Cisco Ultra-Reliable Wireless Backhaul command-line interface (CLI)

Command-line interface user manual

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2. HAZARDOUS CONDITION WARNINGS

Only suitably qualified personnel may use the command-line interface (CLI). All Cisco hardware and software installations must conform to all relevant legislation in the country of use. In some countries, legislation may require that hardware devices be installed only by a certified electrician.

All Cisco products are designed with safety in mind. However, improper use of electronic devices and/or their control software has potential to cause serious injury and/or property damage. To avoid such injury and damage, install, configure and operate Cisco products only if you are properly qualified to do so.

If any Cisco hardware unit breaks down or malfunctions, emits smoke or an unusual smell, if water or other foreign matter enters the unit enclosure, or if the unit is dropped onto a hard surface or damaged in any way, power off the unit immediately and contact an authorized Cisco dealer for assistance.

If you are adjusting and/or controlling a Cisco device using control software such as the command-line interface or the device's offline Configurator, do not make configuration changes unless you know with certainty that your changes will not negatively impact people or animals in the vicinity of the device and its antennas.

2.1. Radio-frequency transmission hazard

RADIO-FREQUENCY RADIATION

Non-ionizing radio frequency (RF) transmissions can be hazardous to human and animal health.

In sufficient quantity, RF radiation is capable of causing radiation burns, tissue damage and other injuries. Keep a safe distance from all RF-radiating devices such as antennas, when such devices are powered ON. Never stand in line with a powered RF-radiating device.

Before activating any device capable of transmitting RF signals, make sure that all persons and animals are protected from possible RF exposure.

Make sure that all RF feeds are securely connected to an appropriate antenna. Never activate any RF-capable device that is not connected to an antenna.

2.2. Optical radiation hazard

LASER RADIATION

If any Cisco hardware device is equipped with one or more SFP fiber-optic modules, it is classified as a Class 1 laser product. It may use laser-emitting components and/or very high-intensity light sources.

Do not look directly at the input/output end of the unit's SFP connector, or at the input/output end of any fiber-optic cable. Fiber-optic systems frequently use high-intensity light from laser or LED sources that may cause temporary or permanent blindness.

For additional guidance regarding the safe use of laser-based and LED-based fiber-optic technology, refer to ANSI Z136.2 *(Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources).*

2.3. Hot surfaces hazard

HOT SURFACES

The outer surfaces of some radio transceiver and gateway unit enclosures may become hot during normal operation. The outer enclosures of such devices are marked with the symbol seen above. During normal operation, do not touch or handle the unit enclosure without personal protective equipment.

3. REPORTING MISTAKES

You can help improve this document.

If you find any mistakes, or if you know of a way to improve the procedures that are given, please let us know by E-mailing your suggestions to the following addresses:

- documentation@fluidmesh.com
- support@fluidmesh.com

4. INTRODUCTION

This manual explains how to use the Cisco Command-line interface (CLI) as a means to configure and control Cisco hardware devices that are part of a network.

The CLI is intended for use by wireless networking professionals who have been tasked with configuring Cisco gateway units and/or radio transceivers, and/or configuring and maintaining the system using Cisco software.

Throughout this manual, configuration and adjustment settings are given for Cisco device parameters. You must have a thorough understanding of each parameter before attempting to configure or adjust it. Many configuration parameters are interdependent. Misconfiguration or poor adjustment of parameters could degrade the performance of a Cisco device, or make it inoperable.

> **!** **IMPORTANT**
>
> The functions of all device configuration parameters are explained in detail in the Cisco *RACER Configuration Manual*, and in the user manual for your Cisco gateway device or radio transceiver device.
>
> Be sure to read and understand the documents above before attempting to configure your device using the command-line interface.

This manual is applicable only to the following Cisco device firmware versions and their relevant hardware devices:

- 1.2.6 (FM Ponte 50 radio transceiver kits)

This manual may contain commands and/or command parameters that are being newly introduced as part of a firmware version described in this manual, or that must be expressed in a way that is different to a previous version of the same command. All sub-sections containing new and/or modified commands are marked with:

<div align="center">NEW</div>

This manual is not applicable to device firmware versions that are more recent than the firmware versions above. For these firmware versions, refer to the appropriate version of the Cisco Command-line interface user manual.

4.1. CLI account types

Users can log onto the CLI using *Administrator* or *View Mode* credentials.

The differences between credential types are shown in the table below.

Account passwords can be changed by an Administrator, using RACER or the offline Configurator interface.

Account	Default user name	Default password	Permissions
Administrator	admin	admin	Full access, with read and write permissions.
View Mode	user	viewmode	Read permissions only. The user cannot change configuration parameters.

If you are logging onto the device as an administrative user, log on using the following command:

```
ssh <admin_user>@<device IP address>
```

If you are logging onto the device in View Mode, log on using the following command:

```
ssh <view_mode>@<device IP address>
```

5. UNDERSTANDING THE CLI

The Cisco Networks command-line interface (CLI) is used to issue configuration commands to a Cisco device over a Secure Shell (SSH) service. SSH is a cryptographic network protocol that allows secure operation of network services over an unsecured network.

The CLI can be regarded as a 'backup' user interface, giving an alternative method of configuring Cisco radio transceiver and gateway devices.

Like the RACER™ and on-board Configurator interfaces, the CLI allows you to inspect and modify the configuration parameters of the relevant unit.

> **TIP**
>
> The on-board Configurator interface features a limited set of configuration options for most Cisco devices.
>
> To gain access to the full set of configuration options for the relevant Cisco device, use the RACER interface or command-line interface to configure the device.

6. USING THE CLI TO CONFIGURE CISCO DEVICES

> **(!)** **IMPORTANT**
>
> Device configuration parameters can only be changed if you are accessing a device as an Administrator.
>
> If you are accessing a device in View Mode, you can view the device's configuration settings, but cannot change them.

To use the CLI to configure a Cisco device, do the steps below:

1. Install an SSH client on the computer that you will use to configure the Cisco device. Recommended SSH clients include SecureCRT (Windows computers) and the built-in SSH terminal (Linux and Mac systems).

2. Use the SSH client to log in to the Cisco device as an administrative user, substituting **<device IP address>** with the IP address of the Cisco unit. Do this by entering the following command using the terminal:

```
ssh <admin_user>@<device IP address>
```

3. Use the SSH client to configure the Cisco device using the appropriate commands as given in this manual. Be sure to use the correct command-line syntax.

4. Confirm the configuration changes by entering the following command:

```
write
```

5. Reboot the unit by entering the following command:

```
reboot
```

7. UNDERSTANDING COMMAND-LINE SYNTAX

The logical structure of the configuration commands given using the CLI is referred to as syntax.

The configuration command syntax used by Cisco devices is simple. The command-line syntax can be used to issue one command, or to issue multiple commands within a single command entry, before pressing the **Enter** key.

If multiple commands are made within a single command entry, all commands must be separated by spaces.

For demonstration, here are typical examples that show ways in which a radio transceiver's Ethernet parameters can be configured.

To show the current configuration for a specific Ethernet port, you would enter the following command:

```
ethernet port eth 1
```

To configure the data transfer speed and duplex mode for a specific Ethernet port, you would make the needed choices based on:

- The specifications given in the network design document, and

- The characteristics of the Cisco device.

As a typical example, an FM3500 Endo radio transceiver has the following features:

- Two RJ-45 Ethernet ports, numbered 1 and 2.

- A choice of two duplex modes (half and full).

Based on this information, if you wanted to set Ethernet port 2 of the FM3500 Endo to transmit and receive data in full duplex mode, you would enter the following command:

```
ethernet port eth 2 duplex full
```

8. CLI COMMANDS

8.1. Help content

Configuration objective	CLI command	Parameter options
Show context-sensitive help content for the current command. To be typed after the command name and command parameters.	`?`	

8.2. Manage the device status logs

Configuration objective	CLI command	Parameter options
View or clear the device status logs.	`status A`	Possible parameters for A are: • *show-logs* (show the device status logs that have been created since the last *clear* command was executed.) • *clear-logs* (delete all existing device status logs.) • `NEW` *delete-logs* (deep-clean the repository containing all device status logs.)

8.3. View the current network uptime duration

Configuration objective	CLI command	Parameter options
Show the amount of time for which the connected network has been operational.	`uptime`	

8.4. View the device configuration that is currently running

Configuration objective	CLI command	Parameter options
Show a detailed view of the currently running device configuration.	`show-running-config`	

8.5. Viewing and setting the device name

Configuration objective	CLI command	Parameter options
Show the device name that has been assigned to the device.	`devicename`	
Edit the device name that has previously been assigned to the device.	`devicename A`	Parameter A is the new device name.

8.6. Running an installed *iperf* server or client

Configuration objective	CLI command	Parameter options
Run the installed iperf server or client.	`iperf`	
Specify iperf configuration options.	`iperf B`	Parameter B is the specified iperf configuration option. For a detailed list of *iperf*

		commands, refer to https://www.mankier.com/1/iperf.

8.7. Connecting to a remote host using SSH

Configuration objective	CLI command	Parameter options
Connect the device to a remote host using Secure Shell.	`ssh C`	Parameter C is the hostname or IP address of the remote host.

8.8. Pinging the configured device

Configuration objective	CLI command	Parameter options
Send a ping from the hardware device to another, specified hardware device.	`ping A`	Parameter A is the IP address of the hardware device that is *not* the local device.
Set the ping count (in other words, to stop pinging after a specified number of packets).	`ping -c B`	Parameter B is the specified number of echo request packets (optional).

8.9. Tracing the route from the device to its connected host

Configuration objective	CLI command	Parameter options
Return a description of the connected route from the local device, to its specified host (A).	`traceroute A`	Parameter A is the hostname of the specified host.
Specify the maximum number of hops included in the traceroute result.	`traceroute -m B`	Parameter B is the specified maximum number of hops. Note that the maximum number of hops cannot exceed 255.

8.10. Wireless interface

IMPORTANT

If commands and values from this section are entered, they are validated in accordance with the installed software plug-ins and the regulatory mode to which the device has been set.

Configuration objective	CLI command	Parameter options
Show the active parameters of the wireless interface.	`wireless`	
Set the frequency, channel width and status parameters to be changed at runtime, without having to reboot the device.	`wireless live`	
Set the device's operating frequency.	`wireless frequency A`	Parameter A is the specified frequency in MHz.
Set the device's operating channel width.	`wireless cwidth B`	Parameter B is the specified channel width in MHz. Depending on radio transceiver type, possible channel width values are *5, 10, 20, 40* or *80.*
Enable and disable advanced encryption standard (AES) traffic encryption.	`wireless crypto C`	Possible parameters for C are *enable* and *disable.*
Set the device's mesh network	`wireless passphrase`	Parameter D is the network

passphrase.	`D`	passphrase.
Set the device's maximum transmission power output.	`wireless txpower E`	Parameter E is the maximum transmission power level in dBm. This parameter must be expressed as an unsigned integer between *0* and *36*. Alternatively, enable automatic transmission-power selection by entering `wireless txpower AUTO`. Note that *AUTO* must be entered in capitals.
Enable and disable the device's wireless interface.	`wireless interface G`	Possible parameters for G are *enable* and *disable.*
Set the device's transmission chain parameters.	`wireless txchain H`	Possible parameters for H are *first* (transmission chain 1 only), *second* (transmission chain 2 only) or *both*.
Enable and disable *Promiscuous Mode* (backwards compatibility with legacy Fluidmesh units).	`wireless promisc F`	Possible parameters for F are *enable* (enable full backwards compatibility) and *disable* (maintain compatibility with newer devices only)*.*
Set the device's transmission chain parameters.	`wireless maxmcx H`	Possible parameters for H are *first* (transmission chain 1 only), *second* (transmission chain 2 only) or *both*.
Enable and disable reduction of false positive results during dynamic frequency selection (DFS) if the device is being operated in the UNII2 frequency band.	`wireless dfs [reduce-false-positives K]`	Possible parameters for K are *enable* and *disable.*
Set the wireless multimedia (WMM) queue configuration string.	`wireless wmm N`	N is the WMM configuration string. This string takes the following form: *[bk|be|vi|vo] aifs A cwmin B cwmax C txop D ampdu E* In the string above, *[bk|be|vi|vo]* represents the class-of-service (CoS) parameters. • *bk* is the CoS background queue parameter. • *be* is the CoS best-effort queue parameter. • *vi* is the CoS video queue parameter. • *vo* is the CoS voice queue parameter. In the string above: • *A* is the arbitration inter-frame spacing value. • *B* is the minimum

		transmission channel width value.
		• *C* is the maximum transmission channel width value.
		• *D* is the transmit opportunity value.
		• *E* is the aggregated MAC protocol data unit value.
Enable and disable noise floor calibration.	`wireless nfcal J`	Possible parameters for J are *enable* and *disable.*
Set the operational mode for dynamic frequency selection (DFS) when the device is operated in the UNII2 frequency band.	`wireless radar-role U`	Possible parameters for U are *auto* (The unit will automatically participate in a Principal/Subordinate role-election process, and the elected Principal unit will determine the operating frequency), *master* (All Subordinate units connected to the unit will match the unit's DFS frequency selection) or *slave* (The unit will match the DFS frequency selection of the closest Principal unit). Note that if value U is set to *auto*, all radio units that are part of the network must also be set to *auto.*

! **IMPORTANT**

If a Cisco radio device is operated in the UNII2 frequency band, and the *wireless radar-role* is set as *master*, the device will continuously monitor the chosen operating frequency for known radar patterns.

If the network detects a known radar pattern, the elected Principal (i.e. master) radio device coordinates a distributed frequency-switching procedure with all Subordinate (i.e. slave) radio units, allowing the network to continue operating on an alternate frequency without interruption.

| Scan a preset list of alternate frequencies.

If the device is being operated in the UNII2 frequency band and detects a TDWR transmission on the current operational frequency, it will scan the preset frequency list for an unoccupied frequency. | `wireless backup-frequencies V` | Parameter V is the preset list of alternate frequencies in MHz. Note that each frequency value added to the list must include a specified channel width in MHz.
Depending on radio transceiver type, possible channel width values are *5, 10, 20, 40* or *80*.

A typical command entry might be `wireless backup-frequencies 5255 20 5300 40 5310 40`. |

Set the signal gain of the antenna connected to the wireless device.	`wireless antenna-gain W`	Parameter W is the maximum antenna gain in dBm. This parameter must be expressed as an unsigned integer between *0* and *36*. Alternatively, reset antenna gain to the factory default level by entering `wireless antenna-gain UNSELECTED`. Note that *UNSELECTED* must be entered in capitals.
NEW Specify the country in which the radio transceiver will be operated.	`wireless country W`	Parameter W is the identification string for the country in which the radio transceiver will be operated. Typical examples are *UNITED STATES* and *ITALY*. Note that the country name must be entered in capitals.

8.11. IP address parameters

Configuration objective	CLI command	Parameter options
Show the device's IP address parameters.	`ip`	
Set the device's IP address.	`ip addr A`	Parameter A is the specified IP address.
Set the device's netmask parameter.	`ip netmask B`	Parameter B is the netmask.
Set the device's IP gateway parameter.	`ip gateway C`	Parameter C is the IP gateway.
Set the device's DNS1 address parameter.	`ip dns1 D`	Parameter D is the DNS1 address.
Set the device's DNS2 address parameter.	`ip dns2 E`	Parameter E is the DNS2 address.

8.1. Administrative user password

IMPORTANT

Before changing the administrative user password, make sure that the password is known to all personnel who will use it.

If an administrative user password has been set, the system cannot recall it or display it for reference.

Configuration objective	CLI command	Parameter options
NEW Set the Administrative user password for access to the device's offline Configurator interface and CLI.	`admin-user username Y passwd Z`	Parameter Y is the new administrator user name. Parameter Z is the new password.

8.2. View Mode user password

> **! IMPORTANT**
>
> Before changing the View Mode user password, make sure that the password is known to all personnel who will use it.
>
> When a password has been entered, the system cannot recall it or display it for reference.

Configuration objective	CLI command	Parameter options
NEW Set the View Mode user password for access to the device's offline Configurator interface and CLI.	`viewmode-user username F passwd G`	Parameter F is the new view-mode user name. Parameter G is the new password.

8.1. Ethernet port parameters

Configuration objective	CLI command	Parameter options
NEW Show the current configuration for a specific Ethernet port on the device.	`ethernet port A`	Parameter A is the number of the Ethernet port being queried. Possible values for A are *eth 1* (LAN 1 port) or *eth 2* (LAN 2 port).
NEW Set the maximum port speed for the device's Ethernet ports.	`ethernet port A speed B`	Parameter A is the number of the Ethernet port (or SFP interface) whose speed is being modified. Possible values for A are *eth 1* or *eth 2*. Parameter B is the data transfer speed for the relevant port. Ethernet port speeds are expressed in Mbps. Possible values for B are *10*, *100*, or *auto*.
NEW Set the duplex mode for the device's Ethernet ports.	`ethernet port A duplex C`	Parameter A is the number of the Ethernet port for which the duplex mode is being set. Parameter C is the port duplex mode. Possible values for C are *half* or *full*.
NEW Change the size of the Ethernet maximum transmission unit (MTU) for the device ports.	`ethernet mtu D`	Parameter D is the port MTU size setting in bytes. The value can be set between a minimum of 1530 and a maximum of 1650 for FM1200V, FM3200, FM4200 and 2000 for FM3500 and FM4500..

8.2. Hardware Reset button

Configuration objective	CLI command	Parameter options
Set the device's hardware Reset button to trigger: • A unit reboot if the button is	`reset-button enable`	

pressed for one second and released. • A factory reset if the button is pressed for 7 seconds and released.		
Set the device's hardware Reset button to trigger a factory reset if the button is pressed for 7 seconds and released (the unit reboot option will be unavailable).	`reset-button factory`	
Disable the hardware Reset button functionality.	`reset-button disable`	

8.3. Telnet functionality

Configuration objective	CLI command	Parameter options
Enable or disable the device's Telnet capability.	`telnet A`	Possible values for A are *on* or *off.*

8.4. Committing configuration settings to memory

IMPORTANT

After the **write** command is entered, you must re-boot the device for the current configuration to take effect.

Configuration objective	CLI command	Parameter options
Commit the current configuration settings to memory.	`write`	

8.1. Rebooting the device

Configuration objective	CLI command	Parameter options
Reboot the device immediately.	`reboot`	

8.2. Discarding configuration changes made during the current session

Configuration objective	CLI command	Parameter options
Discard all configuration changes made during the current session.	`discard`	

8.3. Resetting the unit to factory default condition

Configuration objective	CLI command	Parameter options
Reset the unit to factory default condition.	`factory YES` Note that YES must be typed in capitals.	

8.4. Showing command-line history for the current session

Configuration objective	CLI command	Parameter options
Show a complete list of all CLI commands that have been	`history`	

---

entered during the current session.		

8.1. Adding, removing and showing installed plug-in licenses

Configuration objective	CLI command	Parameter options
Show a complete list of the software plug-in licenses that are currently installed on the device.	`plugins`	
NEW Add a new software plug-in license to the radio transceiver.	`plugins add B`	Value B is the activation code for the relevant plug-in license.
NEW Delete a new software plug-in license from the radio transceiver.	`plugins remove C`	Value C is the name of the relevant plug-in license.

8.2. Showing the device model and firmware revision number

Configuration objective	CLI command	Parameter options
Show the device model and firmware revision number.	`version`	

8.3. Showing the device mesh ID number

Configuration objective	CLI command	Parameter options
Show the device's Cisco mesh ID number.	`meshid`	

8.4. Show an engineering statistics summary

Configuration objective	CLI command	Parameter options
Show an instantaneous summary of current engineering statistics for the device.	`eng-stats`	
Show a summary of engineering statistics for the device that is updated once per second.	`eng-stats refresh`	

8.5. Network Time Protocol settings

Configuration objective	CLI command	Parameter options
Synchronize the device's time settings with a chosen internet time server by activating network time protocol (NTP).	`ntp Q`	Possible values for Q are *enable* or *disable*.
Synchronize the device with a chosen primary NTP server.	`ntp server R`	Value R is the URL of the chosen primary NTP server.
Synchronize the device with a chosen backup NTP server.	`ntp server2 S`	Value S is the URL of the chosen secondary NTP server.
Set the designated time zone in which the device is located.	`ntp timezone T`	Value T is the local time zone. Composite names must be bracketed with double quotation marks. A typical example might read `"America/New York"`.
Set the time and date immediately, instead of waiting	`ntp set`	

for the standard NTP setting period.		

8.6. Virtual LAN settings

> **!** **IMPORTANT**
>
> If you are unfamiliar with virtual LAN (VLAN) networks and their management principles, refer to the *Cisco VLAN specification* document for detailed information.

Configuration objective	CLI command	Parameter options
Activate VLAN capability.	`vlan status U`	Possible values for U are *enable* or *disable*.
Specify the management identification number of the VLAN (used to communicate with the device's operating system).	`vlan mgm-vid V`	Value V is the management VLAN identification number (integer != 0).
Specify the native identification number (the VLAN ID that is implicitly assigned to untagged packets received on trunk ports).	`vlan native-vid W`	Value W is the native VLAN identification number (integer).

8.7. Simple Network Management Protocol settings

Configuration objective	CLI command	Parameter options
Enable or disable SNMP functionality.	`snmp A`	Possible values for A are *enable* or *disable*.
Specify the SNMP protocol version.	`snmp version B`	Possible values for A are *v2c* or *v3*.
Specify the SNMP v2c community ID number (SNMP v2c only).	`snmp community-id C`	Value C is the SNMP v2c community ID number.
Specify the SNMP v3 user name (SNMP v3 only).	`snmp username D`	Value D is the SNMP v3 user name.
Specify the SNMP v3 user password (SNMP v3 only).	`snmp password E`	Value E is the SNMP v3 user password.
Specify the SNMP v3 authentication protocol (SNMP v3 only).	`snmp auth-method F`	Possible values for F are *md5* or *sha*.
Specify the SNMP v3 encryption protocol (SNMP v3 only).	`snmp encryption G`	Possible values for G are *des* or *aes.* Alternatively, enter *none* if a v3 encryption protocol is not needed.
Specify the SNMP v3 encryption passphrase (SNMP v3 only).	`snmp secret H`	Value H is the SNMP v3 encryption passphrase.
Specify the SNMP periodic trap settings.	`snmp periodic-trap I`	Possible values for Y are *enable* or *disable*.
Specify the notification trap period for periodic SNMP traps.	`snmp trap-period J`	Value J is the notification trap period in minutes.
Enable or disable SNMP event traps.	`snmp event-trap K`	Possible values for Y are *enable* or *disable*.
Specify the SNMP NMS hostname or IP address.	`snmp nms-hostname L`	Value L is the hostname or IP address of the SNMP NMS.

8.8. Transport Layer Security settings

> **NOTE**
>
> Cisco hardware devices feature support for all versions of transport-layer security (TLS).

Configuration objective	CLI command	Parameter options
Show the versions of TLS that are supported by the device.	`tls`	
Restrict the device's TLS support capability to TLS 1.2 only.	`tls 1.2-only A`	Possible values for A are *enabled* or *disabled*. If the *disabled* command is executed, the device will support TLS 1.0, 1.1 and 1.2.

8.9. Device cloud-management settings

> **NOTE**
>
> For instructions on how to configure your Cisco device using the cloud-based RACER portal, refer to the *Cisco RACER configuration manual.*

Configuration objective	CLI command	Parameter options
Activate or deactivate Cisco RAdio Configuration EnviRonment (RACER) configuration capability.	`racer B`	Possible values for B are: • *online-cloud-managed* (the device will take its configuration settings from the cloud-based RACER profile that is assigned to it.) • *offline* (the device is disconnected from RACER and must be manually configured using the CLI, or its offline Configurator interface.)

8.10. MONITOR settings

> **NOTE**
>
> For instructions on how to do operational monitoring and gather statistics from your Cisco device using the MONITOR application, refer to the Cisco *Radio Monitoring Dashboard Configuration Manual.*

Configuration objective	CLI command	Parameter options
View the device's current Cisco Radio Monitoring Dashboard (MONITOR) connection status.	`monitor`	Possible values for L are *enable* or *disable*.
Disconnect the device from MONITOR. Note that the device can be re-connected to MONITOR at any	`monitor detach`	Possible values for L are *enable* or *disable*.

time, using the MONITOR application.		

8.11. Link Layer Discovery Protocol settings

Configuration objective	CLI command	Parameter options
Activate LLDP capability.	`lldp B`	Possible values for B are *enable* or *disable*.
Enable or disable the link layer discovery protocol-data SNMP management information database.	`lldp snmp-mib C`	Possible values for C are *enable* or *disable*.
Show neighboring devices that are also LLDP-enabled.	`lldp neighbors`	

8.12. Multicast settings

Note that as the FM Ponte 50 is configured to work in Bridge mode only, multicast capability can only be enabled or disabled.

Configuration objective	CLI command	Parameter options
NEW Enable or disable multicast forwarding capability.	`multicast status D`	Possible values for D are *enable* or *disable*.

8.13. Device firmware upgrade settings

These settings allow you to upgrade the firmware of the connected Cisco device using trivial file transfer protocol (TFTP).

Configuration objective	CLI command	Parameter options
Specify the IP address of the TFTP server containing the needed firmware image.	`tftp-fw-upgrade tftp-server D`	Value D is the IP address of the TFTP server.
Specify the file name of the needed firmware image.	`tftp-fw-upgrade upgrade-fw-image E`	Value E is the file name of the needed firmware image.
Enable or disable automated firmware upgrades.	`tftp-fw-upgrade automatic-upgrade F`	Possible values for F are *enable* or *disable*.
Specify the periodic interval at which the device checks for the presence of a newer firmware upgrade package.	`tftp-fw-upgrade check-period G`	Value G is the automatic upgrade check period in hours.
Force an immediate check for a newer firmware upgrade package.	`tftp-fw-upgrade check-now`	

8.14. Enabling a CLI session time-out

Configuration objective	CLI command	Parameter options
NEW Specify an 'inactive' time period after which, if user activity is still not detected within the CLI console, the current user will automatically be logged out.	`session-timeout O`	Value O is the specified 'inactive' time period in minutes after which the current user will automatically be logged out. Possible values for O are: • *1* to *35791* (i.e. a maximum inactive period of 596 hours.) • *0* (time-out option disabled.)

8.15. Exit the command-line interface console

Configuration objective	CLI command	Parameter options
Exit the command-line interface console.	`exit`	

9. APPENDIX 1: CLI COMMAND RESULTS

This section describes how to understand and interpret the feedback given by the Cisco command-line interface (CLI) under specific circumstances.

9.1. Interpreting # *eng-stats* output

The table below shows the CLI output for # *eng-stats*.

Kbps:	Total	Rx	Tx
LAN:	0	0	0
WLAN:	100	72	28

Fluidity role: master vehicle id 142186476

static 5.0.147.3 [00:F1:CA:80:93:03]	mobile 5.0.41.57 [00:F1:CA:80:29:39]	sn r 47	rss i - 49	handoff 1486754405.00168097 9	tim e 1	ac q 0	
static 5.0.147.3 [00-F1-CA-80-93-03]	mobile 5.0.41.57 [00-F1-CA-80-29-39]		rss i 47				update d 11
static 5.0.88.123 [00-F1-CA-80-58-7B]	mobile 5.0.41.57 [00-F1-CA-80-29-39]		rss i 46				update d 11

WLAN Rx:

00:F1:CA:80:93:03	rate 162	mcs 12	mcs-flags 1	snr 45	rssi -51	received 433	evm 21 26
00:F1:CA:80:58:7B	rate 54	mcs 0	mcs-flags 0	snr 46	rssi -50	received 115	evm 0 0

WLAN Tx:

00:F1:CA:80:93:03	rate 108	mcs 5	mcs-flags 1	sent 1134	failed 0	retries 16	LER 1%	PER 0%

The results shown in the table above are interpreted as follows:

Kbps:	Total	Rx	Tx
LAN:	0	0	0
WLAN:	100	72	28

The section above shows the real-time transmission and receiving rates of the wireless and LAN interfaces.

Fluidity role: master vehicle id 142186476

The section above shows the role of the Cisco device being interrogated. This example is a Principal (i.e. Master) vehicle unit, with unit ID number 142186476.

static 5.0.147.3 [00:F1:CA:80:93:03]	mobile 5.0.41.57 [00:F1:CA:80:29:39]	sn r 47	rss i - 49	handoff 1486754405.00168097 9	tim e 1	ac q 0	
static 5.0.147.3 [00-F1-CA-80-93-03]	mobile 5.0.41.57 [00-F1-CA-80-29-39]		rss i 47				update d 11
static 5.0.88.123 [00-F1-CA-80-58-7B]	mobile 5.0.41.57 [00-F1-CA-80-29-39]		rss i 46				update d 11

In the section above:

- Radio unit 5.0.147.3 (first row) currently has access to radio coverage from two APs (which are also Cisco radio units).

- The first line shows the access point (AP) to which the device being interrogated is currently connected AP.

- The second and third lines show other available APs and the status of those APs.

- The information in the *time 1* cell shows that a time of 1ms was taken to create the new MPLS tunnel.

- The information in the *acq 0* cell shows a connection acquisition time of 0ms. In other words, the vehicle radio took 0ms to connect to the wireless infrastructure radio from outside the coverage zone.

- The information in the *handoff* cell shows a timestamp at which the handoff occurred of 1486754405.001680979.

- The information in the *updated* cell shows the timestamp at which the last control packet was received from the connected AP.

WLAN Rx:

00:F1:CA:80:93:03	rate 162	mcs 12	mcs-flags 1	snr 45	rssi -51	received 433	evm 21 26
00:F1:CA:80:58:7B	rate 54	mcs 0	mcs-flags 0	snr 46	rssi -50	received 115	evm 0 0

WLAN Tx:

00:F1:CA:80:93:03	rate 108	mcs 5	mcs-flags 1	sent 1134	failed 0	retries 16	LER 1%	PER 0%

The tables above show the physical status of the wireless TX (transmission) connection and RX (reception) connection:

- *rate* shows the data transfer rate in Mbps.

- *SNR* shows the signal-to-noise ratio.

- *RSSI* shows the received signal strength in decibel-milliwatts.

- *LER* shows the link error rate.

- *PER* shows the packet error rate.

Ethernet 1 role:	ingress/egress
Ethernet 2 role:	Down

The table above shows the role of the radio unit's Ethernet ports:

- If a *Down* result is shown, the port is not connected.

- If a *mesh* result is shown, the port allows only MPLS packets.

- If an *ingress/egress mesh* result is shown, the port allows all types of data packets.

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⚠	**WARNING**
	Installation of Cisco hardware devices and their supporting infrastructure must be done by suitably qualified personnel only. In some countries, installation by a certified electrician may be required.
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⚠	**WARNING**
	To avoid danger from electric shock, do not expose the unit to water or high humidity if the unit is powered ON, or if any access covers have been removed from the unit enclosure. Do not place liquid-filled objects on or above the unit.

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