery (ONR) process:

- MeshOS version: The MeshOS version, both of the neighbor and the ON is 4.3 or higher.
- Topology: The transmission of messages between nodes that are separated by more than one hop is not possible.
- ON: The ON can be scanned by at least one radio in the mesh point. At least one radio of a neighbor is in WDS mode. The MAC address of the ON is known. The MAC address can be Ethernet, radio (e.g. wifi*), or any VAP (e.g. WDS, STA, or AP).
- Neighbor node: The ON and its neighbor are able to communicate at the physical layer with a RSSI greater than 15.

Use the prerequisites listed above to select a suitable neighbor for the ON and run the CLI command from the selected neighbor node.

Example

The following example shows the use of the command:

```
(host)# orphan-recovery mac 00:17:7b:2c:f7:3f
sending profile.......
% Send profile success,orphan will reboot and try to reconnect.
NOTE:please wait 2-3 minutes before verifying if the mesh links are up with the command
"show mesh links".Also verify other setting on the orphan node once the link is up.
If no links reconnect after 5 minutes, please see more details by checking customer log
with command "show log all | grep orphan".
(host)#
```

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

orphan-reboot

```
orphan-reboot <MAC ADDR>
```

Description

This command is used to reboot an orphan node without changing its configuration.

Syntax

Parameter	Description
<MAC ADDR>	MAC address of the orphan node.

Usage Guidelines

The orphan node (ON) is a mesh node which has lost all links with the other nodes in a mesh network. A neighbor node can be used to reboot the ON without changing its configuration.

The following are the prerequisites for this process:

- MeshOS version: The MeshOS version, both of the neighbor and the ON is 4.3 or higher.
- Topology: The transmission of messages between nodes that are separated by more than one hop is not possible.
- ON: The ON can be scanned by at least one radio in the mesh point. At least one radio of a neighbor is in WDS mode. The MAC address of the ON is known. The MAC address can be ethernet, radio (e.g. wifi*), or any VAP (e.g. WDS, STA, or AP).
- Neighbor node: The ON and its neighbor are able to communicate at the physical layer with a RSSI greater than 15.

Use the prerequisites listed above to select a suitable neighbor for the ON and run the CLI command from the selected neighbor node.

Example

The following example shows the use of the command:

```
(host)# orphan-reboot mac 00:17:7b:2c:f7:3f
sending reboot cmd.......
% Send reboot cmd success,orphan will reboot.
(host)#
```

This command is run from the selected neighbor node.

Command History

Release	Modification
MeshOS 4.3	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

service auto-orphan-recovery

`service auto-orphan-recovery`

Description

This command is used enter the Auto Orphan Recovery (AOR) configuration mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

Auto Orphan Recovery (AOR) feature enables the orphan node (ON) to automatically reconnect back to the mesh network. The Orphan Node reboots itself if it stays in the orphan state for over 12 hours.

The AOR feature works as follows:

- The Mesh Orphan Node's Physical Neighbor (MPN) must be connected to the gateway through the WDS link or should have a WDS data link.
- Once a node becomes a ON, it automatically ask for configuration from MPN. The communication takes place through RVL (Radio Virtual Link).
- Once a node becomes a ON, it broadcasts the request for correct configuration to all physical neighbors by RVL (Radio Virtual Links), so that the transmission will not be limited by wireless mode and channel list.
- If a MPN receives the request, it sends a configuration to ON.
- The MPN sends a trap and the MIB info which includes the Ethernet MAC address of the ON to MeshConfig or Airwave. This information includes the MAC address of the ON and MPN.

When the ON receives the configuration, it checks the following to make sure that the profile is correct:

- Group number ¡X to make sure that the profile is the one asked by ON
- RSSI level > 15
- The information is correctly decrypted.
- Once the ON receives the correct profile, it changes its configuration according to the profile and reboots automatically. The ON stops receiving other profiles until reboot.
- After the ON reboots itself, you can use the `show auto-orphan-recovery history` command to view what time it recovered itself and by which MPN.
- For security purposes, all information is encrypted by AES. The basic key is set at the provisioning stage using WMI or CLI. The final key is generated using the basic-key and a DA MAC address. If two nodes are not set with the same basic key, they will not be able to communicate with each other during AOR.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service auto-orphan-recovery
(host)(config-aor)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the Auto Orphan Recovery.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service auto-orphan-recovery
(host)(config-aor)# aor-key 12345678
(host)(config-aor)# enable
(host)(config-aor)# end
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AOR

disable

`disable`

Description

This command is used to disable the Auto Orphan Recovery.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service auto-orphan-recovery
(host)(config-aor)# aor-key 12345678
(host)(config-aor)# disable
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AOR

aor-key

`aor-key <key>`

Description

This command is used to set the AOR key.

Syntax

Parameter	Description
<key>	A string of 8-64 alphanumeric characters

Usage Guidelines

Use the `no aor-key` command to disable the AOR key.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service auto-orphan-recovery
(host)(config-aor)# aor-key 12345678
(host)(config-aor)# enable
(host)(config-aor)# end
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE AOR

show auto-orphan-recovery history

`show auto-orphan-recovery history`

Description

This command is used to view the AOR history.

Syntax

Parameter	Description
none	-

Usage Guidelines

The prerequisite for the AOR feature is to enable the AOR and set the AOR key. The AOR history will get populated once the AOR feature starts recovering the orphan nodes.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show auto-orphan-recovery history
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Chapter 17

Radio Frequency Management

This chapter covers the following Radio Frequency Management (RFM) and WDS commands:

This chapter includes the following RFM configuration commands:

This chapter includes the following Auto WDS configuration commands:

This chapter includes the following `show` and `debug` commands:

authentication open key-management

```
authentication open key-management wpa
authentication open key-management wpa2
```

Description

This command is used to enable WPA and WPA2 security for WDS.

Syntax

Parameter	Description
`authentication open key-management`	Enables security for WDS.
`wpa`	Enables WPA security.
`wpa2`	Enables WPA2 security.

Usage Guidelines

This authentication command is used to configure the global WDS settings. All WDS related parameters can be configured under the Mesh mode for centralized management. Use the `no authentication` command to remove the authentication configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# hostname hostname1
hostname1(config)# mesh
hostname1(config-mesh)# authentication open key-management wpa
hostname1(config-auth-open-wpa)
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

authentication open/shared wep

```
authentication open wep
authentication shared wep
```

Description

This command is used to enable open/shared WEP security for WDS.

Syntax

Parameter	Description
`open`	Enables open WEP security for WDS.
`shared`	Enables shared WEP security for WDS.

Usage Guidelines

Use the `no authentication` command to remove the authentication configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# hostname hostname1
hostname1(config)# mesh
hostname1(config-mesh)# authentication open wep
hostname1(config-auth-open-wep)
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

psk ascii/hex

```
psk ascii <key-string>
psk hex <key-string>
```

Description

This command is used to configure the key type for WPA and WPA2.

Syntax

Parameter	Description	Length
`ascii`	Configures the key type of WPA /WPA2 as ASCII.	8-63 bits
`hex`	Configures the key type of WPA /WPA2 as Hexadecimal.	64 bits
`key-string`	The name of the key string.	-

Usage Guidelines

Pre-shared key mode (PSK) is designed for home and small office networks that don not require the complexity of an 802.1X authentication server.Each wireless network device encrypts the network traffic using a 256 bit key. This key may be entered either as a string of 64 hexadecimal digits, or as a passphrase of 8 to 63 printable ASCII characters.

Example

The following example shows the configuration of a ASCII key type for WPA:

```
(host)(config)# hostname hostname1
hostname1(config)# mesh
hostname1(config-mesh)# authentication open key-management wpa
hostname1(config-auth-open-wpa)# psk ascii 1234567890
hostname1(config-auth-open-wpa)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	WPA/WPA2

default-key

`default-key <1-4>`

Description

This command uses the key list in the WEP profile and designates a default key serial number to it.

Syntax

Parameter	Description	Values
`default-key`	Uses the key list in WEP profile and designates a default key serial number	1-4

Usage Guidelines

The default key is used where the WEP key is not set.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)#
(host)(config-mesh)# authentication open wep
(host)(config-auth-open-wep)# default-key
  <1-4>  Default WEP key index
(host)(config-auth-open-wep)# default-key 1
(host)(config-auth-open-wep)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	WEP

wep-key

```
wep-key <1-4> hex <key-string>
wep-key <1-4> ascii <key-string>
```

Description

This command is used to add ASCII or Hexadecimal WEP key to the WEP profile.

Syntax

Parameter	Description	Length
`wep-key`	Adds a WEP key to the WEP profile.	-
`hex`	Adds a Hexadecimal WEP key.	10, 26, and 32.
`ascii`	Adds a ASCII WEP key.	5, 13, and 16.
`key-string`	Name of the key-string.	-

Usage Guidelines

This key list can be configured for both open and shared WEP authentication. Use the `default-key <1-4>` command to specify the default key serial number for transmission.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)#
(host)(config-mesh)# authentication open wep
(host)(config-auth-open-wep)# wep-key 2 ascii 12345
(host)(config-auth-open-wep)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	WEP

neighbor-list

`neighbor-list`

Description

This command is used to switch to the neighbor list mode in the mesh mode.

Syntax

Parameter	Description
`neighbor-list`	Switches to the neighbor list mode.

Usage Guidelines

The neighbor list mode enables you to configure Mesh neighbor parameters such as neighbor list type (white-list, black-list), neighbor host, and neighbor ID.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)# neighbor-list
  end
  exit
  help
  list
  neighbor host WORD
  neighbor router WORD
  no neighbor all
  no neighbor host WORD
  no neighbor router WORD
  quit
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-neighbor-list)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

neighbor-list-type

```
neighbor-list-type inactive
neighbor-list-type white-list
neighbor-list-type black-list
```

Description

This command is used to specify the neighbor list that can be used while forming the auto WDS link.

Syntax

Parameter	Description
`inactive`	The neighbor list is not in use
`white-list`	Establishes auto WDS link using only the neighbors whose node ID and Radio number are specified in the neighbor white-list.
`black-list`	Excludes the neighbors whose node ID and Radio number are specified in the neighbor black-list while forming the auto WDS link.

Usage Guidelines

This command can be used to configure neighbor white-lists and black-lists which determine if the router can form a link with a neighbor.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)# neighbor-list-type inactive
(host)(config-mesh)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

neighbor host

`neighbor host <string>`

Description

This command is used to specify the hostname of a neighbor to add as a neighbor-list entry.

Syntax

Parameter	Description
`<string>`	Neighbor host

Usage Guidelines

Use the `no neighbor host <string>` to delete a neighbor host entry and the `no neighbor all` command to delete all neighbor entries.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)# neighbor-list
(host)(config-neighbor-list)# neighbor host zhiyuan-5
(host)(config-neighbor-list)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NEIGHBOR-LIST, PREFERRED-LINK

neighbor router

`neighbor router <ID>`

Description

This command is used to specify the router-id of a neighbor to add as a neighbor-list entry.

Syntax

Parameter	Description
`<ID>`	Neighbor router ID in the format A.B.C.D.

Usage Guidelines

Use the `no neighbor router <ID>` to delete a neighbor router entry and the `no neighbor all` command to delete all neighbor entries.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)# neighbor-list
(host)(config-neighbor-list)# neighbor router 10.65.50.212
(host)(config-neighbor-list)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	NEIGHBOR-LIST, PREFERRED-LINK

preferred-link

`preferred-link <index>`

Description

This command is used to switch to the preferred-link mode in Mesh mode.

Syntax

Parameter	Description	Range
`<index>`	Interface index	0-5

Usage Guidelines

If the preferred-link interface is specified, the router will try to establish WDS link with the specified preferred neighbor whenever possible. Use the `no preferred-link all` to delete all preferred link interfaces.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# mesh
(host)(config-mesh)# preferred-link 0
(host)(config-preferred-link)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH

service rf-management

`service rf-management`

Description

This command is used to switch to Radio Frequency Management (RFM) mode from the CONFIG mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

The `enable` command is used in the RFM mode to enable the RFM service.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service rf-management
(host)(config-rf-management)# list
  debug ( none |error |event |process |info |dump )
  enable
  end
  exit
  help
  list
  quit
  show configuration
  show configuration | (grep|begin) PATTERN
  show running-config
  show running-config | (grep|begin) PATTERN
  write memory
(host)(config-rf-management)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the Radio Frequency Management (RFM) mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service rf-management
(host)(config-rf-management)# enable
(host)(config-rf-management)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE RF-MANAGEMENT

wds auto

`wds auto`

Description

This command is used to enable Auto WDS on a radio.

Syntax

Parameter	Description
none	-

Usage Guidelines

When a radio interface is configured with auto WDS mode, the radio interface will scan all allowed channels to discover all possible neighbor nodes to establish WDS links.

Example

The following example shows the use of the command:

```
(host)# configure terminal
(host) (config)# interface dot11radio 1
(host) (config-dot11radio)# wireless-mode na
(host) (config-dot11radio)#wds auto
(host) (config-wds-auto)# end
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	INTERFACE DOT11RADIO

max-auto-wds

`max-auto-wds <1-6>`

Description

This command is used to set the maximum number of auto WDS interfaces allowed on this radio.

Syntax

Parameter	Description	Range	Default
`max-auto-wds`	Specifies the maximum number of auto WDS interfaces that are allowed on this radio.	1-6	4

Usage Guidelines

Use the `no max-auto-wds` command to remove the max-auto-wds setting and use the default maximum WDS number (4).

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# interface dot11radio 1
(host)(config-dot11radio)# wireless-mode na
(host)(config-dot11radio)# wds auto
(host)(config-wds-auto)# max-auto-wds 3
(host)(config-wds-auto)# end
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	WDS AUTO

show rf-management

```
show rf-management candidates
show rf-management links
show rf-management neighbors
show rf-management portals
```

Description

This command is used to display the status of the WDS links that are established or the ones that are being created.

Syntax

Parameter	Description
`candidates`	Candidate routers
`links`	Backhaul links
`neighbors`	Neighbor routers
`portals`	Portals information

Usage Guidelines

The new command `show mesh` will replace this command. It is recommended that the `show mesh` command is used instead of the `show rf-management`.

Example

The following example shows the use of the command:

```
(host)> enable
(host)#
(host)# show rf-management links
Radio 1 Wireless mode:na, Wireless channel:104
Link 0: Peer hostname: zhiyuan-6,
        Peer radio index: 1, Peer MAC: 00:17:7b:2c:f7:41,
        Local role: ap, Local interface name: dot11radio 1/wds 0,
        Local IP: 8.184.13.77, Peer IP: 8.184.13.78,
        Link state: physical up, Physical up time: 0:1:55,
        Link quality: 22%, Data rate: 39M, RSSI: 29, SNR: 29,
        Input rate: 36.83 Kbps, Output rate: 10.55 Kbps.
Radio 3 Wireless mode:na, Wireless channel:100
Link 1: Peer hostname: zhiyuan-5,
        Peer radio index: 1, Peer MAC: 00:17:7b:00:0b:96,
        Local role: sta, Local interface name: dot11radio 3/wds 7,
        Local IP: 129.5.202.46, Peer IP: 129.5.202.45,
        Link state: physical up, Physical up time: 0:15:0,
        Link quality: 60%, Data rate: 130M, RSSI: 41, SNR: 41,
        Input rate: 32.87 Kbps, Output rate: 4.75 Kbps.
Link 2: Peer hostname: zhiyuan-4,
        Peer radio index: 1, Peer MAC: 00:17:7b:2a:6c:a1,
        Local role: sta, Local interface name: dot11radio 3/wds 9,
        Local IP: 21.54.79.202, Peer IP: 21.54.79.201,
        Link state: physical up, Physical up time: 0:15:0,
        Link quality: 61%, Data rate: 130M, RSSI: 53, SNR: 53,
        Input rate: 32.53 Kbps, Output rate: 8.55 Kbps.
Link 3: Peer hostname: zhiyuan-2,
```

```
        Peer radio index: 0, Peer MAC: 00:17:7b:2a:6c:76,
        Local role: sta, Local interface name: dot11radio 3/wds 10,
        Local IP: 21.54.58.154, Peer IP: 21.54.58.153,
        Link state: physical up, Physical up time: 0:14:59,
        Link quality: 60%, Data rate: 117M, RSSI: 53, SNR: 53,
        Input rate: 30.20 Kbps, Output rate: 5.22 Kbps.
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

Show mesh node-list

`Show mesh node-list`

Description

This command is used to display information on the routers in the mesh.

Syntax

Parameter	Description
none	-

Usage Guidelines

This information includes device MAC, hostname, Management IP, and IS gateway.

Example

The following example shows the use of the command:

```
(host)> enable
(host)#
(host)# show mesh node-list
DeviceMAC         HostName         GW  ManagementIP
00:17:7b:11:70:1a zhiyuan-1        Yes 10.65.12.91
00:17:7b:2c:f7:3f zhiyuan-6        No  10.65.12.96
00:17:7b:00:0b:94 zhiyuan-5        No  10.65.12.95
00:17:7b:2a:6c:75 zhiyuan-2        No  10.65.12.92
00:17:7b:2a:6c:9f zhiyuan-4        No  10.65.12.94
00:17:7b:2a:6b:b5 zhiyuan-3        No  10.65.12.93
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show debug rf-management

`show debug rf-management`

Description

This command is used to display the RFM log information.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `clear debug rf-management` command to clear the RFM log information.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show debug rf-management
Nov 29 19:24:38 MSR4000 dot11radio2 mesh: leave PASSIVE
Nov 29 19:24:38 MSR4000 dot11radio2 mesh: neighbor 00:17:7b:2a:66:b0 conn_state
change to Linking/0
Nov 29 19:24:38 MSR4000 dot11radio2 mesh: switch from channel 153 to channel 149
Nov 29 19:24:38 MSR4000 dot11radio2 mesh: send connection request to neighbor
00:17:7b:2a:66:b0(hostname zhiyuan-6,dot11radio 1/wds 2)
Nov 29 19:25:39 MSR4000 dot11radio2/wds7: delete connection to neighbor
00:17:7b:2a:66:b0(hostname zhiyuan-6,dot11radio 1/wds 2), associate failed
Nov 29 19:25:39 MSR4000 dot11radio2 mesh: neighbor 00:17:7b:2a:66:b0 conn_state
change to Failed/1004
--More--
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

debug

`debug <dump|error|event|info|none|process>`

Description

This command is used to set/ disable the RFM debug log.

Syntax

Parameter	Description
`dump`	Set RFM debug logging to log all RFM debugging information
`error`	Set RFM debug logging to log errors
`event`	Set RFM debug logging to log the process of forming a network
`info`	Set RFM debug logging to log errors, status, and other information
`none`	Disable RFM debug logging
`process`	Set RFM debug logging to log errors, start, information and RFM frames

Usage Guidelines

Use the `show debug log` command to view the log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service rf-management
(host)(config-rf-management)# debug dump
(host)(config-rf-management)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE RF-MANAGEMENT

Chapter 18

MIBs and RFCs

This chapter lists the Management Information Bases (MIBs) and RFCs supported by the Aruba MeshOS firmware.

Supported MIBs

The following is a list of the MIBs supported by the Aruba MeshOS firmware:

Public MIBs:

- IANAifType-MIB
- RFC 1213-MIB
- SNMPv2-SMI
- SNMPv2-TC

Private MIBs:

- AZALEA-AP-MIB
- AZALEA-MESH-MIB

Supported RFCs

The following is the list of RFCs supported by the Aruba MeshOS firmware:

- RFC 1213Network Management of TCP/IP-based internet: MIB-II
- RFC 1157Simple Network Management Protocol
- RFC 1573Interfaces Group MIB
- RFC 2012SNMPv2 Management Information Base for the TCP
- RFC 2013SNMPv2 Management Information Base for the User Datagram Protocol
- RFC 2271An Architecture for Describing SNMP Management Frameworks
- RFC 1901Introduction to Community-based SNMPv2
- RFC 1902Structure of Management Information for Version 2 of the SNMPv2
- RFC 1903Textual Conventions for SNMPv2
- RFC 1904Conformance Statements for SNMPv2
- RFC 1905Protocol Operations for SNMPv2
- RFC 1906Transport Mappings for SNMPv2
- RFC 1907Management Information Base for SNMPv2
- RFC 2571Architecture for SNMP Frameworks
- RFC 2572Message Processing and Dispatching
- RFC 2573SNMP Applications
- RFC 2574User-based Security Model (USM) for SNMPv3
- RFC 2575View-based Access Control Model (VACM) for SNMP

- RFC 2578Structure of Management Information Version 2 (SMIv2).
- RFC 2579Textual Conventions for SMIv2
- RFC 2580Conformance Statements for SMIv2

Chapter 19

QoS Configuration

This chapter describes the quality of service (QoS) commands. Mesh routers support QoS, including QoS policy and bandwidth control. The following are the QoS commands included in this chapter:

qos-policy

```
qos-policy <policy-name>
```

Description

This command is used to create a QoS policy.

Syntax

Parameter	Description
`<policy-name>`	Name of the QoS policy to be created.

Usage Guidelines

A QoS policy consists of the classification and labelling of a data packet. Classify the incoming or outgoing packets and label them using IP QoS label (TOS/DSCP) to ensure that the routers take priority when processing packets to meet the QoS requirement of the various applications. QoS policies can be applied to Ethernet, BSS, and VLAN interfaces.

Example

The following example shows the use of the command:

```
(host)(config)# qos-policy aaa
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

qos-class

```
qos-class <class-id> match access-group <NAME> set dscp <dscp-value>
qos-class <class-id> match access-group <NAME> set tos <tos-value>
qos-class <class id> remark <word>
```

Description

This command is used to add a QoS class to a QoS policy.

Syntax

Parameter	Description	Range
`<class-id>`	The QoS class ID.	<1-999>
`match access-group`	Classification criteria.	-
`<NAME>`	Name of the access group.	-
`set`	Set QoS values.	-
`dscp`	Specifying the DSCP value.	-
`<dscp-value>`	Differentiated Services Code Point (DSCP) value.	0-63
`tos`	Specifying the Type of Service (TOS) value.	-
`<tos-value>`	TOS value.	Normal-Service 2—Minimize-Cost 4—Maximize-Reliability 8—Maximize-Throughput 16—Minimize-Delay
`remark`	Edit or remove description of a QoS class.	-
`<word>`	QOS class description.	-

Usage Guidelines

The QoS class can be used to specify the parameters for labelling the data packets using the IP QoS label (TOS/DSCP).

Type of Service (TOS) consists of the last 4 bits of the IP Header TOS/DS fields represented as D, T, R, and C (Delay, Throughput, Reliability, Cost), namely minimal delay, maximum throughput, optimal reliability, and least cost. The left most bit is currently reserved. The condition is that only one of the 4 bits can be set to 1 once. The default condition is all the 4 bits are set as 0, meaning general service.

Differentiated Services Code Point (DSCP) consists of the first 6 bits of IP Header TOS/DS fields. The last 2 bits are currently reserved. When the right most three bits are not set as 0 simultaneously, these 6 bits can define 64 services which are based on the priority of designated internet, local, temporary, or trial organizations.

Examples

The following are some examples show the application of a QoS policy to a ACL and an interface:

Defining the ACL

Example 1:

```
(host)(config)# ip access-list standard aaa
(host)(config-acl-ip-std)# rule 10 permit 192.168.10.0 0.0.0.255
```

```
(host)(config-acl-ip-std)# qu
```

Example 2:

```
(host)(config)# ip access-list extended CTL_TRAFFIC
(host)(config-acl-ip-ext)# rule 10 permit tcp any eq 22 any eq 22
(host)(config-acl-ip-ext)# rule 20 permit udp any eq 161 any eq 161
(host)(config-acl-ip-ext)# rule 30 permit udp any eq 162 any eq 162
(host)(config-acl-ip-ext)# rule 40 permit udp any eq 53 any eq 53
(host)(config-acl-ip-ext)# qu
```

Defining the QoS policy

Example 1:

```
(host)(config)# qos-policy aaa
(host)(config-qos-policy)# qos-class 10 match access-group aaa set dscp 46
(host)(config-qos-policy)# qu
```

Example 2:

```
(host)(config)# in gigabit-ethernet 0
(host)(config-eth)# qos-policy aaa in
(host)(config-eth)# end
(host)#
```

Applying the QoS policy to the interface

```
(host)(config)# in gigabit-ethernet 0
(host)(config-eth)# qos-policy aaa in
(host)(config-eth)# end
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	QOS POLICY

debug bwctrl

`debug bwctrl {none|error|state|info|frame|dump}`

Description

This command is used to configure the per-station bandwidth control log.

Syntax

Parameter	Description
`debug bwctrl`	Configures the per-station bandwidth control log.
`{none|error|state|info|frame|dump}`	The log level.
`clear debug bwctrl`	Clears the per-station bandwidth control log.
`show debug bwctrl`	Displays the per-station bandwidth control log.

Usage Guidelines

Dynamic per-station bandwidth control needs to work with Motrix.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# debug bwctrl dump
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

default-max-bw out

```
default-max-bw out <1-300000>
```

Description

This command is used to configure maximum bandwidth for each WDS link.

Syntax

Parameter	Description	Default	Range
`<1-300000>`	Maximum bandwidth for each WDS link in kbits/s.	0	0, 1-300000

Usage Guidelines

MSR routers support bandwidth control on WDS. In point-to-multipoint scenarios, bandwidth control on WDS could ensure steady and reliable data transmission for each WDS. Once you configure maximum bandwidth for a mesh router, the output bandwidth of all of its WDS cannot be higher than the maximum bandwidth configured. You can however set special bandwidth for preferred WDS link using the `max-bw out` command. This is an advanced feature and it is recommended for use only by experienced personnel. Check your network design before changing or setting the bandwidth value.

Example

The following example configures a maximum bandwidth of 20000 for each WDS link, but configures a bandwidth of 40000 on the preferred mesh link:

```
(host)(config-mesh)# default-max-bw out 20000
(host)(config-mesh)# preferred-link 0
(host)(config-preferred-link)# max-bw out 40000
(host)(config-preferred-link)# end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	MESH, PREFERRED-LINK

Chapter 20

Troubleshooting & Other CLI

This chapter includes the following commands:

Troubleshooting commands:

Configuration commands:

Show commands:

Power Sourcing Equipment (PSE) mode commands:

ping

```
ping <A.B.C.D> | <hostname>
ping <A.B.C.D> | <hostname> [repeat (1-2147483647) size (36-18024)]
```

Description

This command is used ping the remote host with the specified IP address or hostname or the specified packet number and size of ICMP echo.

Syntax

Parameter	Description
`<A.B.C.D>`	IP address of the router.
`<hostname>`	Hostname of the router.
`[repeat (1-2147483647) size (36-18024)]`	Packet number and size of the ICMP echo

Usage Guidelines

Ping is a common method for troubleshooting the accessibility of devices. It uses a series of Internet Control Message Protocol (ICMP) Echo messages to determine:

- whether a remote host is active and reachable
- the round-trip delay in communicating with the host
- packet loss

The ping command sends an echo request packet to an address and waits for a reply. If a reply is received, the latency between the request and reply is shown. Four ping requests are sent by default. Use Ctrl +c to terminate a running ping operation.

Example

The following examples show the use of the command:

```
(host)> enable
(host)# ping 172.16.11.254
PING 172.16.11.254 (172.16.11.254) 56(84) bytes of data.
64 bytes from 172.16.11.254: icmp_seq=1 ttl=64 time=0.259 ms
64 bytes from 172.16.11.254: icmp_seq=2 ttl=64 time=0.219 ms
64 bytes from 172.16.11.254: icmp_seq=3 ttl=64 time=0.217 ms
64 bytes from 172.16.11.254: icmp_seq=4 ttl=64 time=0.217 ms

--- 172.16.11.254 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3003ms
rtt min/avg/max/mdev = 0.217/0.228/0.259/0.017 ms

(host)# ping 192.168.15.11
PING 192.168.15.11 (192.168.15.11): 56 data bytes

--- 192.168.15.11 ping statistics ---
4 packets transmitted, 0 packets received, 100% packet loss
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

telnet

```
telnet { <A.B.C.D> | <hostname> } <port>
```

Description

This command is used to telnet the remote host with the specified IP address or hostname.

Syntax

Parameter	Description
<A.B.C.D>	IP address of the router.
<hostname>	Hostname of the router.
<port>	Port to be used.

Usage Guidelines

Telnet access is disable by default. You can also use this command to contact other devices on the network.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# telnet 10.65.50.211
  <cr>
  PORT  TCP Port number
(host)# telnet 10.65.50.211

Entering character mode
Escape character is '^]'.

(host) login: root
Password:

Hello, Welcome to Aruba CLI

(host)>
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

ssh

```
ssh {<A.B.C.D>|<hostname>}<port>
```

Description

This command is used to Secure Shell (SSH) the remote host with the specified IP address or hostname.

Syntax

Parameter	Description
`<A.B.C.D>`	IP address of the router.
`<hostname>`	Hostname of the router.
`<port>`	Port to be used.

Usage Guidelines

SSH is disable by default. You can also use this command to contact other devices on the network.

Example

The following example shows the use of the command:

```
(host)> enable
(host)> ssh 10.65.50.211

Host '10.65.50.211' is not in the trusted hosts file.
(fingerprint md5 9e:fd:e2:29:59:8e:5d:7b:24:88:41:24:0e:0f:51:21)
Do you want to continue connecting? (y/n) y
root@10.65.50.211's password:

Hello, Welcome to Aruba CLI

(host)>
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

traceroute

```
traceroute {<A.B.C.D> | <hostname>} port (1-65535) source (A.B.C.D)
```

Description

This command is used to trace the route to the remote host with specified IP address or hostname.

Syntax

Parameter	Description
`<A.B.C.D>`	IP address of the router.
`<hostname>`	Hostname of the router.
`port (1-65535)`	Sets the UDP port number used in probes
`source (A.B.C.D)`	Traceroute source address

Usage Guidelines

Traceroute is used to discover the routes that packets actually take when traveling to their destination. The network device sends out a sequence datagram of User Datagram Protocol (UDP) to an invalid port address at the remote host.

Traceroute sends multiple sets of three datagrams. The first set is sent with a Time-To-Live (TTL) field value set to one. The TTL value of 1 causes the datagram to "timeout" as soon as it hits the first router in the path. The router then responds with an ICMP Time Exceeded Message (TEM) indicating that the datagram has expired. Traceroute waits for the TEM message and, if received, displays the IP address of the router and the latency for each datagram.

The next set of datagrams is then sent with the TTL value incremented by one. This process continues until the packets actually reach the other destination. Since these datagrams are trying to access an invalid port at the destination host, ICMP Port Unreachable Messages are returned, indicating an unreachable port. This event signals to the Traceroute program that it has finished.

The purpose behind this is to record the source of each ICMP Time Exceeded Message to provide a trace of the path the packet took to reach the destination.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# traceroute 192.168.15.126
traceroute to 192.168.15.126 (192.168.15.126), 30 hops max, 40 byte packets
 1  192.168.15.126 (192.168.15.126)  7.134 ms  1.323 ms  0.821 ms
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

debug-level

`debug-level {error|info|dump}`

Description

This command is used to configure the log level of auto recovery.

Syntax

Parameter	Description
`{error|info|dump}`	• **dump**—Set debug level dump • **error**—Set debug level error • **info**—Set debug level info

Usage Guidelines

Use the `show debug log` command to view the log.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service recovery
(host)(config-recovery)# debug-level dump
(host)(config-recovery)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE RECOVERY

remote-capture

```
remote-capture enable| disable
```

Description

This command is used to enable/disable the remote troubleshooting feature.

Syntax

Parameter	Description
none	-

Usage Guidelines

none.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# remote-capture enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

write memory

`write memory`

Description

This command is used to save the current running configuration to the startup-config file.

Syntax

Parameter	Description
none	-

Usage Guidelines

We highly recommend that you save the configuration of the routers on a periodic basis.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# write memory
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

reboot

`reboot`

Description

This command is used to restart the routers.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command performs a hot restart of the router.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# reboot
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

logging

```
logging <A.B.C.D >
logging facility (kern|local0-7|customer) severity <0-7>
logging on
```

Description

This command is used to enable remote syslog service.

Syntax

Parameter	Description
A.B.C.D	Remote syslog server IP address
facility	Set syslog facility parameter. The parameter takes the following values: • **kern**—Kernel • **local0—**Local facility 0 • **local1**—Local facility 1 • **local2**—Local facility 2 • **local3**—Local facility 3 • **local4**—Local facility 4 • **local5**—Local facility 5 • **local6**—Local facility 6 • **local7**—Local facility 7 • **customer**—Customer
on	Enable remote syslog service

Usage Guidelines

The syslog feature allows system events to be logged. You can send the syslog to a remote syslog server using the supported syslog protocol.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# logging on
(host)(config)#
(host)(config)# logging facility
  kern      Kernel
  local0    Local facility 0
  local1    Local facility 1
  local2    Local facility 2
  local3    Local facility 3
  local4    Local facility 4
  local5    Local facility 5
  local6    Local facility 6
  local7    Local facility 7
  customer  Customer
(host)(config)# logging facility local0 severity
  alert          Immediate action needed           (severity=1)
  critical       Critical conditions               (severity=2)
  debug          Debugging messages                (severity=7)
```

```
  emergency      System is unusable                (severity=0)
  error          Error conditions                  (severity=3)
  informational  Informational messages            (severity=6)
  notice         Normal but significant conditions (severity=5)
  warning        Warning conditions                (severity=4)
  <0-7>          Logging severity level

(host)(config)# logging facility local0 severity 0
(host)(config)# logging facility local1 severity debug
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

setup factory

`setup factory`

Description

This command is used to restore to factory default configuration (reboot required).

Syntax

Parameter	Description
none	-

Usage Guidelines

The router will reboot with the factory default state after confirming the setup.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# setup factory
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

service ntp

`service ntp`

Description

This command is used to switch to the NTP mode.

Syntax

Parameter	Description
`none`	-

Usage Guidelines

AirMesh routers support NTP client protocol and are able to sync up with the network clock server. Use the `enable` command to enable the service and the `disable` command to disable the NTP service.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable NTP client function.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE NTP

disable

`disable`

Description

This command is used to disable NTP client function.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# disable
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE NTP

clock timezone

```
clock timezone <timezone> <hours> [minutes]
```

Description

This command is used to configure time zone and time difference for the NTP client.

Syntax

Parameter	Description	Range
`<timezone>`	The name of the time zone (not longer than 6 characters).	-
`<hours>`	The time difference in hours with respect to Greenwich mean time.	-24 -+24
`[minutes]`	The time difference in minutes with respect to Greenwich mean time.	0-59 minutes

Usage Guidelines

Use the `no clock timezone` command to restore the Greenwich Mean Time.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
(host)(config-ntp)# clock timezone BJTime 8
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE NTP

interval

`interval <seconds>`

Description

This command is used to configure the interval for the client sync-up with the NTP server.

Syntax

Parameter	Description	Range	Default
`<seconds>`	Interval in seconds	5-86400	1024

Usage Guidelines

Use the `no interval` command to restore the sync up interval to 1024 seconds.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
(host)(config-ntp)# clock timezone BJTime 8
(host)(config-ntp)# interval 3600
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE NTP

server

`server A.B.C.D`

Description

This command is used to configure the IP address of the NTP server.

Syntax

Parameter	Description
`A.B.C.D`	IP address of the NTP server.

Usage Guidelines

Use the `no server` command to delete the NTP server configuration.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
(host)(config-ntp)# clock timezone BJTime 8
(host)(config-ntp)# interval 3600
(host)(config-ntp)# server 203.117.180.36
(host)(config-ntp)#end
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE NTP

service recovery

`service recovery`

Description

This command is used enter the Auto Recovery configuration mode.

Syntax

Parameter	Description
none	-

Usage Guidelines

Auto Recovery is an advanced feature provided by the MSR series routers. If the Auto Recovery feature is enabled, the MSR routers can automatically detect and recover from certain system faults.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service recovery
(host)(config-recovery)#
  debug-level  Set debug level
  disable      Disable service recovery
  enable       Enable service recovery
  end          End
  exit         Exit
  help         Description of the interactive help system
  list         Print command list
  quit         Quit
  show         Show running system information
  write        Write running configuration to file
(host)(config-recovery)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

enable

`enable`

Description

This command is used to enable the auto recovery service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service recovery
(host)(config-recovery)# enable
(host)(config-recovery)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE RECOVERY

disable

`disable`

Description

This command is used to disable the auto recovery service.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service recovery
(host)(config-recovery)# disable
(host)(config-recovery)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	SERVICE RECOVERY

led off

`led off`

Description

This command allows you to turn off the LEDs in the MSR/MST devices.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command is used to disable the LED lights in a MSR/MST device that is mounted in an elevated place on the city streets or residential areas, to avoid unwanted attention or disturbance. This command turns off only the LED lights that indicate the software status, for example the R0, R1, R2, R3, Radio 0, and Radio 1. The LEDs that indicate the hardware status, for example Power, P/S, POE, HEAT, and ETH, cannot be turned off using this command. Use the `no led off` command to turn the LEDs back on.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)#
(host)(config)# led off
(host)(config)# no led off
(host)(config)#
```

Command History

Release	Modification
MeshOS 4.5	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	CONFIG

show tech-support

`Show tech-support`

Description

This command is used to display the troubleshooting information.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command can be used to collect troubleshooting information for remote troubleshooting when a wireless mesh router is down.

This command will combine the output of the following CLIs:

- `Show clock`
- `Show version`
- `Show hostname`
- `Show router-id`
- `Show running-config`
- `Show interface brief`
- `Show interface gigabit-ethernet 0`
- `show interface dot11radio <r> [option]`
- `show interface dot11radio <r> station all`
- `Show rf-management links`
- `Show rf-management neighbors`
- `Show ip route`
- `Show ip awr neighbor`
- `Show ip awr database`
- `Show mesh node-list`
- `Show vplm membership-database`
- `Show vplm mac-address-table`

Example

The following example shows the use of the command:

```
(host)# enable
(host)# show tech-support | grep service
service avt
service ntp
service recovery
service rf-management
service roaming-motrix
service vplm
Codes: K - kernel route, C - connected, S - static, H - host, O - OSPF,
       A - AWR, d - DHCP, > - selected route, * - FIB route

A>* 6.1.1.0/24 [50/2] via 8.184.13.114, dot11radio 3/wds 0, 2d07h08m
C>* 8.184.13.112/30 is directly connected, dot11radio 3/wds 0
S>* 10.0.0.0/8 [1/0] via 10.65.50.1, vlan 1
```

```
C>* 10.65.50.0/24 is directly connected, vlan 1
C>* 21.51.87.4/30 is directly connected, dot11radio 2/wds 7
A>* 21.51.87.48/30 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 1d23h33m
A>* 21.51.87.52/30 [50/2] via 21.53.218.185, dot11radio 3/wds 7, 22:07:19
A>* 21.51.87.56/30 [50/2] via 8.184.13.114, dot11radio 3/wds 0, 2d07h08m
C>* 21.53.218.184/30 is directly connected, dot11radio 3/wds 7
A>* 21.54.58.132/30 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
C>* 21.54.58.144/30 is directly connected, dot11radio 3/wds 8
C>* 91.1.1.0/24 is directly connected, vlan 2
C>* 111.91.201.0/24 is directly connected, vlan 201
C>* 111.91.202.0/24 is directly connected, vlan 202
C>* 111.91.203.0/24 is directly connected, vlan 203
C>* 111.91.204.0/24 is directly connected, vlan 204
C>* 111.91.205.0/24 is directly connected, vlan 205
C>* 111.91.206.0/24 is directly connected, vlan 206
C>* 111.91.207.0/24 is directly connected, vlan 207
C>* 111.91.208.0/24 is directly connected, vlan 208
C>* 111.91.209.0/24 is directly connected, vlan 209
C>* 111.91.210.0/24 is directly connected, vlan 210
C>* 111.91.211.0/24 is directly connected, vlan 211
C>* 111.91.212.0/24 is directly connected, vlan 212
C>* 111.91.213.0/24 is directly connected, vlan 213
C>* 111.91.214.0/24 is directly connected, vlan 214
C>* 111.91.215.0/24 is directly connected, vlan 215
C>* 111.91.216.0/24 is directly connected, vlan 216
A>* 111.92.201.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.202.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.203.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.204.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.205.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.206.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.207.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.208.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
A>* 111.92.209.0/24 [50/2] via 21.54.58.145, dot11radio 3/wds 8, 2d07h09m
--More--
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show log all

`Show log all`

Description

This command is used to display all the log information on a router.

Syntax

Parameter	Description
none	-

Usage Guidelines

Each log item contains the following information:

- Timestamp
- Identity
- Event
- Brief description

The identity information is listed in the table below:

Identity	Area
Hostname	System
Radio#	Radio
Mesh, Radio#Mesh, Radio#WDS#	Mesh
Radio#BSS#	Access
Eth#	Ethernet
VLAN#	VLAN
VideoOpt	AVT

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show log
  all  Show log
(host)# show log all | grep services
(host)# show log all
(host)#
```

The following is an example of a log entry:

```
YY/MM/DD hh:mm:ss.mm Radio0BSS0: Client AA:BB:CC:DD:EE:FF (11a|b|g|n, RSSI XX, WMM,
WPA,…) associated.
```

This log entry indicates that a client is associated with a BSS.

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ntp debug

`show ntp debug`

Description

This command is used to show the NTP configuration information.

Syntax

Parameter	Description
none	-

Usage Guidelines

This command shows the NTP details such as server, status, interval, and time zone.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# configure terminal
(host)(config)# service ntp
(host)(config-ntp)# enable
(host)(config-ntp)# clock timezone BJTime 8
(host)(config-ntp)# interval 3600
(host)(config-ntp)# server 203.117.180.36
(host)(config-ntp)# end
(host)# show ntp debug
Server IP:203.117.180.36 Status:1 Interval:3600 Timezone: 'BJTime' Hour: 8 Minute: 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show running-config

`show running-config`

Description

This command is used to display the current information on the system configuration.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `write memory` command to save the configuration file.

Example

The following example shows information on the current system configuration:

```
(host)> enable
(host)# show running-config
ip nat
ip dhcp relay
ip dhcp server
 dns 10.1.1.50
 pool 01
  gateway 91.1.1.1
  network 91.1.1.0/24
  range 91.1.1.2 91.1.1.4
location-info
 altitude 44
 latitude 12 58 13 N
 longitude 77 33 37 W
mesh
 neighbor-list
 authentication open key-management wpa2
  psk ascii  wdsshouldworkwell
 mesh-id Do-not-change-zhiyuan-conf
 neighbor-list-type inactive
 preferred-link 0
  neighbor host zhiyuan-5
router awr
 debug error
 enable
router multicast
 debug information
 enable
 rp-address 192.168.200.91
router ospf
 debug all
 disable
 network 10.65.12.0/24 area 1234
 router-priority 1
service avt
 mode disabled
```

```
service ntp
 clock timezone bj8 8
 enable
 server 10.64.147.195
service recovery
 debug-level info
 enable
service rf-management
 debug process
service roaming-motrix
 debug-level info
 disable
service vplm
 allowed-vlan auto
 enable
client-list 1.1.1.1/24
country-code EU
hostname zhiyuan-1
interface dot11radio 0
 beacon-interval 100
 bss 1
  access-list
  authentication open key-management wpa2
   encryption-mode-cipher aes-tkip
   preauth
   wpa-type psk ascii abcdefgh
  ignore-broadcast-ssid
  ssid zy1
  switchport access vlan 100
  wmm
 channel-list bg 9
 cts-protection disable
 txpower 5
 wireless-mode ng
interface dot11radio 1
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface dot11radio 2
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface dot11radio 3
 beacon-interval 100
 cts-protection disable
 short-gi
 wds auto
 wireless-mode na
interface gigabit-ethernet 0
 mode gateway
 switchport trunk allowed-vlan 1
 switchport site-id 100
interface loopback 0
 ip address 192.168.200.91/32
```

```
 router-id
interface vlan 1
 ip address 10.65.12.91/24
 management
 mtu 1500
interface vlan 2
 dhcp server 01
 ip address 91.1.1.1/24
 mtu 1500
interface vlan 201
 ip address 111.91.201.1/24
 mtu 1500
interface vlan 202
 ip address 111.91.202.1/24
 mtu 1500
interface vlan 203
 ip address 111.91.203.1/24
 mtu 1500
interface vlan 204
 ip address 111.91.204.1/24
 mtu 1500
interface vlan 205
 ip address 111.91.205.1/24
 mtu 1500
interface vlan 206
 ip address 111.91.206.1/24
 mtu 1500
interface vlan 207
 ip address 111.91.207.1/24
 mtu 1500
interface vlan 208
 ip address 111.91.208.1/24
 mtu 1500
interface vlan 209
 ip address 111.91.209.1/24
 mtu 1500
interface vlan 210
 ip address 111.91.210.1/24
 mtu 1500
interface vlan 211
 ip address 111.91.211.1/24
 mtu 1500
interface vlan 212
 ip address 111.91.212.1/24
 mtu 1500
interface vlan 213
 ip address 111.91.213.1/24
 mtu 1500
interface vlan 214
 ip address 111.91.214.1/24
 mtu 1500
interface vlan 215
 ip address 111.91.215.1/24
 mtu 1500
interface vlan 216
 ip address 111.91.216.1/24
 mtu 1500
ip route 10.0.0.0/8 10.65.12.1
```

```
ip telnet server
local-ip 192.168.216.1/24
mesh installation outdoor
snmp-server syscontact support@arubanetworks.com
snmp-server syslocation BeiJing
snmp-server community public ro
snmp-server community private rw
snmp-server trap open client_online
snmp-server trap open client_offline
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show startup-config

`show startup-config`

Description

This command is used to display saved configuration file information on the system.

Syntax

Parameter	Description
none	-

Usage Guidelines

Use the `write memory` command to save the configuration file.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show startup-config | grep interface
 no ingress-interface
interface dot11radio 0
interface dot11radio 1
interface dot11radio 2
interface dot11radio 3
interface gigabit-ethernet 0
no interface loopback all
interface loopback 0
no interface vlan all
interface vlan 1
interface vlan 2
interface vlan 201
interface vlan 202
interface vlan 203
interface vlan 204
interface vlan 205
interface vlan 206
interface vlan 207
interface vlan 208
interface vlan 209
interface vlan 210
interface vlan 211
interface vlan 212
interface vlan 213
interface vlan 214
interface vlan 215
interface vlan 216
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show ap-list

```
show ap-list dot11radio <0-3>
```

Description

This command is used to view the list of APs for a particular radio interface.

Syntax

Parameter	Description
<0-3>	Radio index

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show ap-list
(host)# show ap-list
  dot11radio  Radio inteface
(host)# show ap-list dot11radio 0
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show arp

```
show arp
```

Description

This command is used to view all ARP entries of the device.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show arp
(host)# show arp
Address                  HWtype  HWaddress           Flags Mask            Iface
21.54.79.242             ether   1E:17:7B:2A:6C:76   C                     ath0
10.65.12.1               ether   00:1A:1E:13:2F:00   C                     vlan1
21.54.79.134             ether   22:1A:1E:40:10:20   C                     ath32
21.54.162.5              ether   06:17:7B:2A:6D:46   C                     ath7
21.54.79.198             ether   1E:17:7B:2A:66:AF   C                     ath33
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show channel-list dot11radio

```
show channel-list dot11radio <0-3>
```

Description

This command is used to view the channel list on a specified radio interface.

Syntax

Parameter	Description
<0-3>	Radio index

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show channel-list dot11radio 0
(host)# show channel-list dot11radio 0
CHANNEL LIST#   mode          chan freq      width              dfs
          1   a              149 5745      20                 no
          2   a              153 5765      20                 no
          3   a              157 5785      20                 no
          4   a              161 5805      20                 no
          5   a              165 5825      20                 no
          6   b                1 2412      20                 no
          7   b                2 2417      20                 no
          8   b                3 2422      20                 no
          9   b                4 2427      20                 no
         10   b                5 2432      20                 no
         11   b                6 2437      20                 no
         12   b                7 2442      20                 no
         13   b                8 2447      20                 no
         14   b                9 2452      20                 no
         15   b               10 2457      20                 no
         16   b               11 2462      20                 no
         17   g                1 2412      20                 no
         18   g                2 2417      20                 no
         19   g                3 2422      20                 no
         20   g                4 2427      20                 no
         21   g                5 2432      20                 no
         22   g                6 2437      20                 no
         23   g                7 2442      20                 no
         24   g                8 2447      20                 no
         25   g                9 2452      20                 no
         26   g               10 2457      20                 no
         27   g               11 2462      20                 no
         28   na             149 5745      20                 no
         29   na             153 5765      20                 no
         30   na             157 5785      20                 no
         31   na             161 5805      20                 no
         32   na             165 5825      20                 no
```

```
            33   ng                1 2412      20                  no
            34   ng                2 2417      20                  no
            35   ng                3 2422      20                  no
            36   ng                4 2427      20                  no
            37   ng                5 2432      20                  no
            38   ng                6 2437      20                  no
            39   ng                7 2442      20                  no
            40   ng                8 2447      20                  no
            41   ng                9 2452      20                  no
            42   ng               10 2457      20                  no
            43   ng               11 2462      20                  no
            44   na-ht40plus     149 5745      40                  no
            45   na-ht40plus     157 5785      40                  no
            46   na-ht40minus    153 5765      40                  no
            47   na-ht40minus    161 5805      40                  no
            48   ng-ht40plus       1 2412      40                  no
            49   ng-ht40plus       2 2417      40                  no
            50   ng-ht40plus       3 2422      40                  no
            51   ng-ht40plus       4 2427      40                  no
            52   ng-ht40plus       5 2432      40                  no
            53   ng-ht40plus       6 2437      40                  no
            54   ng-ht40plus       7 2442      40                  no
            55   ng-ht40minus      5 2432      40                  no
            56   ng-ht40minus      6 2437      40                  no
            57   ng-ht40minus      7 2442      40                  no
            58   ng-ht40minus      8 2447      40                  no
            59   ng-ht40minus      9 2452      40                  no
            60   ng-ht40minus     10 2457      40                  no
            61   ng-ht40minus     11 2462      40                  no
            62   g-only            1 2412      20                  no
            63   g-only            2 2417      20                  no
            64   g-only            3 2422      20                  no
            65   g-only            4 2427      20                  no
            66   g-only            5 2432      20                  no
            67   g-only            6 2437      20                  no
            68   g-only            7 2442      20                  no
            69   g-only            8 2447      20                  no
            70   g-only            9 2452      20                  no
            71   g-only           10 2457      20                  no
            72   g-only           11 2462      20                  no
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show client

```
show client <HH:HH:HH:HH:HH:HH>
```

Description

This command is used to view the client.

Syntax

Parameter	Description
`HH:HH:HH:HH:HH:HH`	`MAC address`

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show client 00:1A:1E:13:2F:00
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show clock

`show clock`

Description

This command is used to view the current time.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show clock
Mon June 8 01:27:25 UTC 2012
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show hardware

`show hardware`

Description

This command is used to view the hardware details of the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show hardware
(host)# show hardware
Model: MSR1200
Board: BOARD PB44
Firmware: 1.0.0
S/N: AMABCCc9f
CPU: AR7161 680MHz
Flash: 16M*1
Mem: 128M
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show hostname

```
show hostname
```

Description

This command is used to view the hostname of the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show hostname
hostname Test-1
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show inventory

`show inventory`

Description

This command is used to view the inventory information of the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show inventory
Model:  MSR1200
S/N: AMABCCc9f
SW Version: 4.5.0.0
Running image: Primary
Boot loader: APBoot ver 1.2.7.8
Manufacture date: 2012-01-19
CPU:  AR7161  680Mhz
MAC: 00:17:7b:2a:6c:9f
Power type: AC
Flash size: 16M*1
Factory Default: No
CPU Usage: 36%
Mem Total: 126548KB
Mem Usage: 61%
Storage Total: 2496KB
Storage Free: 1376KB
Uptime: 548030s
Temperature: 35C
Board: BOARD PB44
Radio card0:  ar9223 100mw
Radio card1:  ar9223 100mw
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show router-id

```
show router-id
```

Description

This command is used to view the router ID.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show router-id
Router ID: 10.42.108.159
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show version

```
show version
```

Description

This command is used to view the image versions on the router.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show version
(host)# show version
  The Running Image
    Partition: Primary
    Version: 4.5.0.0
    Create Time: 2012/06/06 22:21
    Type: Official Release
  Partition Primary
    Status: [Running]
    Version: 4.5.0.0
    Create Time: 2012/06/06 22:21
    Type: Official Release
(host)#
```

Command History

Release	Modification
MeshOS 4.2 or before	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

pse-mode

`pse-mode {at|af|off}`

Description

This command is used to set the Power Sourcing Equipment(PSE) mode for the MST200.

Syntax

Parameter	Description
`{at|af|off}`	at — 802.3at mode af — 802.3af mode off— PSE mode off

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(MST200)(config)# pse-mode ?
at: set PSE to 802.3 AT mode(25w)
af: set PSE to 802.3 AF mode(15w)
off: turn off PSE

(MST200)# pse-mode at
```

Command History

Release	Modification
MeshOS 4.6	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC

show pse status

```
show pse status
```

Description

This command is used to view the status of the PSE controller.

Syntax

Parameter	Description
none	-

Usage Guidelines

None.

Example

The following example shows the use of the command:

```
(host)> enable
(host)# show pse status
```

Command History

Release	Modification
MeshOS 4.6	Command introduced

Command Information

Platforms	Licensing	Command Mode
All platforms	Base operating system	EXEC