AIRVINE

Airvine WaveTunnel™

User Manual and Configuration Guide

Part No:	800-00217-001
Revision:	May 2024 1.6
SW Release	1.3.0.81

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WaveTunnel Introduction

The WaveTunnel 2041-DC is an indoor wireless backhaul system supporting multiple in-building topologies. Operating in the 60 GHz band, this is a point-to-point (PtP) system with a 2Gbps maximum throughput rate and a 150-meter link range.

The system has an advanced RF front end with enough gain to beam through indoor wall materials thus enabling NLOS backbones, and with +/- 45-degree steering can also avoid obstacles and beam around corners. The unit can be configured quickly by using a Smartphone App, AirvineMobile™ or a browser version, VineManager™. Powered by a collection of software, VineSuite, the WaveTunnel is the world's first mmWave indoor wireless backbone.

The WaveTunnel system can be employed in a variety of applications or markets. The product has been designed from the ground up to be simple to install, simple to configure and simple to use. All of this means no rf or special skills are needed enabling installation of a single unit inminutes.

WaveTunnel is ideal for a multitude or applications, a sampling is listed here:

- Multiple Dwelling Units
- Hospitality
- Industrial and Manufacturing
- Large Private Venue

Featured benefits for these and other applications include the ability to deploy without construction and hence there is little to no disruption to tenants, guests, or employees. In addition, Wave Tunnel provides:

- The ability to be deployed in a ring or daisy chain topology
- Our proprietaryVineOS for resilient ring support
- Deployment of a high-speed Ethernet backbone in hours
- Nodes that automatically connect once configured
- The ability to be installed flush against a ceiling
- Three layers of security for your traffic

Regulatory Compliance & Safety Information

For important regulatory compliance information for the WaveTunnel System, please refer to the **Airvine Regulatory and Safety Guide** which is available for download at www.airvine.com/support.

Important Safety Warnings

All products are intended to be installed, used, and maintained by experienced and trained professional personnel only.

When installing and using these products, safety precautions should always be carefully followed to reduce the risk of fire, electrical shock, injury to persons, and damage to the system.

Such safety precautions including the following:

- Read the installation instructions before using, installing, or connecting the system to the power source.
- Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
- Devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation.
- Installation of these products in the end use environments must conform to all applicable national and local regulations and codes including all relevant electrical codes.
- Devices are to be used with and powered only by power sources that are either provided by Airvine or recommended by Airvine. Failure to properly power the unit, which includes using power sources that don’t comply to the system’s required input voltage or current ranges, or the use of unapproved power sources, or the failure to not properly connect the power sources to the system’s power connector, can result in possible injury or permanent damage to the unit.
- Ultimate disposal of this product should be handled according to all national laws and regulations.
- No user-serviceable parts inside; all repairs and services must be handled by a qualified Airvine service center.
- To avoid the risk of electric shock or damage to the unit, do not open unit or remove any covers of the unit.
- Do not insert any objects of any shape or size inside these devices while powered on. Such objects may contact hazardous energy parts that could result in a risk of fire, personal injury, or damage to the unit.
- Do not remove or alter the markings or labels affixed to these devices.
- Airvine devices are for indoor use only and are not meant to be installed outdoors.

Regularity and Safety Information

For important regulatory and safety information, please refer to the Airvine Regulatory and Safety Guide.

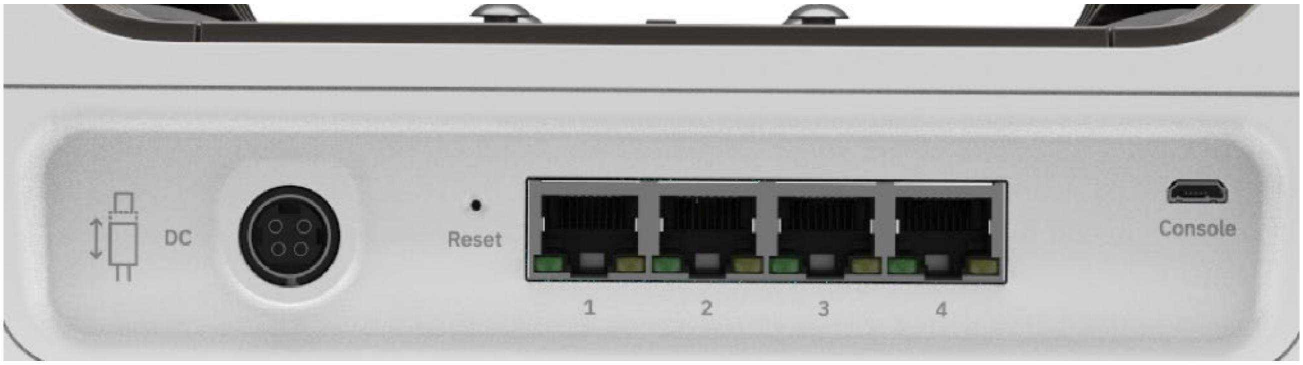
Key Specifications – Model 2041DC

Networking Interface	4 x 1 RJ45 Shielded Gigabit Ethernet ports Each port can support Power Over Ethernet (POE) PSE Output
RF Connections	2 x 60 GHz WaveTunnel radios – one on either side of the WaveTunnel unit, 802.11b/g/n WiFi for management.
Power Consumption	**Without External AC/DC Adapter:** 27W (no POE output) 147W (with max 120 Watt POE output) **Including ACC-PS180M External AC/DC Adapter (@115VAC):** 28W (no POE output) 152W (with max 120 Watt POE output) **Including ACC-PS180M External AC/DC Adapter (@230VAC):** 30W (no POE output) 163W (with max 120 Watt POE output)
Power Input Voltage & Current	Input Voltage Range: 43 to 58 VDC Max Input Current: 4.7A
Power Output (POE)	Total Maximum POE Power for System: 120 Watts Maximum POE Power for an Ethernet Port: 60 Watts POE Output Voltage Range: 43 to 58 VDC Note: POE output voltage will be equivalent to the WaveTunnel input DC Voltage.
DC Input Power Connector Type	Kycon KPJX-4S Female 4-PIN connector
External AC/DC Power Adapter (included with PN: WT-2041DC-1)	Part Number: ACC-PS180M External AC/DC Adapter (optional) Description: 180-Watt, 90 VAC to 264 VAC Input, 54VDC Output, Class II
Operating Temperature	0 – 40 °C
Humidity	0 – 95%
Usage	For Indoor Use Only

Electrical and Mechanical Interfaces: Model 2041DC

The WaveTunnel's simple design has the following Electrical and Mechanical Interfaces on the front panel listed from left to right:

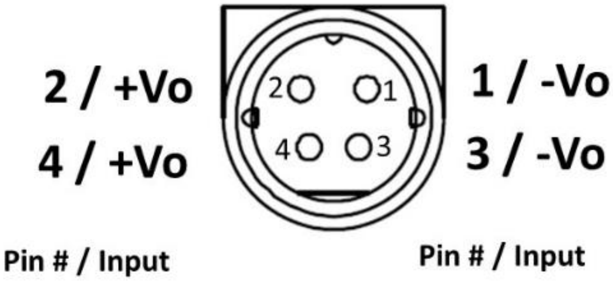
- DC Power Connector: Kycon KPJX-45 Circular Connector, 4-pin
- System Reset Button: Pin Hole (press to reset unit, press for 5 seconds to restore to factory defaults.
- 4 x 1 Gb Ethernet: RJ45, (POE Output, 120 Watts Total POE Output Power)
- Console Port Micro USB Type B connector, non-powered

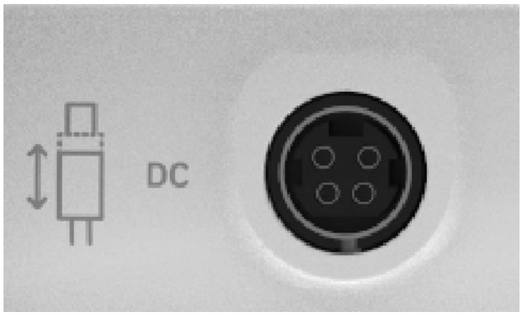


Model 2041DC – DC Power Connector Pinout

The following pinout shows the DC voltages assigned to each pin on the WaveTunnel DC Power Connector. The External Power Supplies offered by Airvine all follow this pinout and are compatible with the WaveTunnel unit. For optimal performance, it is recommended to use a power supply that outputs 54 Volts.

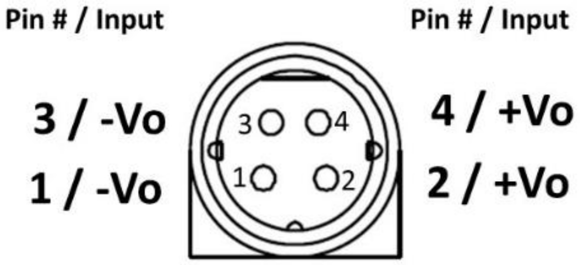
Warning: Not following the voltage/pin assignments will result in damage to the WaveTunnel unit (blowing internal non-replaceable fuses) and will require system repair.

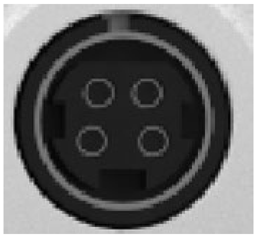




Model 2041SM – DC Power Connector Pinout

Note: The WaveTunnel DC Power Kycon connector of Model 2041SM is upside down (rotated 180 degrees) from model 2041DC.



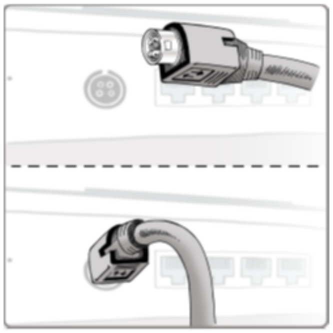


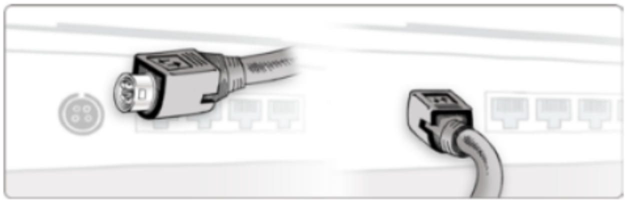
Connecting to and External DC Power Source

When connecting power to a WaveTunnel, connect the DC plug from the power brick into the WaveTunnel first. The circular connection is keyed for proper orientation. Once the DC plug is connected to the WaveTunnel, plug the AC power cord from the power brick into an electrical outlet.

For model **2041SM**, the flat side of the power connector is down.

For model **2041DC**, the flat side of the power connector is up.





External Power Adapter Specifications

WaveTunnel Units Typically Ship with an External AC/DC Power Adapter. Specifications for this External Power Adapter are as follows:

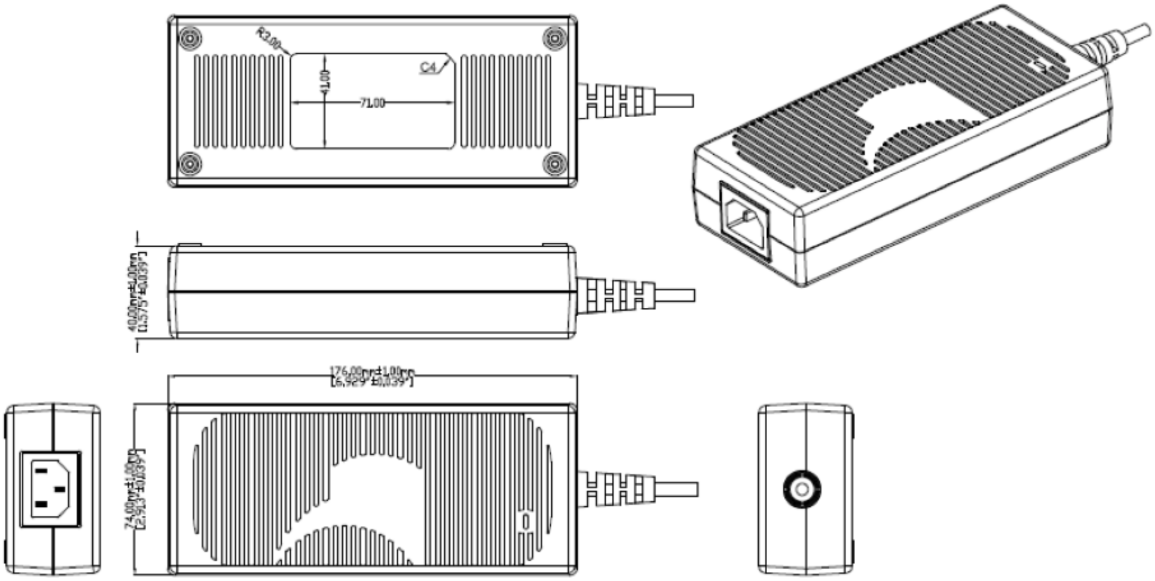
ACC-PS180M – AC/DC External Power Adapter

Part Number: ACC-PS180M	External AC/DC Adapter (optional) Tested with WaveTunnel Model 2041-DC and included with WT-2041-DC-1.

ACC-PS180M – Key Specifications

Vendor/Model	GlobeTek, GTM961800PWWWVV.V-T3
Input Voltage & Current	Maximum Input Voltage Range: 90-264VAC Typical Input Voltage Range: 100-240 VAC Max Input Current: 2.2A
Output Voltage, Current, and Power	Output Voltage: 54 VDC Output Current: 3.333A Output Power: 180 Watts
Isolation	Class 2
Efficiency	DoE Level VI and EU CoC Tier 2 Compliant
Input Connector	Input Connector: IEC 60320 C14 Male Accommodates IEC 60320 C13 Female Connector Power Cord
Output Connector	Output Connector: Kycon KPPX-4P, 4-PIN Circular Connector, Male
DC Input Power Connector Type	Kycon KPJX-4S Female 4-PIN connector
Operating Temperature	Operating Temperature: -10°C to 40 °C (full load)
Humidity	0 - 95%, Relative Humidity, non-condensing
Usage	For Indoor Use Only

ACC-PS180M – Enclosure Drawing



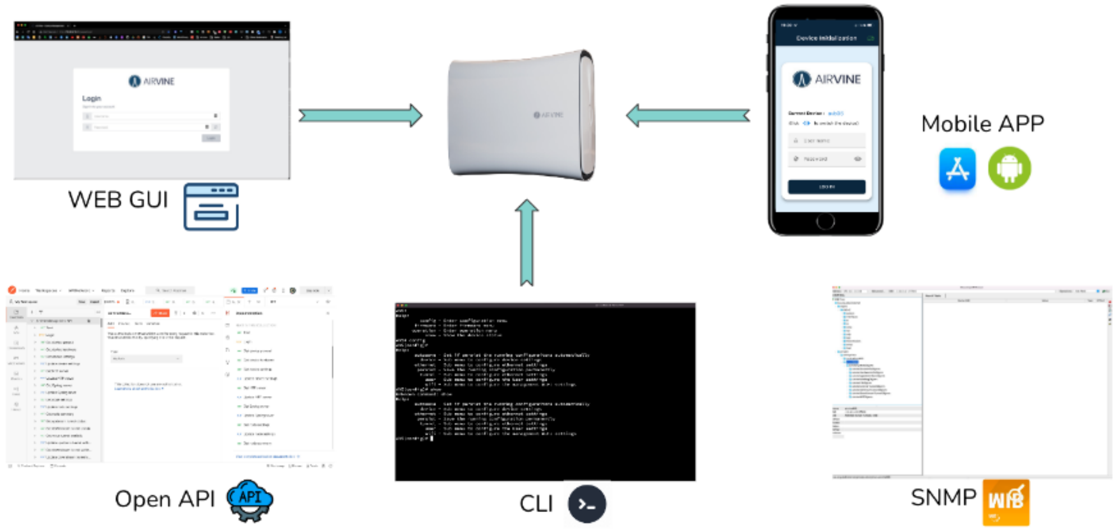
Configuring and Managing WaveTunnel Devices

Management Interfaces of WaveTunnel device

There are several management interfaces supported by the WaveTunnel device which you can use to manage the network. It includes:

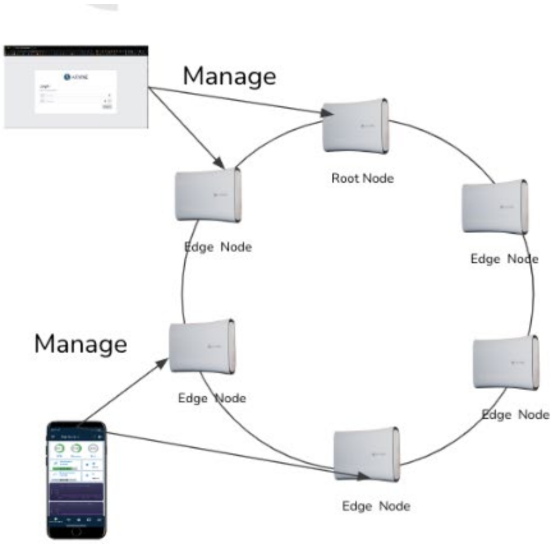
- WEB GUI
- Mobile App
- Command-Line Interface
- Open API
- SNMP interface

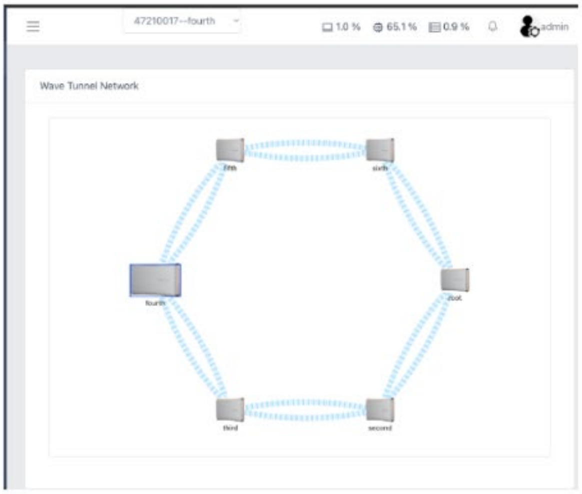
You can select the interfaces in your environment which are most appropriate to configure and monitor your network.



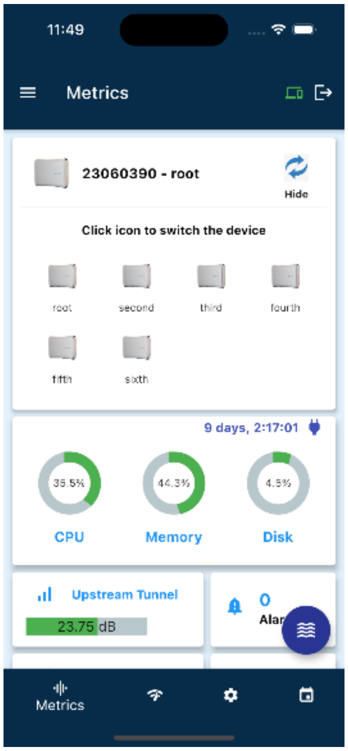
For Open API and SNMP, please refer to the API/SNMP documents for more detailed information.

The architecture of the WaveTunnel network is designed as the “controller-less” system. It means there is no central controller in the network to manage the WaveTunnel devices. You can connect to any WaveTunnel device in the network to manage others via the WEB GUI or Mobile App. Please refer to the diagrams below.





To manage the WaveTunnel device, you can select any device on the network from the drop-down list in the WEB GUI or Mobile App.


11:49

Metrics

23060390 - root

Hide

Click icon to switch the device

root second third fourth

fifth sixth

9 days, 2:17:01

35.5% CPU

44.3% Memory

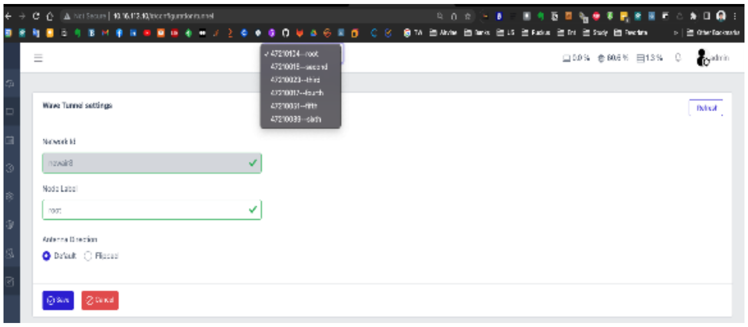
4.5% Disk

Upstream Tunnel

23.75 dB

0 Alar

Metrics


✓ 47210124--root
47210015--second
47210023--third
47210017--fourth
47210031--fifth
47210039--sixth

Wave Tunnel settings

Reload

Network Id

nowair8 ✓

Node Label

root ✓

Antenna Direction

● Default ○ Flipped

Save Cancel

Prerequisites for using the management interfaces

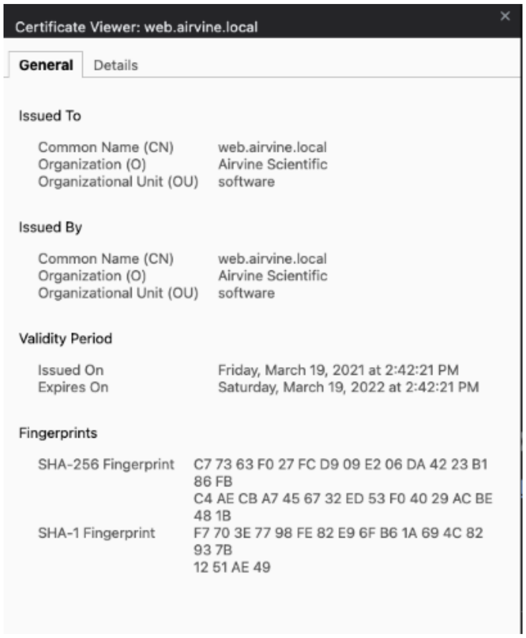
Web GUI Prerequisites

For being able to connect to the WEB GUI of the WaveTunnel device, you need a computer installed with one of the following web browsers:

- Google Chrome
- Microsoft Edge
- Safari
- Firefox

The WEB GUI supports both **http** and **https** connections.For https connections,the web server of the WaveTunnel device uses the self-signed certificate. Thus, you need to ignore the security warnings on the browser to bypass the validation.

The information of the Airvine self-signed certificate.



Certificate Viewer: web.airvine.local

Issued To

Common Name (CN)	web.airvine.local
Organization (O)	Airvine Scientific
Organizational Unit (OU)	software

Issued By

Common Name (CN)	web.airvine.local
Organization (O)	Airvine Scientific
Organizational Unit (OU)	software

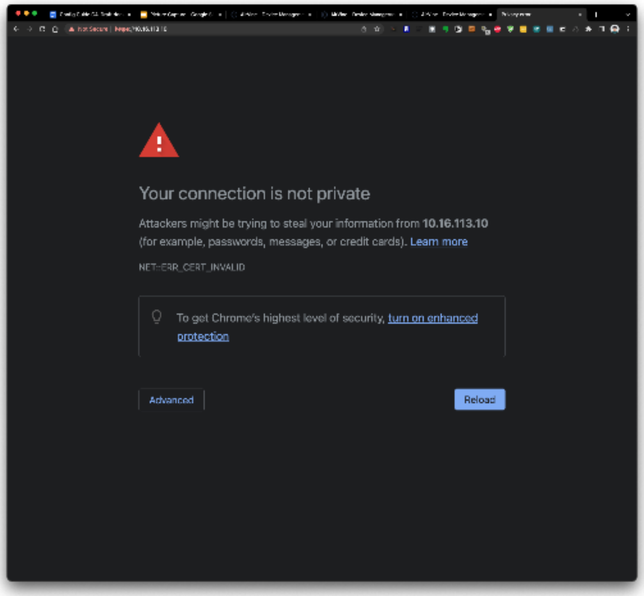
Validity Period

Issued On	Friday, March 19, 2021 at 2:42:21 PM
Expires On	Saturday, March 19, 2022 at 2:42:21 PM

Fingerprints

SHA-256 Fingerprint	C7 73 63 F0 27 FC D9 09 E2 06 DA 42 23 B1 86 FB C4 AE CB A7 45 67 32 ED 53 F0 40 29 AC BE 48 1B
SHA-1 Fingerprint	F7 70 3E 77 98 FE 82 E9 6F B6 1A 69 4C 82 93 7B 12 51 AE 49

For Google Chrome, there is no link on the warning page to ignore the certificate and move forward. You can type **“thisisunsafe”** to proceed.



Your connection is not private

Attackers might be trying to steal your information from **10.16.113.10** (for example, passwords, messages, or credit cards). Learn more

NET::ERR_CERT_INVALID

To get Chrome's highest level of security, turn on enhanced protection

The default login credential of the WEB GUI are

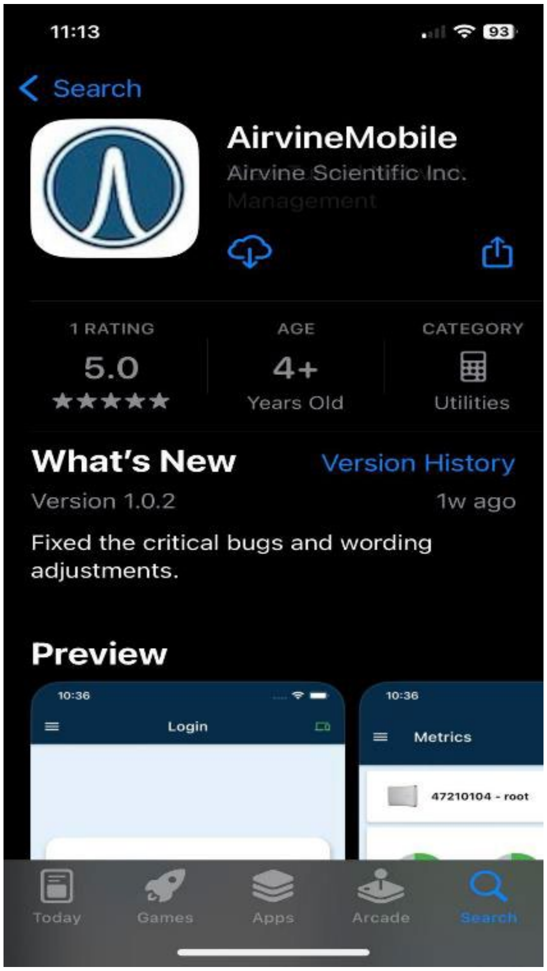
Username: **admin**
Password: **admin**

Mobile App Prerequisites

Download the "AirvineMobile" App from the App Store.

[Apple iOS]

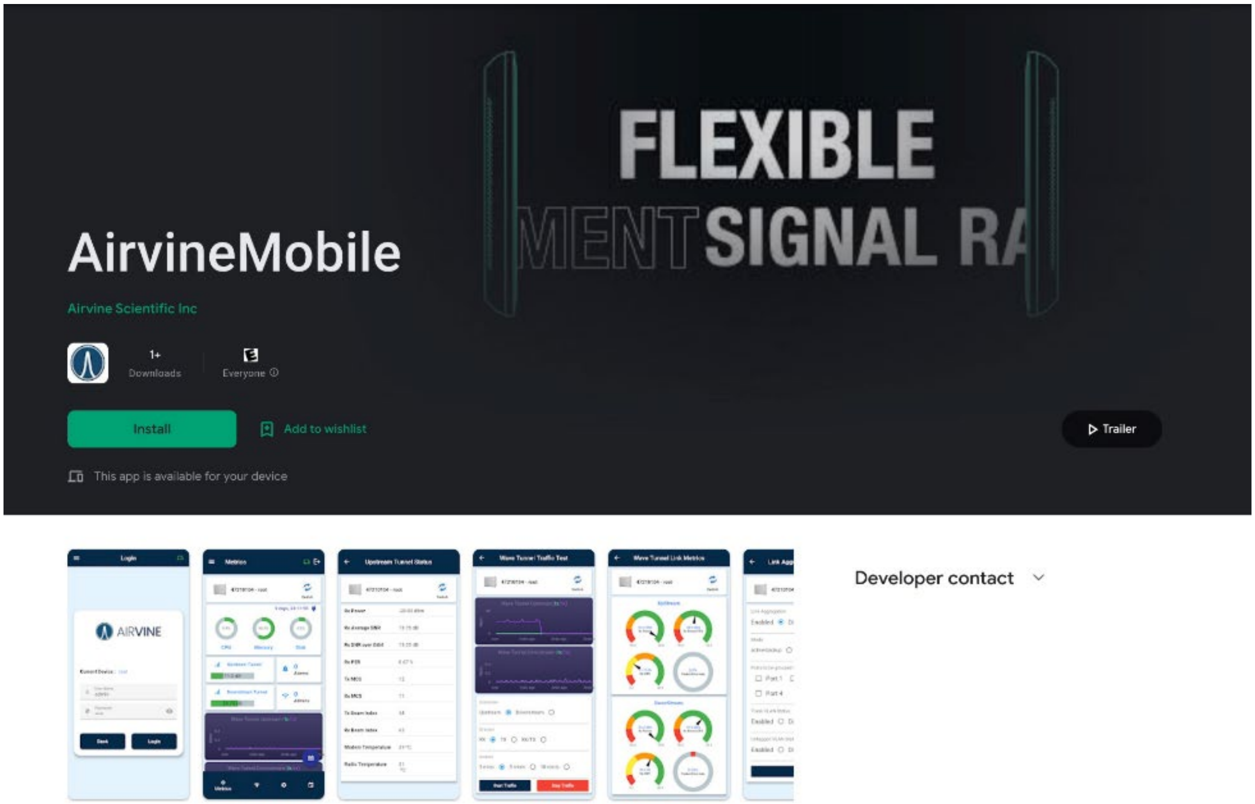
Search "AirvineMobile" from the App Store in your mobile device.



Fixed the critical bugs and wording adjustments.

[Android]

Search AirvineMobile and download the App from Google Play.

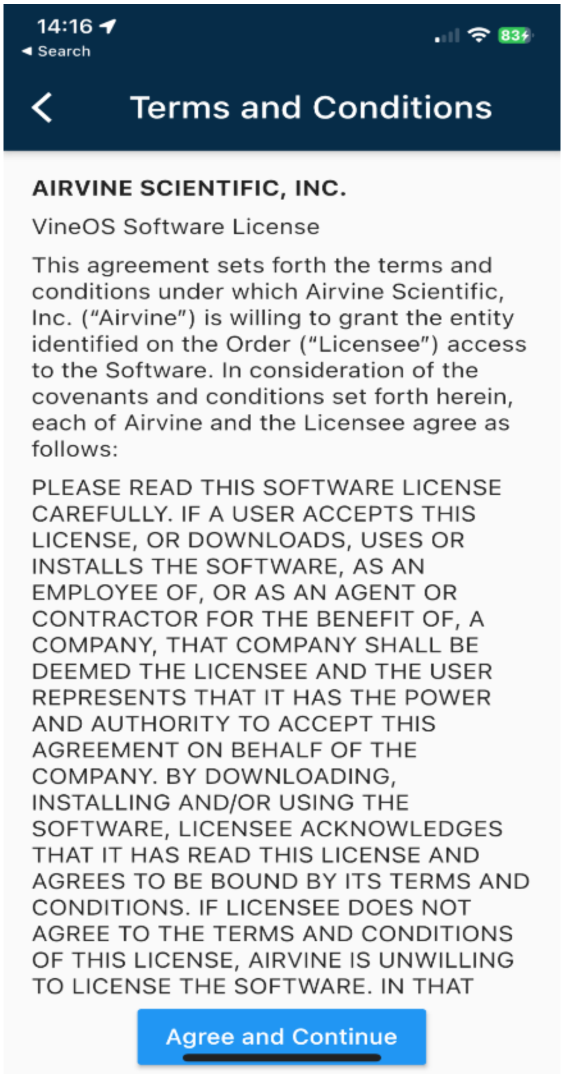


The default login credential of the mobile App are

User name: **admin**
Password: **admin**

Note: The MobileApp uses the 2.4 GHz WaveTunnel WiFi radio. To connect to

If you wish to use the WaveTunnel mobile app for managing your WaveTunnel devices, please read the "Terms and Conditions" before connecting.



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Command-Line Interface Prerequisites

There are two methods you can use to get into the command-line interface of the WaveTunnel device. You can either use the serial cable or connect through the SSH connection.

The default login credential of the command-line interface is as follows.

User name: admin
Password: admin

Enable Password: blank, just hit enter key

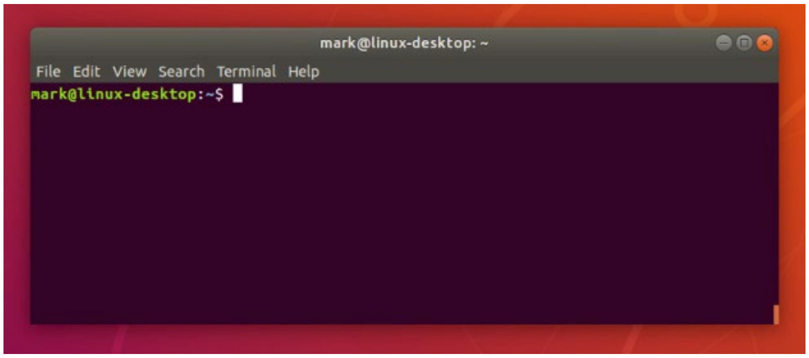
[CLI command keys]

Key	Action
Enter	Show the sub categories or command list
Tab	Auto complete
↑ ↓	View the command history
..	Go up to the parent category
Exit or Ctrl+D	Exit the CLI

[SSH Client]

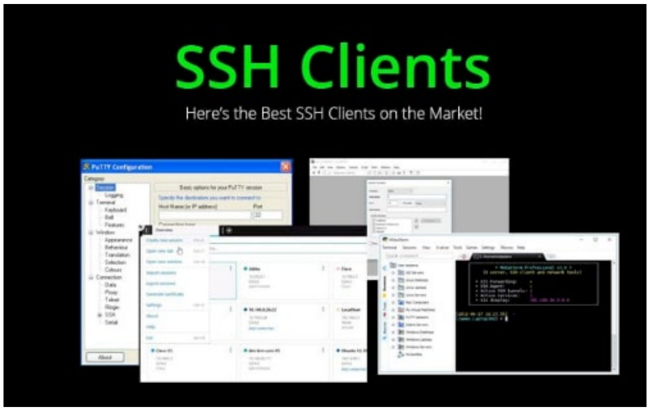
To connect the WaveTunnel device, you need to have the SSH(Secure Shell protocol) client. It can be the Linux terminal console or SSH client on other operating systems. For example, Putty, Kitty, MobaXterm…..etc.

Linux Terminal



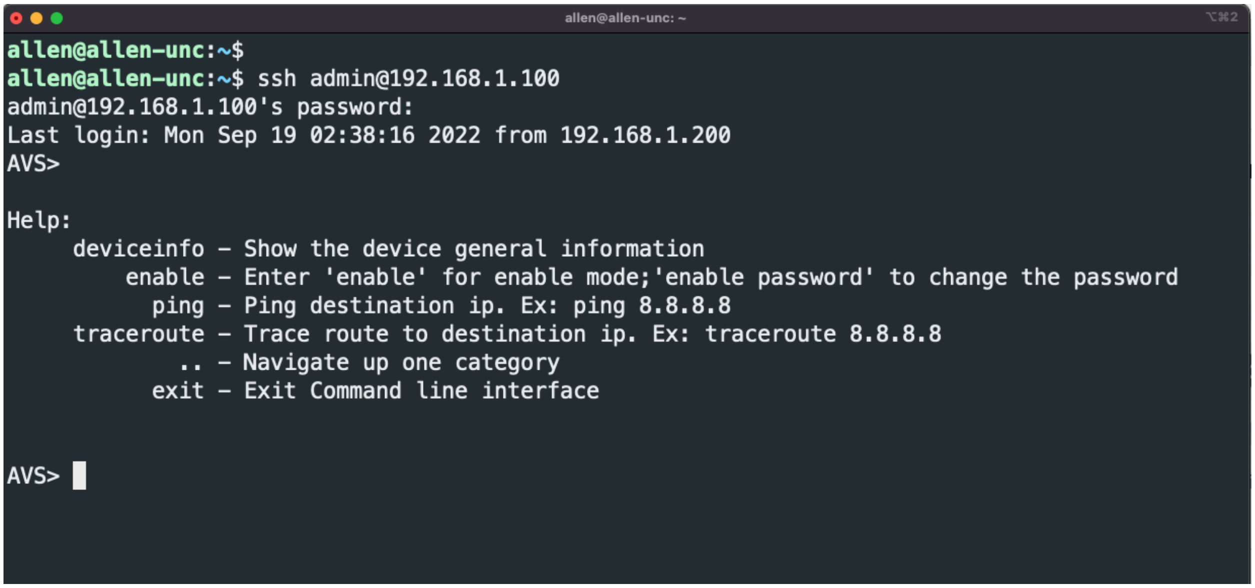
```
mark@linux-desktop:~$ 
```

SSH Clients



With these ssh clients, you can type “ssh admin@[IP of WaveTunel]” to connect to the device.

For example, ssh admin@192.168.3.1 if you are connecting through the management WLAN.



```
allen@allen-unc:~$
allen@allen-unc:~$ ssh admin@192.168.1.100
admin@192.168.1.100's password:
Last login: Mon Sep 19 02:38:16 2022 from 192.168.1.200
AVS>

Help:
     deviceinfo - Show the device general information
         enable - Enter 'enable' for enable mode;'enable password' to change the password
           ping - Ping destination ip. Ex: ping 8.8.8.8
     traceroute - Trace route to destination ip. Ex: traceroute 8.8.8.8
             .. - Navigate up one category
           exit - Exit Command line interface

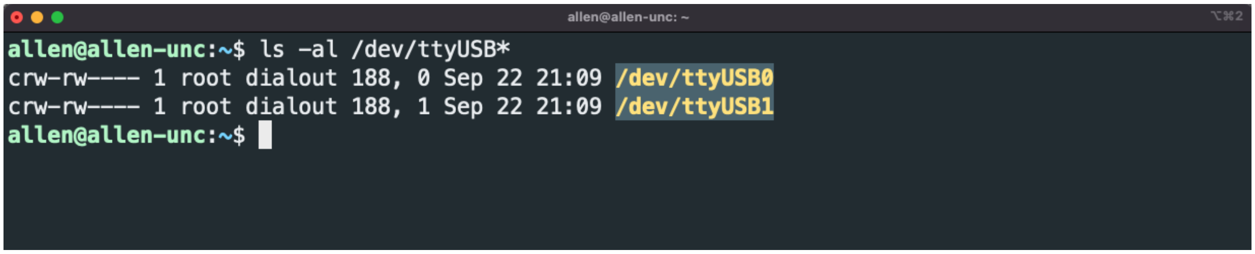

AVS> 
```

[Serial USB cable]

Micro-USB cable is required to connect to the WaveTunnel device if you want to use the console.

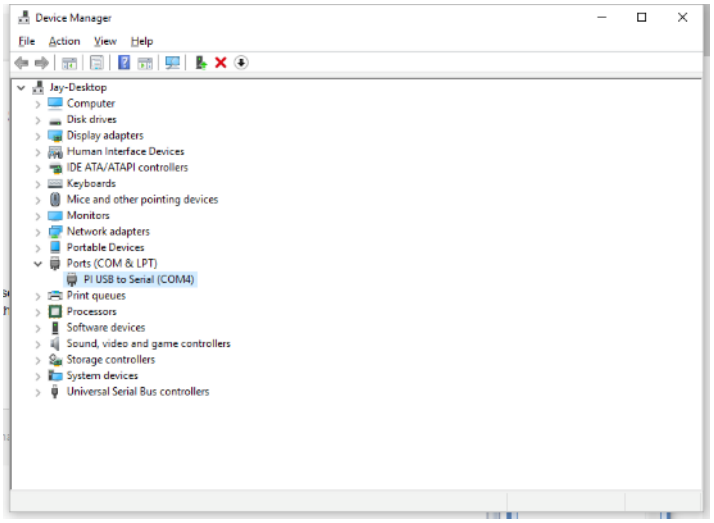
To use the serial cable connecting to the WaveTunnel device, you need to know the name of the serial port.

Below is an example of Linux or MacOS.



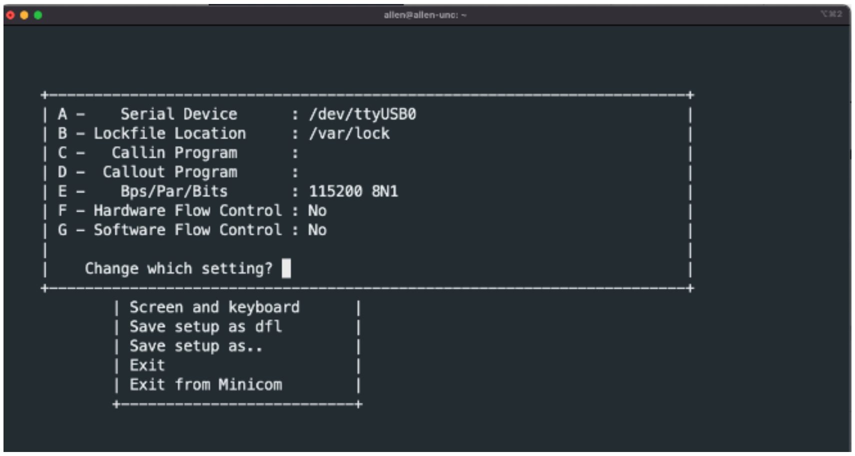
```
allen@allen-unc:~$ ls -al /dev/ttyUSB*
crw-rw---- 1 root dialout 188, 0 Sep 22 21:09 /dev/ttyUSB0
crw-rw---- 1 root dialout 188, 1 Sep 22 21:09 /dev/ttyUSB1
allen@allen-unc:~$ 
```

For Windows OS, please check the COM



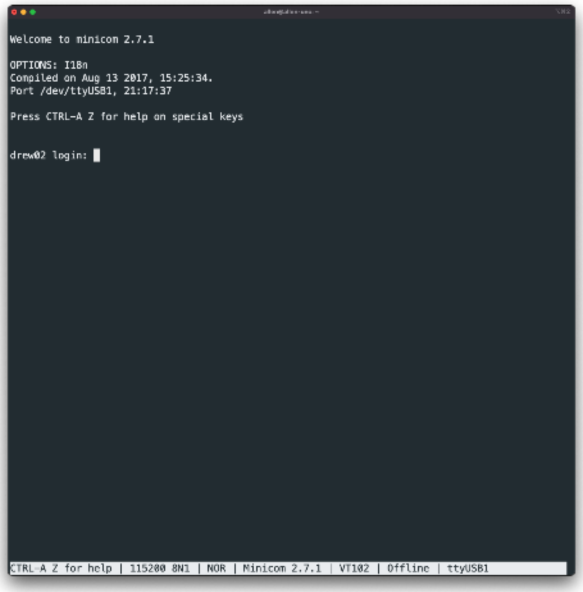
- Jay-Desktop
  - Computer
  - Disk drives
  - Display adapters
  - Human Interface Devices
  - IDE ATA/ATAPI controllers
  - Keyboards
  - Mice and other pointing devices
  - Monitors
  - Network adapters
  - Portable Devices
  - Ports (COM & LPT)
    - PI USB to Serial (COM4)
  - Print queues
  - Processors
  - Software devices
  - Sound, video and game controllers
  - Storage controllers
  - System devices
  - Universal Serial Bus controllers

Once you know the name of the serial port, you need to configure the settings in minicom or Putty as follows.



```
+-----------------------------------------------------------------------+
| A -    Serial Device      : /dev/ttyUSB0                              |
| B - Lockfile Location     : /var/lock                                 |
| C -   Callin Program      :                                           |
| D -  Callout Program      :                                           |
| E -    Bps/Par/Bits       : 115200 8N1                                |
| F - Hardware Flow Control : No                                        |
| G - Software Flow Control : No                                        |
|                                                                       |
|    Change which setting?                                              |
+-----------------------------------------------------------------------+
        | Screen and keyboard      |
        | Save setup as dfl        |
        | Save setup as..          |
        | Exit                     |
        | Exit from Minicom        |
        +--------------------------+
```

You can see the screen if you can connect to the device.



```
Welcome to minicom 2.7.1

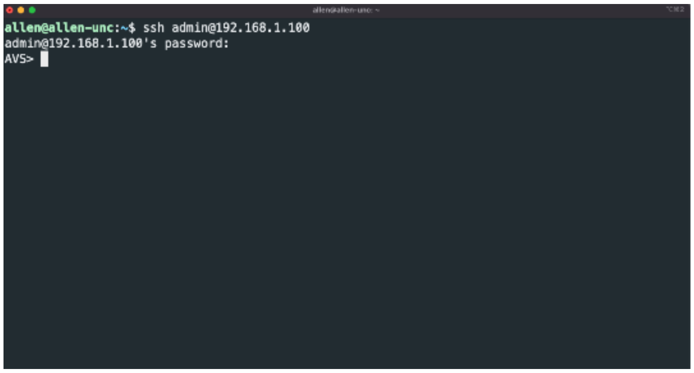
OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB1, 21:17:37

Press CTRL-A Z for help on special keys

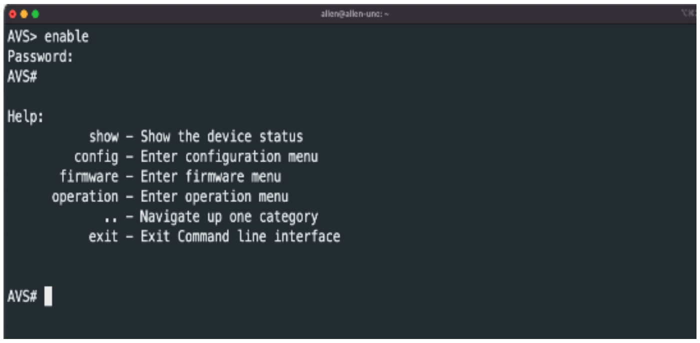

drew02 login: █

CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.7.1 | VT102 | Offline | ttyUSB1
```

The console prompt after successfully login.



```
allen@allen-unc:~$ ssh admin@192.168.1.100
admin@192.168.1.100's password:
AVS> █
```



```
AVS> enable
Password:
AVS#

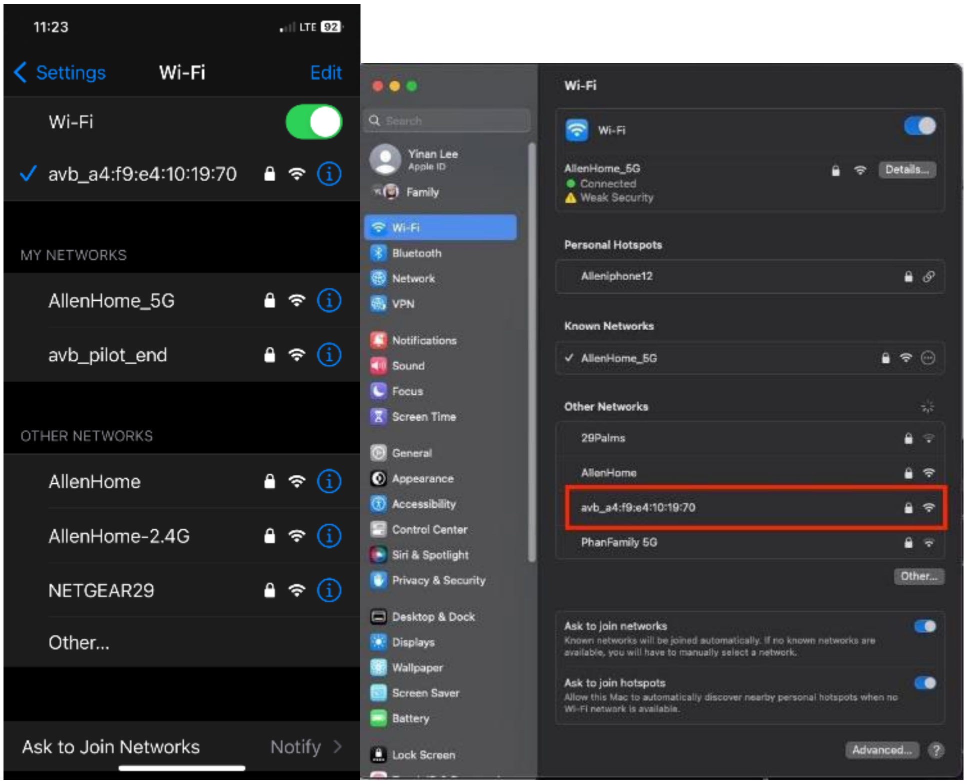
Help:
           show - Show the device status
         config - Enter configuration menu
       firmware - Enter firmware menu
      operation - Enter operation menu
             .. - Navigate up one category
           exit - Exit Command line interface


AVS# █
```

How to connect to the new WaveTunnel device

Management WLAN

The default management SSID is **“avb_[MAC_ADDRESS]”**. You can check the MAC address from the label of your WaveTunnel device.



You can connect to this SSID with your mobile device or laptop. The default passphrase is **“airvine!”**.

For the laptop, type “http://192.168.3.1” on your browser to access the WEB GUI.

1. Ethernet cable

You can plug in the ethernet cable to any of the ports of the WaveTunnel device.The default IP address of the WaveTunnel device is “**192.168.0.253**”. Set the IP address of your laptop to the same subnet(e.g. 192.168.0.100) for being able to connect to the WaveTunnel device.

2. Serial console cable

Please refer to the “Command-Line Interface Prerequisites” above.

Initialize the WaveTunnel device

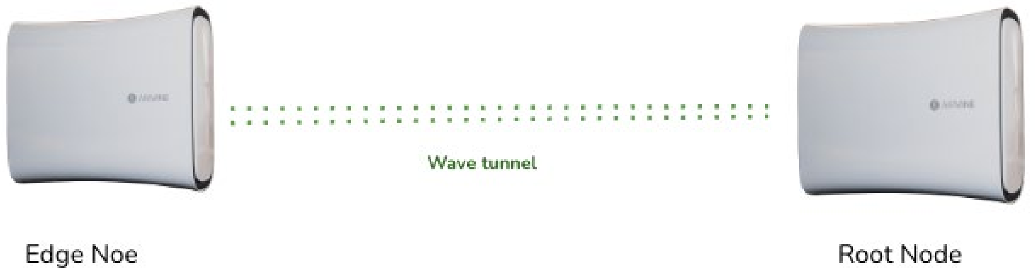
Before You Begin you will need the following:

- MAC address, which is printed on each WaveTunnel device.
- Mounting location for each node
- Root node Ethernet cabling
- Each of the nodes to be installed must be in the factory default state
- The network topology of your deployment. Please refer to the following example for the pilot phase.

Mounting Instructions

Select mounting locations for each node in the network. Nodes should be mounted using the appropriate bracket and hardware, and then powered-up before beginning the configuration process. When multiple Ethernet cables are used ensure they are bundled together.

Important: These pre-production Nodes need to be mounted facing the same direction so the radios can communicate properly (see below WaveTunnel example, the Airvine logo is on the same side.



For more detailed mounting instructions, please see the "WaveTunnel Installation Guide".

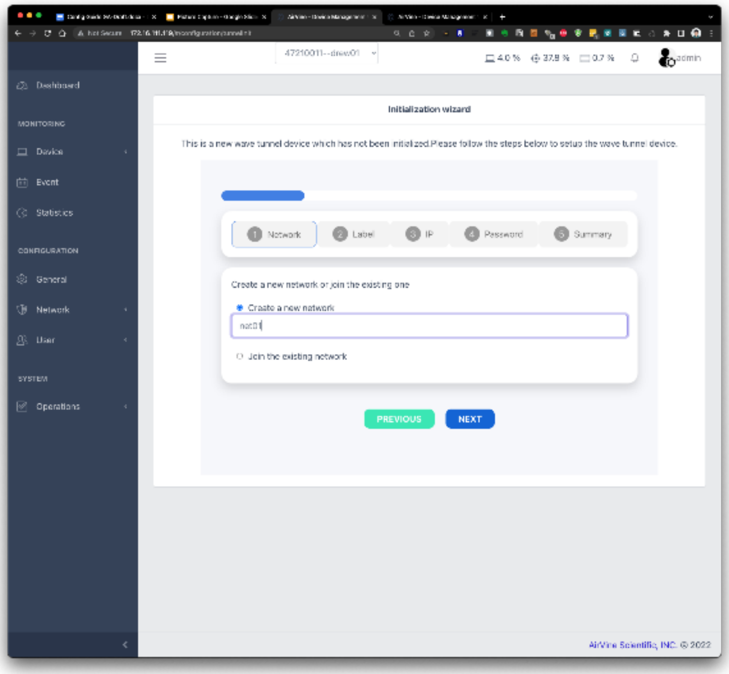
Take the example below to set up the wave tunnel connection between the first(root) and the second(edge) nodes.

[WEB GUI]

Connect the WEB GUI through the default management SSID or ethernet cable.

- Set up the Root Node

After logon to the WEB GUI, the initialization wizard is shown on the landing page. Following the Initialization wizard to set up the wave tunnel connection. The first step is selecting “Create a new network” and giving the name of this network.



Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

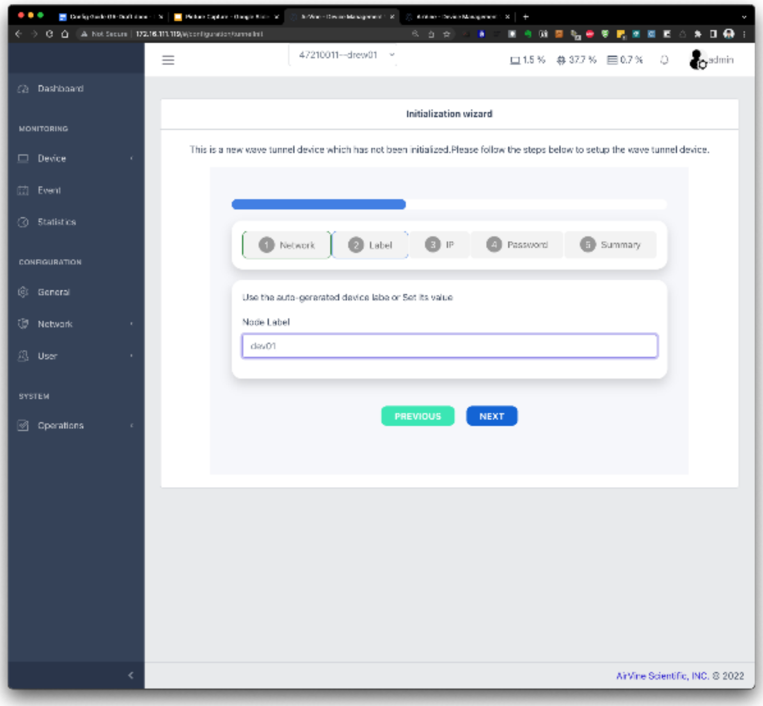
Create a new network or join the existing one

● Create a new network

net01

○ Join the existing network

Input the label of this root node to recognize it later.



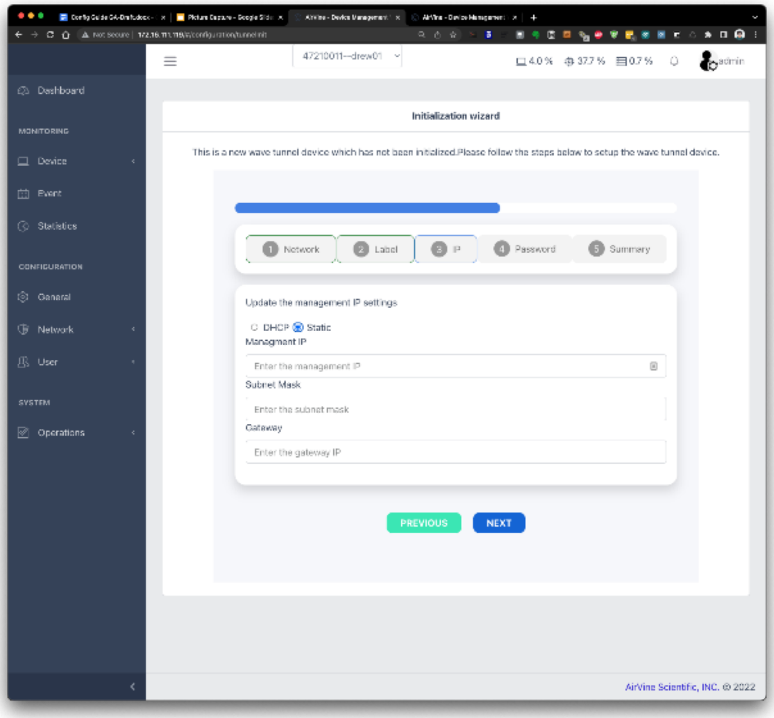
Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Use the auto-gerarated device labe or Set its value

Node Label: dev01

Configure the management IP of this WaveTunnel device. It can be DHCP or Static IP.



Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Update the management IP settings

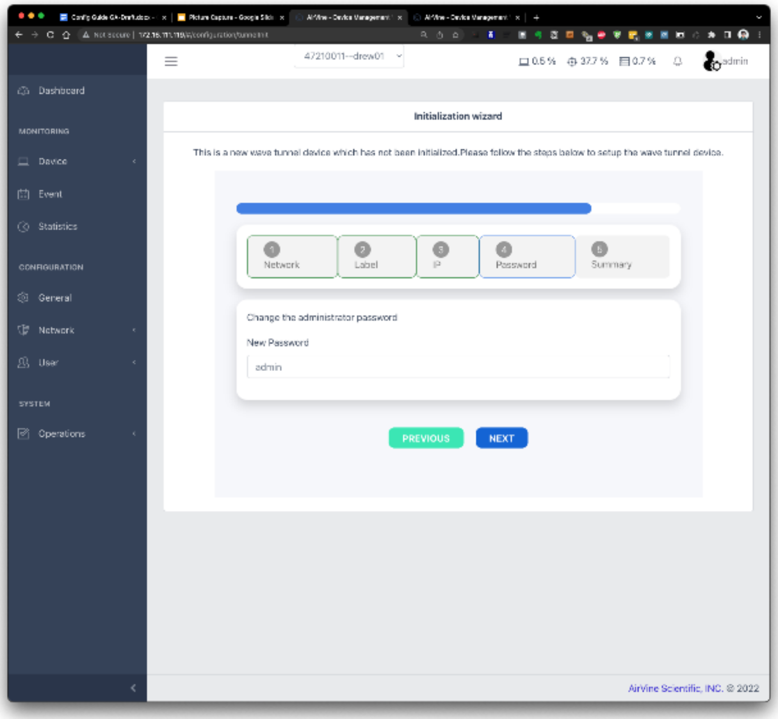
○ DHCP ● Static

Managmant IP: Enter the management IP

Subnet Mask: Enter the subnet mask

Gateway: Enter the gateway IP

For security considerations, you can also change the default admin password in this step.



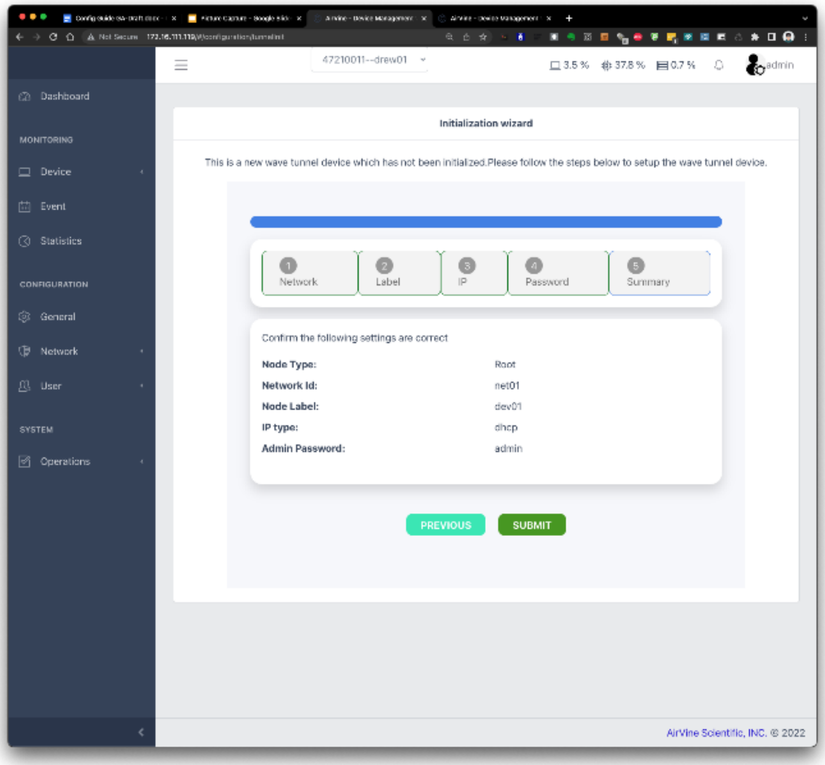
Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Change the administrator password

New Password: admin

Review the settings and then click the “submit’ button to finish the configurations. You can go back to the previous steps to change the setting before clicking the “submit” button.After setup successfully, you can see the Dashboard page in your browser.



Initialization wizard

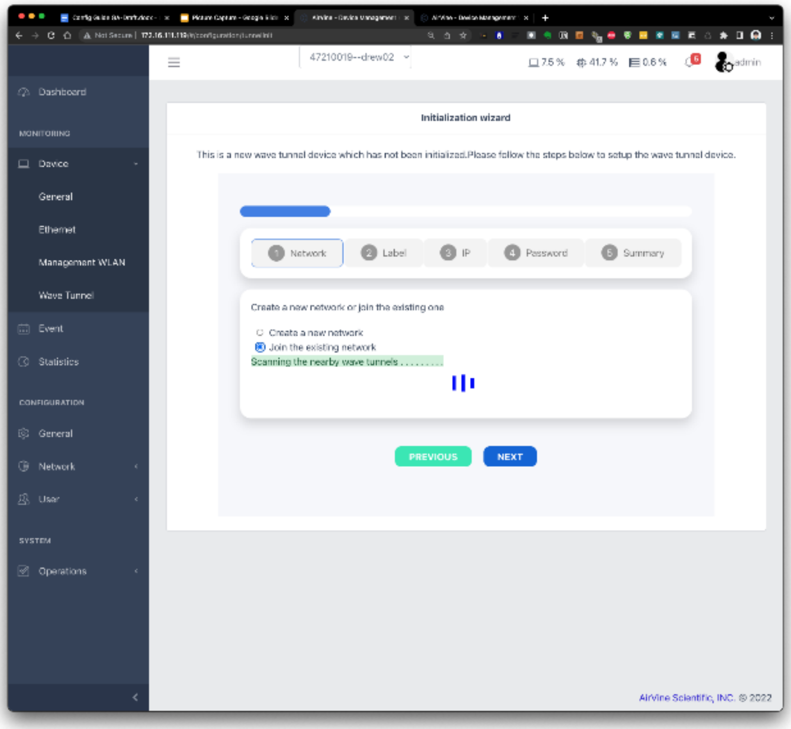
This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Confirm the following settings are correct

Node Type: Root
Network Id: net01
Node Label: dev01
IP type: dhcp
Admin Password: admin

- Set up the Edge Node

After logon to the WEB GUI, the initialization wizard is shown on the landing page. Following the Initialization wizard to set up the wave tunnel connection. The first step is selecting “join the existing network”. The page automatically scans the nearby WaveTunnel network and shows the list in the dropdown list.



Initialization wizard

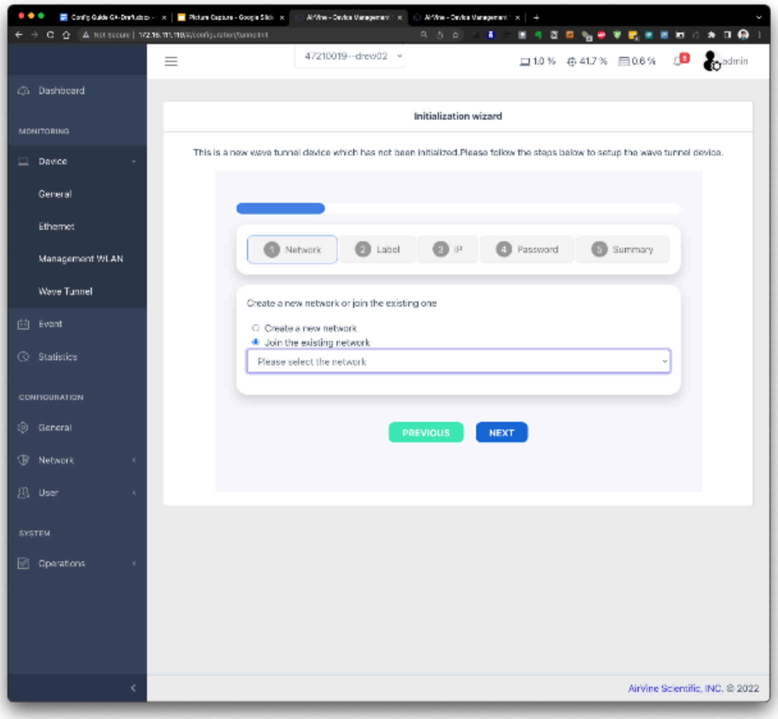
This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Create a new network or join the existing one

○ Create a new network
● Join the existing network

Scanning the nearby wave tunnels . . . .

Select the network you want to connect from the drawdown list and then go to the “next” step.



Initialization wizard

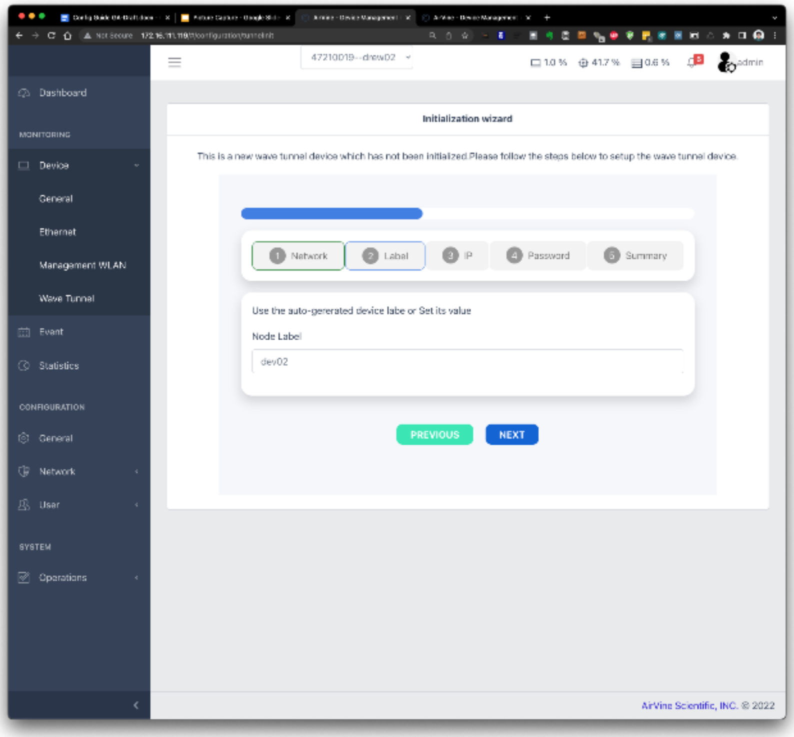
This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Create a new network or join the existing one

○ Create a new network
● Join the existing network

Please select the network

Input the label of this leaf node to recognize it later.



Initialization wizard

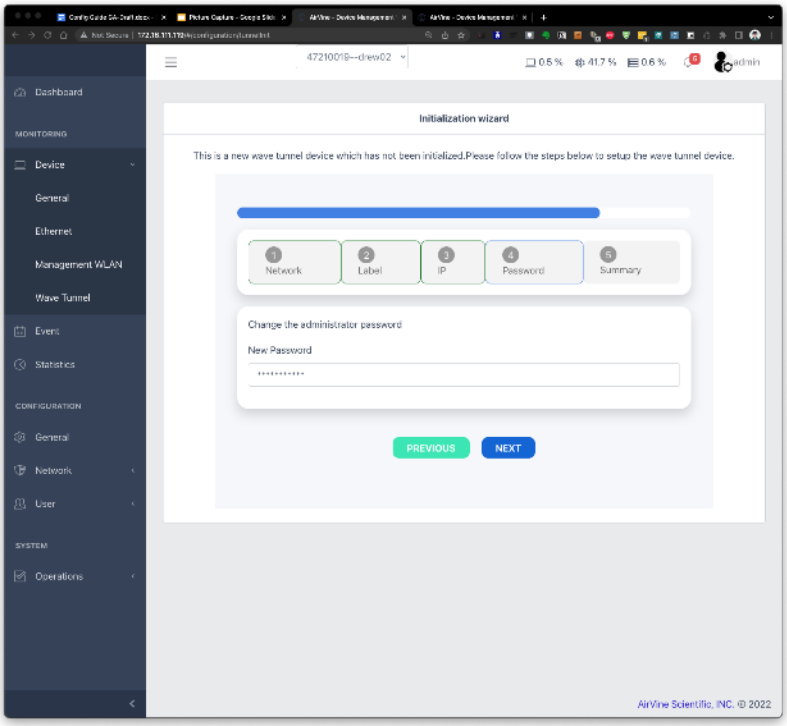
This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Use the auto-gererated device labe or Set its value

Node Label

dev02

For security considerations, you can change the default admin password in this step.



Initialization wizard

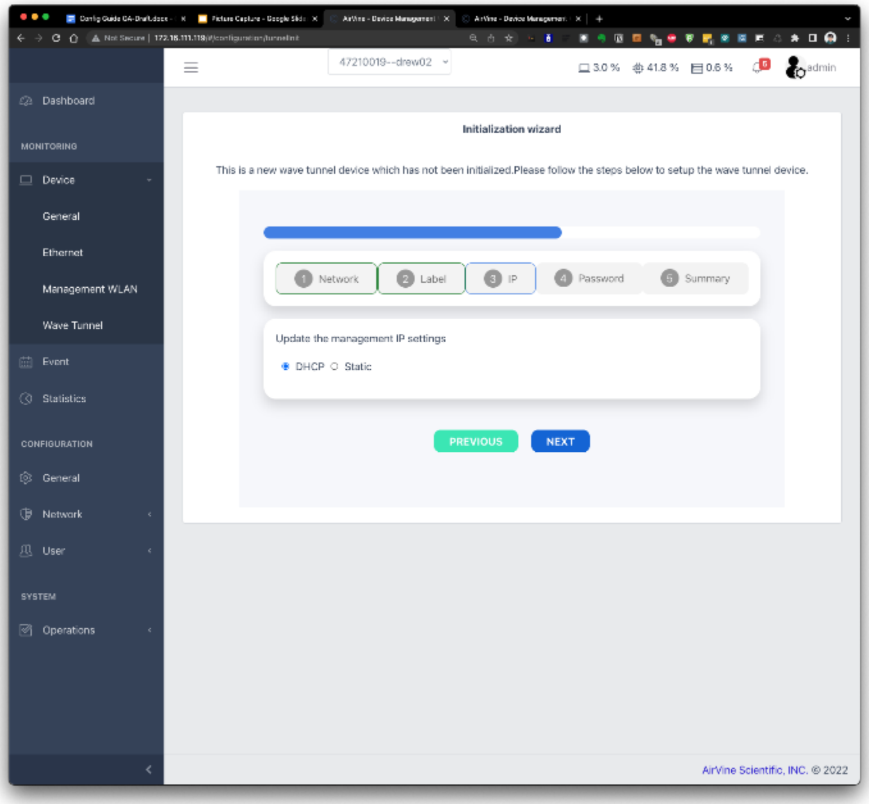
This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Change the administrator password

New Password

•••••••••••

Configure the management IP of this WaveTunnel device, it can be DHCP or Static IP.



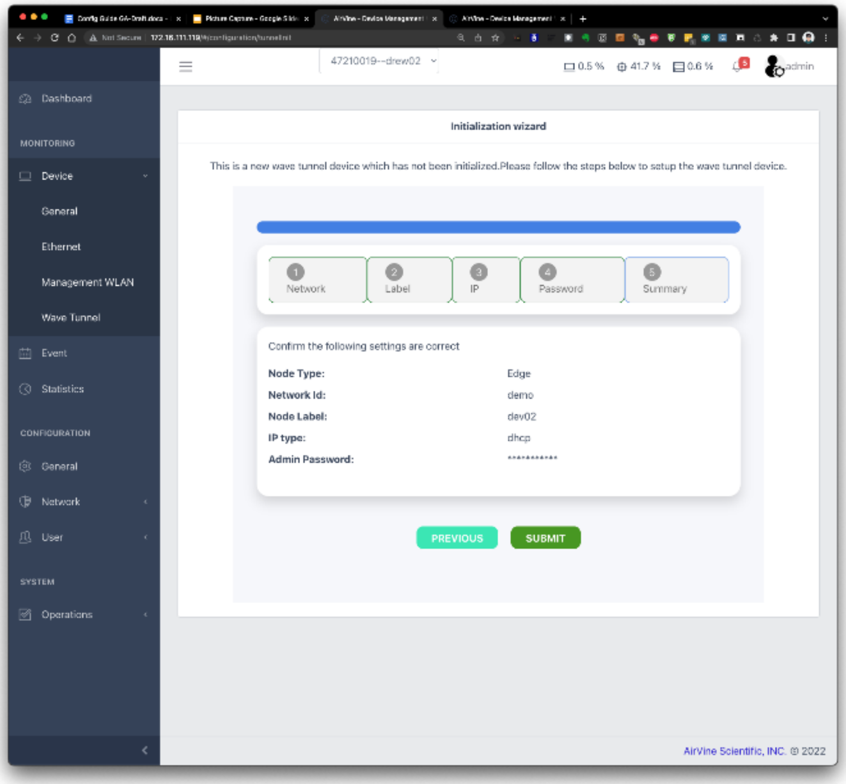
Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

Update the management IP settings

● DHCP ○ Static

Review the settings and then click the “submit’ button to finish the configurations. You can go back to the previous steps to change the setting before clicking the “submit” button.After setup successfully, you can see the Dashboard page in your browser.



Initialization wizard

This is a new wave tunnel device which has not been initialized.Please follow the steps below to setup the wave tunnel device.

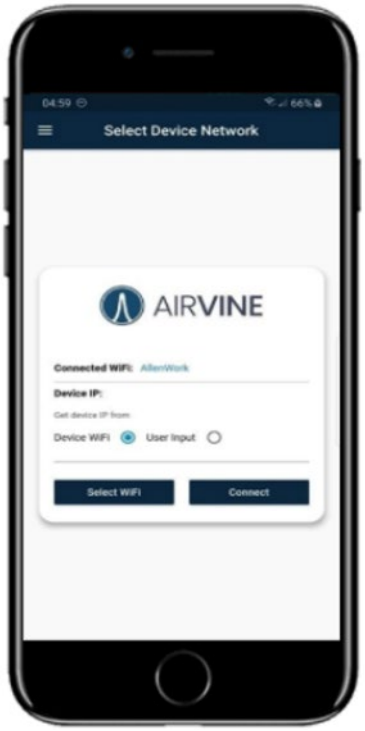
Confirm the following settings are correct

Node Type:	Edge
Network Id:	demo
Node Label:	dev02
IP type:	dhcp
Admin Password:	***********

If you need to set up more than two WaveTunnel devices in your network, you can repeat the Leaf node setup steps to initialize the configurations for the remaining nodes. The max. Number of the WaveTunnel nodes supported in this release is up to 8.

[Mobile App]

Open “AirvineMobile” App on your mobile device to configure a WaveTunnel node. The “Select Device Network” page appears for you to select the device network. Click “Device Wi-Fi” to select and connect to the management Wi-Fi SSID.



Select Device Network

Connected WiFi: AllenWork

Device IP:

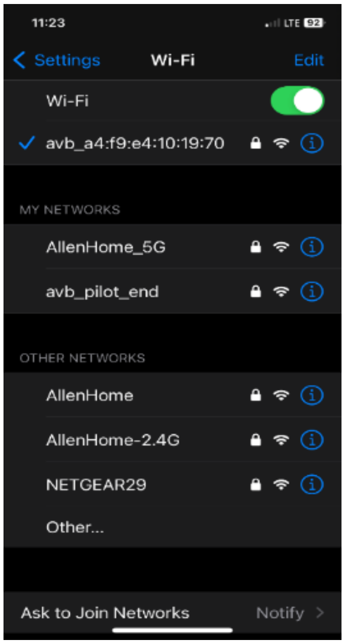
Get device IP from

Device WiFi ● User Input ○

Connect the WaveTunnel node to be configured via the default management SSID which is “avb_[Device MAC]”. Note: A WaveTunnel node's MAC address is included in the default SSID for aiding in the setup of a network when there are other WaveTunnels broadcasting SSIDs in the area. The MAC address is printed on a label affixed to each WaveTunnel unit.

The default password for the management Wi-Fi SSID is “airvine!”. The exclamation mark is required.

Once connected to the management Wi-Fi SSID, please press “<” on the bottom right to go to the “AirvineMobile” App.



Wi-Fi: On

✓ avb_a4:f9:e4:10:19:70

MY NETWORKS

AllenHome_5G

avb_pilot_end

OTHER NETWORKS

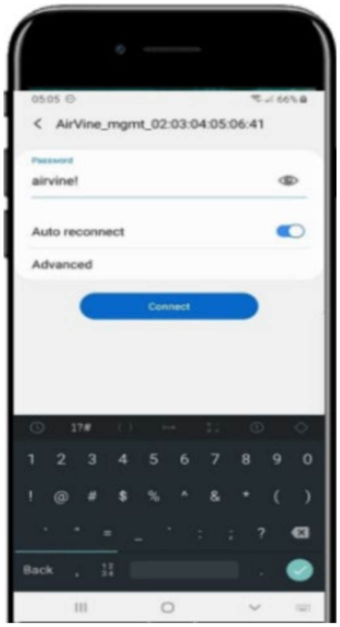
AllenHome

AllenHome-2.4G

NETGEAR29

Other...

Ask to Join Networks: Notify



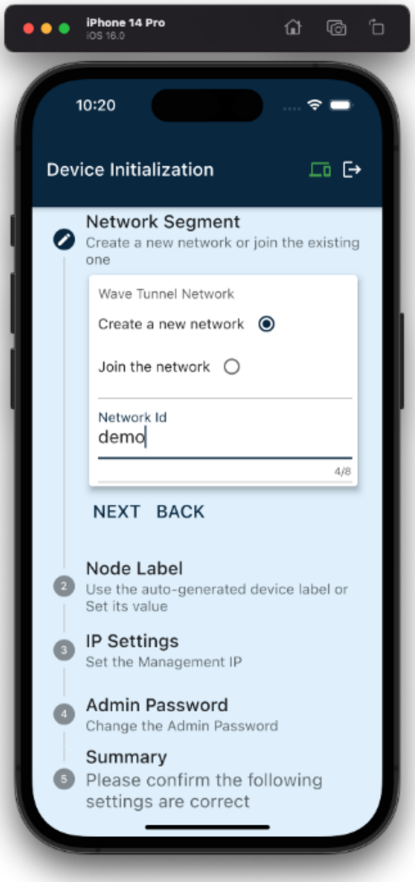
AirVine_mgmt_02:03:04:05:06:41

Password: airvine!

Auto reconnect: On

Advanced

The “AirvineMobile” App is checking to see if it can reach the device via the selected Wi-Fi SSID. If the mobile App can reach the device, it will show the Device Initialization wizard page.



Device Initialization

Network Segment
Create a new network or join the existing one

Wave Tunnel Network

Create a new network ●

Join the network ○

Network Id
demo

2 Node Label
Use the auto-generated device label or Set its value

3 IP Settings
Set the Management IP

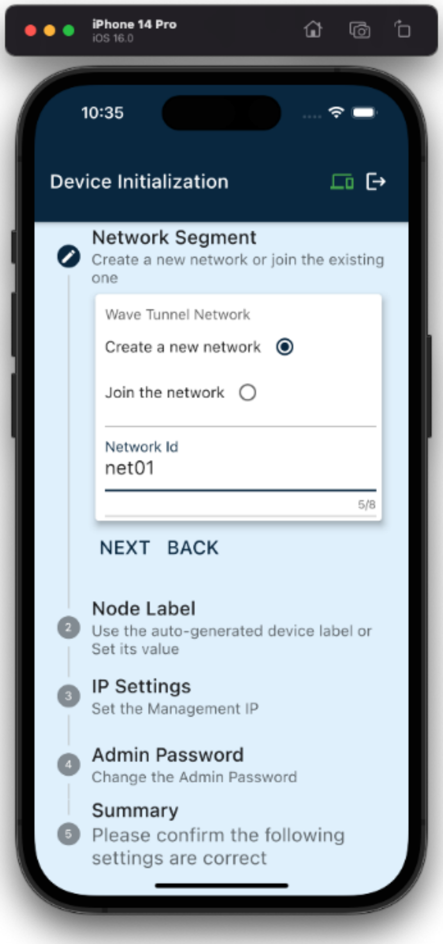
4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

There are slight differences between the configurations of the root node and all other nodes. Please check the steps below.

Initializing the root device:

- To configure the root device, select the “Create a new network” option in the network segment step.
- Then input the Network ID for this new deployment. The Network ID can be automatically generated, or you can input any meaningful string for future identification of your network, for example.
  “net01”.
- Click “NEXT” for the next setting.



Device Initialization

Network Segment
Create a new network or join the existing one

Wave Tunnel Network

Create a new network ●

Join the network ○

Network Id
net01
5/8

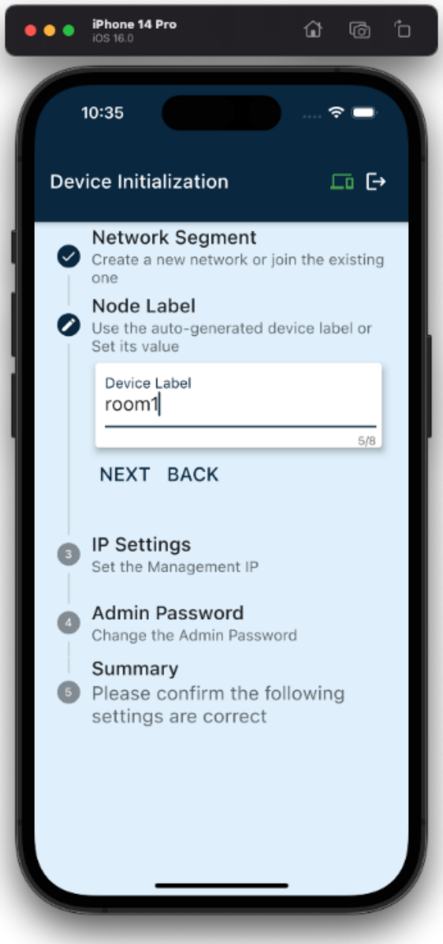
2 Node Label
Use the auto-generated device label or Set its value

3 IP Settings
Set the Management IP

4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

Input the “Device Label” to name this device. It will be used to recognize your device later.



Device Initialization

Network Segment
Create a new network or join the existing one

Node Label
Use the auto-generated device label or Set its value

Device Label
room1
5/8

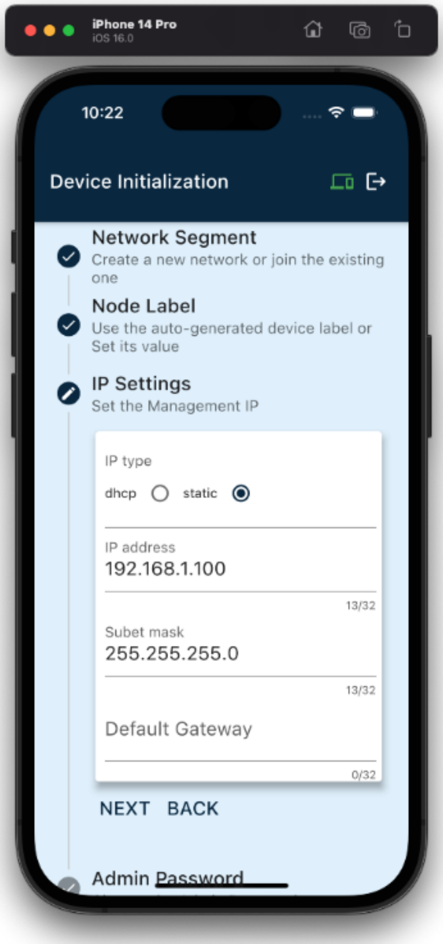
NEXT BACK

3 IP Settings
Set the Management IP

4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

Click “Next” to set the management IP of your device.



Device Initialization

Network Segment
Create a new network or join the existing one

Node Label
Use the auto-generated device label or Set its value

IP Settings
Set the Management IP

IP type
dhcp ○ static ●

IP address
192.168.1.100
13/32

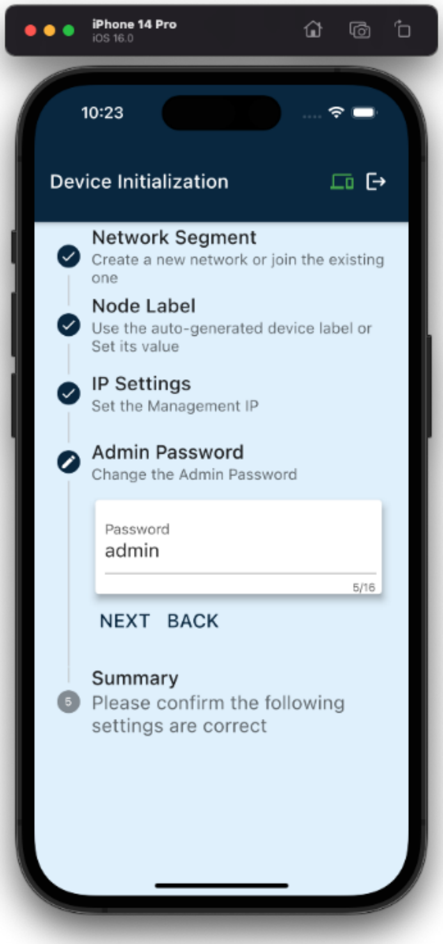
Subet mask
255.255.255.0
13/32

Default Gateway
0/32

NEXT BACK

Admin Password

Click “Next” to change the admin password of your device.



Device Initialization

✓ Network Segment
Create a new network or join the existing one

✓ Node Label
Use the auto-generated device label or Set its value

✓ IP Settings
Set the Management IP

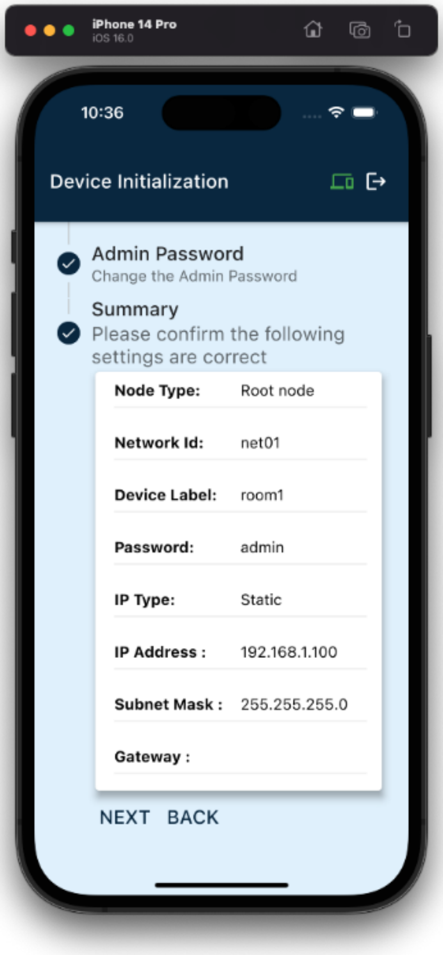
Admin Password
Change the Admin Password

Password
admin
5/16

NEXT BACK

5 Summary
Please confirm the following settings are correct

Click “Next” to check the summary of your configurations.



Admin Password
Change the Admin Password

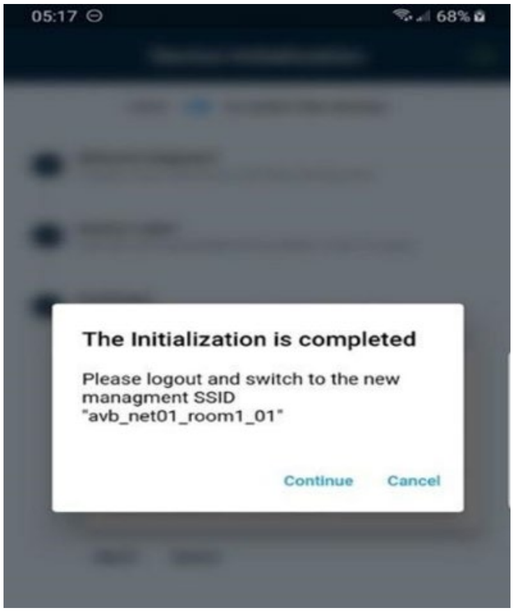
Summary
Please confirm the following settings are correct

Node Type:	Root node
Network Id:	net01
Device Label:	room1
Password:	admin
IP Type:	Static
IP Address :	192.168.1.100
Subnet Mask :	255.255.255.0
Gateway :	

Once you confirm the configurations are correct, click “Next” to initialize the settings for this device.

When the initialization is completed, the popup window appears. Click
“Continue” to finish the settings.

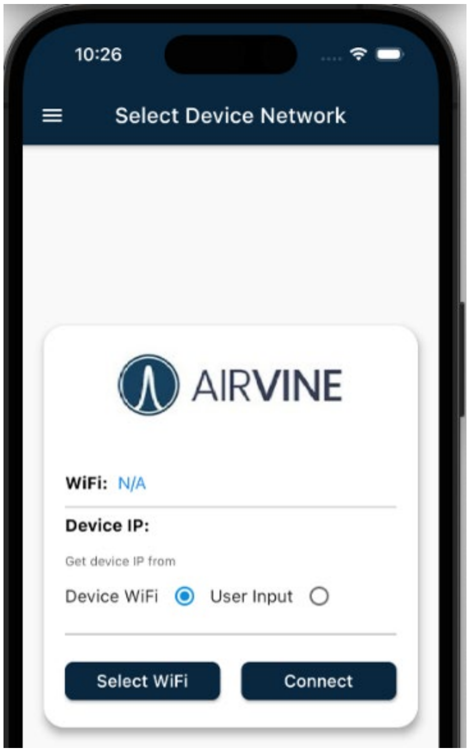
Note: the format of the management SSID for the WaveTunnel node has changed to a combination of **avb_[network Id]_[device label].**



The Initialization is completed

Please logout and switch to the new managment SSID "avb_net01_room1_01"

The “Select Device Network” page will be shown to you after completing the initialization step.



Select Device Network

WiFi: N/A

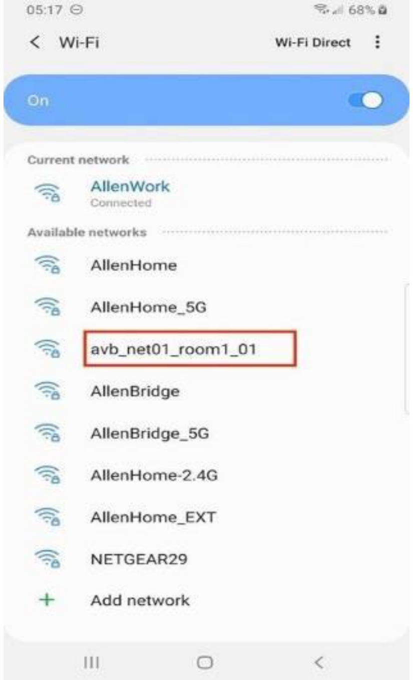
Device IP:

Get device IP from

Device WiFi ● User Input ○

Click on “Select Wi-FI” to switch to the newly configured management SSID “avb_net01_room1”.

Note: The management SSID changes after completing the initialization process from a default SSID to an SSID that includes the Network ID name and Node Label name.



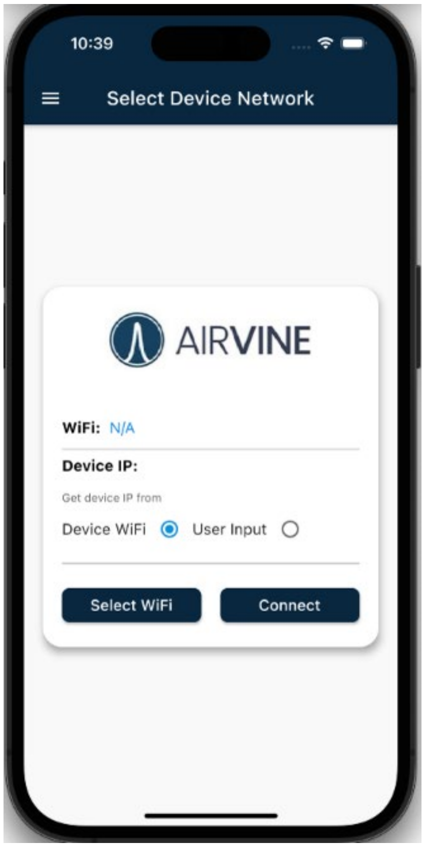
Current network

AllenWork
Connected

Available networks

AllenHome
AllenHome_5G
avb_net01_room1_01
AllenBridge
AllenBridge_5G
AllenHome-2.4G
AllenHome_EXT
NETGEAR29

Click “Connect” to go to the Login page.



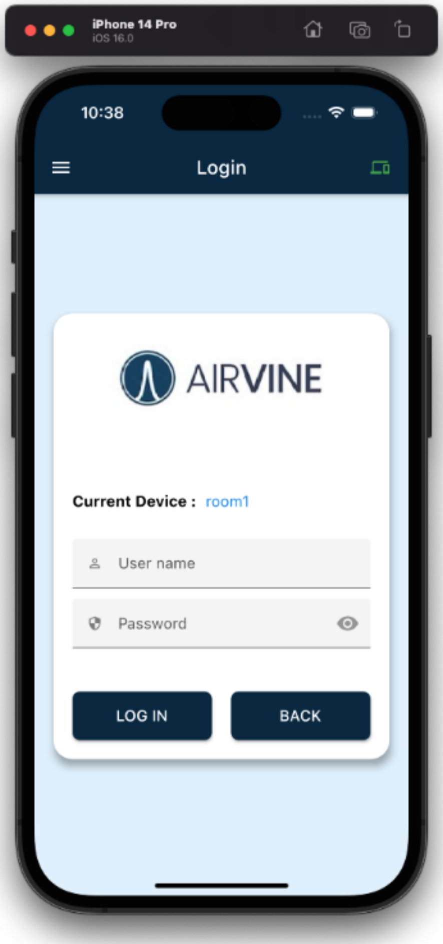
WiFi: N/A

Device IP:

Get device IP from

Device WiFi ● User Input ○

The root device has now been configured successfully. You can use the default username and password to login into the mobile App management pages.



Current Device : room1

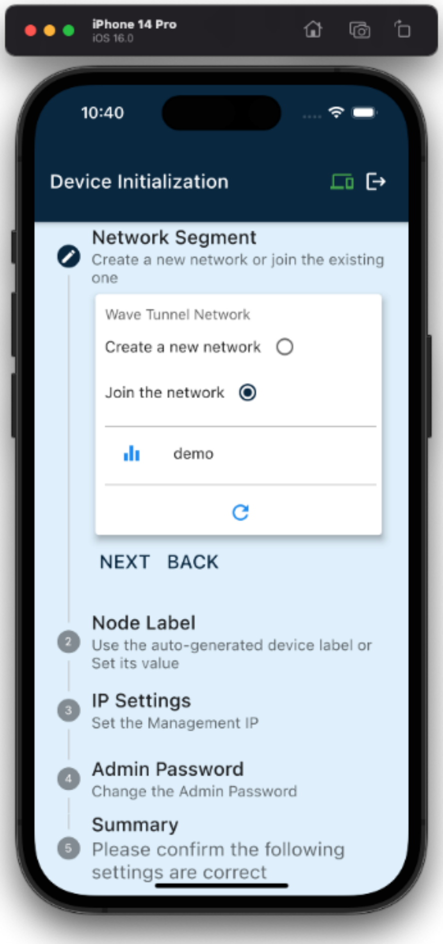
User name

Password

To configure the remaining devices in the network, select the “Join the network” option in the network segment step.

Nearby WaveTunnel devices will be broadcasting their SSIDs, which will appear in the list. Click on the SSID of the next node to be configured. This is the node that will talk to the root node that was just configured. Then click “next” for next settings.

As each node is added to the network, traffic flows are automatically configured between that node and the root node. These flows can pass through relay nodes, but all traffic must flow to and from the root node.



Device Initialization

Network Segment
Create a new network or join the existing one

Wave Tunnel Network
Create a new network ○
Join the network ●

demo

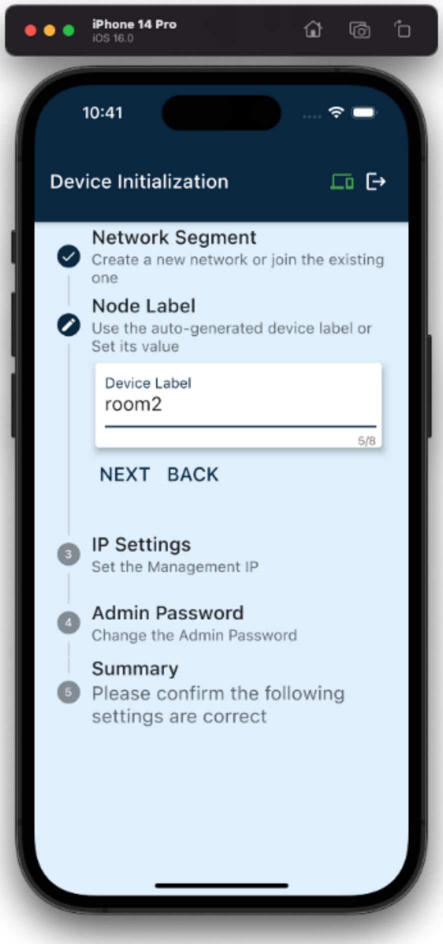
2 Node Label
Use the auto-generated device label or Set its value

3 IP Settings
Set the Management IP

4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

Enter the "Device Label" for this device. Your device can be recognized later using this information.



Device Initialization

Network Segment
Create a new network or join the existing one

Node Label
Use the auto-generated device label or Set its value

Device Label
room2
5/8

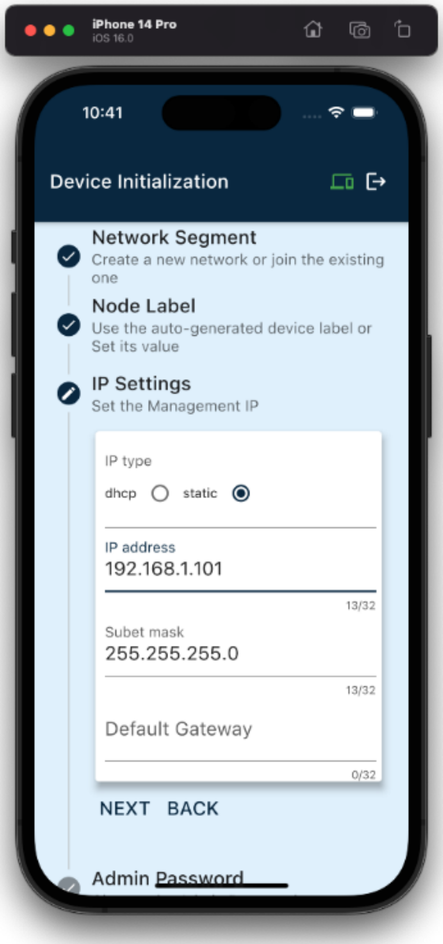
NEXT BACK

3 IP Settings
Set the Management IP

4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

Click “Next” to set the management IP of your device.



Device Initialization

✓ Network Segment
Create a new network or join the existing one

✓ Node Label
Use the auto-generated device label or Set its value

IP Settings
Set the Management IP

IP type
dhcp ○ static ●

IP address
192.168.1.101
13/32

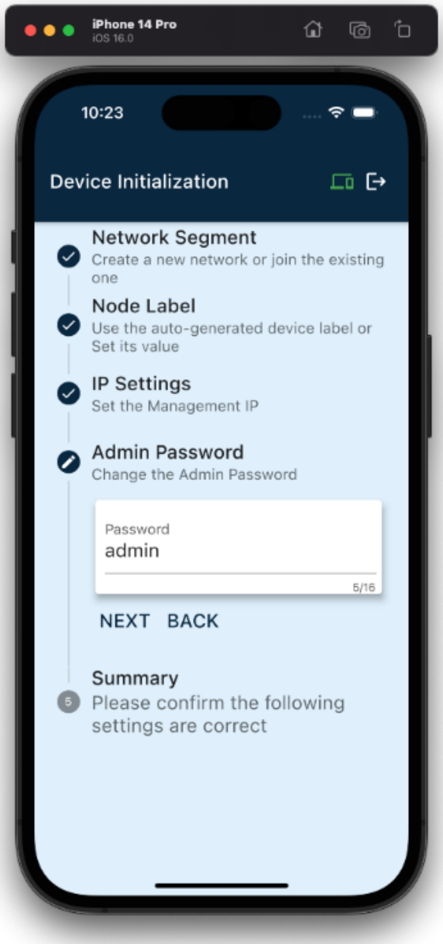
Subet mask
255.255.255.0
13/32

Default Gateway
0/32

NEXT BACK

Admin Password

Click “Next” to change the admin password of your device.



Device Initialization

✓ Network Segment
Create a new network or join the existing one

✓ Node Label
Use the auto-generated device label or Set its value

✓ IP Settings
Set the Management IP

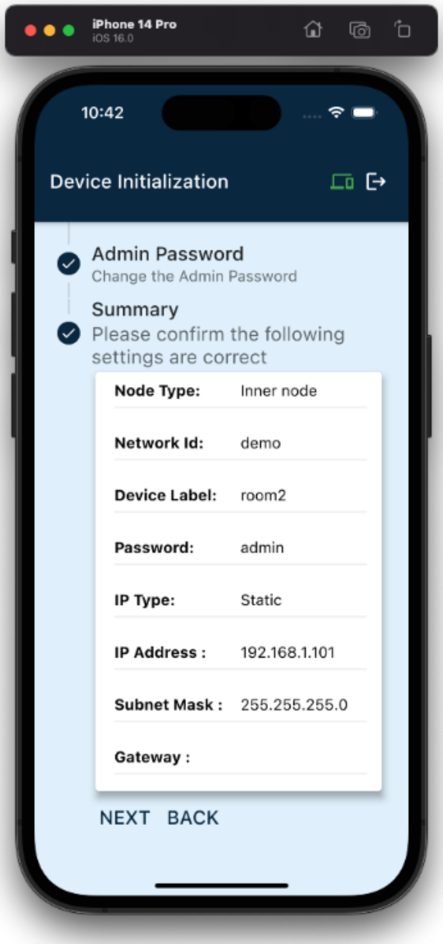
Admin Password
Change the Admin Password

Password
admin
5/16

NEXT BACK

5 Summary
Please confirm the following settings are correct

Click “Next” to check the summary of your configurations.



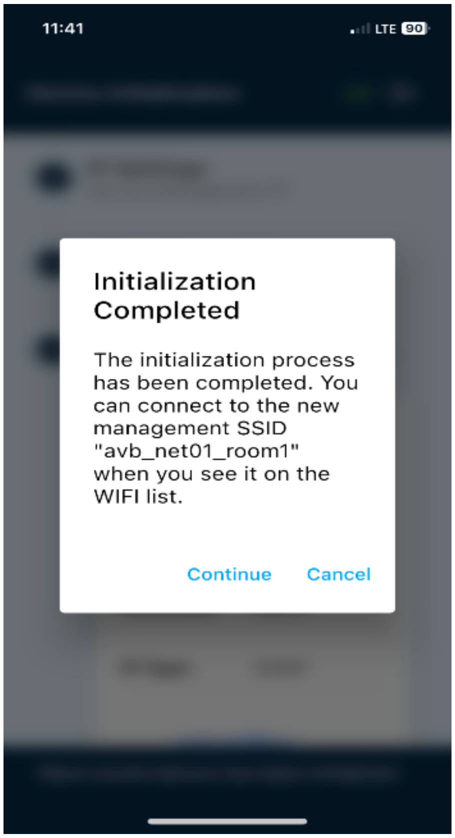
Admin Password
Change the Admin Password

Summary
Please confirm the following settings are correct

Node Type:	Inner node
Network Id:	demo
Device Label:	room2
Password:	admin
IP Type:	Static
IP Address :	192.168.1.101
Subnet Mask :	255.255.255.0
Gateway :	

Once you confirm the configurations are correct, click “Next” to initialize the WaveTunnel settings for this device. When the initialization is completed, the popup window appears. Click “Continue” to finish the settings.

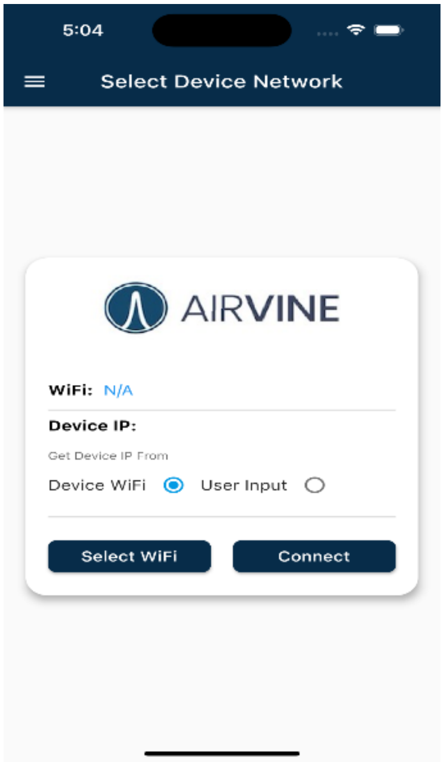
The format of the management SSID is now a combination of
avb_[network Id]_[device label].



Initialization Completed

The initialization process has been completed. You can connect to the new management SSID "avb_net01_room1" when you see it on the WIFI list.

The “Select Device Network” page will be shown for you to switch the New Management SSID.



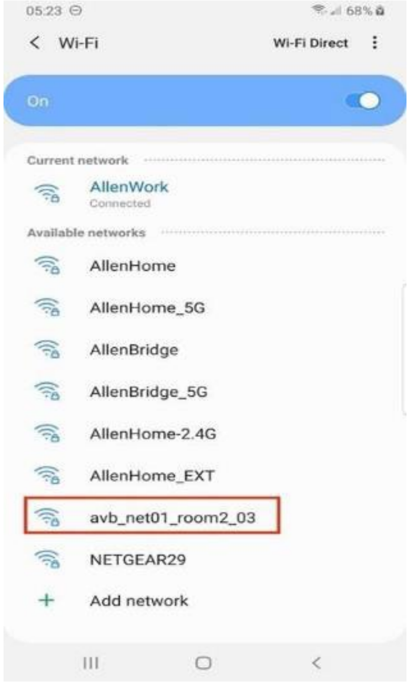
WiFi: N/A

Device IP:

Get Device IP From

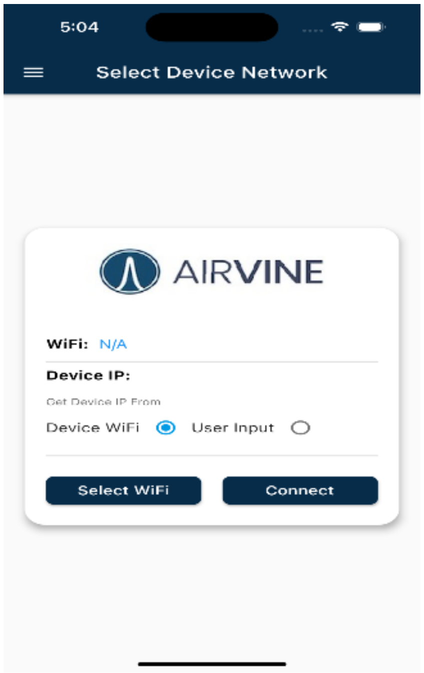
Device WiFi ● User Input ○

Click “Select Wi-FI” to switch to the newly configured management SSID “avb_net01_room2”.



AllenWork
Connected

AllenHome
AllenHome_5G
AllenBridge
AllenBridge_5G
AllenHome-2.4G
AllenHome_EXT
avb_net01_room2_03
NETGEAR29



5:04

Select Device Network

AIRVINE

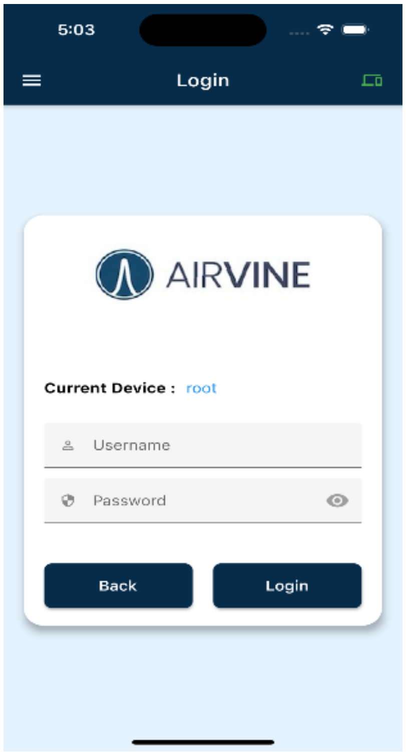
WiFi: N/A

Device IP:

Get Device IP From

Device WiFi ● User Input ○

Click “Connect” to go to the Login page



5:03

Login

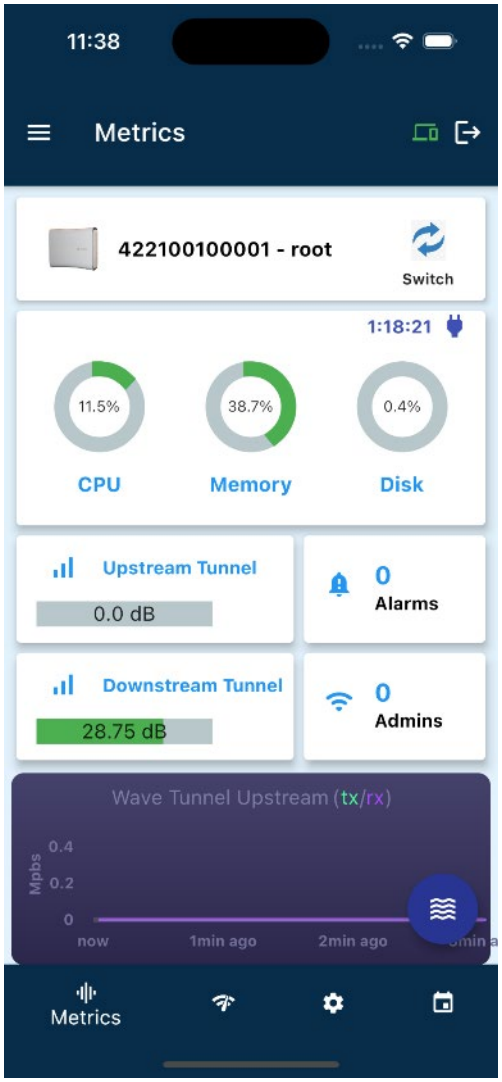
AIRVINE

Current Device : root

Username

Password

This device is configured successfully. You can use the default username and password to login the mobile App management page. You will see the tunnel connection is established on the dashboard page.



422100100001 - root

1:18:21

CPU 11.5%

Memory 38.7%

Disk 0.4%

Upstream Tunnel 0.0 dB

0 Alarms

Downstream Tunnel 28.75 dB

0 Admins

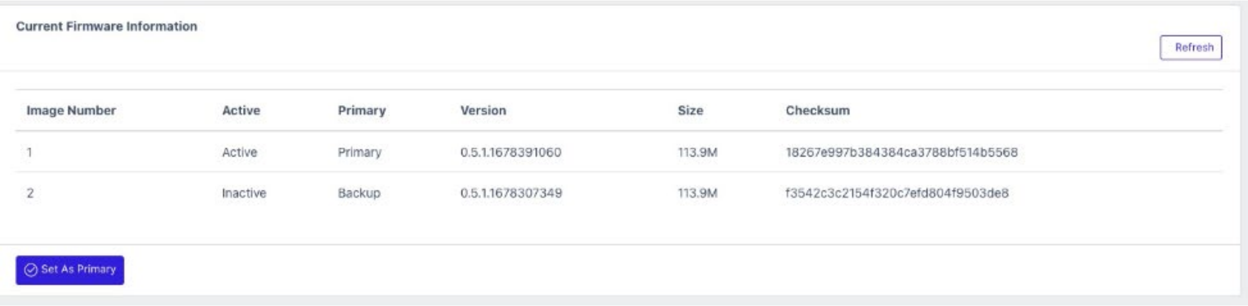
Manage WaveTunnel device firmware

Check the current firmware information

There are two image banks in the WaveTunnel device which allow us to load two firmware image files. But only one image is active and the other is the backup. This gives us the capability to update the image to the back bank first without impacting the service. Also, we can revert back to the previous if the new firmware is not running well.

The Firmware information page shows the following information.

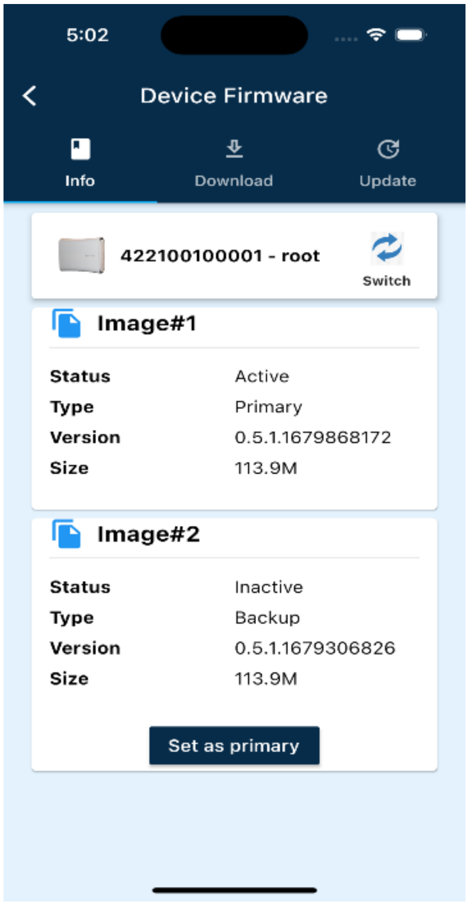
Active status, Is Primary or backup image, Firmware version , Size, checksum.
[WEB GUI]
Operation -> Firmware Update



Current Firmware Information

Image Number	Active	Primary	Version	Size	Checksum
1	Active	Primary	0.5.1.1678391060	113.9M	18267e997b384384ca3788bf514b5568
2	Inactive	Backup	0.5.1.1678307349	113.9M	f3542c3c2154f320c7efd804f9503de8

[Mobile App]
Settings -> Firmware -> Info



422100100001 - root

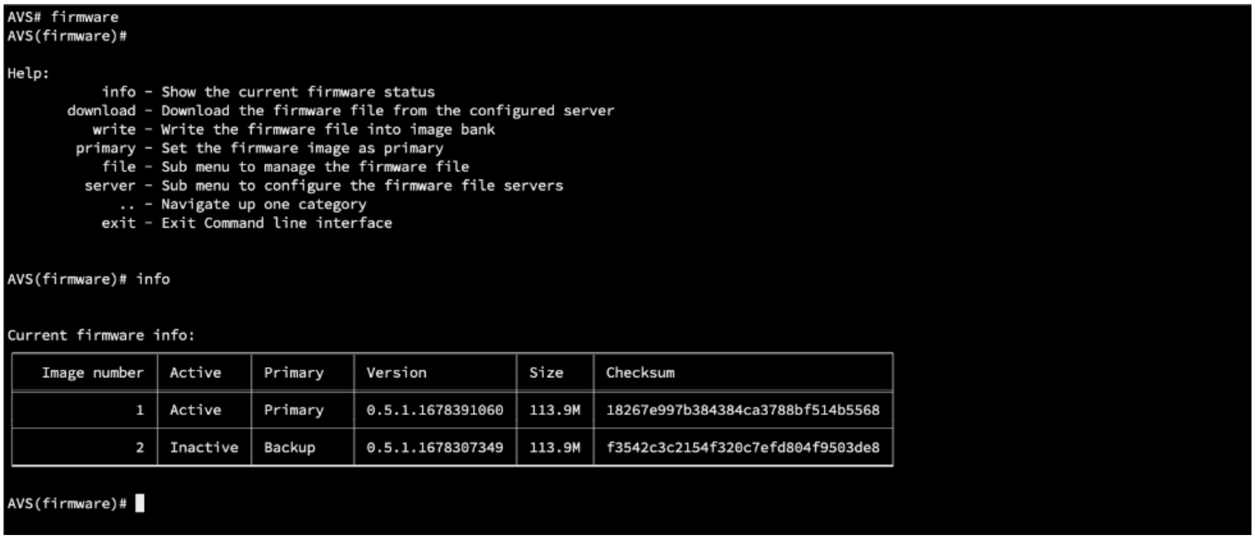
Image#1

Status	Active
Type	Primary
Version	0.5.1.1679868172
Size	113.9M

Image#2

Status	Inactive
Type	Backup
Version	0.5.1.1679306826
Size	113.9M

[CLI]
Firmware -> info



```
AVS# firmware
AVS(firmware)#

Help:
           info - Show the current firmware status
       download - Download the firmware file from the configured server
          write - Write the firmware file into image bank
        primary - Set the firmware image as primary
           file - Sub menu to manage the firmware file
         server - Sub menu to configure the firmware file servers
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(firmware)# info


Current firmware info:
 | Image number | Active   | Primary | Version            | Size   | Checksum                         |
 |            1 | Active   | Primary | 0.5.1.1678391060   | 113.9M | 18267e997b384384ca3788bf514b5568 |
 |            2 | Inactive | Backup  | 0.5.1.1678307349   | 113.9M | f3542c3c2154f320c7efd804f9503de8 |

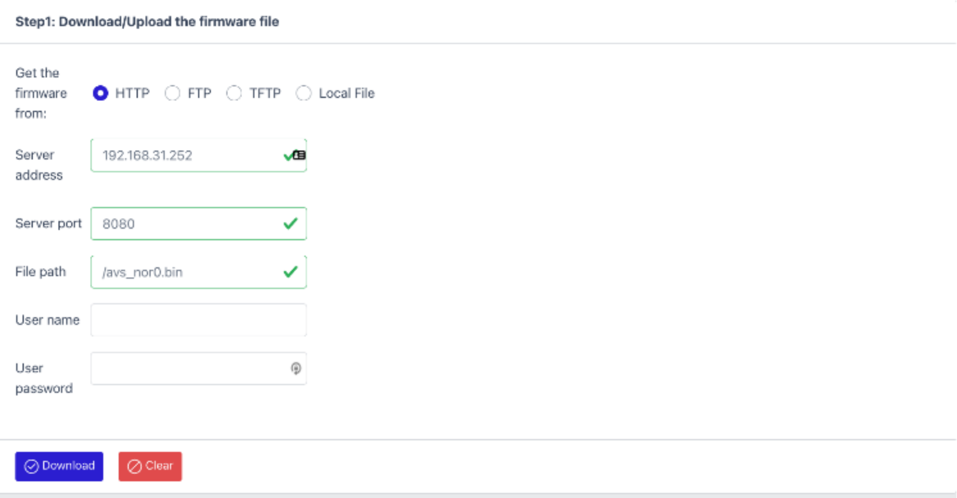
AVS(firmware)# █
```

Upload/Download the firmware file to the device

There are two mechanisms you can get the firmware image file to be loaded into your WaveTunnel device. You can set up the Http, FTP or TFPF server and put the image file on it. Then, you can download the image file from the server through WEB GUI, Mobile App or CLI to your device. Or you can directly upload the firmware image file from your local laptop through the WEB GUI to the device.

For the download mechanism, you need to put the server address, server port , the file path of the image file, user name(optional),password(optional) before starting the download operation.

[WEB GUI]
Operation -> Firmware Update -> Step 1
Input the server setting and click "download" button



Step1: Download/Upload the firmware file

Get the firmware from: ● HTTP ○ FTP ○ TFTP ○ Local File

Server address: 192.168.31.252

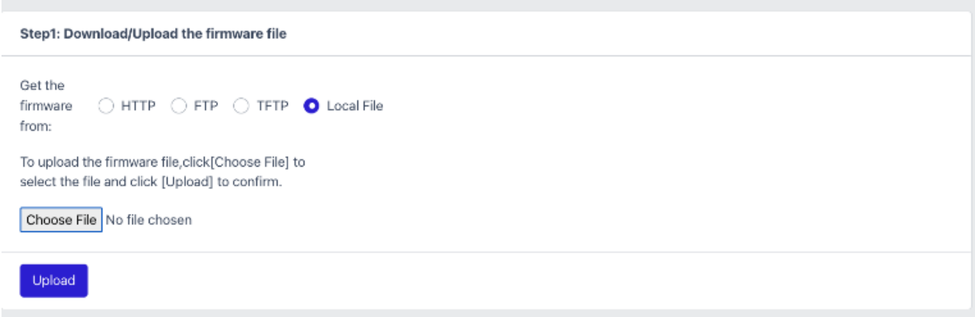
Server port: 8080

File path: /avs_nor0.bin

User name:

User password:

Select the firmware image file from your local laptop and then click "upload" button.



Step1: Download/Upload the firmware file

Get the firmware from: ○ HTTP ○ FTP ○ TFTP ● Local File

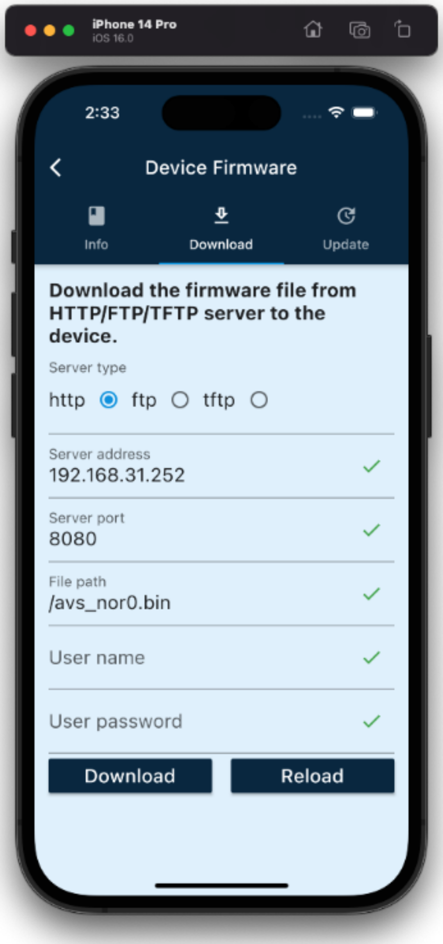
To upload the firmware file,click[Choose File] to select the file and click [Upload] to confirm.

Choose File No file chosen

[Mobile App]

Settings -> Firmware -> Download

Input the server setting and click download button



Download the firmware file from HTTP/FTP/TFTP server to the device.

Server type

http ● ftp ○ tftp ○

Server address: 192.168.31.252 ✓

Server port: 8080 ✓

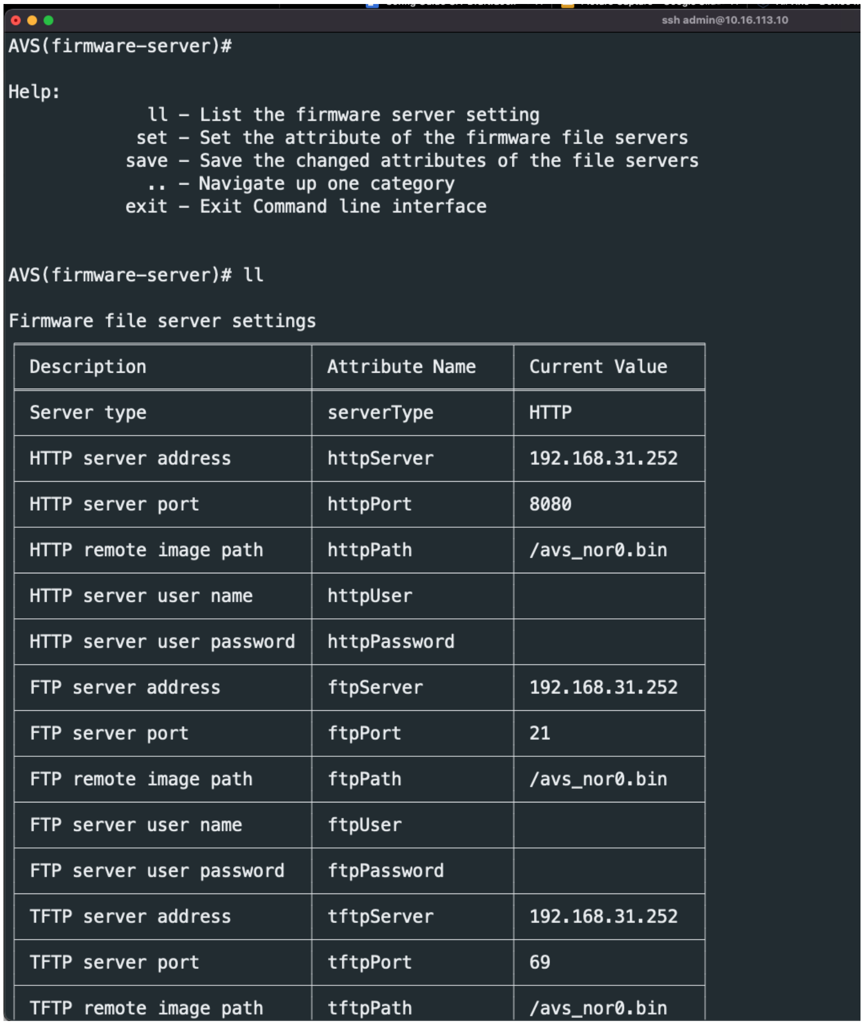
File path: /avs_nor0.bin ✓

User name ✓

User password ✓

[CLI]
Firmware - > Server

Input the server configurations in this category.



```
AVS(firmware-server)#

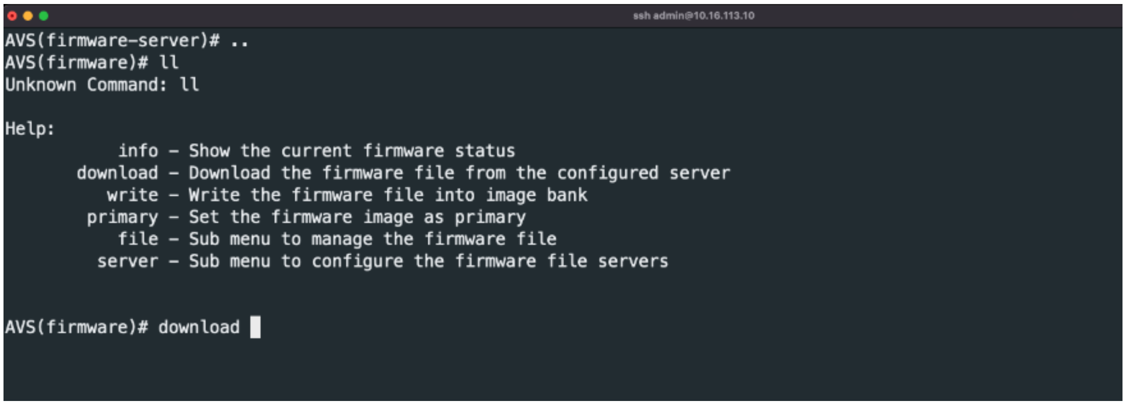
Help:
            ll - List the firmware server setting
           set - Set the attribute of the firmware file servers
          save - Save the changed attributes of the file servers
            .. - Navigate up one category
          exit - Exit Command line interface


AVS(firmware-server)# ll

Firmware file server settings
+----------------------------+-------------------+-----------------+
| Description                | Attribute Name    | Current Value   |
+----------------------------+-------------------+-----------------+
| Server type                | serverType        | HTTP            |
+----------------------------+-------------------+-----------------+
| HTTP server address        | httpServer        | 192.168.31.252  |
+----------------------------+-------------------+-----------------+
| HTTP server port           | httpPort          | 8080            |
+----------------------------+-------------------+-----------------+
| HTTP remote image path     | httpPath          | /avs_nor0.bin   |
+----------------------------+-------------------+-----------------+
| HTTP server user name      | httpUser          |                 |
+----------------------------+-------------------+-----------------+
| HTTP server user password  | httpPassword      |                 |
+----------------------------+-------------------+-----------------+
| FTP server address         | ftpServer         | 192.168.31.252  |
+----------------------------+-------------------+-----------------+
| FTP server port            | ftpPort           | 21              |
+----------------------------+-------------------+-----------------+
| FTP remote image path      | ftpPath           | /avs_nor0.bin   |
+----------------------------+-------------------+-----------------+
| FTP server user name       | ftpUser           |                 |
+----------------------------+-------------------+-----------------+
| FTP server user password   | ftpPassword       |                 |
+----------------------------+-------------------+-----------------+
| TFTP server address        | tftpServer        | 192.168.31.252  |
+----------------------------+-------------------+-----------------+
| TFTP server port           | tftpPort          | 69              |
+----------------------------+-------------------+-----------------+
| TFTP remote image path     | tftpPath          | /avs_nor0.bin   |
```

Firmware -> download

Input the “download” command to download the file



```
AVS(firmware-server)# ..
AVS(firmware)# ll
Unknown Command: ll

Help:
           info - Show the current firmware status
       download - Download the firmware file from the configured server
          write - Write the firmware file into image bank
        primary - Set the firmware image as primary
           file - Sub menu to manage the firmware file
         server - Sub menu to configure the firmware file servers


AVS(firmware)# download
```

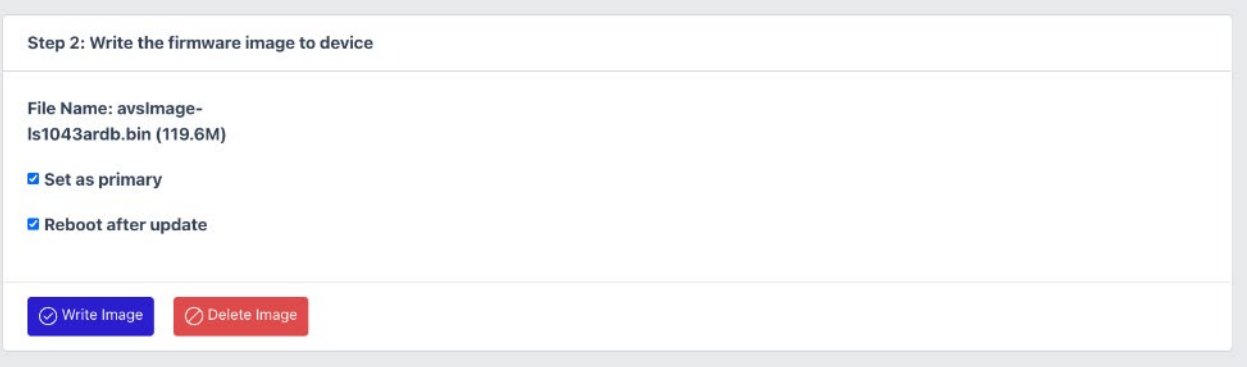
Update the firmware

Once the firmware image file is downloaded or uploaded to the WaveTunnel device. You can see the image file name on the page. Clicking the “Write image” button to update the firmware to the WaveTunnel device. Clicking the “Delete image” button to discard the uploaded image.

There are two options on the update page.

[Set as primary] => The updated image will set to primary after system reboot
[Reboot after update] => The WaveTunnel will be rebooted automatically after the firmware update operation. Un-selected it to delay the reboot if you want to do it later. But the image will only take effect after the system reboot with the primary flag set.

[WEB GUI]
Operation -> Firmware Update -> Step 2



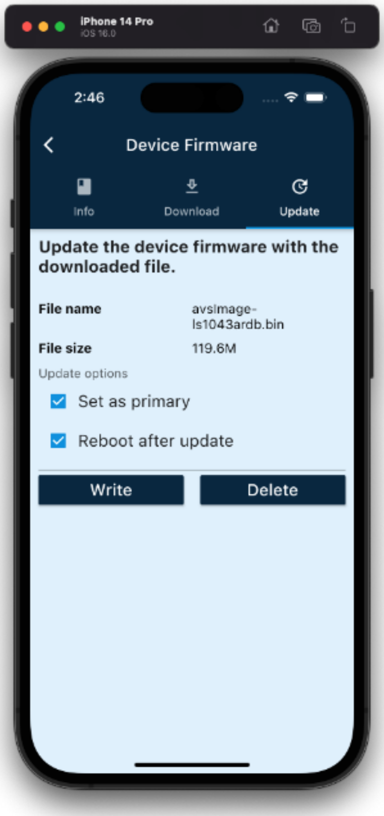
Step 2: Write the firmware image to device

File Name: avsImage-ls1043ardb.bin (119.6M)

☑ Set as primary

☑ Reboot after update

[Mobile App]
Settings -> Firmware -> Update



Update the device firmware with the downloaded file.

File name avsImage-ls1043ardb.bin

File size 119.6M

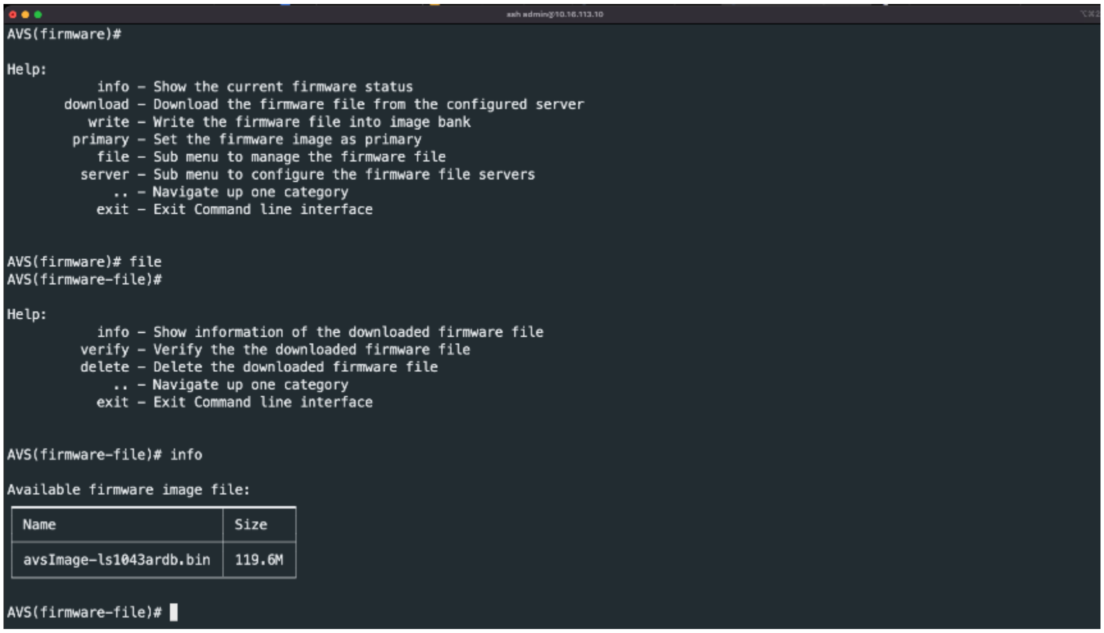
Update options

☑ Set as primary

☑ Reboot after update

[CLI] Firmware -> File -> Info

To check if the firmware image file exists or not.



```
ssh admin@10.16.113.10
AVS(firmware)#

Help:
           info - Show the current firmware status
       download - Download the firmware file from the configured server
          write - Write the firmware file into image bank
        primary - Set the firmware image as primary
           file - Sub menu to manage the firmware file
         server - Sub menu to configure the firmware file servers
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(firmware)# file
AVS(firmware-file)#

Help:
           info - Show information of the downloaded firmware file
         verify - Verify the the downloaded firmware file
         delete - Delete the downloaded firmware file
             .. - Navigate up one category
           exit - Exit Command line interface

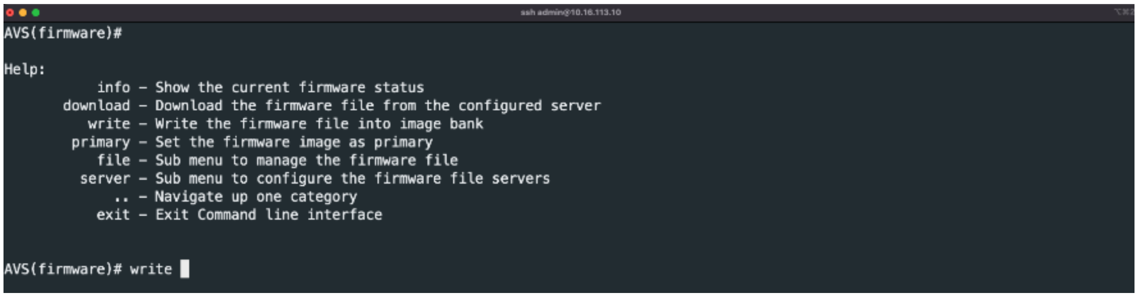

AVS(firmware-file)# info

Available firmware image file:
 ┌─────────────────────────┬────────┐
 │ Name                    │ Size   │
 ├─────────────────────────┼────────┤
 │ avsImage-ls1043ardb.bin │ 119.6M │
 └─────────────────────────┴────────┘

AVS(firmware-file)# █
```

[CLI] Firmware - > Write

Type “write” command to trigger the firmware update operation.



```
ssh admin@10.16.113.10
AVS(firmware)#

Help:
           info - Show the current firmware status
       download - Download the firmware file from the configured server
          write - Write the firmware file into image bank
        primary - Set the firmware image as primary
           file - Sub menu to manage the firmware file
         server - Sub menu to configure the firmware file servers
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(firmware)# write █
```

Configuring WaveTunnel Devices

Once the Wave tunnel connections are established,you should not change the setting in most scenarios. But if you do need to modify the configuration,here are the pages for you to do it.

Updating WaveTunnel Configurations

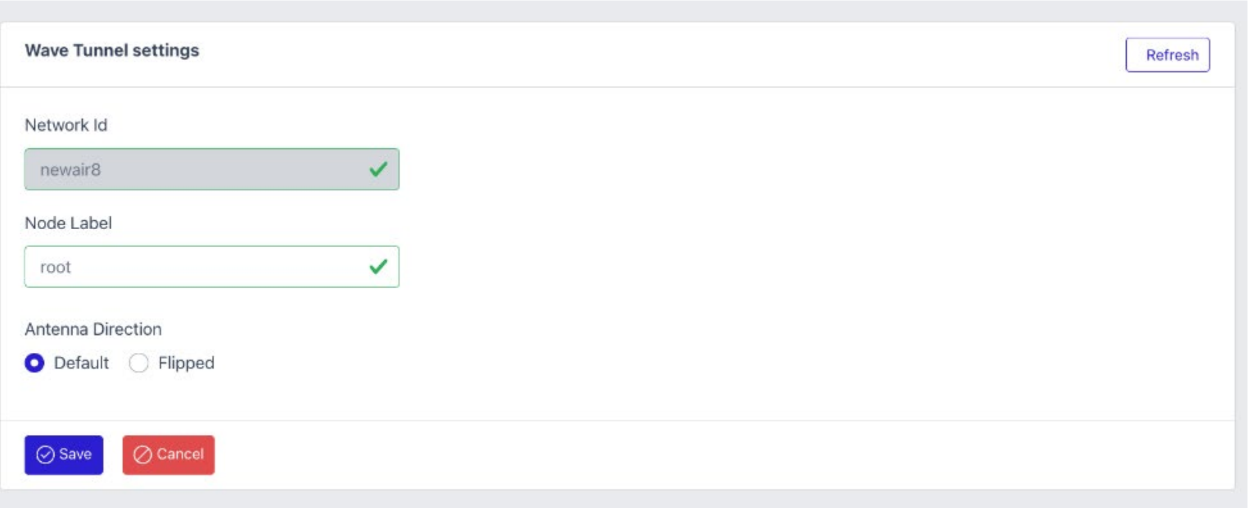
General WaveTunnel settings

The General Node settings,you can change the label and the antenna direction. For the antenna direction, you will need to adjust the position of the nodes after you make the changes. We suggest you not change it if there is no strong requirement.

The Downstream tunnel settings.
You can enable/disable the downstream connection or change the channel value. If you disable the connection,it will cause the connection to be lost in the network. We suggest disable only when there is no downstream node connected. For the channel setting,please ensure the channel setting is not identical to the neighboring device to avoid the interference.

The Upstream tunnel settings.
You can enable/disable the upstream connection or change the connection name. If you disable the connection,it will cause the connection to be lost in the network. We suggest disable only when there is no upstream node connected or you want to switch the upstream connection to another device.

[WEB GUI]
Configuration -> Network -> Wave Tunnel

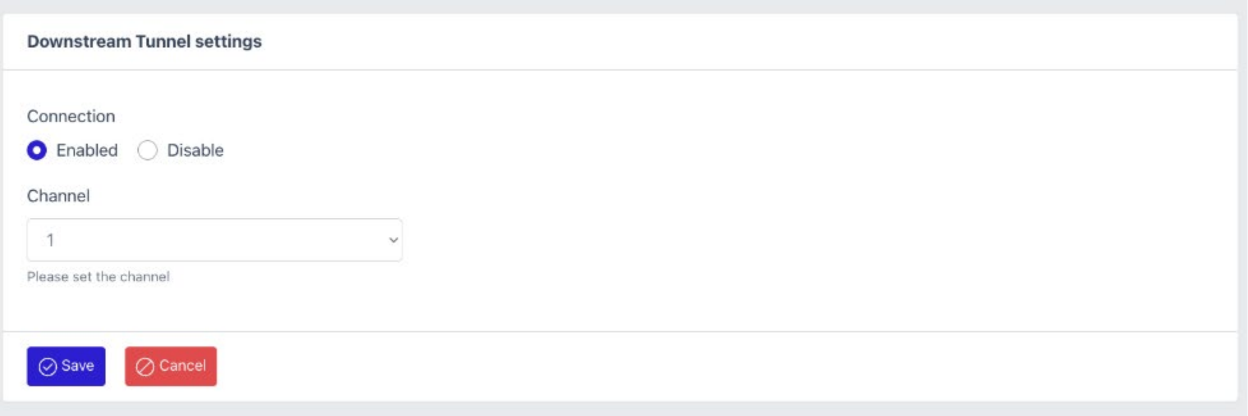


Wave Tunnel settings

Network Id
newair8 ✓

Node Label
root ✓

Antenna Direction
● Default ○ Flipped

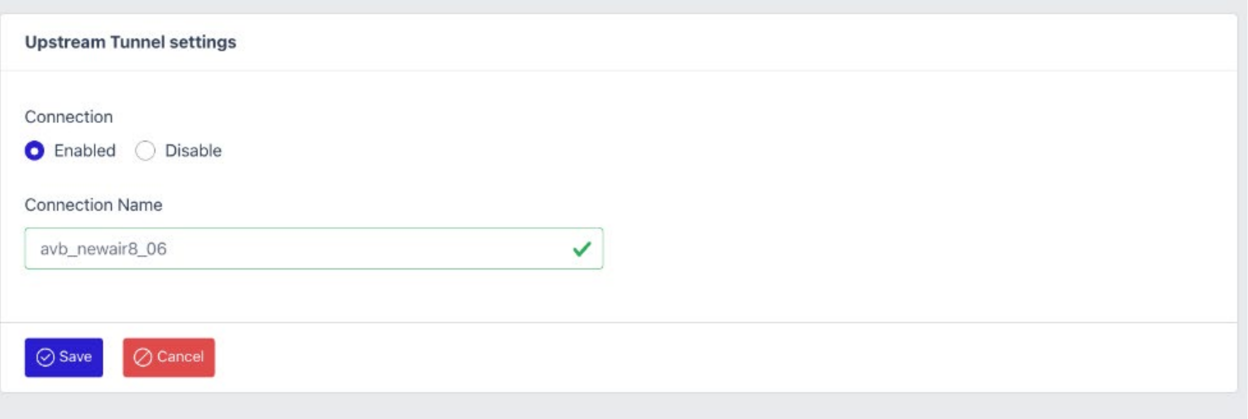


Downstream Tunnel settings

Connection
● Enabled ○ Disable

Channel
1

Please set the channel

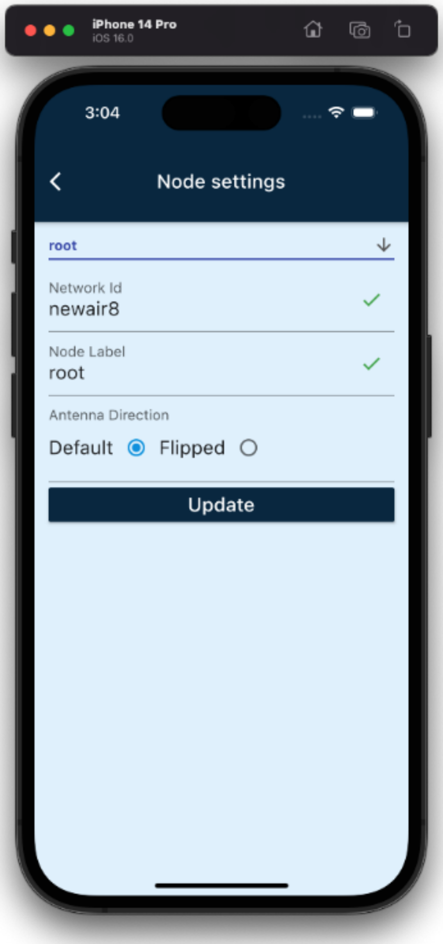


Upstream Tunnel settings

Connection
● Enabled ○ Disable

Connection Name
avb_newair8_06 ✓

[Mobile App]
Settings -> Wave Tunnel settings



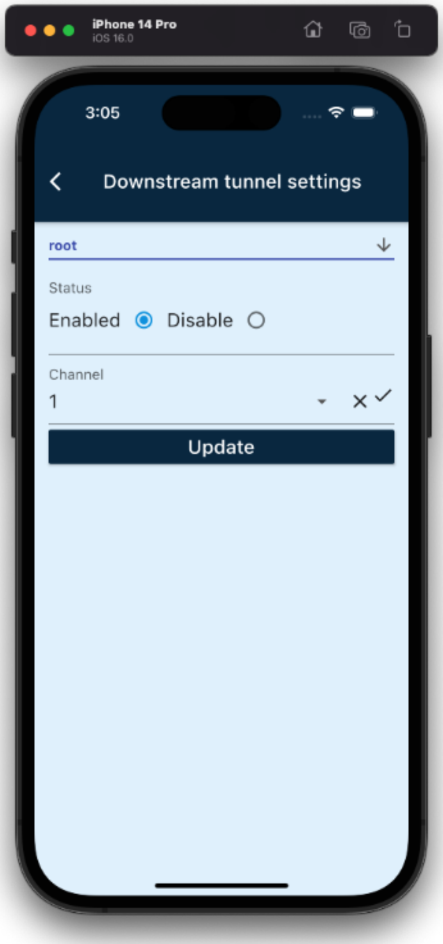
root

Network Id
newair8 ✓

Node Label
root ✓

Antenna Direction
Default ● Flipped ○

Settings -> Downstream Tunnel settings



Downstream tunnel settings

root

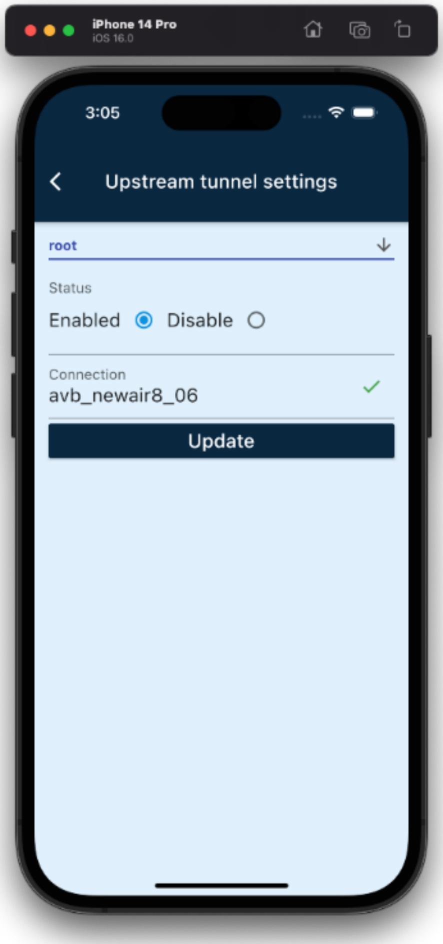
Status

Enabled ● Disable ○

Channel

1

Settings -> Upstream Tunnel settings



Upstream tunnel settings

root

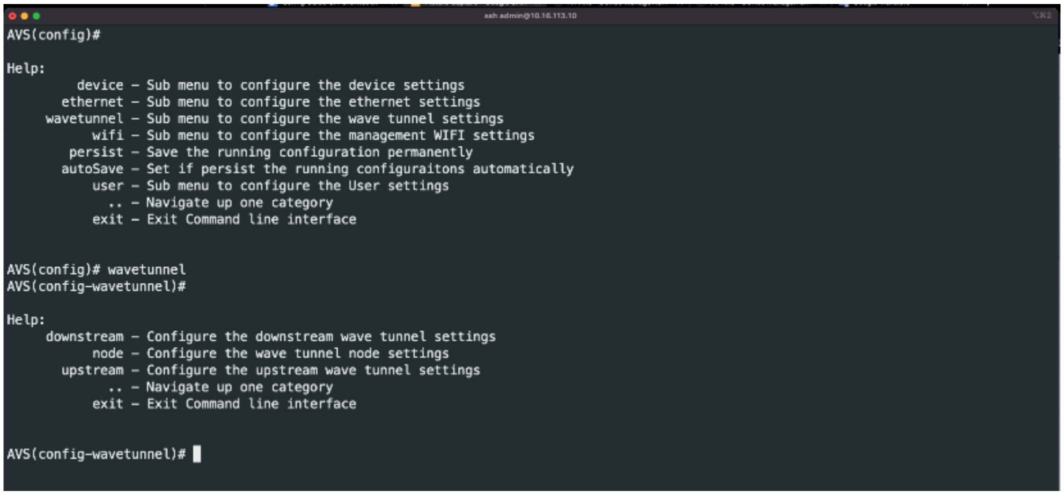
Status

Enabled ● Disable ○

Connection
avb_newair8_06 ✓

Update

[CLI] config -> wavetunnel



```
AVS(config)#

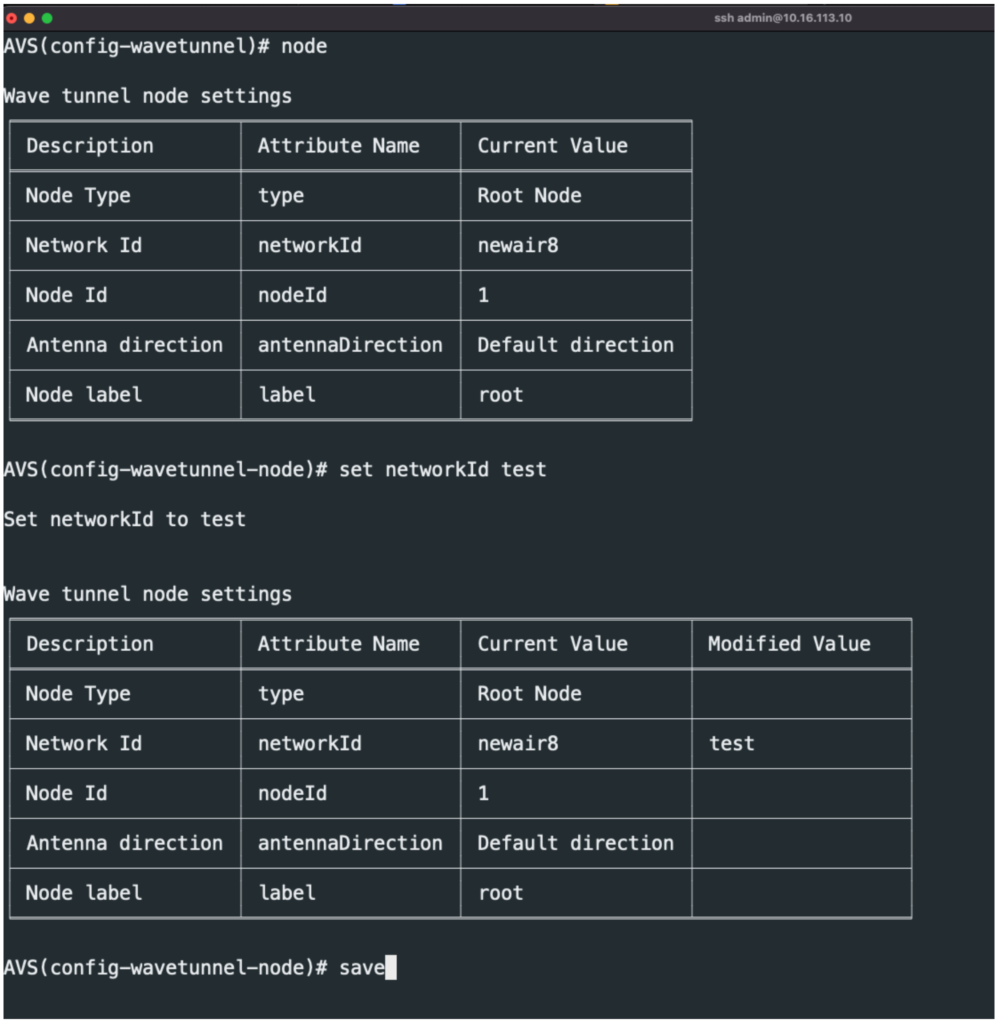
Help:
          device - Sub menu to configure the device settings
        ethernet - Sub menu to configure the ethernet settings
      wavetunnel - Sub menu to configure the wave tunnel settings
            wifi - Sub menu to configure the management WIFI settings
         persist - Save the running configuration permanently
        autoSave - Set if persist the running configuraitons automatically
            user - Sub menu to configure the User settings
              .. - Navigate up one category
            exit - Exit Command line interface


AVS(config)# wavetunnel
AVS(config-wavetunnel)#

Help:
      downstream - Configure the downstream wave tunnel settings
            node - Configure the wave tunnel node settings
        upstream - Configure the upstream wave tunnel settings
              .. - Navigate up one category
            exit - Exit Command line interface


AVS(config-wavetunnel)# █
```

[CLI] config -> wavetunnel -> node



```
AVS(config-wavetunnel)# node

Wave tunnel node settings
┌───────────────────┬───────────────────┬───────────────────┐
│ Description       │ Attribute Name    │ Current Value     │
├───────────────────┼───────────────────┼───────────────────┤
│ Node Type         │ type              │ Root Node         │
├───────────────────┼───────────────────┼───────────────────┤
│ Network Id        │ networkId         │ newair8           │
├───────────────────┼───────────────────┼───────────────────┤
│ Node Id           │ nodeId            │ 1                 │
├───────────────────┼───────────────────┼───────────────────┤
│ Antenna direction │ antennaDirection  │ Default direction │
├───────────────────┼───────────────────┼───────────────────┤
│ Node label        │ label             │ root              │
└───────────────────┴───────────────────┴───────────────────┘

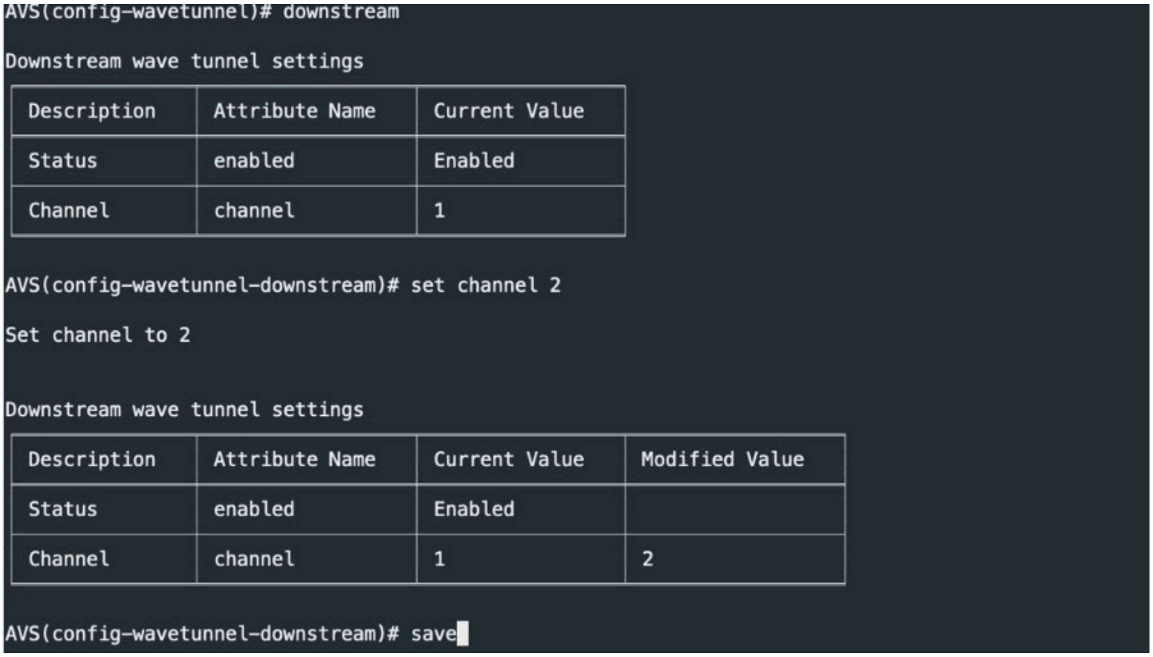
AVS(config-wavetunnel-node)# set networkId test

Set networkId to test


Wave tunnel node settings
┌───────────────────┬───────────────────┬───────────────────┬───────────────────┐
│ Description       │ Attribute Name    │ Current Value     │ Modified Value    │
├───────────────────┼───────────────────┼───────────────────┼───────────────────┤
│ Node Type         │ type              │ Root Node         │                   │
├───────────────────┼───────────────────┼───────────────────┼───────────────────┤
│ Network Id        │ networkId         │ newair8           │ test              │
├───────────────────┼───────────────────┼───────────────────┼───────────────────┤
│ Node Id           │ nodeId            │ 1                 │                   │
├───────────────────┼───────────────────┼───────────────────┼───────────────────┤
│ Antenna direction │ antennaDirection  │ Default direction │                   │
├───────────────────┼───────────────────┼───────────────────┼───────────────────┤
│ Node label        │ label             │ root              │                   │
└───────────────────┴───────────────────┴───────────────────┴───────────────────┘

AVS(config-wavetunnel-node)# save
```

[CLI] config -> wavetunnel -> downstream



```
AVS(config-wavetunnel)# downstream

Downstream wave tunnel settings
┌─────────────┬────────────────┬───────────────┐
│ Description │ Attribute Name │ Current Value │
├─────────────┼────────────────┼───────────────┤
│ Status      │ enabled        │ Enabled       │
├─────────────┼────────────────┼───────────────┤
│ Channel     │ channel        │ 1             │
└─────────────┴────────────────┴───────────────┘

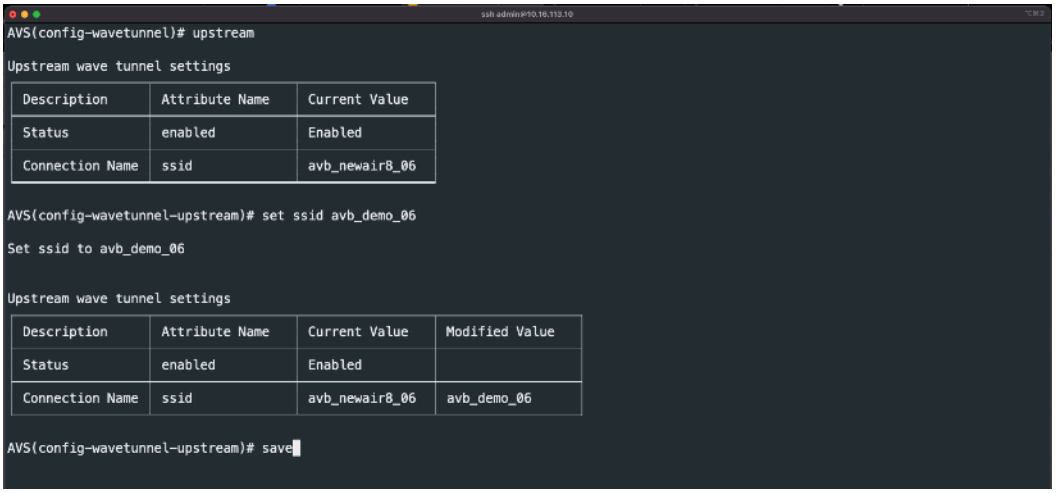
AVS(config-wavetunnel-downstream)# set channel 2

Set channel to 2


Downstream wave tunnel settings
┌─────────────┬────────────────┬───────────────┬────────────────┐
│ Description │ Attribute Name │ Current Value │ Modified Value │
├─────────────┼────────────────┼───────────────┼────────────────┤
│ Status      │ enabled        │ Enabled       │                │
├─────────────┼────────────────┼───────────────┼────────────────┤
│ Channel     │ channel        │ 1             │ 2              │
└─────────────┴────────────────┴───────────────┴────────────────┘

AVS(config-wavetunnel-downstream)# save
```

config -> wavetunnel -> upstream



```
AVS(config-wavetunnel)# upstream

Upstream wave tunnel settings
 Description      Attribute Name    Current Value
 Status           enabled           Enabled
 Connection Name  ssid              avb_newair8_06

AVS(config-wavetunnel-upstream)# set ssid avb_demo_06

Set ssid to avb_demo_06

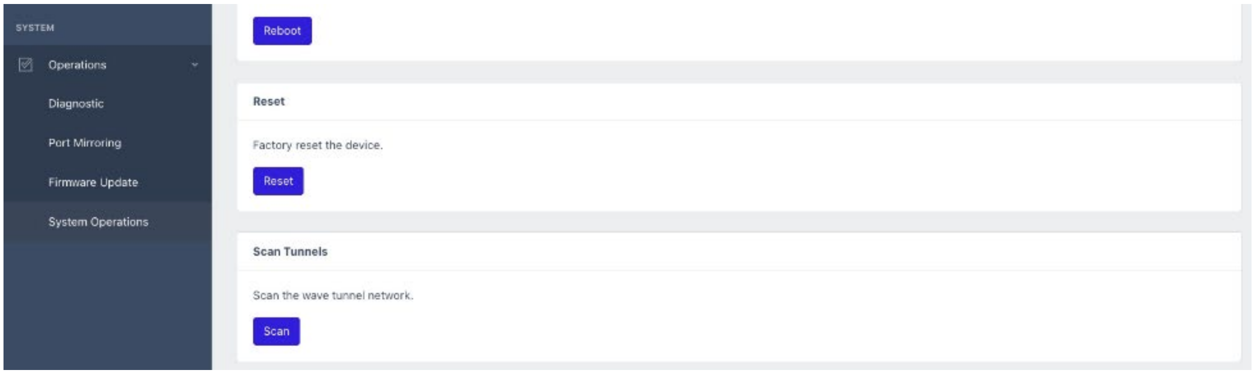
Upstream wave tunnel settings
 Description      Attribute Name    Current Value    Modified Value
 Status           enabled           Enabled
 Connection Name  ssid              avb_newair8_06   avb_demo_06

AVS(config-wavetunnel-upstream)# save
```

Scan the WaveTunnel network

If there is a WaveTunnel device removed from the network or you are seeing an abnormal network topology diagram on the WEB GUI, you can use the “Scan Tunnel” to clean up the cache data of network devices. It will retrieve the information from each node in the network and reflect the changes of your network.

System -> System Operations-> Scan Tunnel



Reset

Factory reset the device.

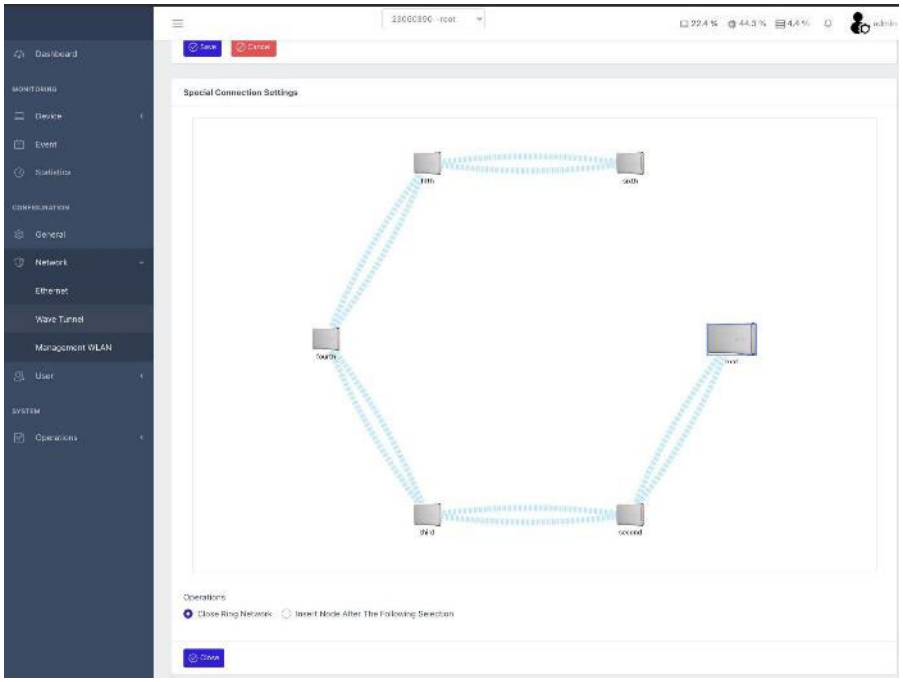
Scan Tunnels

Scan the wave tunnel network.

Close the Ring Network

WaveTunnel devices are configured in order (from root to leaf).. If you want to form a ring network to support the redundancy. You can use this function to close the ring network. The configuration is to set the root node point to the end leaf node. You can either do it from WEB GUI or Mobile App.

[WEB GUI] Configuration -> Network -> Wave Tunnel

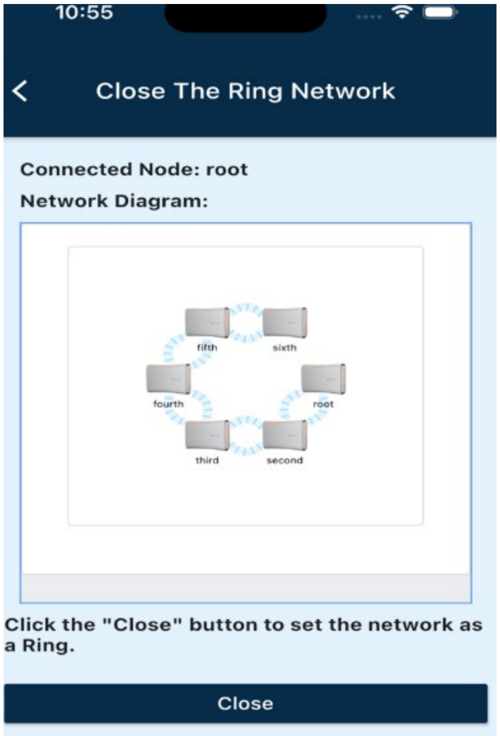


Special Connection Settings

Operations

● Close Ring Network ○ Insert Node After The Following Selection

[Mobile App] Settings -> Wave Tunnel settings->Close Ring



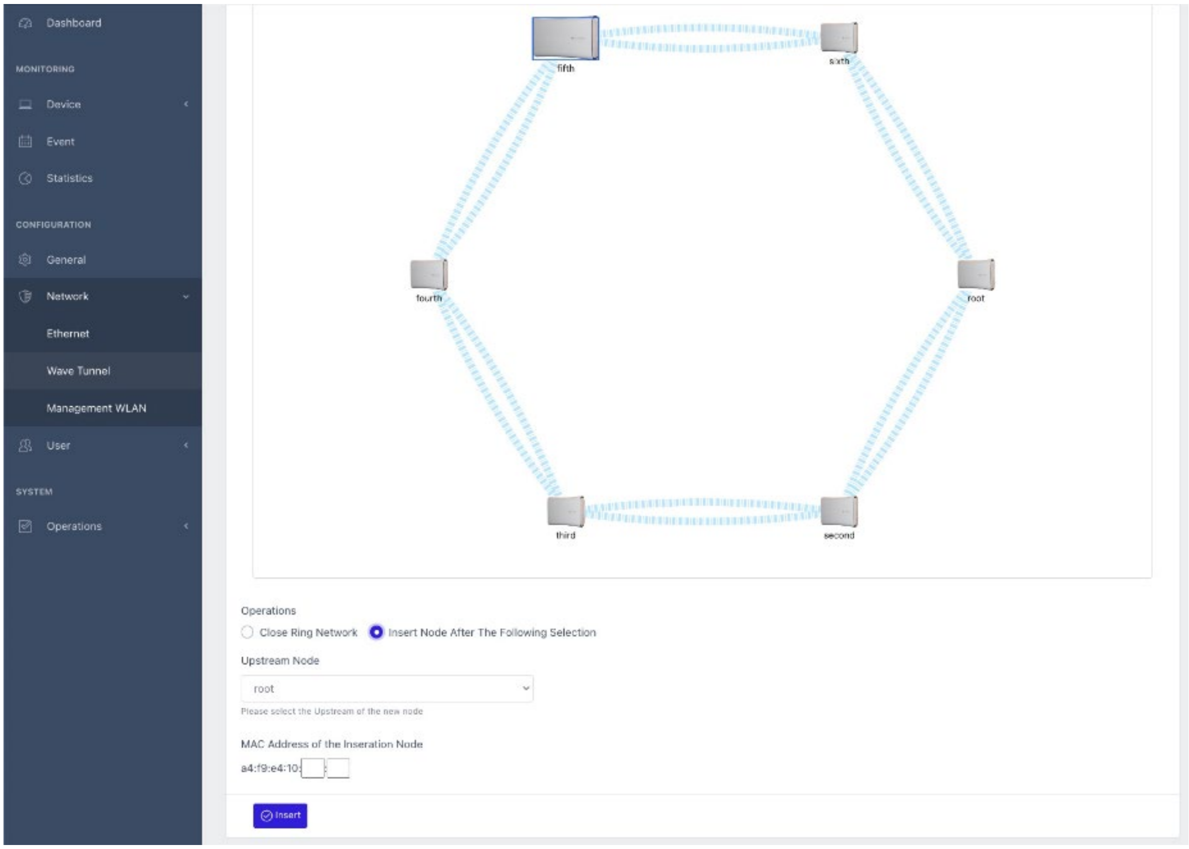
Connected Node: root

Network Diagram:

Click the "Close" button to set the network as a Ring.

Insert a WaveTunnel Device to the Network

WaveTunnel devices are configured in order (from root to leaf). The function can be used to finish the setup if you need to install a new WaveTunnel device in the position of an existing network.



Operations

○ Close Ring Network ● Insert Node After The Following Selection

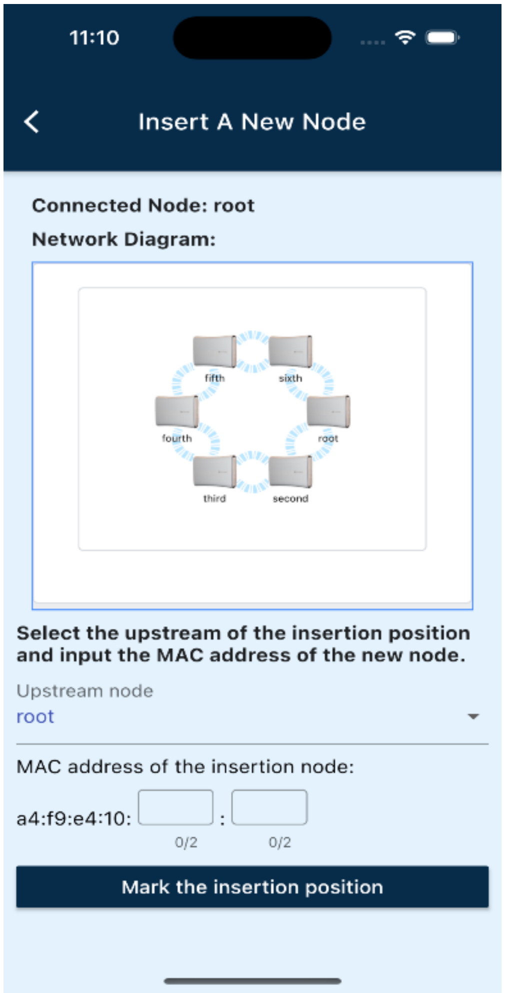
Upstream Node

root

Please select the Upstream of the new node

MAC Address of the Inseration Node

a4:f9:e4:10:□:□



Insert A New Node

Connected Node: root

Network Diagram:

Select the upstream of the insertion position and input the MAC address of the new node.

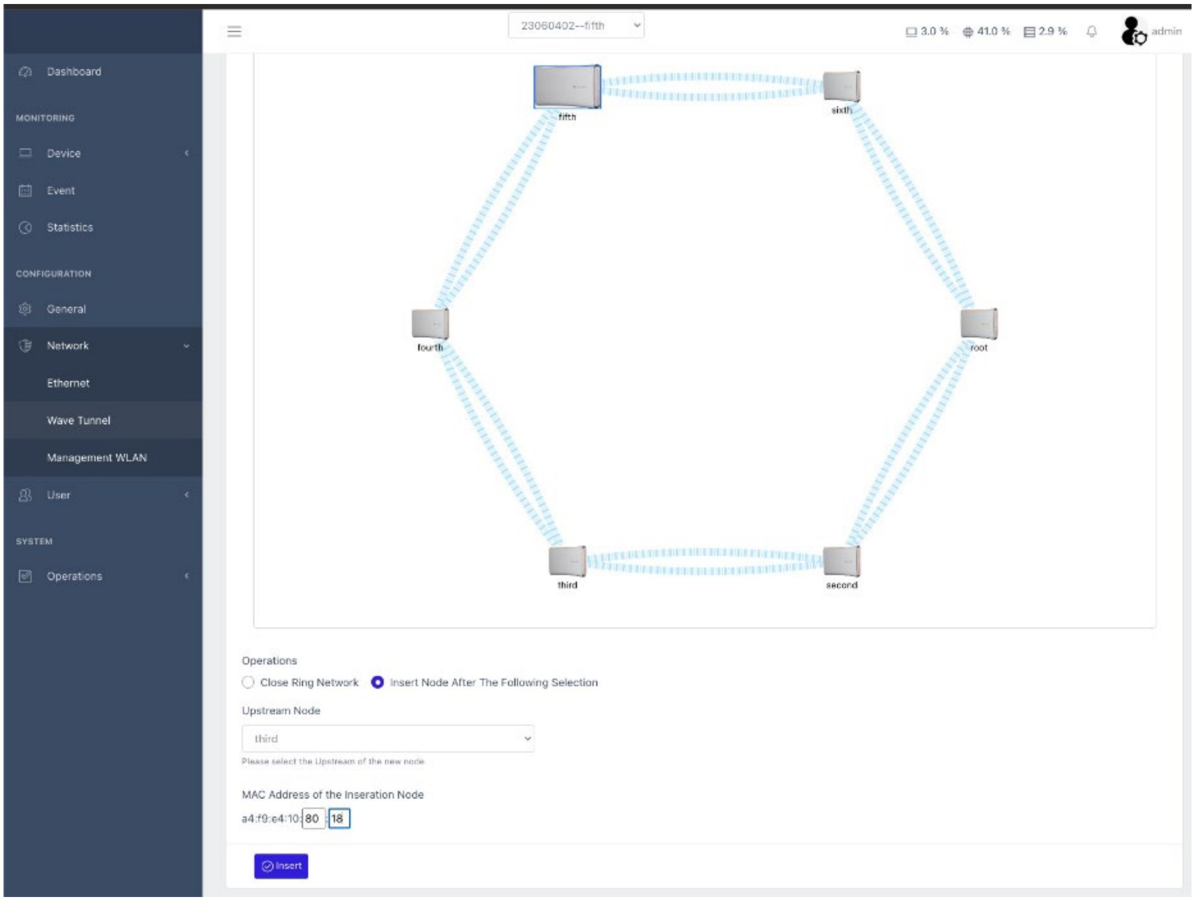
Upstream node
root

MAC address of the insertion node:

a4:f9:e4:10: :

There are two steps to finish the insertion. Let's take the above network as an example for inserting a device between node third and node fourth.

Step 1: Mark the insertion position
Connect to any device in the existing network. Select node "third" as the upstream node and input the MAC address of the new node which is planned to be inserted.



Operations

○ Close Ring Network ● Insert Node After The Following Selection

Upstream Node

third

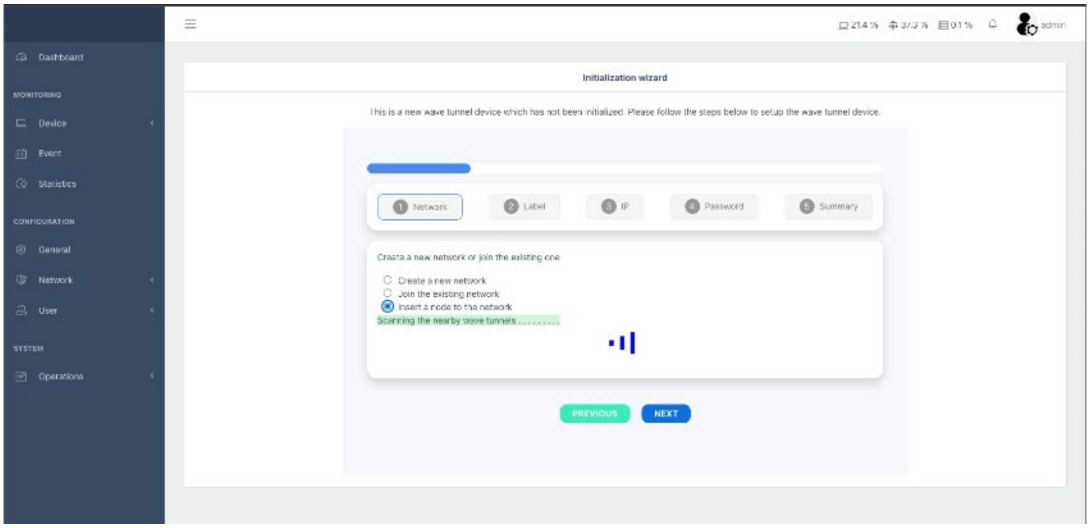
Please select the Upstream of the new node

MAC Address of the Inseration Node

a4:f9:e4:10:80:18

d

Step 2: join the new WaveTunnel device to the network
Use WEB GUI or Mobile to connect to the new WaveTunnel device. In the setup wizard, select the option “Insert a node into the network”. Following the steps of the setup wizard to finish the initialization of the new device. Once finished, you can see the new node is inserted into the position specified in step 1.



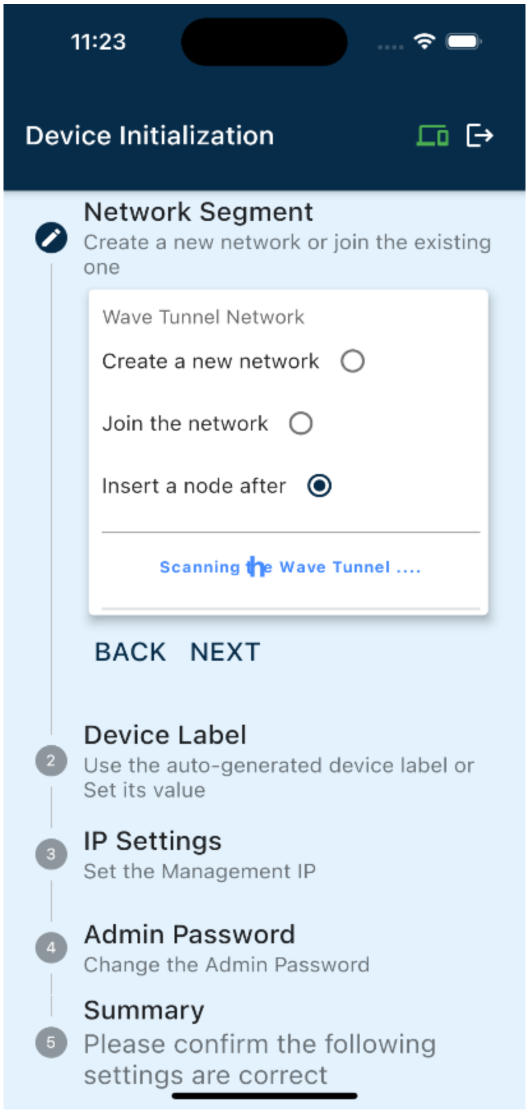
Initialization wizard

This is a new wave tunnel device which has not been initialized. Please follow the steps below to setup the wave tunnel device.

Create a new network or join the existing one

○ Create a new network
○ Join the existing network
● Insert a node to the network

Scanning the nearby wave tunnels ....



11:23

Device Initialization

Network Segment
Create a new network or join the existing one

Wave Tunnel Network

Create a new network ○

Join the network ○

Insert a node after ●

Scanning the Wave Tunnel ....

BACK NEXT

2 Device Label
Use the auto-generated device label or Set its value

3 IP Settings
Set the Management IP

4 Admin Password
Change the Admin Password

5 Summary
Please confirm the following settings are correct

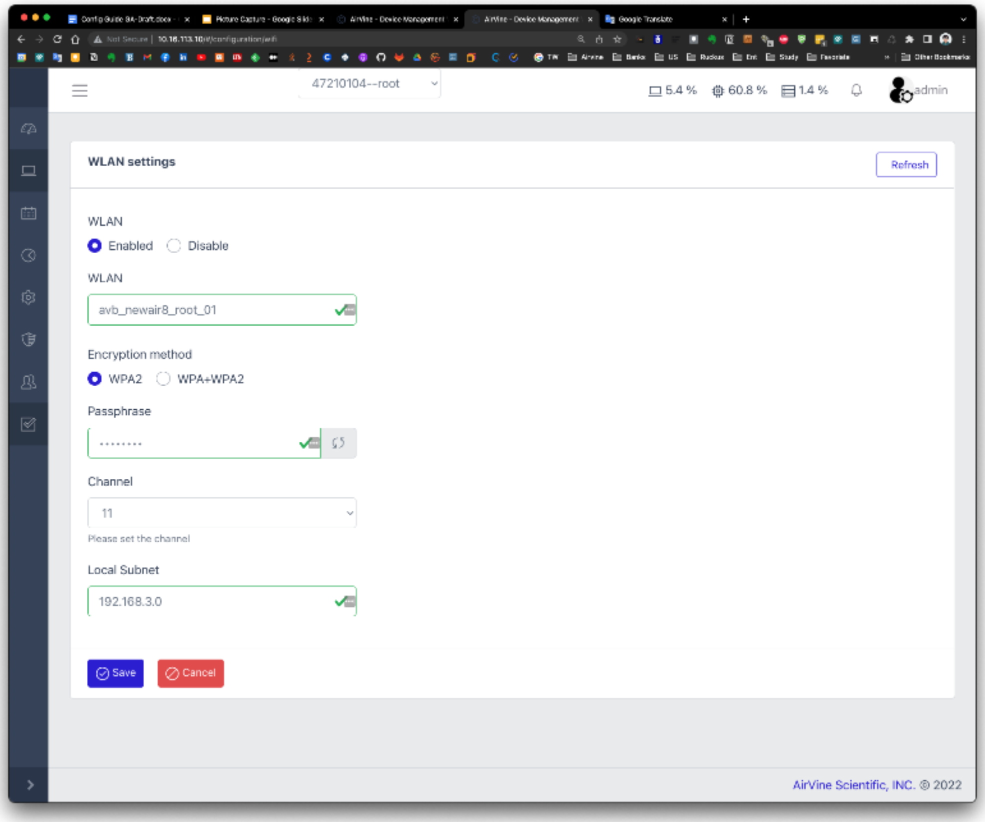
Note: You need to finish step (2) within 30 minutes after step(1). Otherwise, the settings in step (1) will be rollback. This design is to avoid the service impact of the WaveTunnel disconnection.

Update the Management WiFi Wireless LAN (WLAN)

The Wi-Fi management WLAN is used for local management of the WaveTunnel device. You can change the settings according to your need. For example, you can disable the WLAN or change the default passphrase after the wave tunnel initialization for security considerations.

There are several attribute values you can change on this page. It includes enabled/disable, SSID name,encryption method, passphrase, channel and local subnet.

[WEB GUI] Configuration -> Network -> Management WLAN



47210104--root

5.4 % 60.8 % 1.4 % admin

WLAN settings Refresh

WLAN

● Enabled ○ Disable

WLAN

avb_newair8_root_01 ✓

Encryption method

● WPA2 ○ WPA+WPA2

Passphrase

.... ✓

Channel

11

Please set the channel

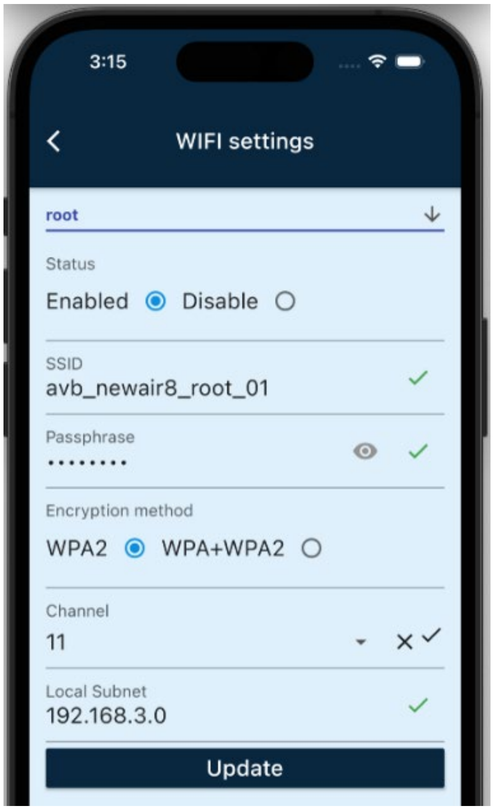
Local Subnet

192.168.3.0 ✓

Save Cancel

AirVine Scientific, INC. © 2022

[Mobile App] Settings -> WIFI settings



3:15

WIFI settings

root

Status

Enabled ● Disable ○

SSID

avb_newair8_root_01 ✓

Passphrase

•••••••• ✓

Encryption method

WPA2 ● WPA+WPA2 ○

Channel

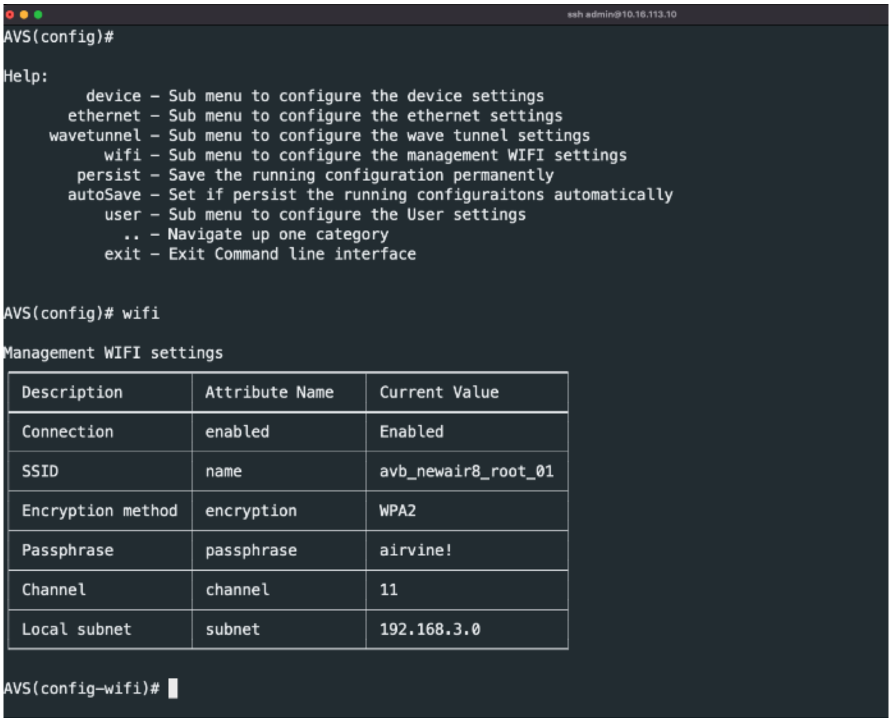
11 ✕ ✓

Local Subnet

192.168.3.0 ✓

Update

[CLI] config -> wifi



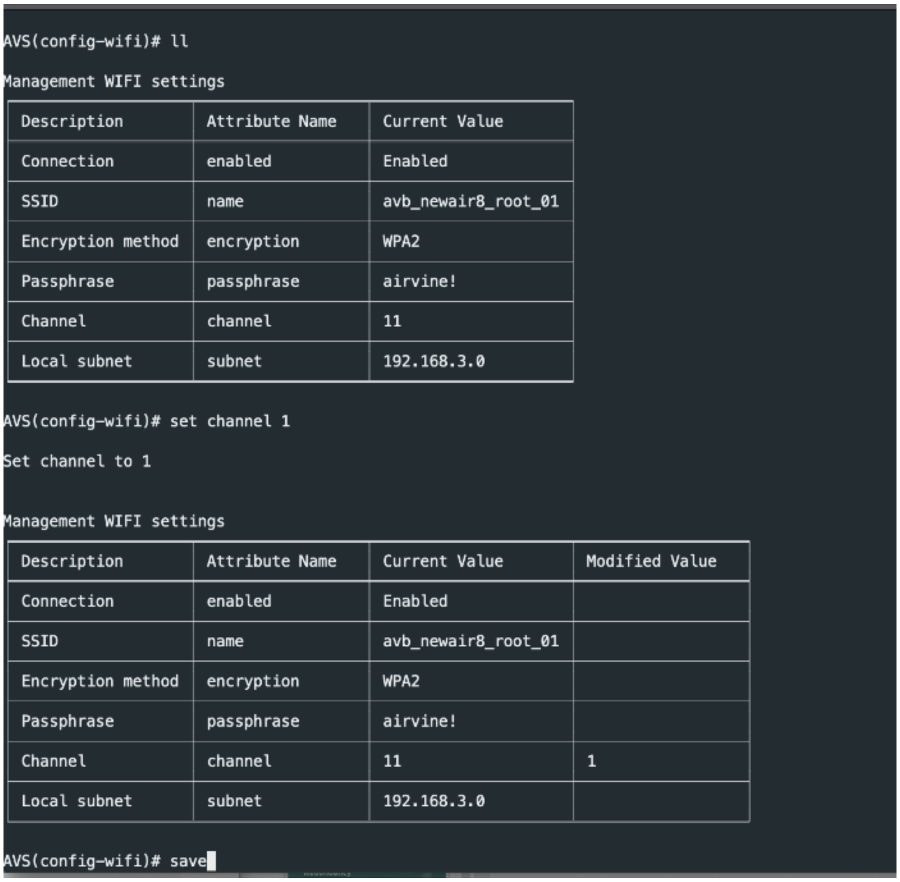
```
ssh admin@10.16.113.10
AVS(config)#

Help:
        device - Sub menu to configure the device settings
      ethernet - Sub menu to configure the ethernet settings
    wavetunnel - Sub menu to configure the wave tunnel settings
          wifi - Sub menu to configure the management WIFI settings
       persist - Save the running configuration permanently
      autoSave - Set if persist the running configuraitons automatically
          user - Sub menu to configure the User settings
            .. - Navigate up one category
          exit - Exit Command line interface


AVS(config)# wifi

Management WIFI settings
 ┌───────────────────┬──────────────────┬──────────────────────┐
 │ Description       │ Attribute Name   │ Current Value        │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Connection        │ enabled          │ Enabled              │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ SSID              │ name             │ avb_newair8_root_01  │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Encryption method │ encryption       │ WPA2                 │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Passphrase        │ passphrase       │ airvine!             │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Channel           │ channel          │ 11                   │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Local subnet      │ subnet           │ 192.168.3.0          │
 └───────────────────┴──────────────────┴──────────────────────┘

AVS(config-wifi)#
```



```
AVS(config-wifi)# ll

Management WIFI settings
 ┌───────────────────┬──────────────────┬──────────────────────┐
 │ Description       │ Attribute Name   │ Current Value        │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Connection        │ enabled          │ Enabled              │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ SSID              │ name             │ avb_newair8_root_01  │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Encryption method │ encryption       │ WPA2                 │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Passphrase        │ passphrase       │ airvine!             │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Channel           │ channel          │ 11                   │
 ├───────────────────┼──────────────────┼──────────────────────┤
 │ Local subnet      │ subnet           │ 192.168.3.0          │
 └───────────────────┴──────────────────┴──────────────────────┘

AVS(config-wifi)# set channel 1

Set channel to 1


Management WIFI settings
 ┌───────────────────┬──────────────────┬──────────────────────┬──────────────────┐
 │ Description       │ Attribute Name   │ Current Value        │ Modified Value   │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ Connection        │ enabled          │ Enabled              │                  │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ SSID              │ name             │ avb_newair8_root_01  │                  │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ Encryption method │ encryption       │ WPA2                 │                  │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ Passphrase        │ passphrase       │ airvine!             │                  │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ Channel           │ channel          │ 11                   │ 1                │
 ├───────────────────┼──────────────────┼──────────────────────┼──────────────────┤
 │ Local subnet      │ subnet           │ 192.168.3.0          │                  │
 └───────────────────┴──────────────────┴──────────────────────┴──────────────────┘

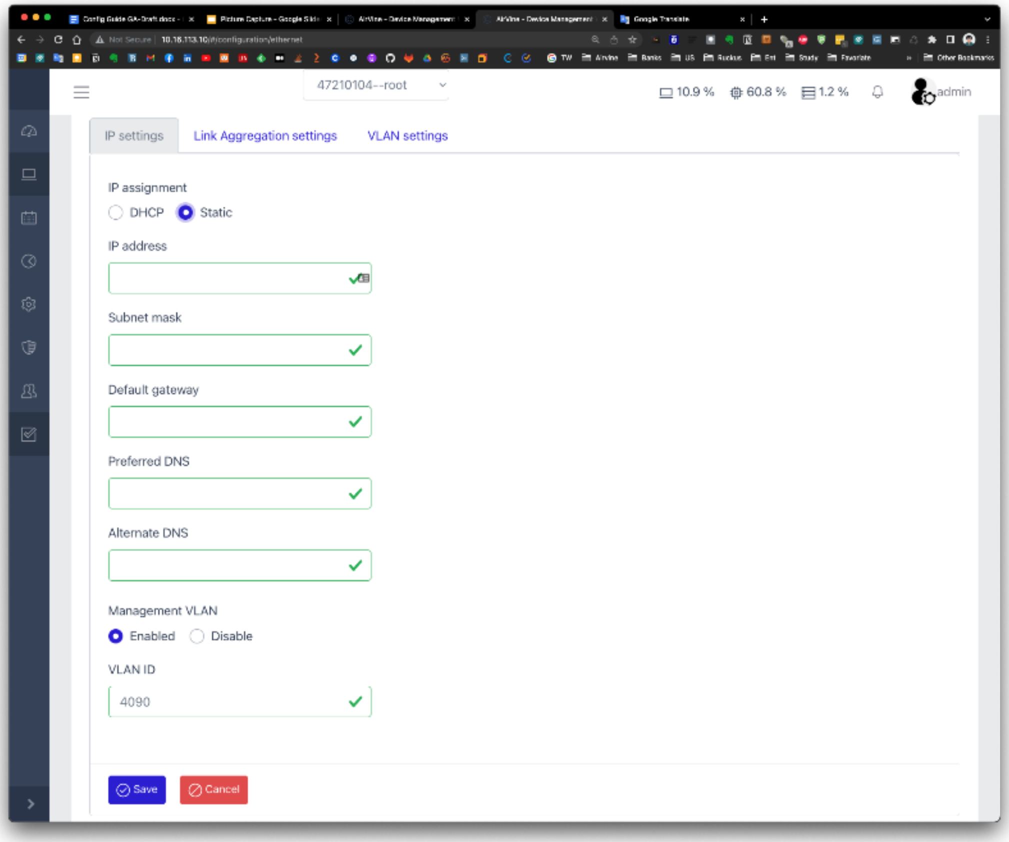
AVS(config-wifi)# save
```

Update the Ethernet Configurations

Management IP settings

You can configure the management IP of the WaveTunnel device on this page. It includes the type of IP assignment, IP address, subnet mask, default gateway and management VLAN.

[WEB GUI]   Configuration-> Network ->Ethernet ->IP settings



IP assignment
○ DHCP ● Static

IP address

Subnet mask

Default gateway

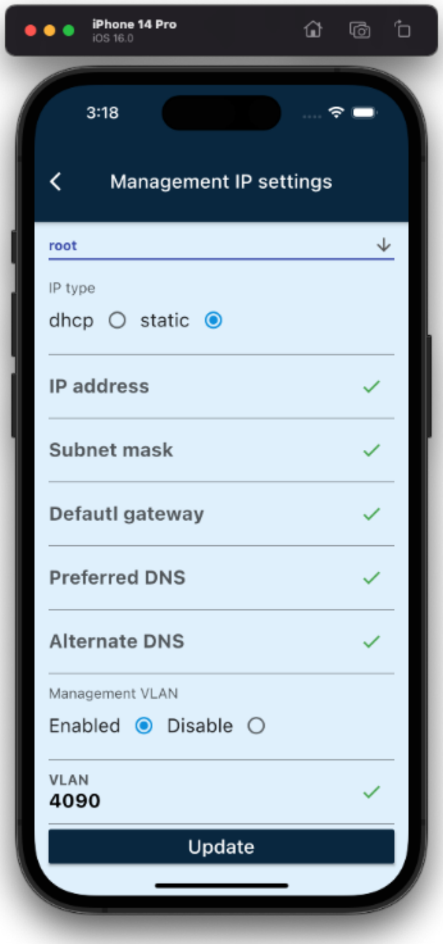
Preferred DNS

Alternate DNS

Management VLAN
● Enabled ○ Disable

VLAN ID
4090

[Mobile App] Settings-> Management



Management IP settings

root

IP type

dhcp ○ static ●

IP address ✓

Subnet mask ✓

Defautl gateway ✓

Preferred DNS ✓

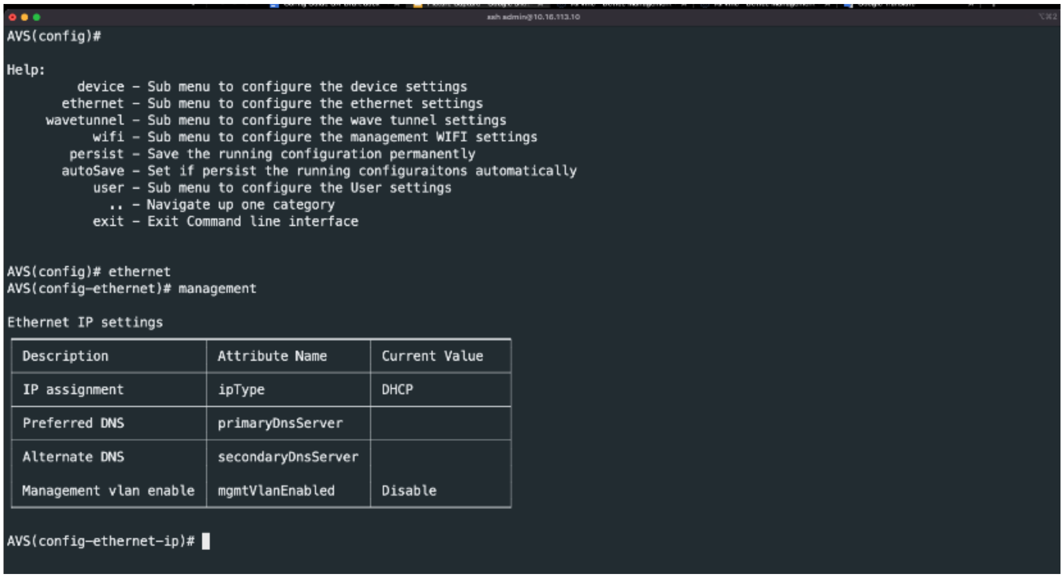
Alternate DNS ✓

Management VLAN

Enabled ● Disable ○

VLAN
4090 ✓

[CLI] **config ->ethernet-> management**



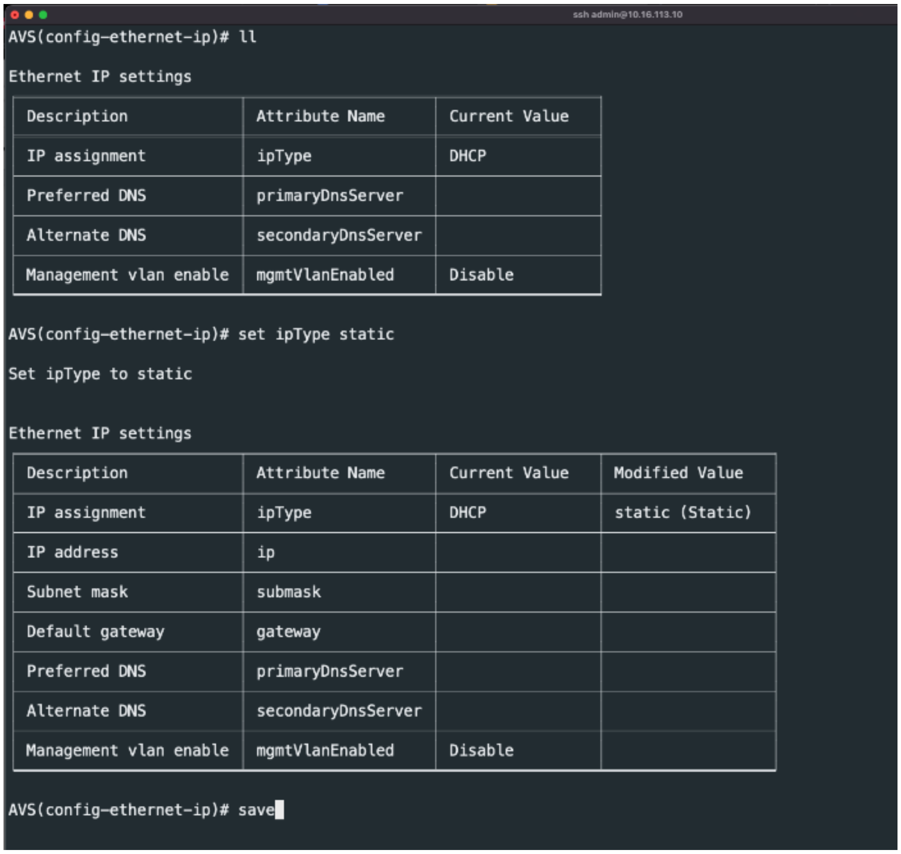
```
AVS(config)#

Help:
         device - Sub menu to configure the device settings
       ethernet - Sub menu to configure the ethernet settings
     wavetunnel - Sub menu to configure the wave tunnel settings
           wifi - Sub menu to configure the management WIFI settings
        persist - Save the running configuration permanently
       autoSave - Set if persist the running configuraitons automatically
           user - Sub menu to configure the User settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config)# ethernet
AVS(config-ethernet)# management

Ethernet IP settings
| Description            | Attribute Name     | Current Value |
| IP assignment          | ipType             | DHCP          |
| Preferred DNS          | primaryDnsServer   |               |
| Alternate DNS          | secondaryDnsServer |               |
| Management vlan enable | mgmtVlanEnabled    | Disable       |

AVS(config-ethernet-ip)#
```



```
AVS(config-ethernet-ip)# ll

Ethernet IP settings
| Description            | Attribute Name     | Current Value |
| IP assignment          | ipType             | DHCP          |
| Preferred DNS          | primaryDnsServer   |               |
| Alternate DNS          | secondaryDnsServer |               |
| Management vlan enable | mgmtVlanEnabled    | Disable       |

AVS(config-ethernet-ip)# set ipType static

Set ipType to static

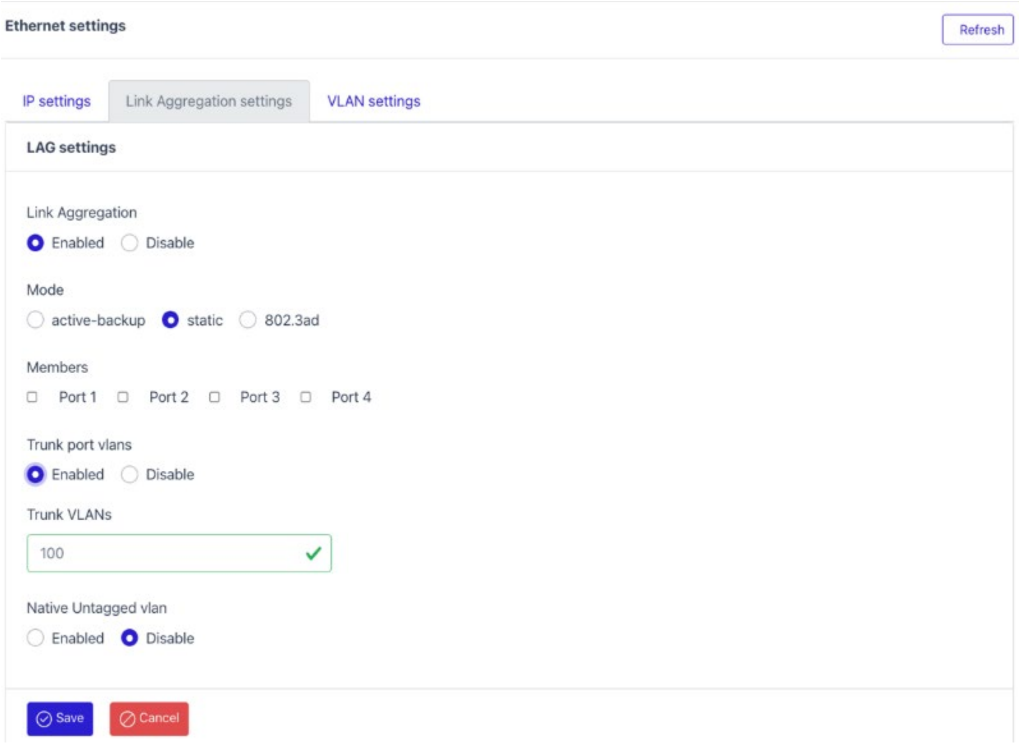

Ethernet IP settings
| Description            | Attribute Name     | Current Value | Modified Value  |
| IP assignment          | ipType             | DHCP          | static (Static) |
| IP address             | ip                 |               |                 |
| Subnet mask            | submask            |               |                 |
| Default gateway        | gateway            |               |                 |
| Preferred DNS          | primaryDnsServer   |               |                 |
| Alternate DNS          | secondaryDnsServer |               |                 |
| Management vlan enable | mgmtVlanEnabled    | Disable       |                 |

AVS(config-ethernet-ip)# save
```

Link aggregation settings

If your backend switch supports link aggregation, you can configure ethernet ports on this page. Select the LAG type and the ports want to be aggregated. The LAG interface also supports trunk VLAN and native VLAN. For trunk VLAN,it can be a range of VLAN id. For example, 2,3,4-8.

[WEB GUI] Configuration-> Network ->Ethernet ->Link aggregation settings



LAG settings

Link Aggregation
● Enabled ○ Disable

Mode
○ active-backup ● static ○ 802.3ad

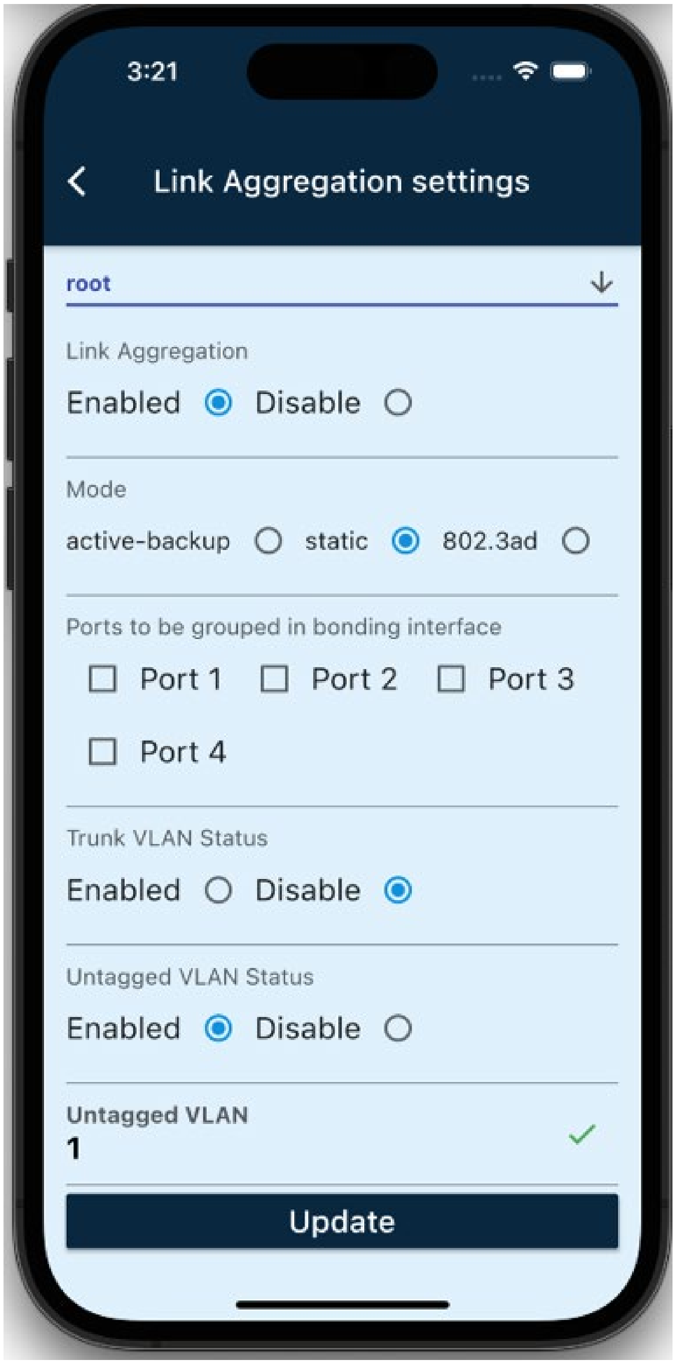
Members
□ Port 1 □ Port 2 □ Port 3 □ Port 4

Trunk port vlans
● Enabled ○ Disable

Trunk VLANs
100 ✓

Native Untagged vlan
○ Enabled ● Disable

[Mobile App] Settings -> LAG



Link Aggregation settings

root

Link Aggregation

Enabled ● Disable ○

Mode

active-backup ○ static ● 802.3ad ○

Ports to be grouped in bonding interface

□ Port 1 □ Port 2 □ Port 3

□ Port 4

Trunk VLAN Status

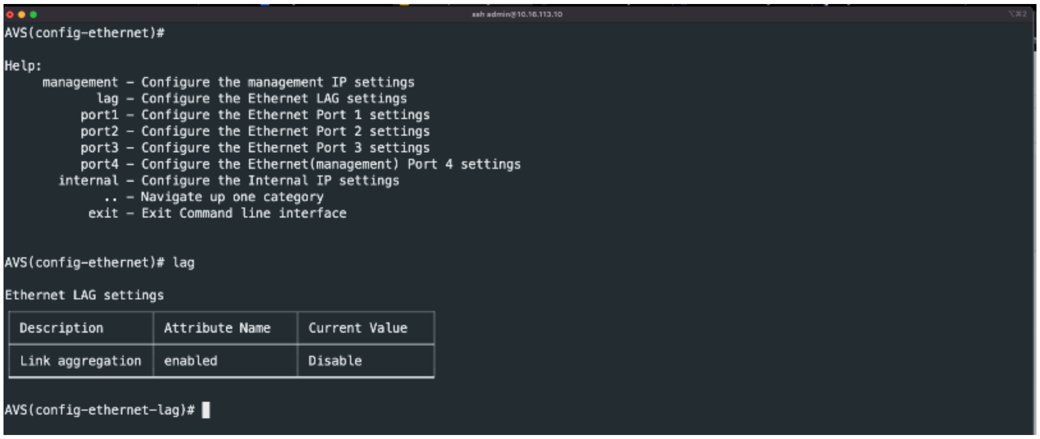
Enabled ○ Disable ●

Untagged VLAN Status

Enabled ● Disable ○

Untagged VLAN
1 ✓

[CLI] **config -> ethernet - lag**



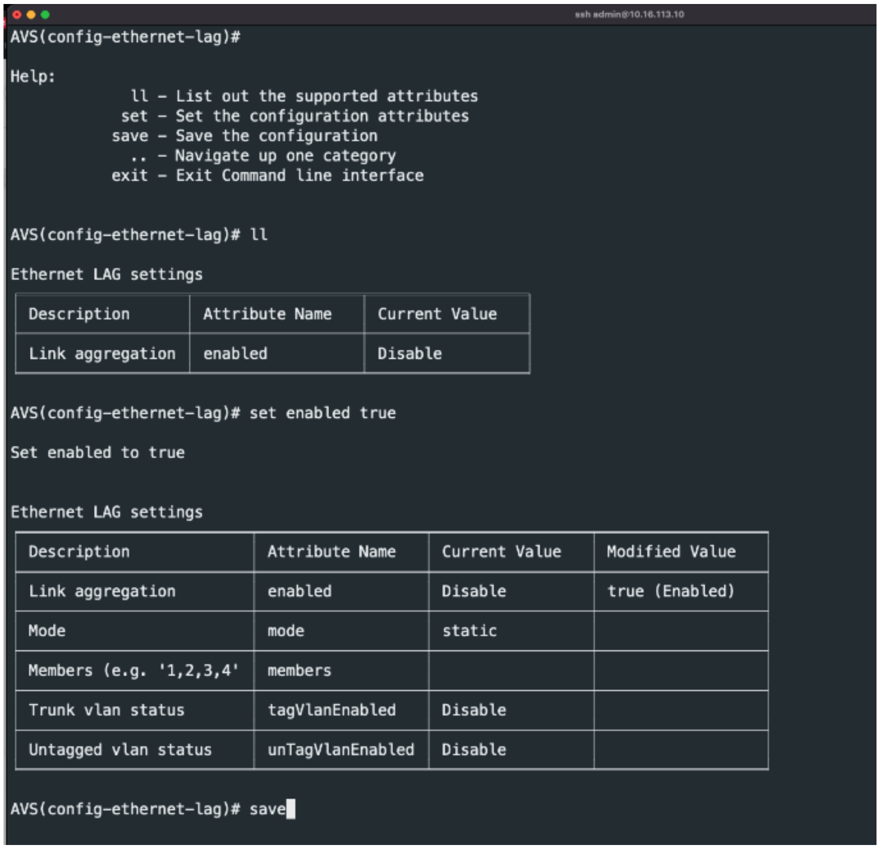
```
AVS(config-ethernet)#

Help:
     management - Configure the management IP settings
            lag - Configure the Ethernet LAG settings
          port1 - Configure the Ethernet Port 1 settings
          port2 - Configure the Ethernet Port 2 settings
          port3 - Configure the Ethernet Port 3 settings
          port4 - Configure the Ethernet(management) Port 4 settings
       internal - Configure the Internal IP settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config-ethernet)# lag

Ethernet LAG settings
 | Description      | Attribute Name | Current Value |
 | Link aggregation | enabled        | Disable       |

AVS(config-ethernet-lag)# 
```



```
AVS(config-ethernet-lag)#

Help:
               ll - List out the supported attributes
              set - Set the configuration attributes
             save - Save the configuration
               .. - Navigate up one category
             exit - Exit Command line interface


AVS(config-ethernet-lag)# ll

Ethernet LAG settings
 | Description      | Attribute Name | Current Value |
 | Link aggregation | enabled        | Disable       |

AVS(config-ethernet-lag)# set enabled true

Set enabled to true

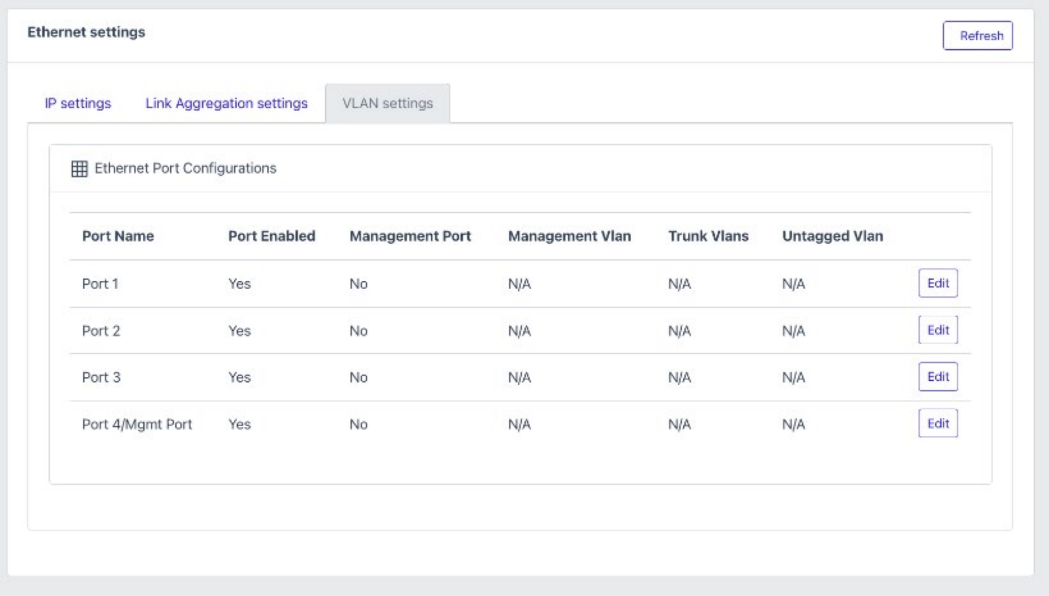

Ethernet LAG settings
 | Description               | Attribute Name  | Current Value | Modified Value |
 | Link aggregation          | enabled         | Disable       | true (Enabled) |
 | Mode                      | mode            | static        |                |
 | Members (e.g. '1,2,3,4'   | members         |               |                |
 | Trunk vlan status         | tagVlanEnabled  | Disable       |                |
 | Untagged vlan status      | unTagVlanEnabled| Disable       |                |

AVS(config-ethernet-lag)# save
```

Ethernet Port and VLAN settings

You can configure the ethernet port settings on this page. Enable/Disable the ethernet port or change the VLAN settings. The ethernet port supports trunk VLAN and native VLAN. For trunk VLAN, it can be a range of VLAN id. For example, 2,3,4-8. The port 4 can be enabled to be the dedicated management interface.

[WEB GUI] **Configuration-> Network ->Ethernet -> VLAN settings**

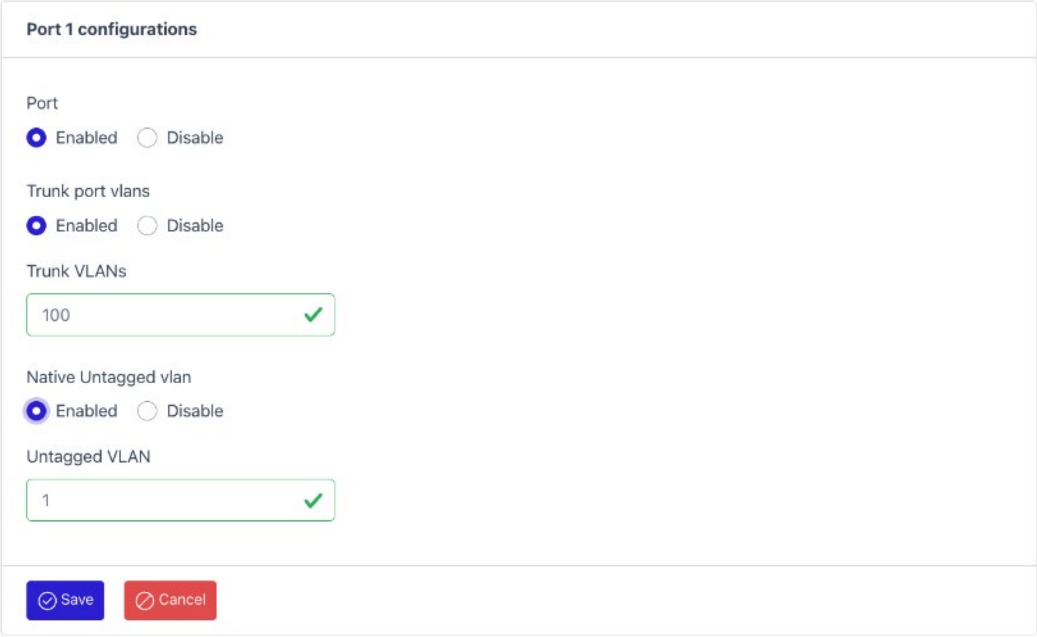


Ethernet settings

Ethernet Port Configurations

Port Name	Port Enabled	Management Port	Management Vlan	Trunk Vlans	Untagged Vlan	
Port 1	Yes	No	N/A	N/A	N/A	Edit
Port 2	Yes	No	N/A	N/A	N/A	Edit
Port 3	Yes	No	N/A	N/A	N/A	Edit
Port 4/Mgmt Port	Yes	No	N/A	N/A	N/A	Edit

Click "edit" to configure the specific port



Port 1 configurations

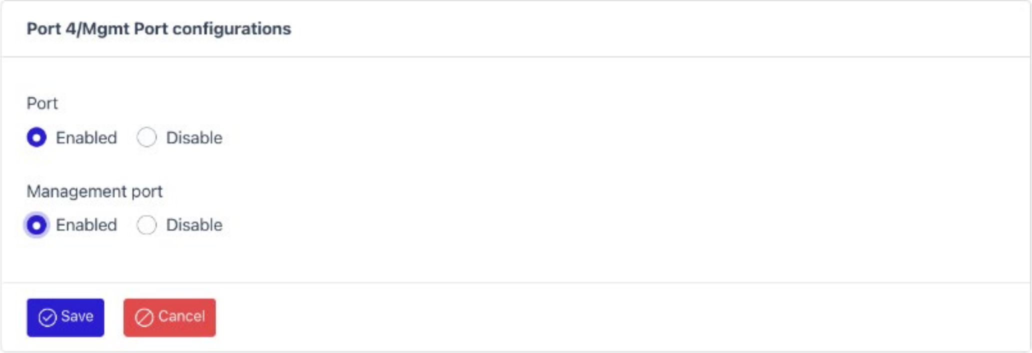
Port
● Enabled ○ Disable

Trunk port vlans
● Enabled ○ Disable

Trunk VLANs: 100 ✓

Native Untagged vlan
● Enabled ○ Disable

Untagged VLAN: 1 ✓



Port 4/Mgmt Port configurations

Port

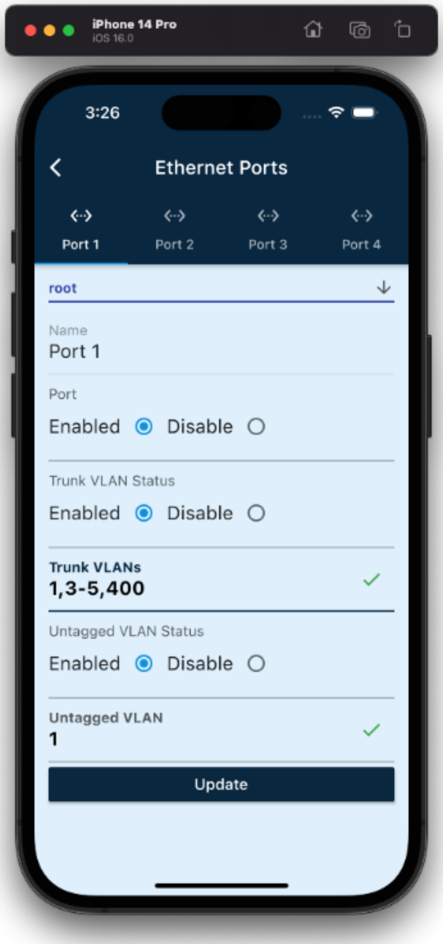
● Enabled ○ Disable

Management port

● Enabled ○ Disable

Port 4 can be configured as a dedicated management port.

[Mobile App] **Settings -> Ports**



root

Name
Port 1

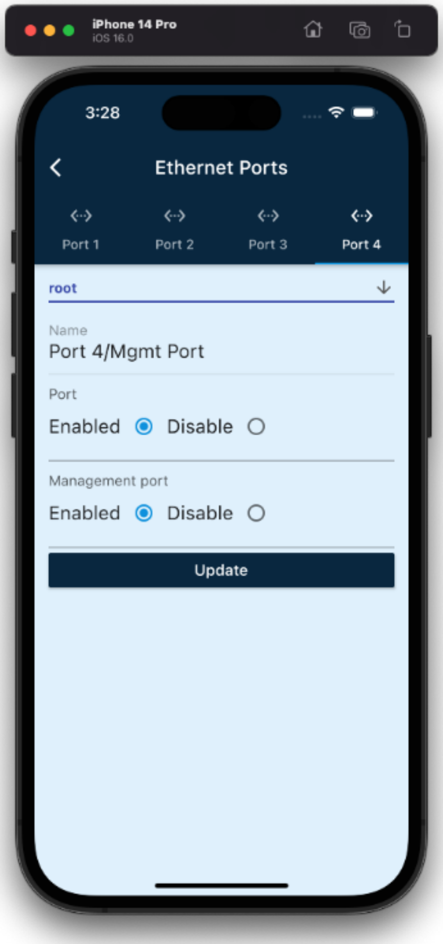
Port
Enabled ● Disable ○

Trunk VLAN Status
Enabled ● Disable ○

Trunk VLANs
1,3-5,400 ✓

Untagged VLAN Status
Enabled ● Disable ○

Untagged VLAN
1 ✓



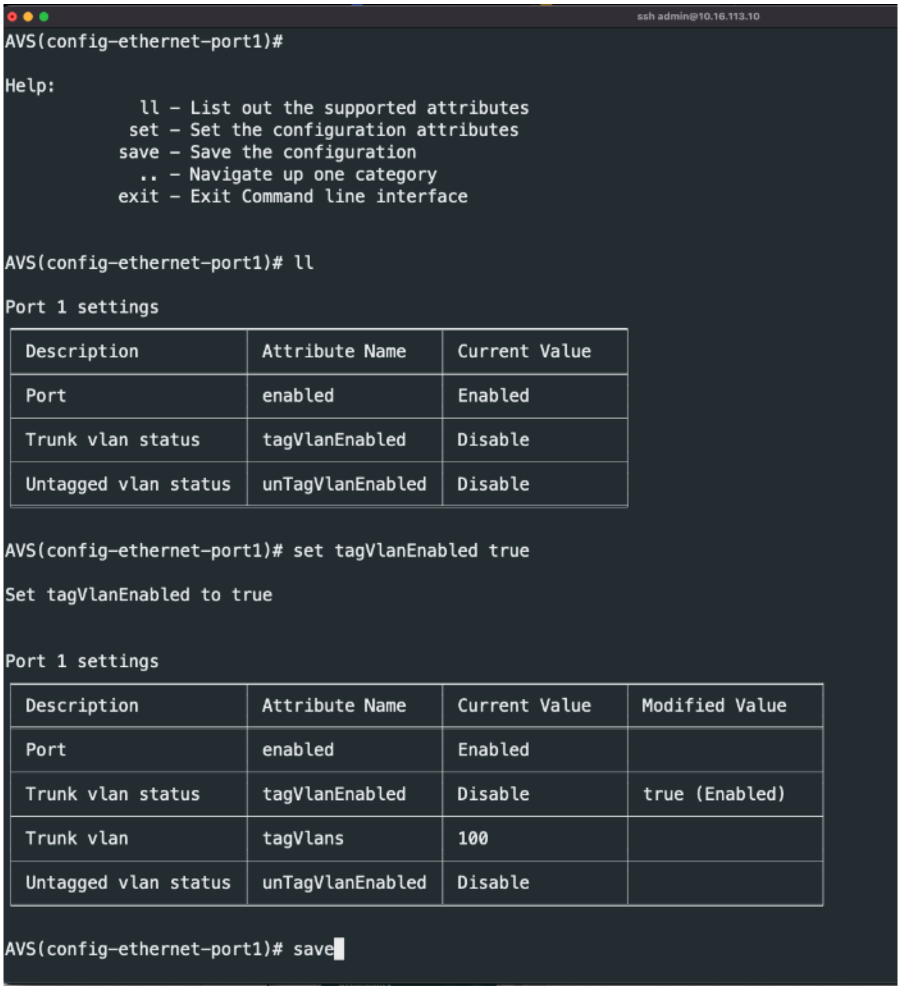
root

Name
Port 4/Mgmt Port

Port
Enabled ● Disable ○

Management port
Enabled ● Disable ○

[CLI] **config -> ethernet -> portN**



```
AVS(config-ethernet-port1)#

Help:
             ll - List out the supported attributes
            set - Set the configuration attributes
           save - Save the configuration
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config-ethernet-port1)# ll

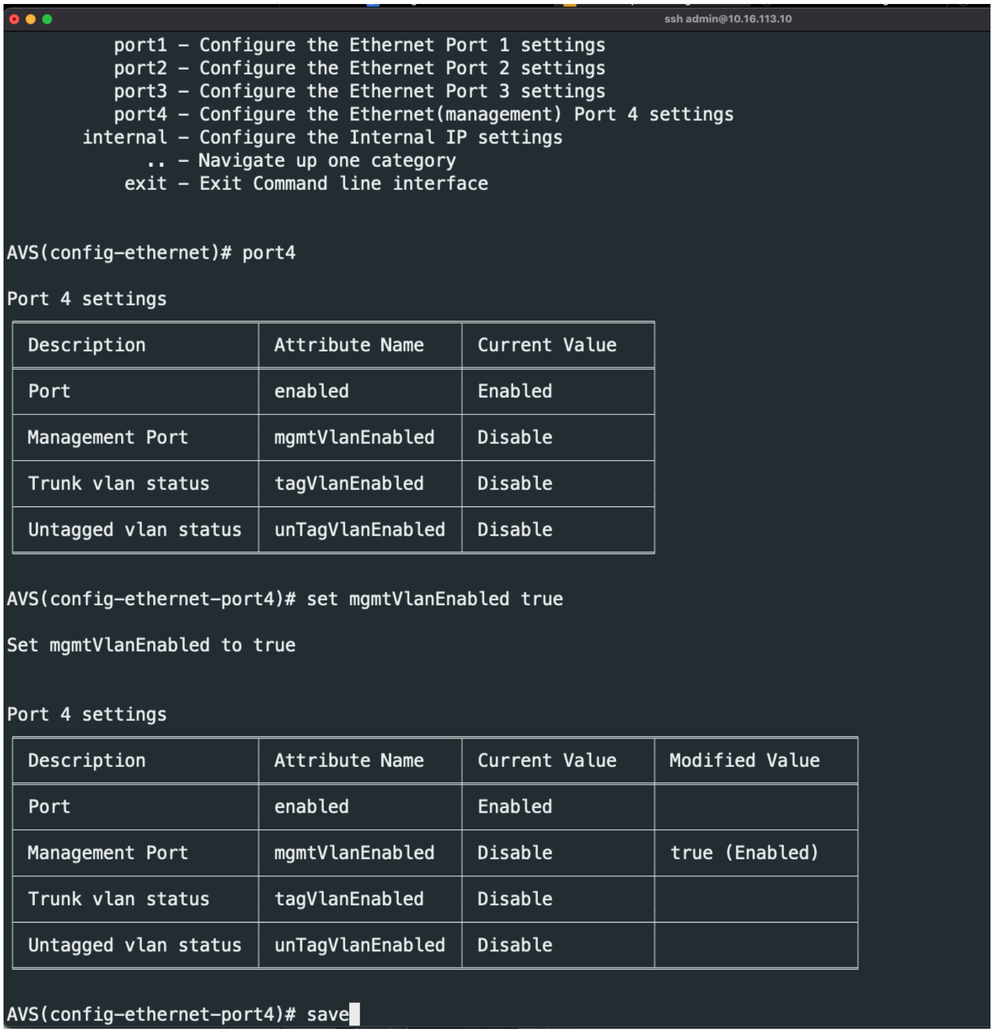
Port 1 settings
┌───────────────────────┬───────────────────┬─────────────────┐
│ Description           │ Attribute Name    │ Current Value   │
├───────────────────────┼───────────────────┼─────────────────┤
│ Port                  │ enabled           │ Enabled         │
├───────────────────────┼───────────────────┼─────────────────┤
│ Trunk vlan status     │ tagVlanEnabled    │ Disable         │
├───────────────────────┼───────────────────┼─────────────────┤
│ Untagged vlan status  │ unTagVlanEnabled  │ Disable         │
└───────────────────────┴───────────────────┴─────────────────┘

AVS(config-ethernet-port1)# set tagVlanEnabled true

Set tagVlanEnabled to true


Port 1 settings
┌───────────────────────┬───────────────────┬─────────────────┬──────────────────┐
│ Description           │ Attribute Name    │ Current Value   │ Modified Value   │
├───────────────────────┼───────────────────┼─────────────────┼──────────────────┤
│ Port                  │ enabled           │ Enabled         │                  │
├───────────────────────┼───────────────────┼─────────────────┼──────────────────┤
│ Trunk vlan status     │ tagVlanEnabled    │ Disable         │ true (Enabled)   │
├───────────────────────┼───────────────────┼─────────────────┼──────────────────┤
│ Trunk vlan            │ tagVlans          │ 100             │                  │
├───────────────────────┼───────────────────┼─────────────────┼──────────────────┤
│ Untagged vlan status  │ unTagVlanEnabled  │ Disable         │                  │
└───────────────────────┴───────────────────┴─────────────────┴──────────────────┘

AVS(config-ethernet-port1)# save
```



```
          port1 – Configure the Ethernet Port 1 settings
          port2 – Configure the Ethernet Port 2 settings
          port3 – Configure the Ethernet Port 3 settings
          port4 – Configure the Ethernet(management) Port 4 settings
       internal – Configure the Internal IP settings
             .. – Navigate up one category
           exit – Exit Command line interface


AVS(config-ethernet)# port4

Port 4 settings
┌───────────────────────┬──────────────────┬─────────────────┐
│ Description           │ Attribute Name   │ Current Value   │
├───────────────────────┼──────────────────┼─────────────────┤
│ Port                  │ enabled          │ Enabled         │
├───────────────────────┼──────────────────┼─────────────────┤
│ Management Port       │ mgmtVlanEnabled  │ Disable         │
├───────────────────────┼──────────────────┼─────────────────┤
│ Trunk vlan status     │ tagVlanEnabled   │ Disable         │
├───────────────────────┼──────────────────┼─────────────────┤
│ Untagged vlan status  │ unTagVlanEnabled │ Disable         │
└───────────────────────┴──────────────────┴─────────────────┘

AVS(config-ethernet-port4)# set mgmtVlanEnabled true

Set mgmtVlanEnabled to true


Port 4 settings
┌───────────────────────┬──────────────────┬─────────────────┬──────────────────┐
│ Description           │ Attribute Name   │ Current Value   │ Modified Value   │
├───────────────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Port                  │ enabled          │ Enabled         │                  │
├───────────────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Management Port       │ mgmtVlanEnabled  │ Disable         │ true (Enabled)   │
├───────────────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Trunk vlan status     │ tagVlanEnabled   │ Disable         │                  │
├───────────────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Untagged vlan status  │ unTagVlanEnabled │ Disable         │                  │
└───────────────────────┴──────────────────┴─────────────────┴──────────────────┘

AVS(config-ethernet-port4)# save
```

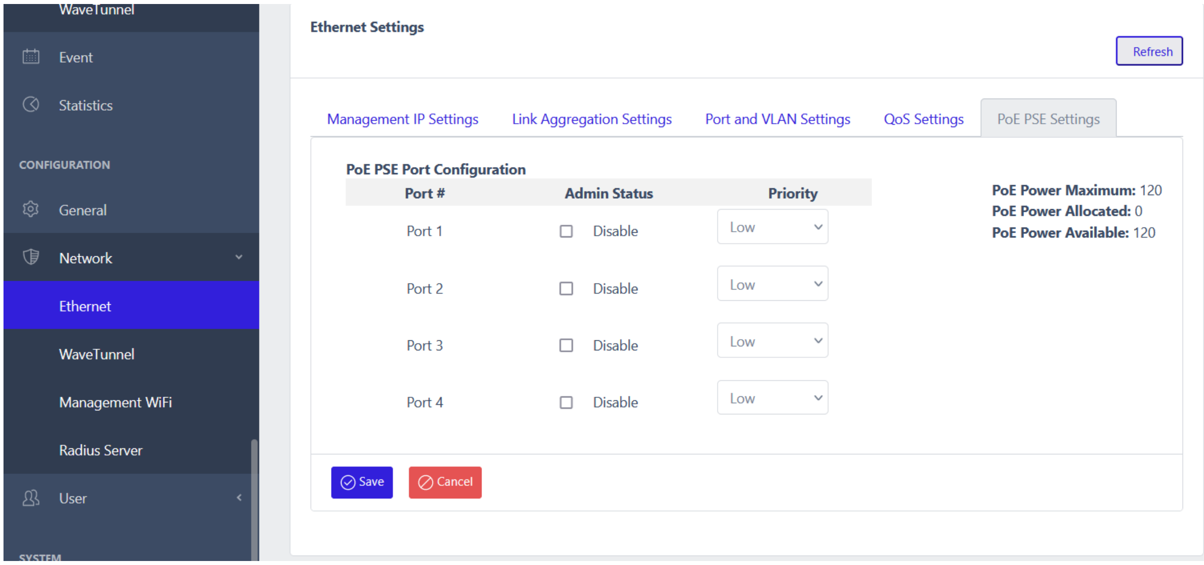
Changing Ethernet PoE PSE Settings

The WT PoE Power Sourcing Equipment (PSE) supports standard PoE negotiation based on the 801.3bt standard (POE++) up to 60 Watts per port up to an aggregate total PSE power of 120 Watts per WaveTunnel. The PSE negotiates with each PoE-powered device (PD) plugged into an active Ethernet port, and attempts to provide the power requested by the PD device.

On the PoE PSE Settings page, you can disable PoE functionality on any of the 4 Ethernet ports. The PSE priority can be set to Low (default), Medium or High. PSE priority is useful in the event of a power over-subscription. Power over-subscription occurs when the total power requested by all the plugged-in PD devices exceeds the total 120W PSE maximum power available.

- Navigate to **CONFIGURATION/Network/Ethernet/PoE PSE Settings**. In the PoE PSE Settings page, select the required parameter values.

Note: The WaveTunnel supplies up to a total of 120W PoE for all four Ethernet ports.
o If the WT has sufficient available wattage, it provides the requested wattage (up to 120W) to the PD.
o In the event of an over-subscription event, Ethernet ports configured with higher priorities continue getting their requested power while lower priority ports may not receive the power requested by the PD. Within the same priority level, higher port numbers take precedence over lower port numbers.



Ethernet Settings

PoE PSE Port Configuration

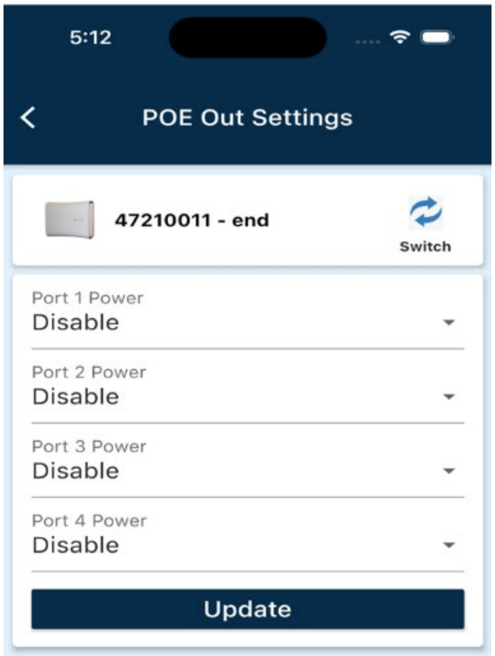
Port #	Admin Status	Priority
Port 1	□ Disable	Low
Port 2	□ Disable	Low
Port 3	□ Disable	Low
Port 4	□ Disable	Low

PoE Power Maximum: 120
PoE Power Allocated: 0
PoE Power Available: 120

Parameters	Select or Enter	Then
dmin Status	Click the checkbox to disable PoE on this port. If the box is not checked, the port is Enabled for PoE **Note:** If PoE is disabled, the port can still function as a standard non-PoE Ethernet port. By default, PoE is enabled on all ports	Click "Save".
PoE Priority	Select the PSE priority for this port: Low (default), Medium, or High	

Note: The AirvineMobile App cannot be used to configure or Monitor PoE setting for WaveTunnels running 1.3 or higher firmware versions.

[Mobile App] **Settings -> POE PSE**



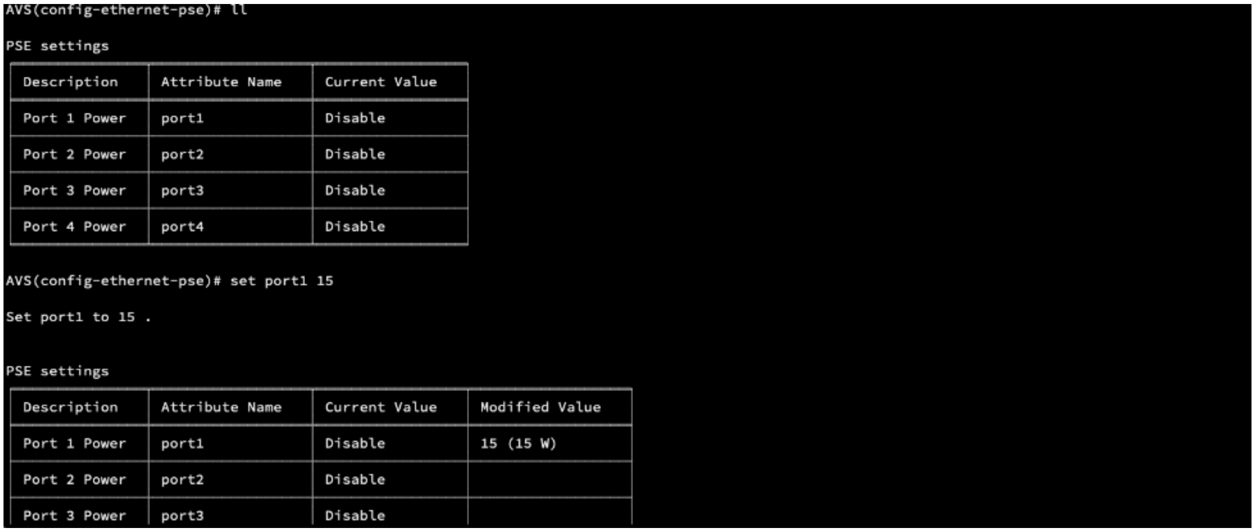
Port 1 Power: Disable

Port 2 Power: Disable

Port 3 Power: Disable

Port 4 Power: Disable

[CLI] **config -> ethernet -> pse**



```
AVS(config-ethernet-pse)# ll

PSE settings

| Description  | Attribute Name | Current Value |
| Port 1 Power | port1          | Disable       |
| Port 2 Power | port2          | Disable       |
| Port 3 Power | port3          | Disable       |
| Port 4 Power | port4          | Disable       |

AVS(config-ethernet-pse)# set port1 15

Set port1 to 15 .

PSE settings

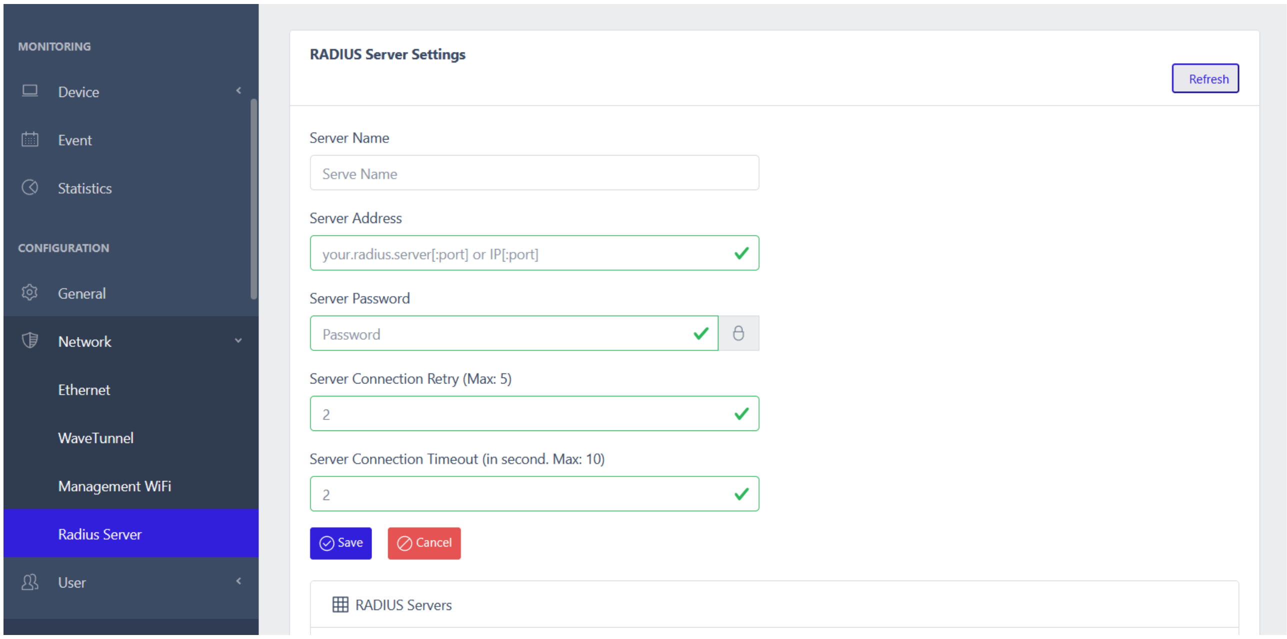
| Description  | Attribute Name | Current Value | Modified Value |
| Port 1 Power | port1          | Disable       | 15 (15 W)      |
| Port 2 Power | port2          | Disable       |                |
| Port 3 Power | port3          | Disable       |                |
```

Configuring RADIUS Server Settings

Remote authentication of user accounts can be accomplished via an external RADIUS server. A RADIUS server connection must be configured before a WaveTunnel node can communicate with the RADIUS authentication server application. The WaveTunnel currently only supports communication to a single RADIUS server but multiple servers can be configured and locally saved on the WaveTunnel.

Configuring RADIUS Using the VineManager Web GUI

- Navigate to CONFIGURATION/Network/Radius Server. In the RADIUS Server Settings page, enter the required parameter values.



RADIUS Server Settings

Server Name: Serve Name

Server Address: your.radius.server[:port] or IP[:port]

Server Password: Password

Server Connection Retry (Max: 5): 2

Server Connection Timeout (in second. Max: 10): 2

RADIUS Servers

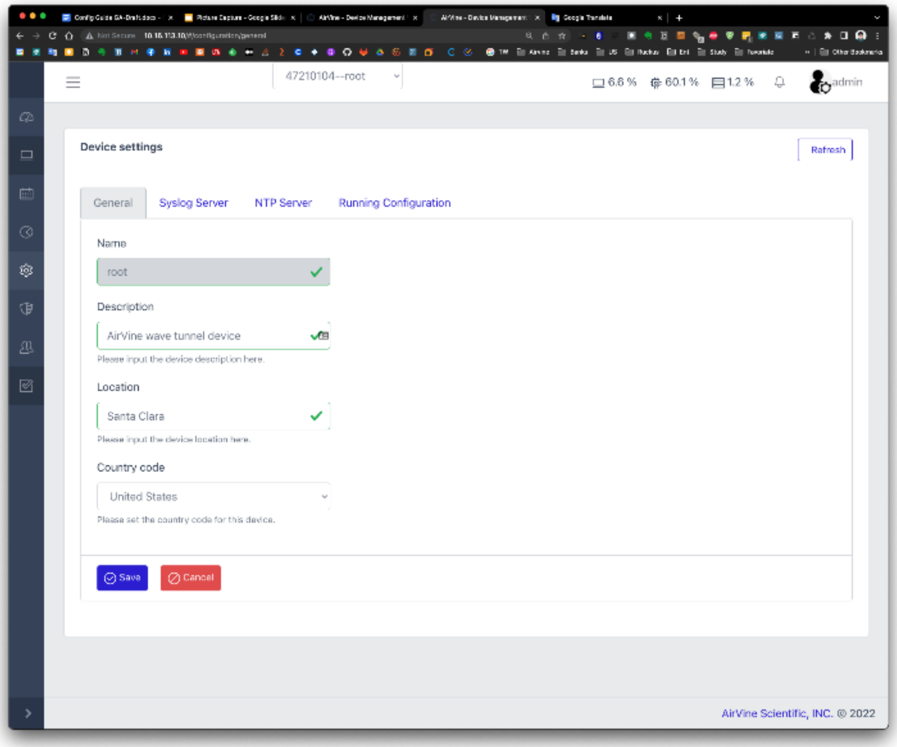
Parameter	Enter	Then
Server Name	Enter a name for this RADIUS server	Click “Save”.
Server Address	Enter the address (and/or port number) of the RADIUS server. Example: 10.30.45.236, 10.30.45.236:1645, radius.airvine.com, radius.airvine.com:1645 The default port number is 1812 and will be used if no port is specified.	
Server Password	Enter the password for this RADIUS server.	
Server Connection Retry	Enter the number of retries between 1 and 5 that a RADIUS ACCESS-REQUEST request will be resent by the WaveTunnel when the server is not responding or is responding too slowly (see Server Connection Timeout). The RADIUS user authentication will fail when the number of unsuccess attempts equal to the Server Connection Retry number.	
Server Connection Timeout	Enter the number of seconds between 1 and 10 that the WaveTunnel will wait after sending an ACCESS-REQUEST to the RADIUS server to receive an access response from the RADIUS server before timing out the request.	

Update the device settings

General settings

To update the description,location,Country code of the WaveTunnel device on this page.

[WEB GUI] **Config -> General**



Device settings

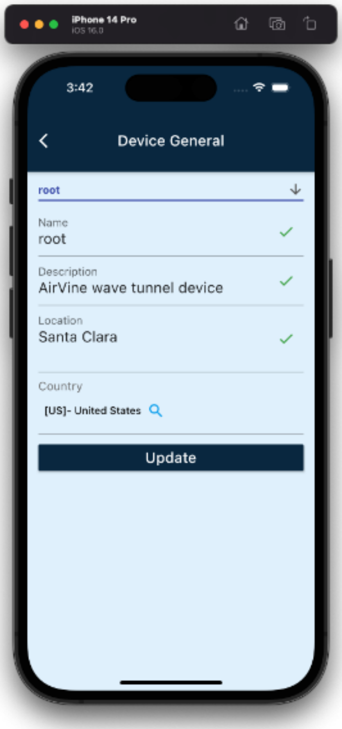
Name
root

Description
AirVine wave tunnel device
Please input the device description here.

Location
Santa Clara
Please input the device location here.

Country code
United States
Please set the country code for this device.

[Mobile App] **Settings -> General**



root

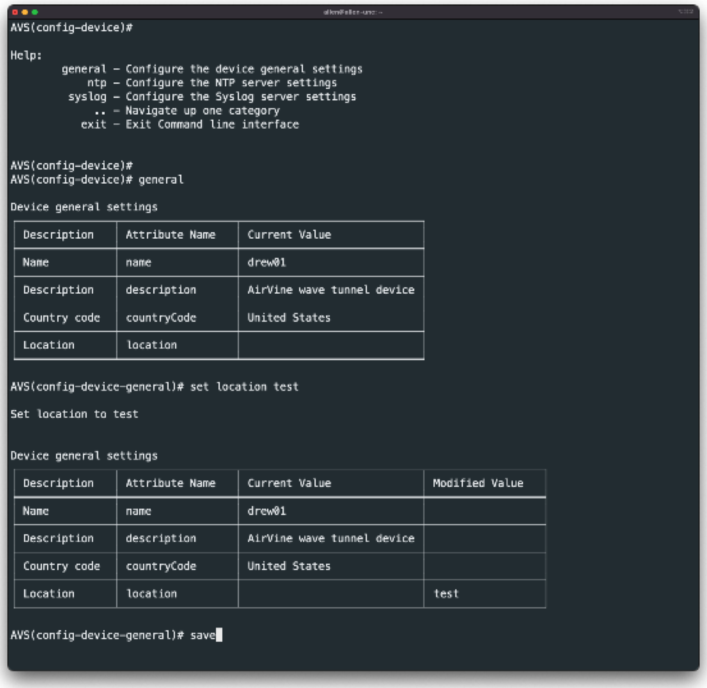
Name
root ✓

Description
AirVine wave tunnel device ✓

Location
Santa Clara ✓

Country
[US]- United States

[CLI] **Config -> device -> general**



```
AVS(config-device)#

Help:
        general - Configure the device general settings
            ntp - Configure the NTP server settings
         syslog - Configure the Syslog server settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config-device)#
AVS(config-device)# general

Device general settings
┌─────────────┬────────────────┬────────────────────────────┐
│ Description │ Attribute Name │ Current Value              │
├─────────────┼────────────────┼────────────────────────────┤
│ Name        │ name           │ drew01                     │
├─────────────┼────────────────┼────────────────────────────┤
│ Description │ description    │ AirVine wave tunnel device │
│ Country code│ countryCode    │ United States              │
├─────────────┼────────────────┼────────────────────────────┤
│ Location    │ location       │                            │
└─────────────┴────────────────┴────────────────────────────┘

AVS(config-device-general)# set location test

Set location to test

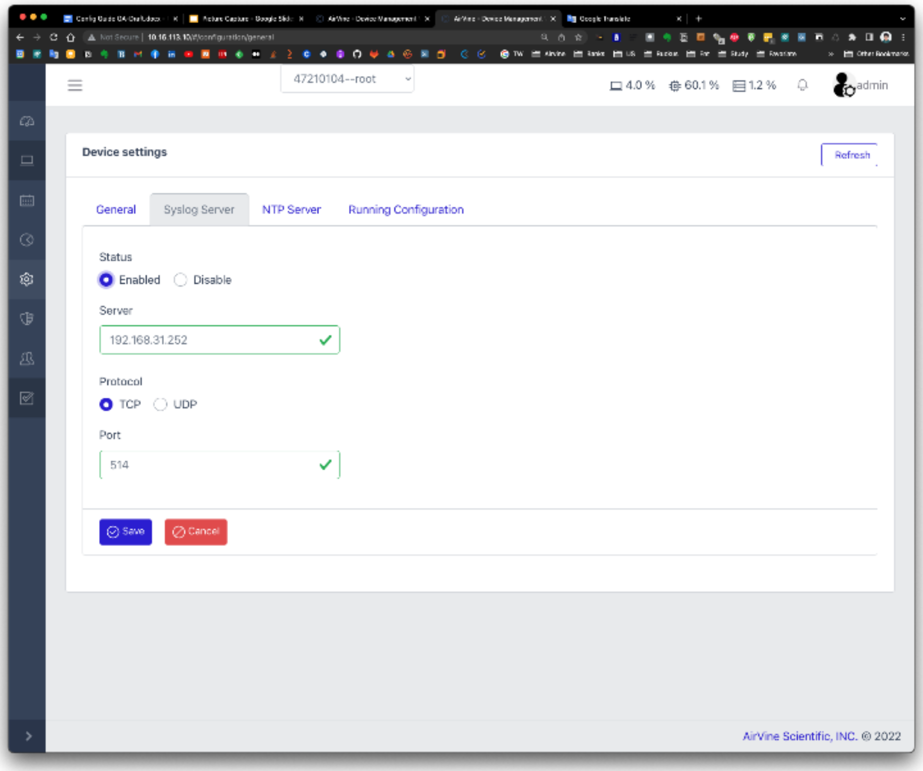

Device general settings
┌─────────────┬────────────────┬────────────────────────────┬────────────────┐
│ Description │ Attribute Name │ Current Value              │ Modified Value │
├─────────────┼────────────────┼────────────────────────────┼────────────────┤
│ Name        │ name           │ drew01                     │                │
├─────────────┼────────────────┼────────────────────────────┼────────────────┤
│ Description │ description    │ AirVine wave tunnel device │                │
├─────────────┼────────────────┼────────────────────────────┼────────────────┤
│ Country code│ countryCode    │ United States              │                │
├─────────────┼────────────────┼────────────────────────────┼────────────────┤
│ Location    │ location       │                            │ test           │
└─────────────┴────────────────┴────────────────────────────┴────────────────┘

AVS(config-device-general)# save
```

Syslog settings

To export the log messages to the external syslog server, you can enable the syslog server on this page. The settings include enabled/disable, server address, port.

[WEB GUI] **Configuration-> General -> Syslog Server**



Device settings

Status
● Enabled ○ Disable

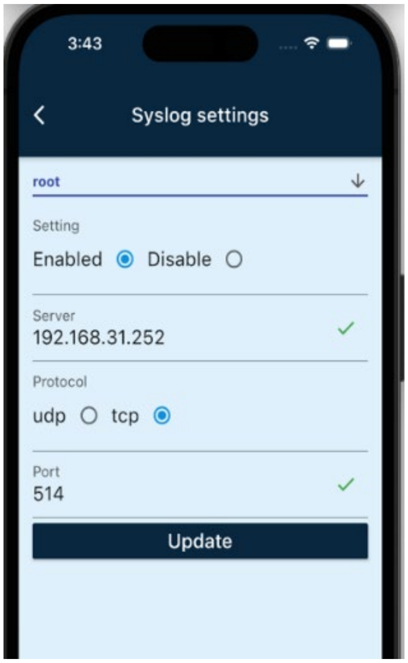
Server
192.168.31.252 ✓

Protocol
● TCP ○ UDP

Port
514 ✓

AirVine Scientific, INC. © 2022

[Mobile App] **Settings -> Syslog**



Syslog settings

root

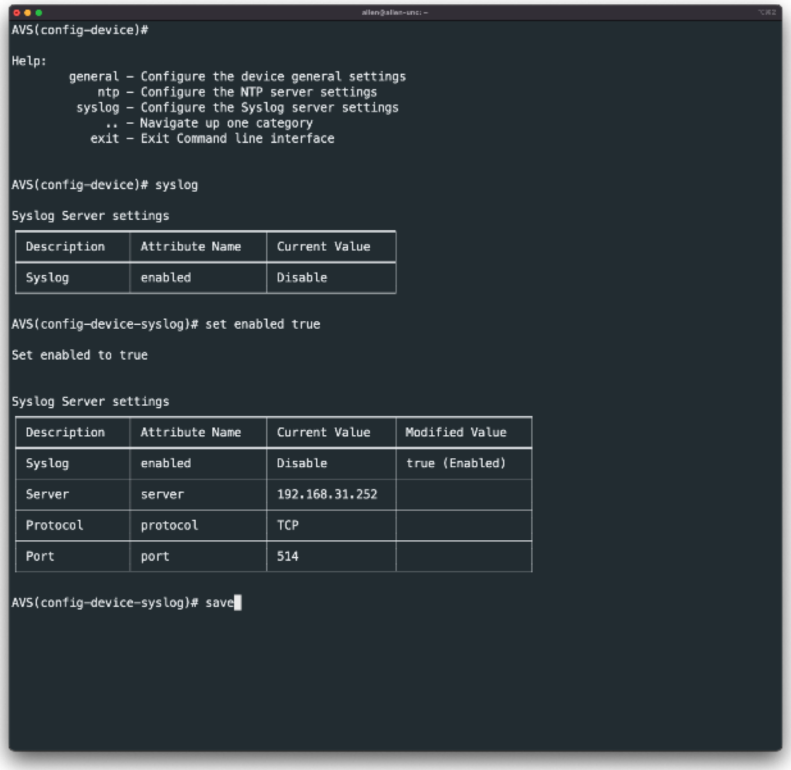
Setting
Enabled ● Disable ○

Server
192.168.31.252 ✓

Protocol
udp ○ tcp ●

Port
514 ✓

[CLI] Config -> device -> syslog



```
AVS(config-device)#

Help:
        general - Configure the device general settings
            ntp - Configure the NTP server settings
         syslog - Configure the Syslog server settings
             .. - Navigate up one category
           exit - Exit Command line interface

AVS(config-device)# syslog

Syslog Server settings
┌───────────────┬──────────────────┬─────────────────┐
│ Description   │ Attribute Name   │ Current Value   │
├───────────────┼──────────────────┼─────────────────┤
│ Syslog        │ enabled          │ Disable         │
└───────────────┴──────────────────┴─────────────────┘

AVS(config-device-syslog)# set enabled true

Set enabled to true

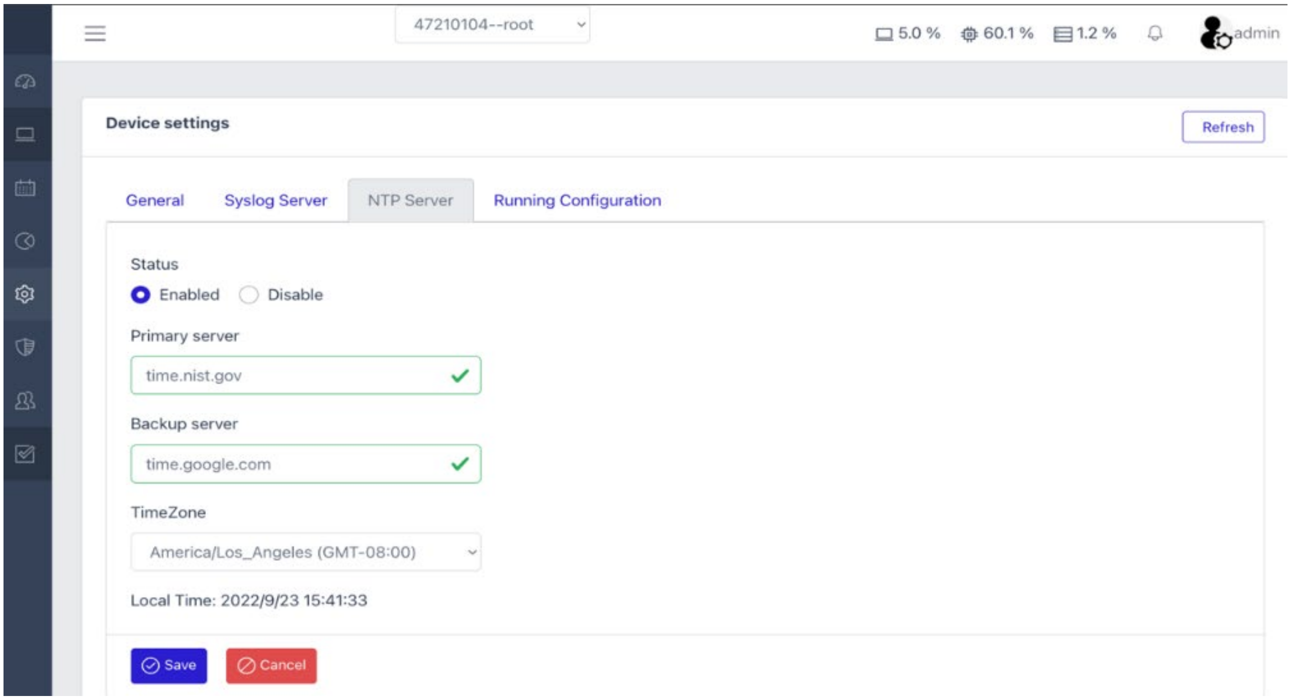

Syslog Server settings
┌───────────────┬──────────────────┬─────────────────┬──────────────────┐
│ Description   │ Attribute Name   │ Current Value   │ Modified Value   │
├───────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Syslog        │ enabled          │ Disable         │ true (Enabled)   │
├───────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Server        │ server           │ 192.168.31.252  │                  │
├───────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Protocol      │ protocol         │ TCP             │                  │
├───────────────┼──────────────────┼─────────────────┼──────────────────┤
│ Port          │ port             │ 514             │                  │
└───────────────┴──────────────────┴─────────────────┴──────────────────┘

AVS(config-device-syslog)# save
```

NTP settings

You can configure the NTP settings of the WaveTunnel to synchronize the date time with the external server. It requires that your WaveTunnel can reach the NTP server in your local network or Internet. If there is no NTP server available, the WaveTunnel sync up the date time with the user's client device when they login.

[WEB GUI] Configuration-> General ->NTP ->



Device settings

Status
● Enabled ○ Disable

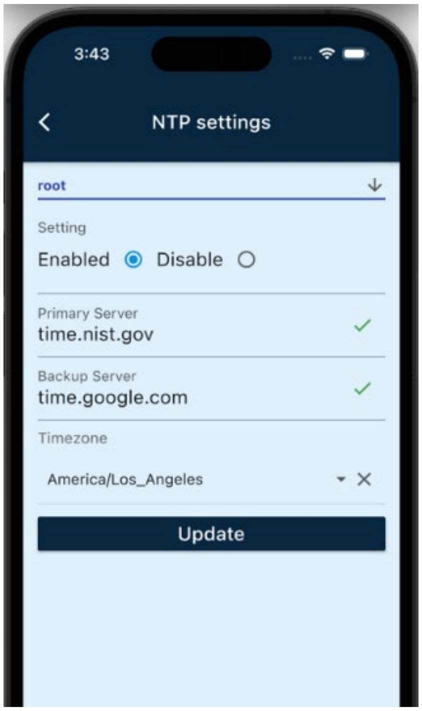
Primary server
time.nist.gov ✓

Backup server
time.google.com ✓

TimeZone
America/Los_Angeles (GMT-08:00)

Local Time: 2022/9/23 15:41:33

[Mobile App] Settings -> NTP



root

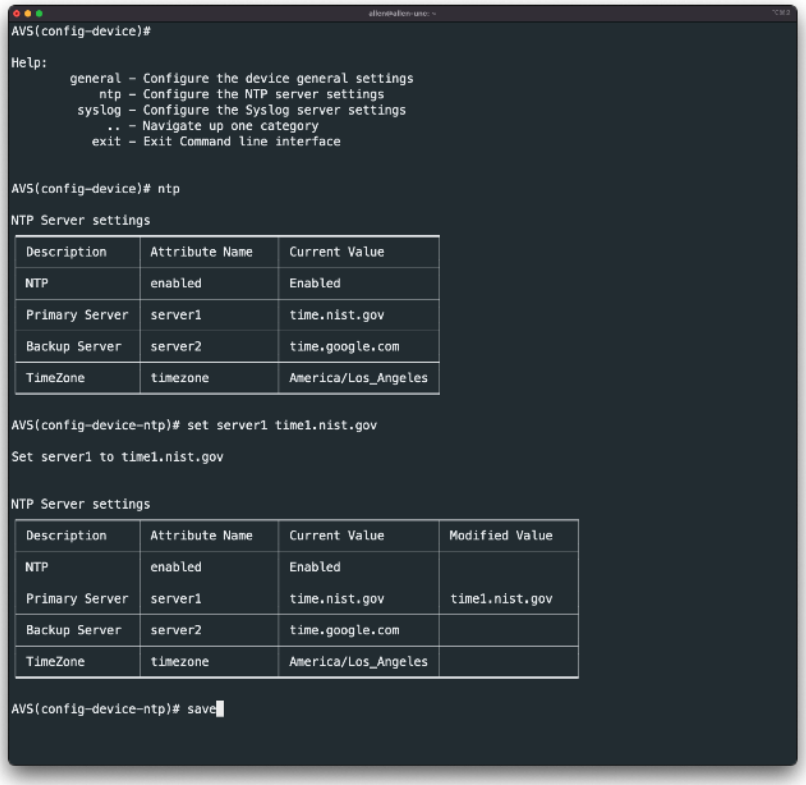
Setting
Enabled ● Disable ○

Primary Server
time.nist.gov ✓

Backup Server
time.google.com ✓

Timezone
America/Los_Angeles

[CLI] **config -> device -> ntp**



```
AVS(config-device)#

Help:
        general - Configure the device general settings
            ntp - Configure the NTP server settings
         syslog - Configure the Syslog server settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config-device)# ntp

NTP Server settings
 ┌────────────────┬──────────────────┬─────────────────────┐
 │ Description    │ Attribute Name   │ Current Value       │
 ├────────────────┼──────────────────┼─────────────────────┤
 │ NTP            │ enabled          │ Enabled             │
 ├────────────────┼──────────────────┼─────────────────────┤
 │ Primary Server │ server1          │ time.nist.gov       │
 ├────────────────┼──────────────────┼─────────────────────┤
 │ Backup Server  │ server2          │ time.google.com     │
 ├────────────────┼──────────────────┼─────────────────────┤
 │ TimeZone       │ timezone         │ America/Los_Angeles │
 └────────────────┴──────────────────┴─────────────────────┘

AVS(config-device-ntp)# set server1 time1.nist.gov

Set server1 to time1.nist.gov

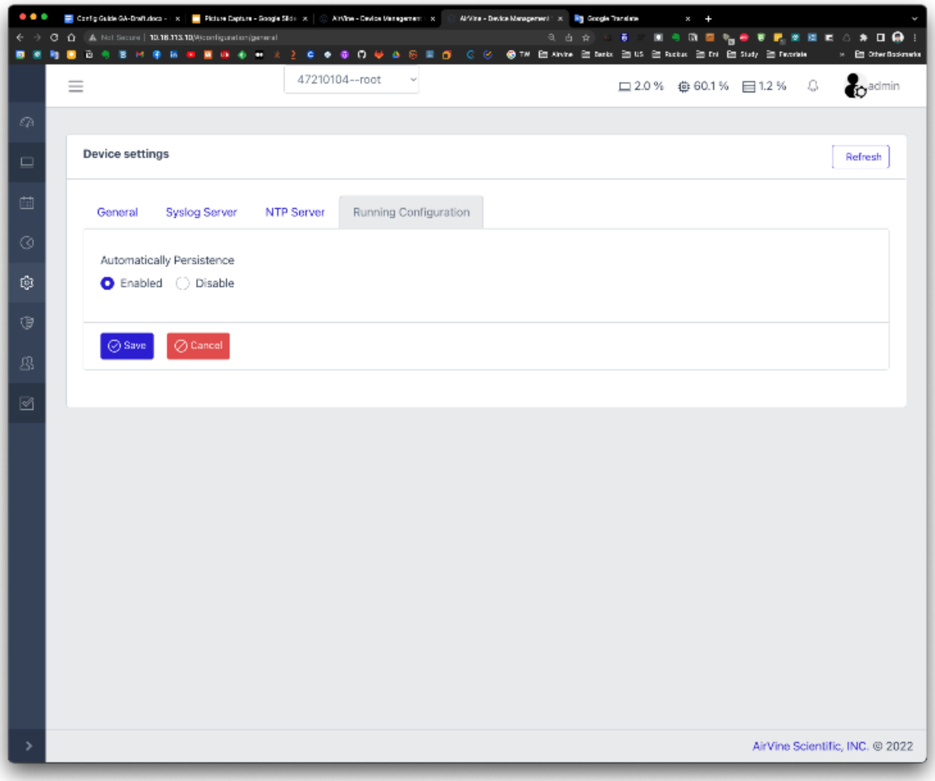

NTP Server settings
 ┌────────────────┬──────────────────┬─────────────────────┬──────────────────┐
 │ Description    │ Attribute Name   │ Current Value       │ Modified Value   │
 ├────────────────┼──────────────────┼─────────────────────┼──────────────────┤
 │ NTP            │ enabled          │ Enabled             │                  │
 │ Primary Server │ server1          │ time.nist.gov       │ time1.nist.gov   │
 ├────────────────┼──────────────────┼─────────────────────┼──────────────────┤
 │ Backup Server  │ server2          │ time.google.com     │                  │
 ├────────────────┼──────────────────┼─────────────────────┼──────────────────┤
 │ TimeZone       │ timezone         │ America/Los_Angeles │                  │
 └────────────────┴──────────────────┴─────────────────────┴──────────────────┘

AVS(config-device-ntp)# save
```

Auto persistent settings

There is a mechanism in the WaveTunnel device which you can disable the persistence of configurations. This means the configurations are temporarily stored in memory as “running configuration”. It will be lost if you reboot the WaveTunnel device. It’s useful if you want to test some new functions. If the device runs into any issue, you can just reboot the device back to the previous good configurations.

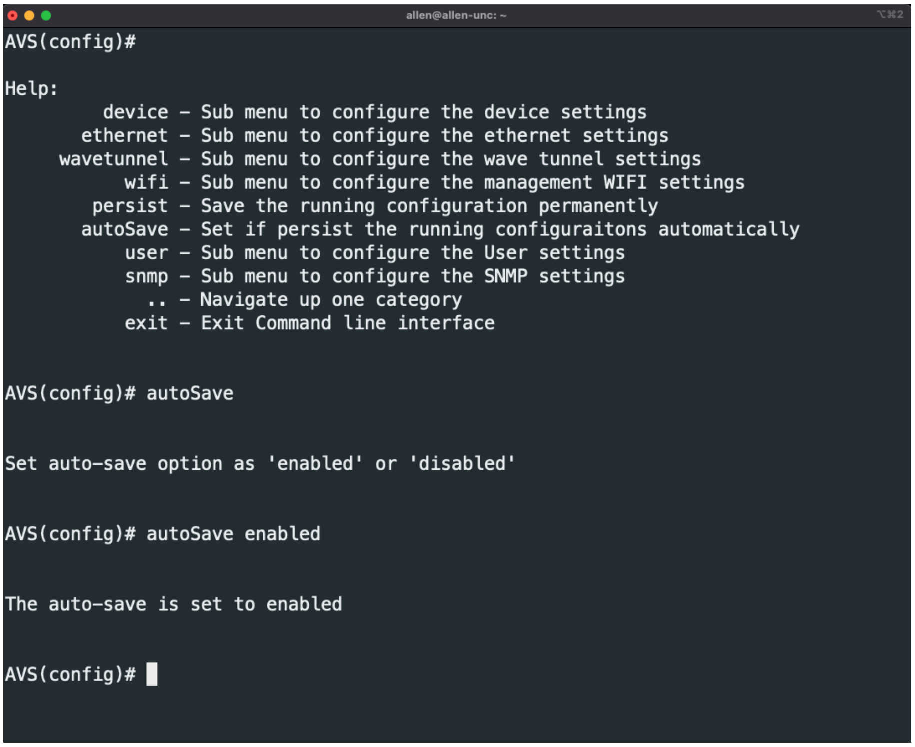
[WEB GUI] **Configuration-> General ->Running Configuration ->**



Device settings

Automatically Persistence
● Enabled ○ Disable

[CLI] **Config -> autosave**



```
AVS(config)#

Help:
          device - Sub menu to configure the device settings
        ethernet - Sub menu to configure the ethernet settings
      wavetunnel - Sub menu to configure the wave tunnel settings
            wifi - Sub menu to configure the management WIFI settings
         persist - Save the running configuration permanently
        autoSave - Set if persist the running configuraitons automatically
            user - Sub menu to configure the User settings
            snmp - Sub menu to configure the SNMP settings
              .. - Navigate up one category
            exit - Exit Command line interface


AVS(config)# autoSave

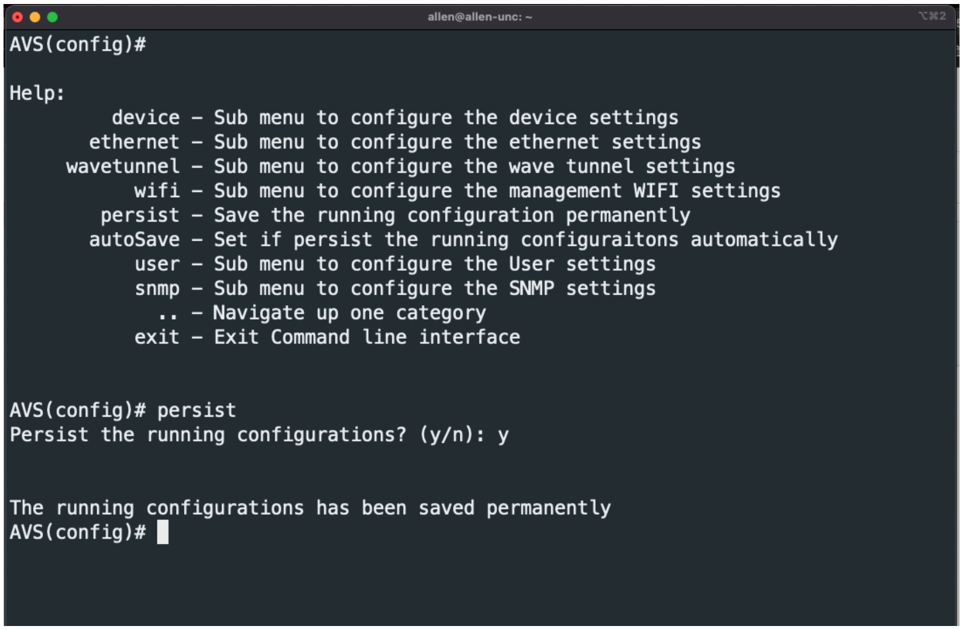

Set auto-save option as 'enabled' or 'disabled'


AVS(config)# autoSave enabled


The auto-save is set to enabled


AVS(config)# 
```

Type “**persist**” command to save the configurations permanently.



```
AVS(config)#

Help:
         device - Sub menu to configure the device settings
       ethernet - Sub menu to configure the ethernet settings
     wavetunnel - Sub menu to configure the wave tunnel settings
           wifi - Sub menu to configure the management WIFI settings
        persist - Save the running configuration permanently
       autoSave - Set if persist the running configuraitons automatically
           user - Sub menu to configure the User settings
           snmp - Sub menu to configure the SNMP settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config)# persist
Persist the running configurations? (y/n): y


The running configurations has been saved permanently
AVS(config)#
```

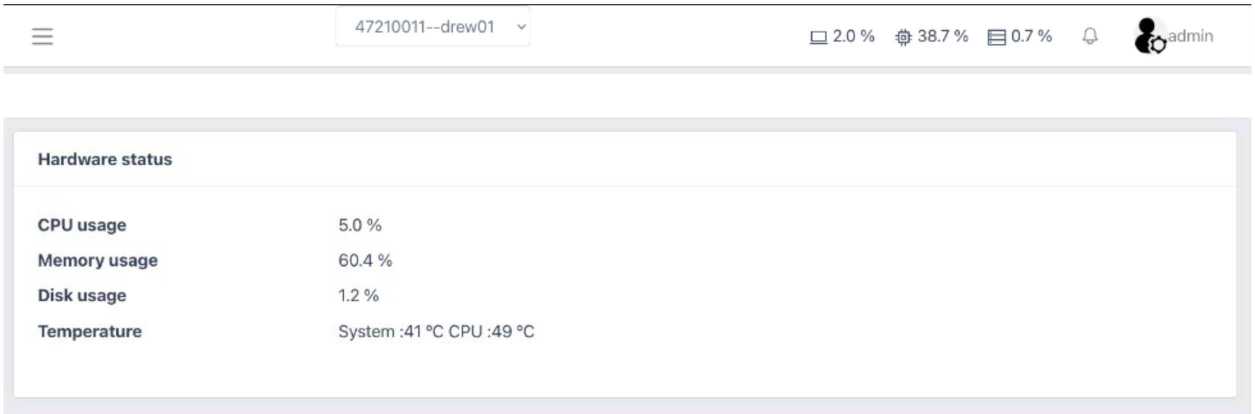
Monitor the WaveTunnel device

There are several pages in the system you can use to monitor the status of your WaveTunnel device. You can check these sections below for more information.

Check the system resource usage

You can check the resource usages of System CPU, Memory, Flash Drive and Temperature on this page

[WEB GUI] **Monitoring -> Device -> General**

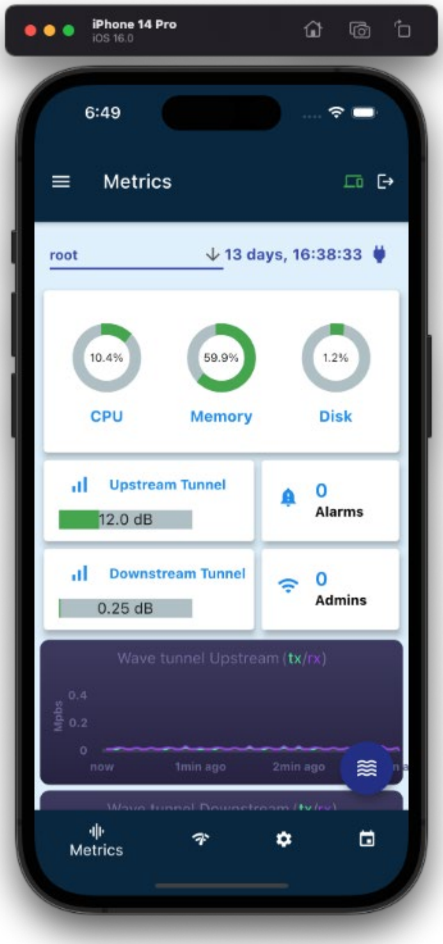


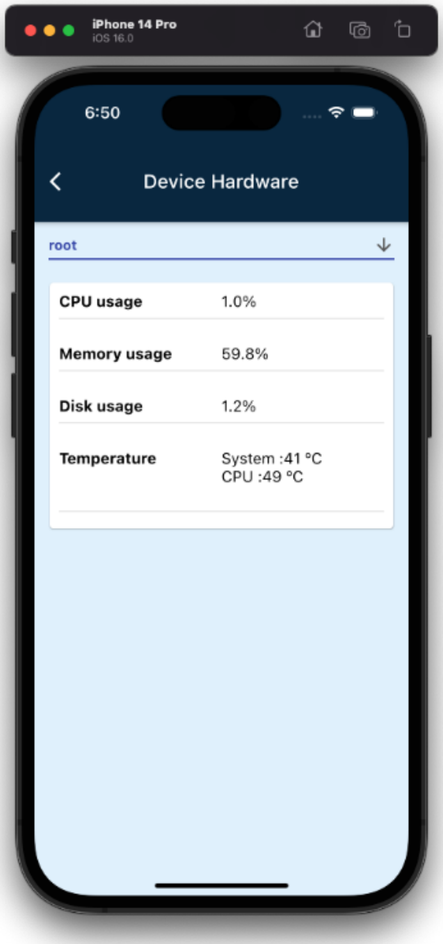
Hardware status

CPU usage	5.0 %
Memory usage	60.4 %
Disk usage	1.2 %
Temperature	System :41 °C CPU :49 °C

[Mobile App] Dashboard

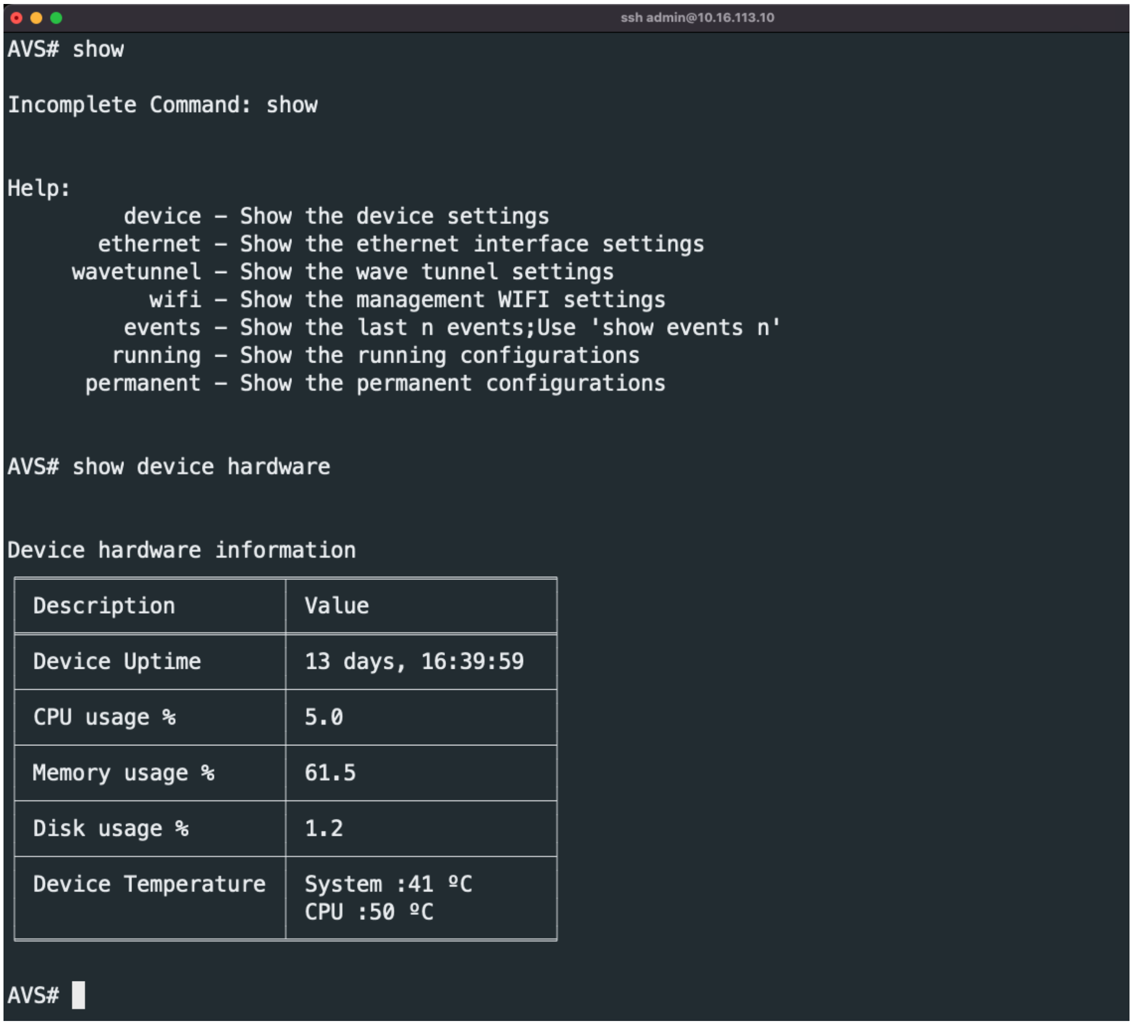
You can click the Dashboard widget to see the usage of system resources.





CPU usage	1.0%
Memory usage	59.8%
Disk usage	1.2%
Temperature	System :41 °C CPU :49 °C

[CLI] **Show -> Device -> Hardware**



```
AVS# show

Incomplete Command: show


Help:
         device – Show the device settings
       ethernet – Show the ethernet interface settings
     wavetunnel – Show the wave tunnel settings
           wifi – Show the management WIFI settings
         events – Show the last n events;Use 'show events n'
        running – Show the running configurations
      permanent – Show the permanent configurations

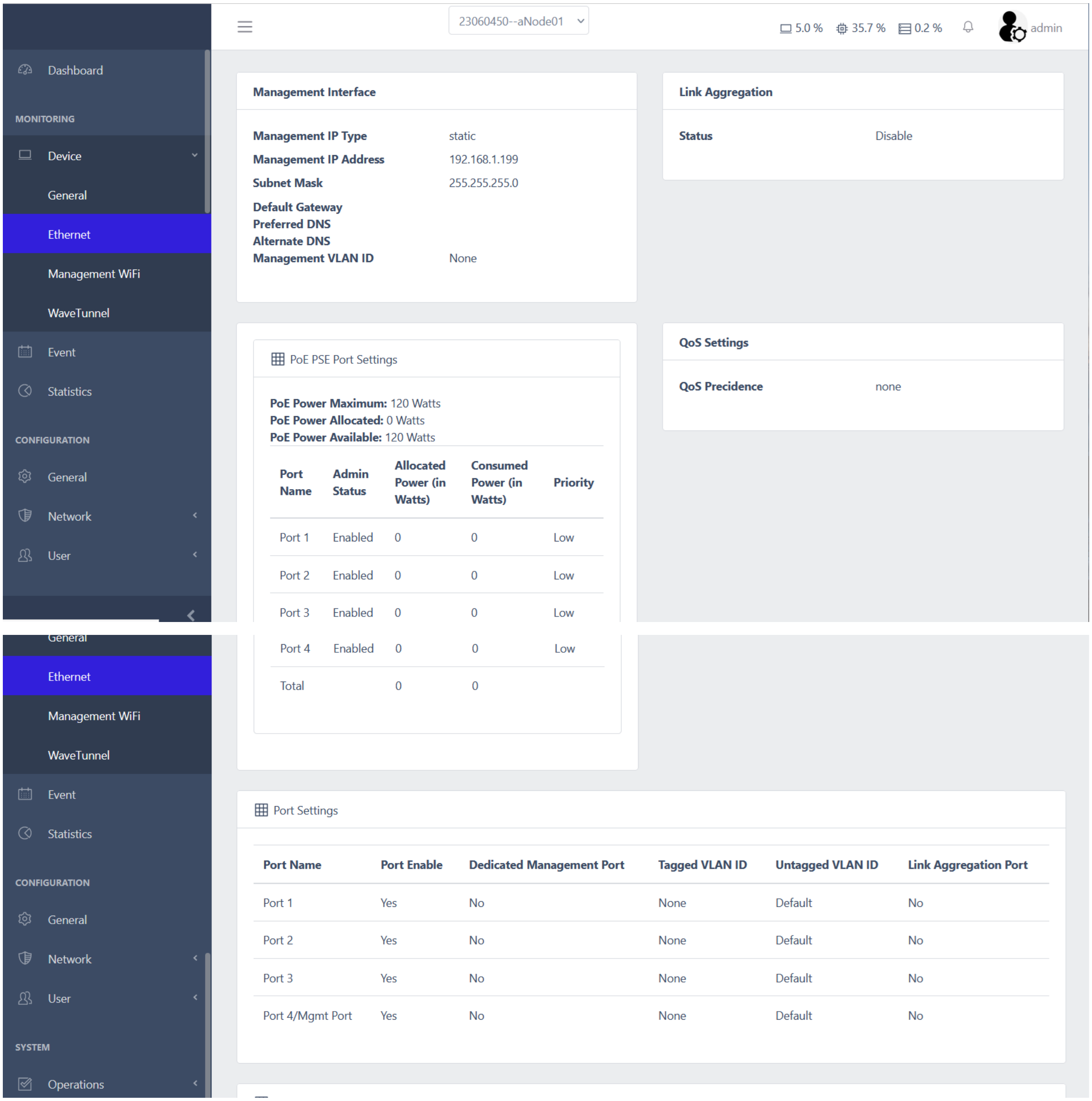

AVS# show device hardware


Device hardware information
┌────────────────────┬────────────────────┐
│ Description        │ Value              │
├────────────────────┼────────────────────┤
│ Device Uptime      │ 13 days, 16:39:59  │
├────────────────────┼────────────────────┤
│ CPU usage %        │ 5.0                │
├────────────────────┼────────────────────┤
│ Memory usage %     │ 61.5               │
├────────────────────┼────────────────────┤
│ Disk usage %       │ 1.2                │
├────────────────────┼────────────────────┤
│ Device Temperature │ System :41 ºC      │
│                    │ CPU :50 ºC         │
└────────────────────┴────────────────────┘

AVS# █
```

Viewing Ethernet Settings and Statistics

- After you log into the VineManager Web GUI, you can use the left navigation bar to go to the Device/Ethernet page. On the Monitoring/Device/Ethernet page, you can view WT Ethernet settings and real-time statistics.



Management Interface

Management IP Type	static
Management IP Address	192.168.1.199
Subnet Mask	255.255.255.0
Default Gateway	
Preferred DNS	
Alternate DNS	
Management VLAN ID	None

Link Aggregation

Status	Disable

PoE PSE Port Settings

PoE Power Maximum: 120 Watts
PoE Power Allocated: 0 Watts
PoE Power Available: 120 Watts

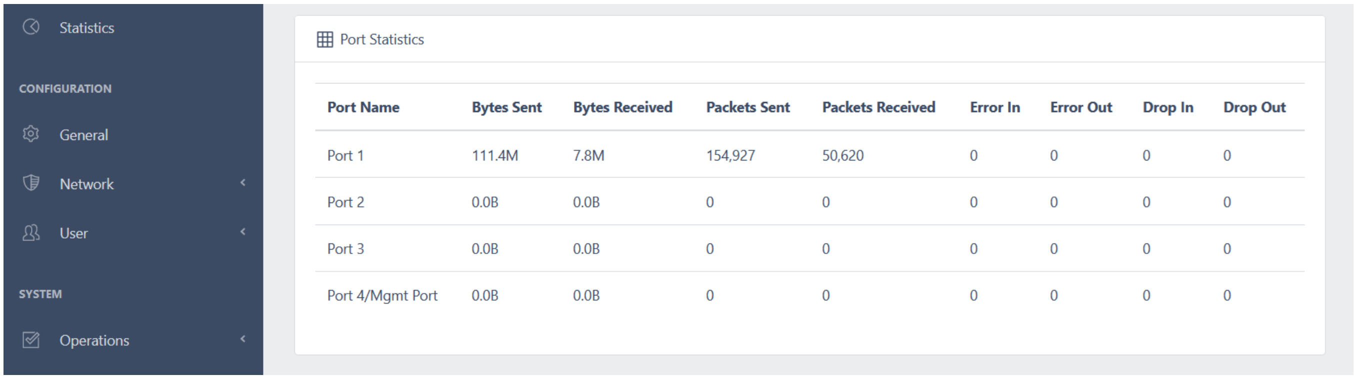
Port Name	Admin Status	Allocated Power (in Watts)	Consumed Power (in Watts)	Priority
Port 1	Enabled	0	0	Low
Port 2	Enabled	0	0	Low
Port 3	Enabled	0	0	Low
Port 4	Enabled	0	0	Low
Total		0	0	

QoS Settings

QoS Precidence	none

Port Settings

Port Name	Port Enable	Dedicated Management Port	Tagged VLAN ID	Untagged VLAN ID	Link Aggregation Port
Port 1	Yes	No	None	Default	No
Port 2	Yes	No	None	Default	No
Port 3	Yes	No	None	Default	No
Port 4/Mgmt Port	Yes	No	None	Default	No



Port Statistics

Port Name	Bytes Sent	Bytes Received	Packets Sent	Packets Received	Error In	Error Out	Drop In	Drop Out
Port 1	111.4M	7.8M	154,927	50,620	0	0	0	0
Port 2	0.0B	0.0B	0	0	0	0	0	0
Port 3	0.0B	0.0B	0	0	0	0	0	0
Port 4/Mgmt Port	0.0B	0.0B	0	0	0	0	0	0

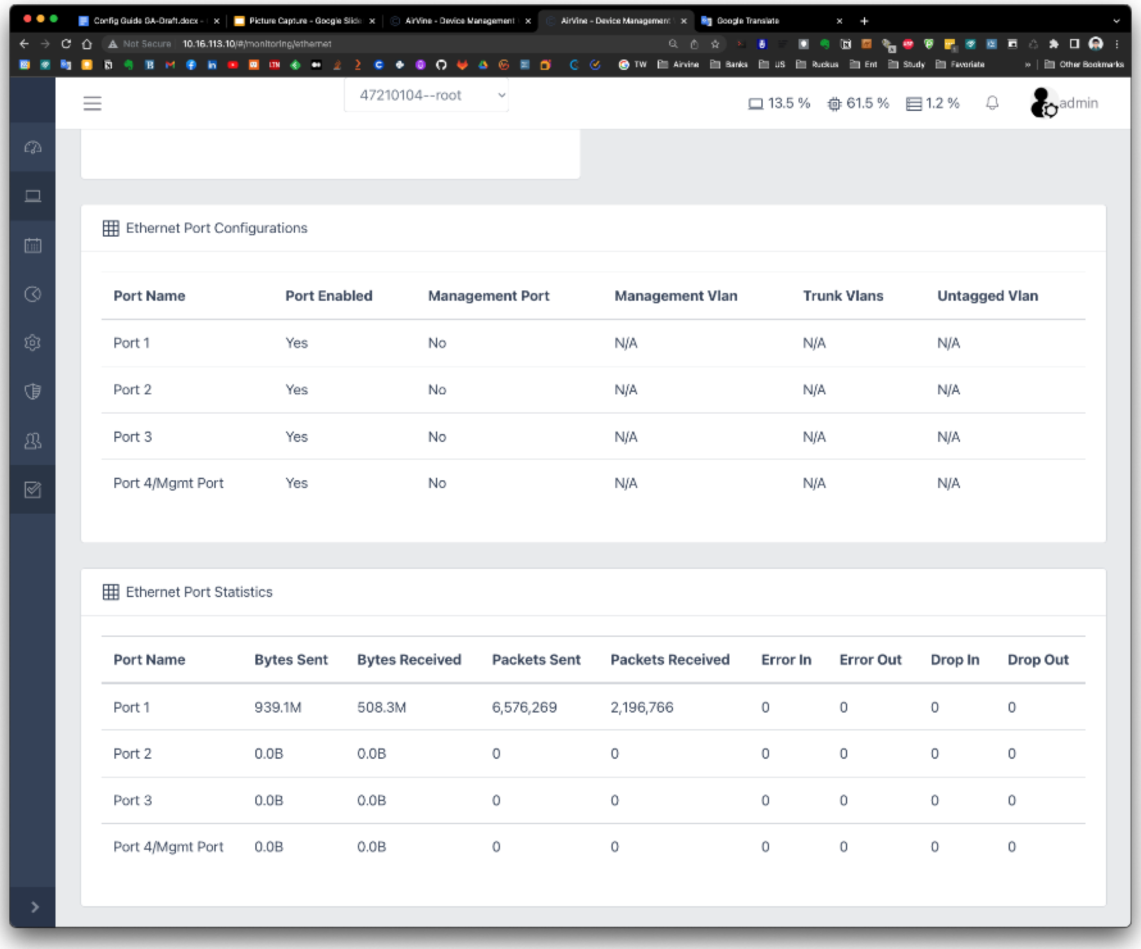
WaveTunnel Ethernet Parameters	
Management Interface	
Management IP Type	IP address assignment type - Static or DHCP
Management IP Address	Management IP address (required)
Subnet Mask	Management IP subnet mask (optional)
Default Gateway	Default gateway (optional)
Preferred DNS	Primary domain name server (optional)
Alternate DNS	Secondary domain name server (optional)
Management VLAN ID	Management VLAN ID (default 4090) (optional)
Link Aggregation	
Status	Customer-selected--enabled or disabled
Members	Customer-selected ports members if LAG Status is enabled
Mode	Customer-selected mode if LAG Status is enabled • Static: a method of manually combining or bundling multiple switch ports to make a single Ethernet link. • Active-Backup: Only one channel in the link is active. A different channel becomes active if the active channel fails. • 802.3ad: Dynamic link aggregation, LACP. Uses aggregation groups that share the same speed and duplex settings. The Ethernet link is set up dynamically between two LACP-supporting peers.
Tagged VLAN ID	Customer-selected tagged VLAN ID if LAG Status is enabled
Untagged VLAN ID	Customer-selected untagged VLAN ID if LAG Status is enabled
PoE PSE Port Settings (Power over Ethernet and Power Sourcing Equipment)	
PoE Power Maximum	Maximum PoE power available from the WT for all four ports in Watts. This value is 120 Watts.
PoE Power Allocated	Total PoE power allocated and granted to all PD devices connected to the Wave Tunnel
PoE Power Available	Remaining unallocated PoE power available to port other PD devices. PoE Power Available = PoE Power Maximum – PoE Power Allocated
Port Name	Specified the Ethernet Port Number (1 to 4)
Priority	Customer-selected Ethernet port status, enabled or disabled Allocated PoE power from the port in Watts Current wattage being supplied to a Powered Device (PD) PSE priority: Low (default), Medium, or High If the WT has sufficient available wattage, it provides the requested wattage (up to 120W) to the PD. In the event of an over-subscription event, Ethernet ports configured with higher priorities continue getting their requested power while lower priority ports may not receive the power requested by the PD. Within the same priority level, higher port numbers take precedence over lower port numbers.

QoS Settings	
QoS Precidence	Customer-selected Quality of Service: DSCP (Differentiated Services Code Point), CoS (Class of Service), or none
Port Settings Table	
Port Name	Customer-selected port name (future)
Port Enable	Customer-selected value, Yes (default) or No
Dedicated Management Port	(Port 4 only) Customer-defined management port, Yes or No
Tagged VLAN ID	Indicate if a port is configured as at Trunk port and if so, lists all tagged VLAN ID associated with that TRUNK port. None: Port is not configured as a VLAN TRUNKING port. List of VLAN IDs: Indicates that port is configured as a VLAN TRUNK port and lists all VLAN ID's associated with that Trunk ports. VLAN packets whose VLAN ID don't match what is configured on the TRUNK port will be dropped.
Untagged VLAN ID	Indicated if at port is configured as an untagged VLAN port. That is, the port will support VLAN tagging and untagging. None: Port is not configured as an untagged VLAN port. VLAN ID: A SINGLE VLAN ID number (example: 5) indicates the port is SINGLE configured as an untagged VLAN port. Untagged ingress packets received on the Ethernet port will be tagged with the specified VLAN ID (EX 5) and forwarded to that WT's switch. Egress tagged VLAN packets with the specified VLAN ID (ex: 5) received on the port's Ethernet interface from the WaveTunnel switch, will be specified untagged VLAN ID (example 5) will be untagged before egressing out of the Ethernet port.
Link Aggregation Port	Indicates if the port is part of a LAG group , Yes or No (default)
Port Statistics	
Port Name	Customer-defined port name (future)
Bytes Sent	Number of traffic bytes sent on WT link
Bytes Received	Number of traffic bytes received on WT link
Error In	Number of errored packets received
Error Out	Number of errored packets sent
Drop In	Number of received packets dropped
Drop Out	Number of received packets sent

Check the accumulated traffics of ethernet ports

On this page, you can check the accumulated traffic statistics of each ethernet port since last boot up. It includes Bytes sent, Bytes received, Packets sent, Packets received, Error in, Error out, Drop in and Drop out. These values are reset when the system is rebooted.

[WEB GUI] **Monitoring -> Ethernet**



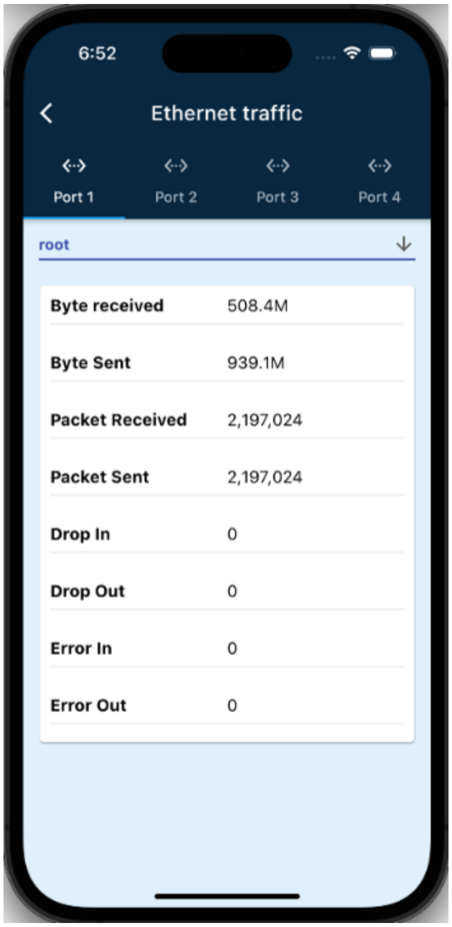
Ethernet Port Configurations

Port Name	Port Enabled	Management Port	Management Vlan	Trunk Vlans	Untagged Vlan
Port 1	Yes	No	N/A	N/A	N/A
Port 2	Yes	No	N/A	N/A	N/A
Port 3	Yes	No	N/A	N/A	N/A
Port 4/Mgmt Port	Yes	No	N/A	N/A	N/A

Ethernet Port Statistics

Port Name	Bytes Sent	Bytes Received	Packets Sent	Packets Received	Error In	Error Out	Drop In	Drop Out
Port 1	939.1M	508.3M	6,576,269	2,196,766	0	0	0	0
Port 2	0.0B	0.0B	0	0	0	0	0	0
Port 3	0.0B	0.0B	0	0	0	0	0	0
Port 4/Mgmt Port	0.0B	0.0B	0	0	0	0	0	0

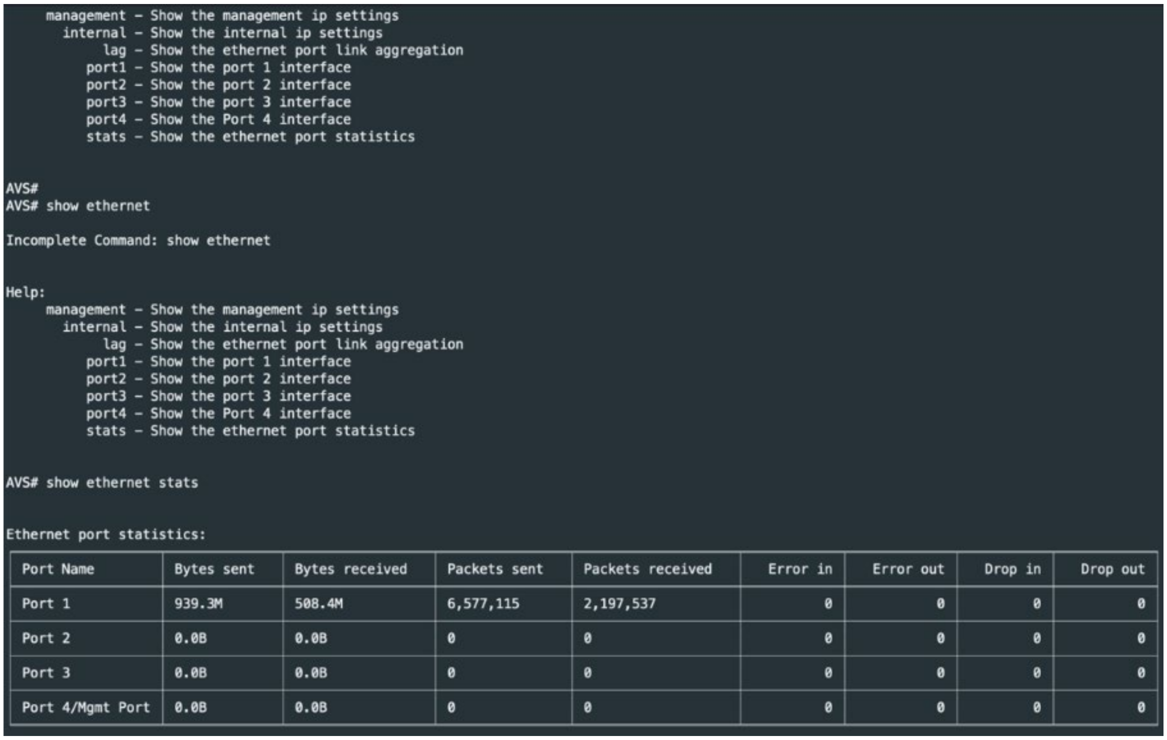
[Mobile App] **Monitoring - > Ethernet Port - >Traffic**



Ethernet traffic

Byte received	508.4M
Byte Sent	939.1M
Packet Received	2,197,024
Packet Sent	2,197,024
Drop In	0
Drop Out	0
Error In	0
Error Out	0

[CLI] **Show -> ethernet -> stats**



```
     management - Show the management ip settings
       internal - Show the internal ip settings
            lag - Show the ethernet port link aggregation
          port1 - Show the port 1 interface
          port2 - Show the port 2 interface
          port3 - Show the port 3 interface
          port4 - Show the Port 4 interface
          stats - Show the ethernet port statistics


AVS#
AVS# show ethernet

Incomplete Command: show ethernet


Help:
     management - Show the management ip settings
       internal - Show the internal ip settings
            lag - Show the ethernet port link aggregation
          port1 - Show the port 1 interface
          port2 - Show the port 2 interface
          port3 - Show the port 3 interface
          port4 - Show the Port 4 interface
          stats - Show the ethernet port statistics

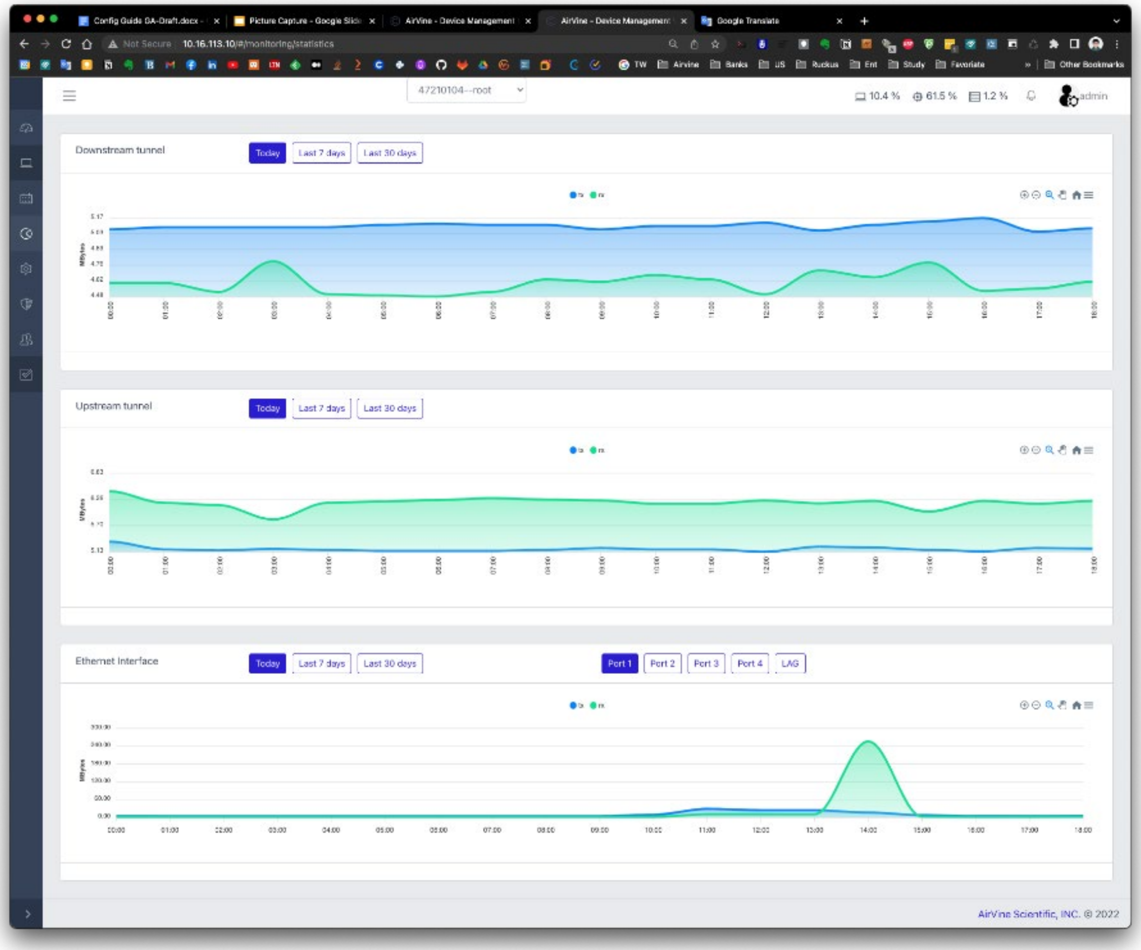

AVS# show ethernet stats


Ethernet port statistics:
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
| Port Name        | Bytes sent | Bytes received | Packets sent  | Packets received  | Error in | Error out | Drop in | Drop out |
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
| Port 1           | 939.3M     | 508.4M         | 6,577,115     | 2,197,537         |        0 |         0 |       0 |        0 |
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
| Port 2           | 0.0B       | 0.0B           | 0             | 0                 |        0 |         0 |       0 |        0 |
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
| Port 3           | 0.0B       | 0.0B           | 0             | 0                 |        0 |         0 |       0 |        0 |
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
| Port 4/Mgmt Port | 0.0B       | 0.0B           | 0             | 0                 |        0 |         0 |       0 |        0 |
+------------------+------------+----------------+---------------+-------------------+----------+-----------+---------+----------+
```

Check the historical statistic

The WaveTunnel collects the historical statistics every 10 minutes, and the collected data last for 30 days. You can query the TX/RX traffic going through the WaveTunnel connection or ethernet ports with different criteria.

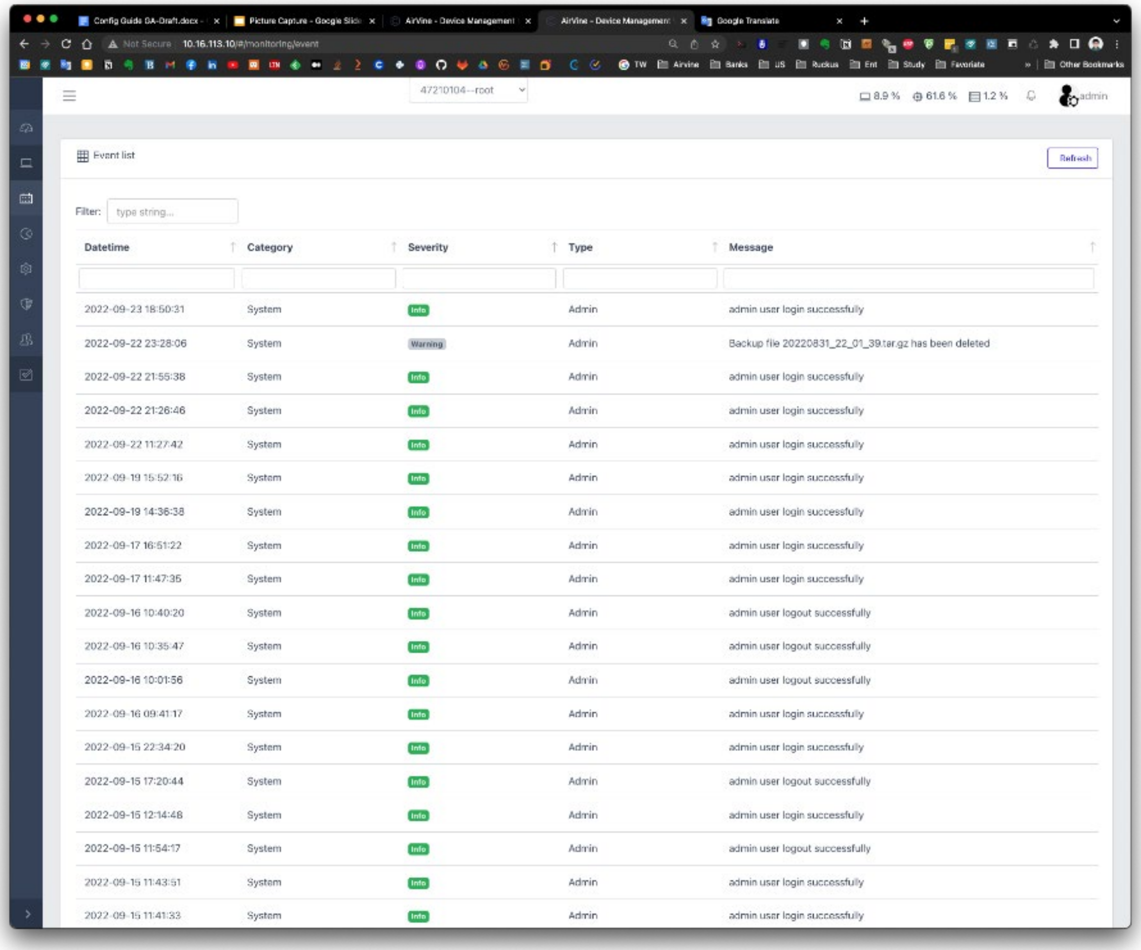
[WEB GUI] **Statistics**



Check the events and alarms

The System events and user operations are logged in the event database. These events are classified by category, severity and type. You can do the full search or sorting to locate the events you want to check. For some critical events, it will be translated as an alarm to notify the user on the Dashboard banner or sending out the SNMP trap.

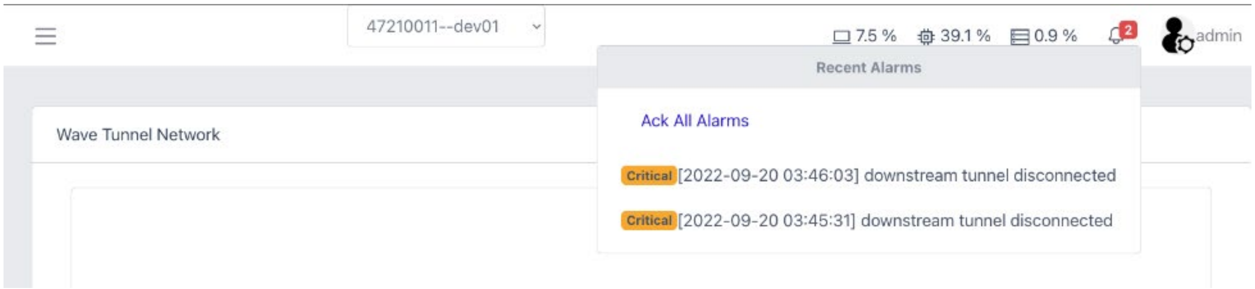
[WEB GUI] Events



Filter: type string...

Datetime	Category	Severity	Type	Message
2022-09-23 18:50:31	System	Info	Admin	admin user login successfully
2022-09-22 23:28:06	System	Warning	Admin	Backup file 20220831_22_01_39.tar.gz has been deleted
2022-09-22 21:55:38	System	Info	Admin	admin user login successfully
2022-09-22 21:26:46	System	Info	Admin	admin user login successfully
2022-09-22 11:27:42	System	Info	Admin	admin user login successfully
2022-09-19 15:52:16	System	Info	Admin	admin user login successfully
2022-09-19 14:36:38	System	Info	Admin	admin user login successfully
2022-09-17 16:51:22	System	Info	Admin	admin user login successfully
2022-09-17 11:47:35	System	Info	Admin	admin user login successfully
2022-09-16 10:40:20	System	Info	Admin	admin user logout successfully
2022-09-16 10:35:47	System	Info	Admin	admin user logout successfully
2022-09-16 10:01:56	System	Info	Admin	admin user logout successfully
2022-09-16 09:41:17	System	Info	Admin	admin user login successfully
2022-09-15 22:34:20	System	Info	Admin	admin user login successfully
2022-09-15 17:20:44	System	Info	Admin	admin user logout successfully
2022-09-15 12:14:48	System	Info	Admin	admin user login successfully
2022-09-15 11:54:17	System	Info	Admin	admin user logout successfully
2022-09-15 11:43:51	System	Info	Admin	admin user login successfully
2022-09-15 11:41:33	System	Info	Admin	admin user login successfully

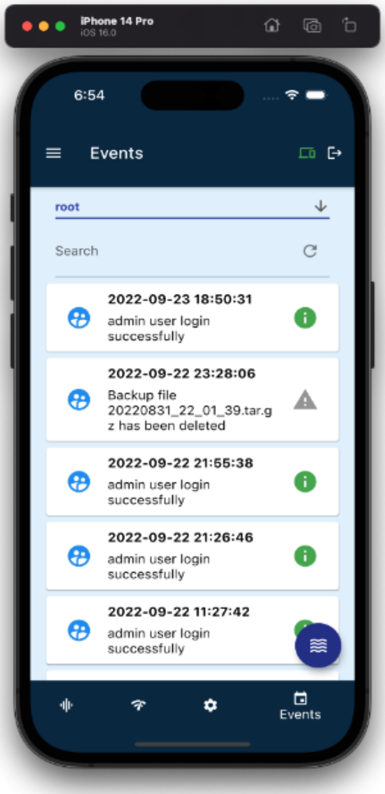
The alarms shown on the top banner. You can check the list and acknowledge it.



Critical [2022-09-20 03:46:03] downstream tunnel disconnected

Critical [2022-09-20 03:45:31] downstream tunnel disconnected

[Mobile App] Events



2022-09-23 18:50:31
admin user login successfully

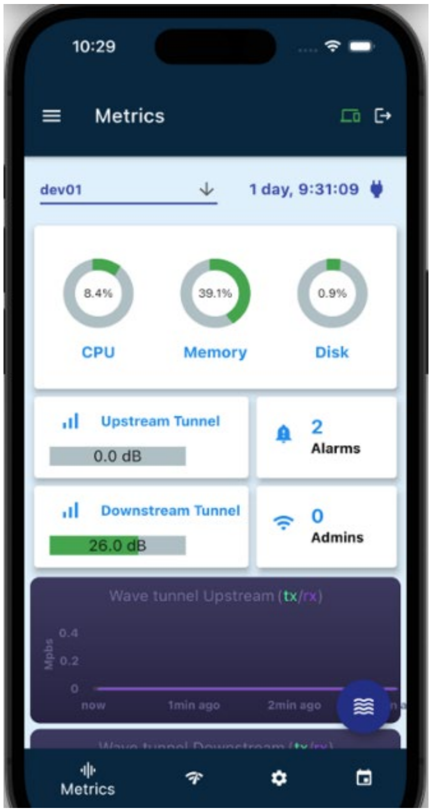
2022-09-22 23:28:06
Backup file 20220831_22_01_39.tar.gz has been deleted

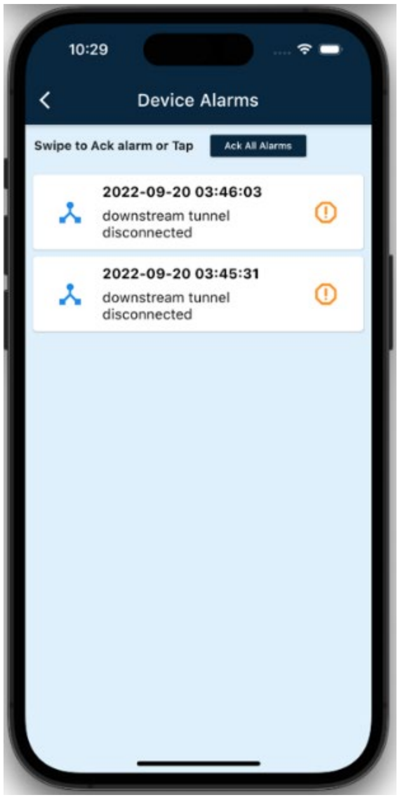
2022-09-22 21:55:38
admin user login successfully

2022-09-22 21:26:46
admin user login successfully

2022-09-22 11:27:42
admin user login successfully

The alarms shown on the top banner. You can check the list and acknowledge it.

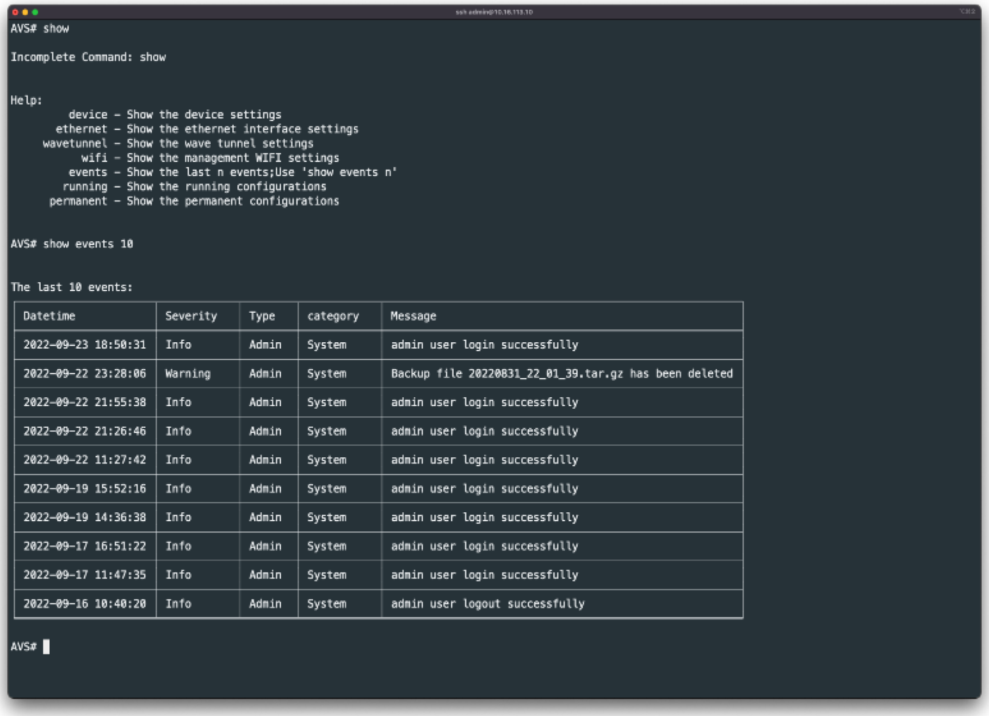




2022-09-20 03:46:03
downstream tunnel disconnected

2022-09-20 03:45:31
downstream tunnel disconnected

[CLI] Show -> events



```
AVS# show

Incomplete Command: show


Help:
         device - Show the device settings
       ethernet - Show the ethernet interface settings
     wavetunnel - Show the wave tunnel settings
           wifi - Show the management WIFI settings
         events - Show the last n events;Use 'show events n'
        running - Show the running configurations
      permanent - Show the permanent configurations


AVS# show events 10


The last 10 events:
+---------------------+----------+-------+----------+---------------------------------------------+
| Datetime            | Severity | Type  | category | Message                                     |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-23 18:50:31 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-22 23:28:06 | Warning  | Admin | System   | Backup file 20220831_22_01_39.tar.gz has been deleted |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-22 21:55:38 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-22 21:26:46 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-22 11:27:42 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-19 15:52:16 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-19 14:36:38 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-17 16:51:22 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-17 11:47:35 | Info     | Admin | System   | admin user login successfully               |
+---------------------+----------+-------+----------+---------------------------------------------+
| 2022-09-16 10:40:20 | Info     | Admin | System   | admin user logout successfully              |
+---------------------+----------+-------+----------+---------------------------------------------+

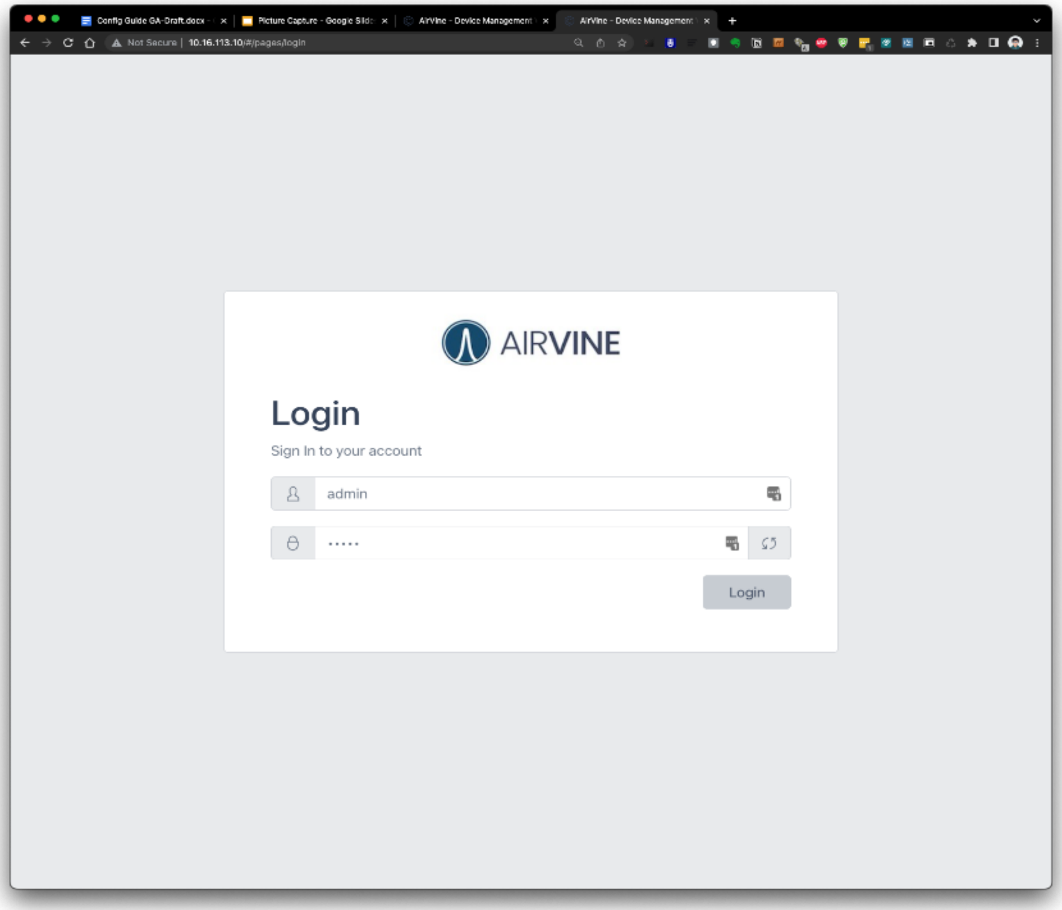
AVS# █
```

User Management

User Login

This is the page for the user to login to the management interface. The user authentication is provided by the Linux user database and the default user is “admin”. You can create more admin users based on your needs.

[WEB GUI] Type the http://[management IP address] on your browser



Config Guide GA-Draft.docx
Picture Capture - Google Slid
AirVine - Device Management
AirVine - Device Management
Not Secure
AIRVINE
Login

10.16.113.10/#/pages/login

Login

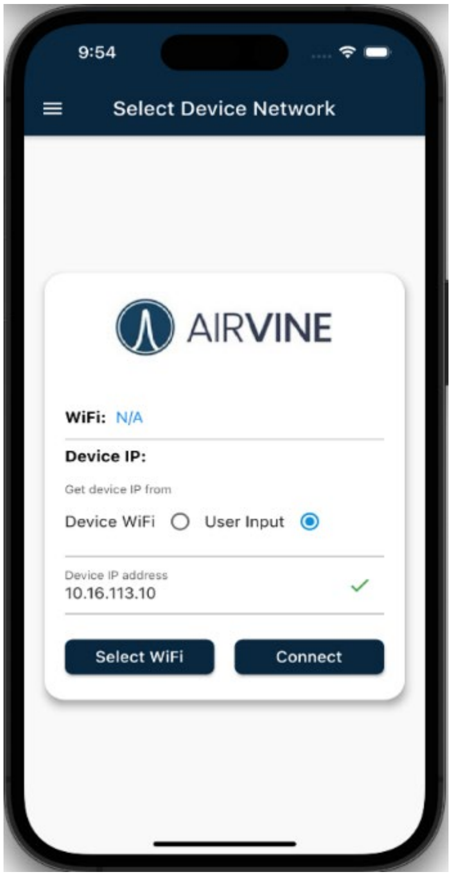
Sign In to your account

admin

•••••

[Mobile App]

Select the device you want to connect via WIFI or management IP.



Select Device Network

WiFi: N/A

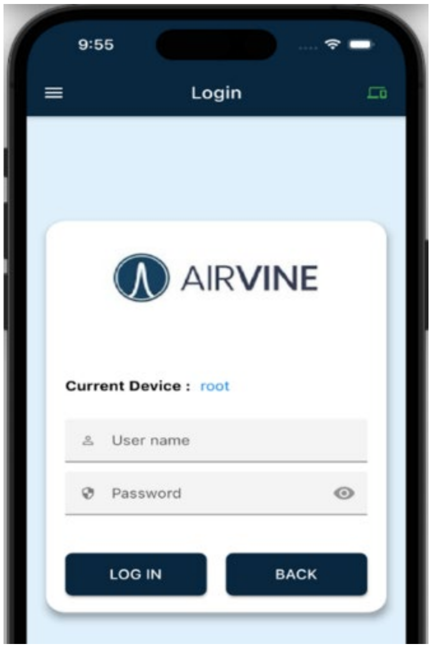
Device IP:

Get device IP from

Device WiFi ○ User Input ●

Device IP address
10.16.113.10 ✓

Input the username and password to login the Mobile App.



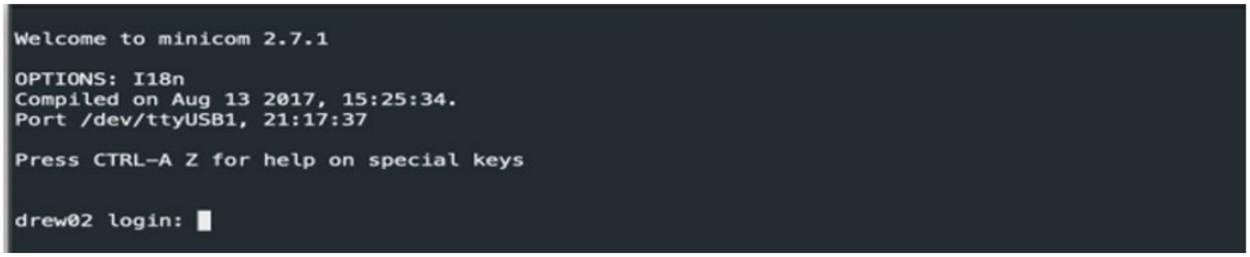
Login

Current Device : root

User name

Password

[CLI] Use SSH client or Serial cable to connect to the CLI.



```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyUSB1, 21:17:37

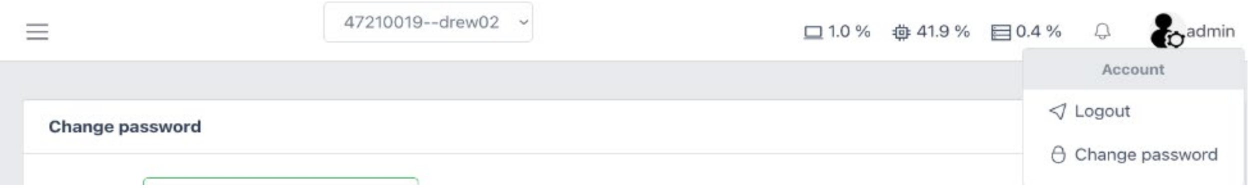
Press CTRL-A Z for help on special keys

drew02 login: █
```

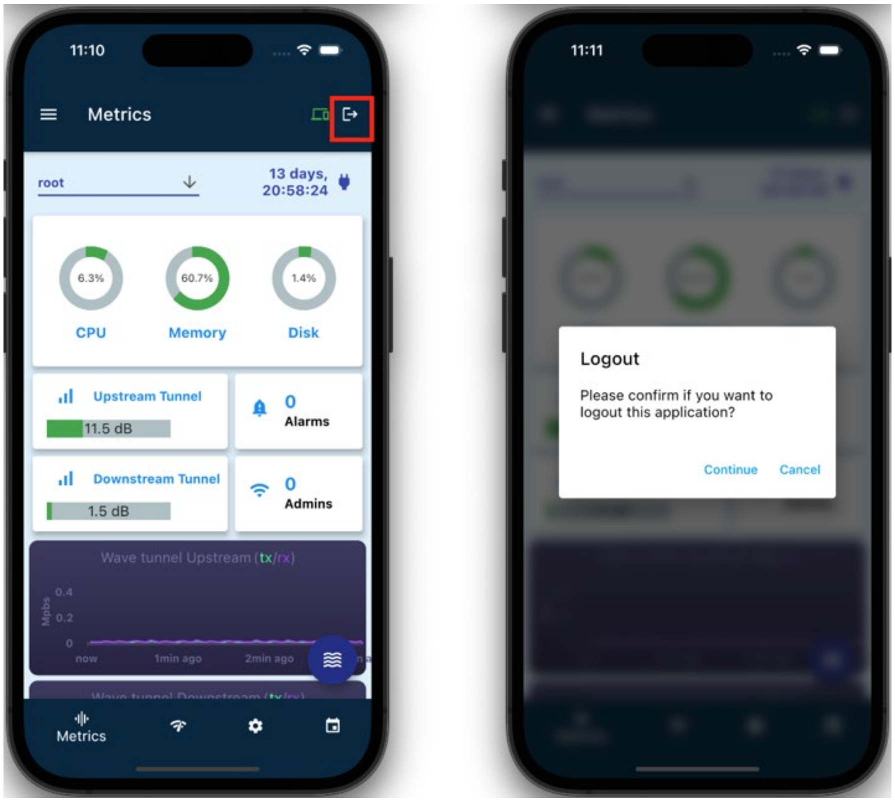
User Logout

There is a button on WEB GUI and Mobile for the user to logout the system. The user session is cleared after the logout.

[WEB GUI] - Logout



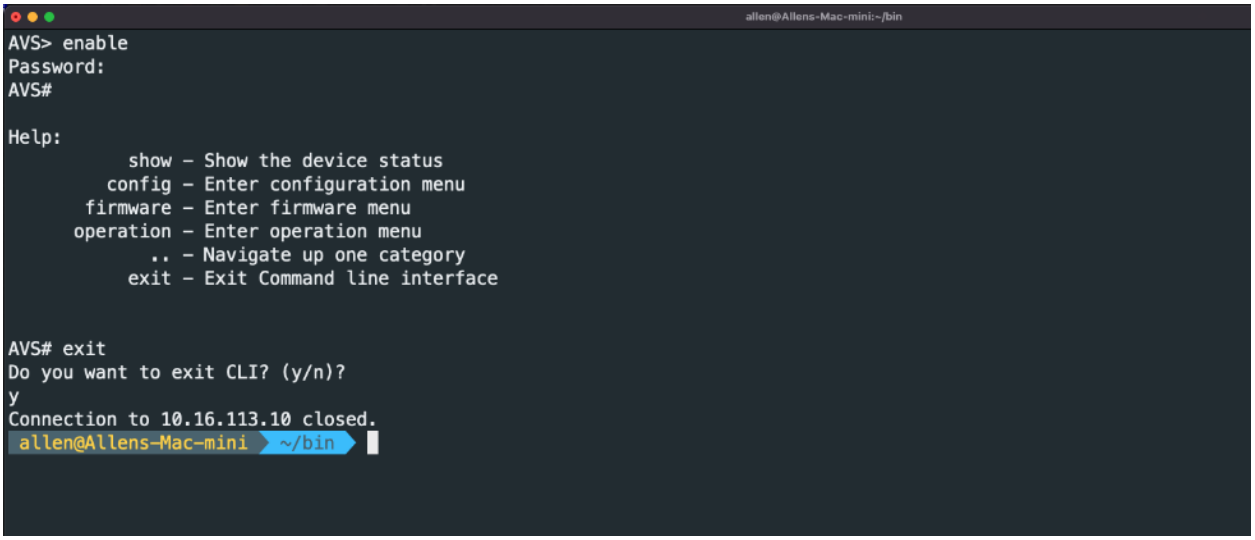
[Mobile App] - Logout



Please confirm if you want to logout this application?

[CLI] - Logout

For CLI, type “exit” to logout the console.



```
AVS> enable
Password:
AVS#

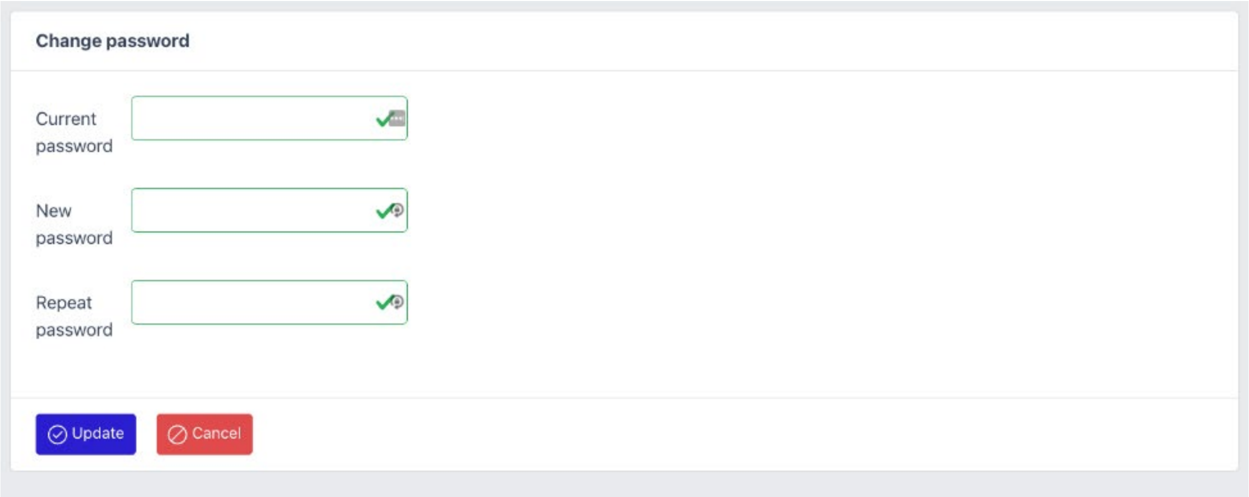
Help:
           show - Show the device status
         config - Enter configuration menu
       firmware - Enter firmware menu
      operation - Enter operation menu
             .. - Navigate up one category
           exit - Exit Command line interface


AVS# exit
Do you want to exit CLI? (y/n)?
y
Connection to 10.16.113.10 closed.
 allen@Allens-Mac-mini  ~/bin 
```

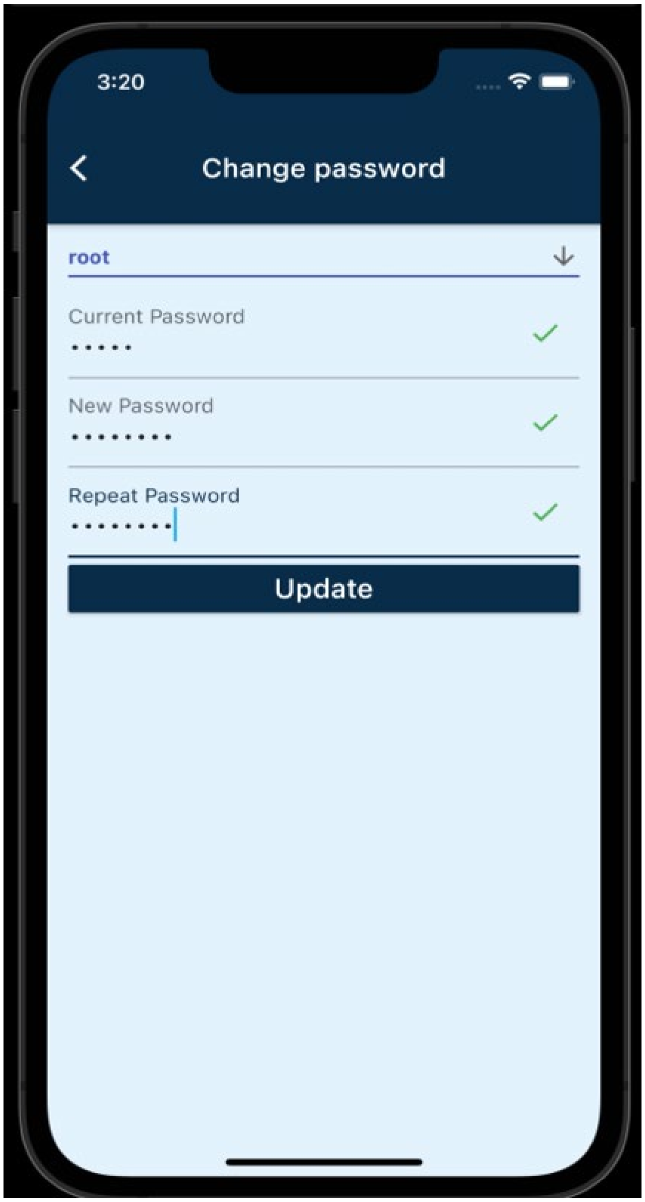
Change the user password

You can change the password on this page

[WEB GUI] – Change Password



[Mobile App] – Change Password



3:20

Change password

root

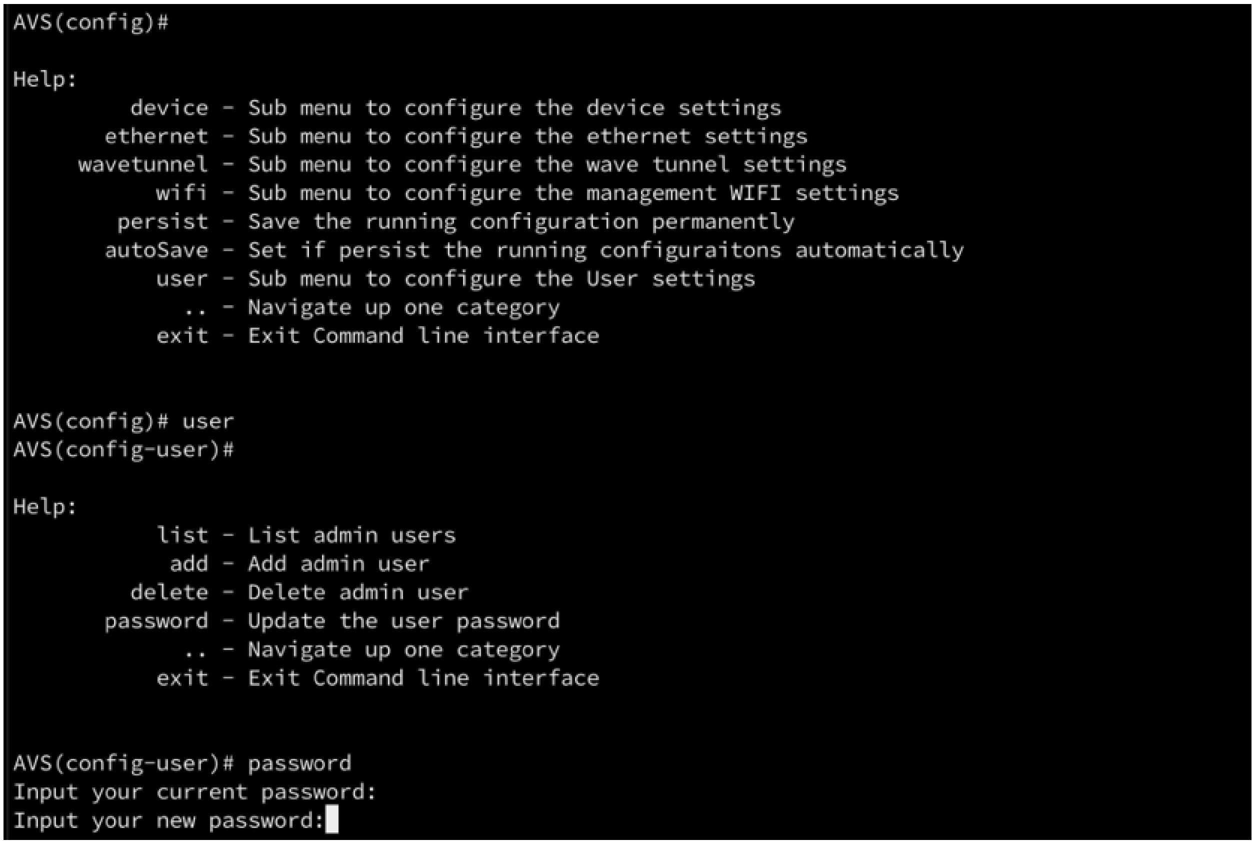
Current Password ••••• ✓

New Password •••••••• ✓

Repeat Password •••••••• ✓

Update

[CLI] – Change Password



```
AVS(config)#

Help:
         device - Sub menu to configure the device settings
       ethernet - Sub menu to configure the ethernet settings
     wavetunnel - Sub menu to configure the wave tunnel settings
           wifi - Sub menu to configure the management WIFI settings
        persist - Save the running configuration permanently
       autoSave - Set if persist the running configuraitons automatically
           user - Sub menu to configure the User settings
             .. - Navigate up one category
           exit - Exit Command line interface

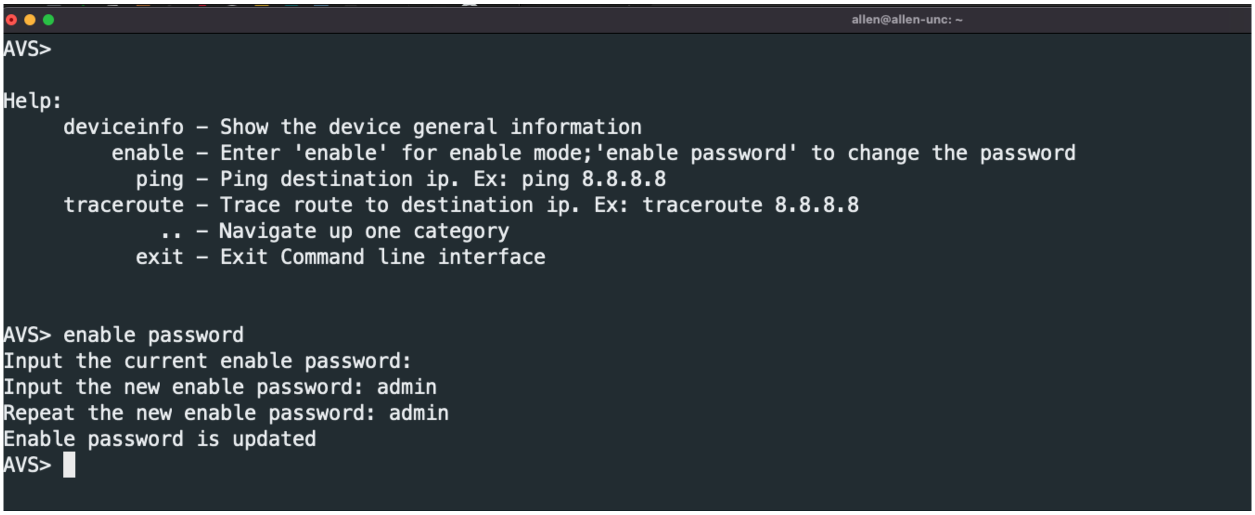

AVS(config)# user
AVS(config-user)#

Help:
           list - List admin users
            add - Add admin user
         delete - Delete admin user
       password - Update the user password
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(config-user)# password
Input your current password:
Input your new password:
```

Change the enable password of CLI

For CLI, there are two levels of command set. To enter the second level, you need to input the “enable” password. The default password is blank but you can change it via the following commands.



```
AVS>

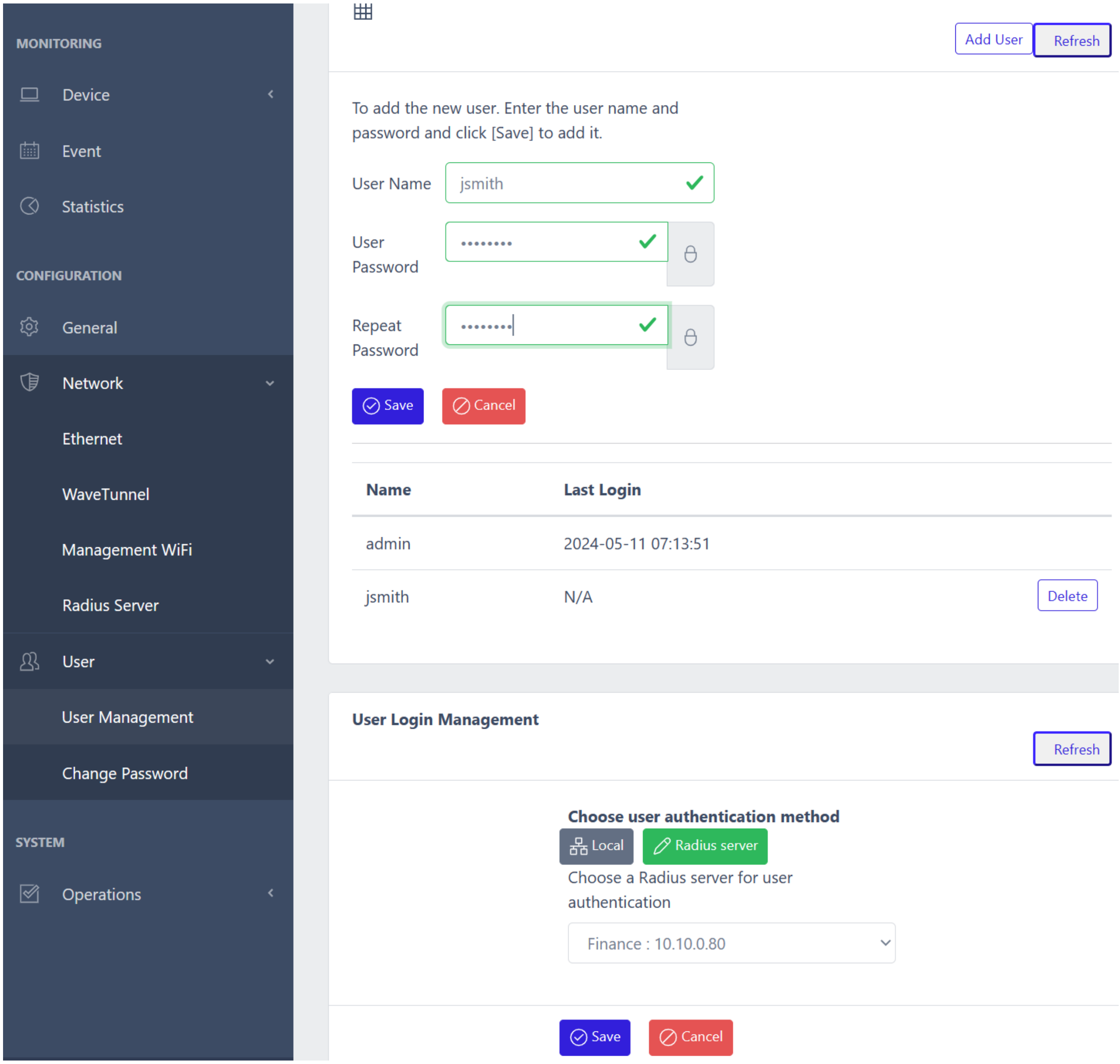
Help:
     deviceinfo - Show the device general information
         enable - Enter 'enable' for enable mode;'enable password' to change the password
           ping - Ping destination ip. Ex: ping 8.8.8.8
     traceroute - Trace route to destination ip. Ex: traceroute 8.8.8.8
             .. - Navigate up one category
           exit - Exit Command line interface


AVS> enable password
Input the current enable password:
Input the new enable password: admin
Repeat the new enable password: admin
Enable password is updated
AVS>
```

Adding a local user account

The User Management screen is where local user accounts can be added to the connected WaveTunnel device.

To add a new local admin user to the connected WaveTunnel device enter the local username and password. Click “Save” to register and stored this account information into the WaveTunnel device’s memory. The User Password must be 8 characters in length.



To add the new user. Enter the user name and password and click [Save] to add it.

User Name: jsmith ✓

User Password: •••••••• ✓

Repeat Password: •••••••• ✓

Name	Last Login	
admin	2024-05-11 07:13:51	
jsmith	N/A	Delete

User Login Management

Choose user authentication method

Choose a Radius server for user authentication

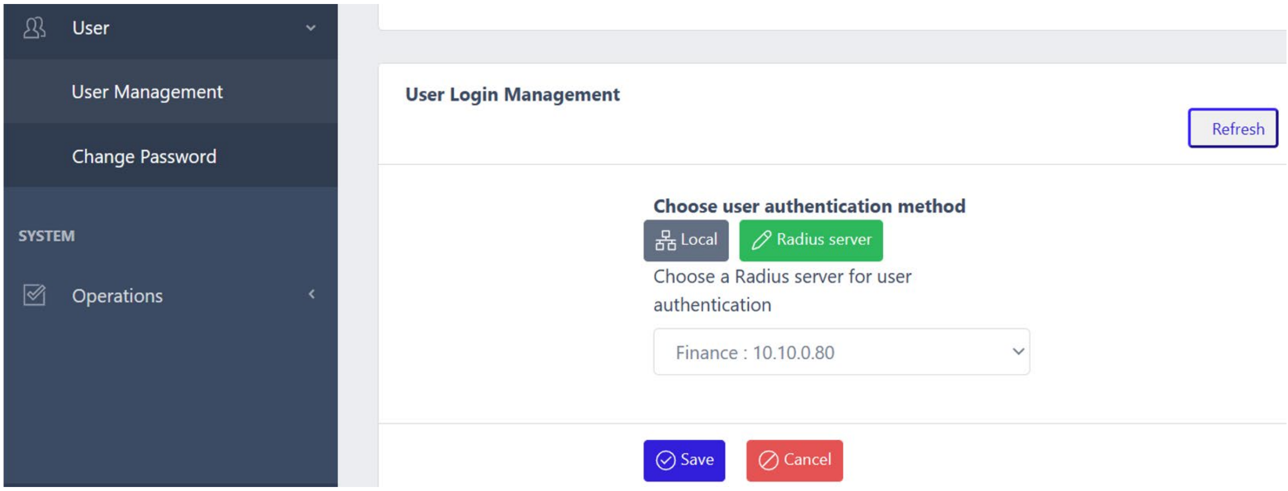
Finance : 10.10.0.80

Selecting Local or RADIUS user authentication method

Choose the user account authentication method that applies to the connected WaveTunnel device by either selecting **Local** for local authentication or “**Radius server**” for authentication by an external RADIUS server that was previously configiured

If **Local** is selected, the user login credentials will be authenticated against the user accounts listed in this screen.

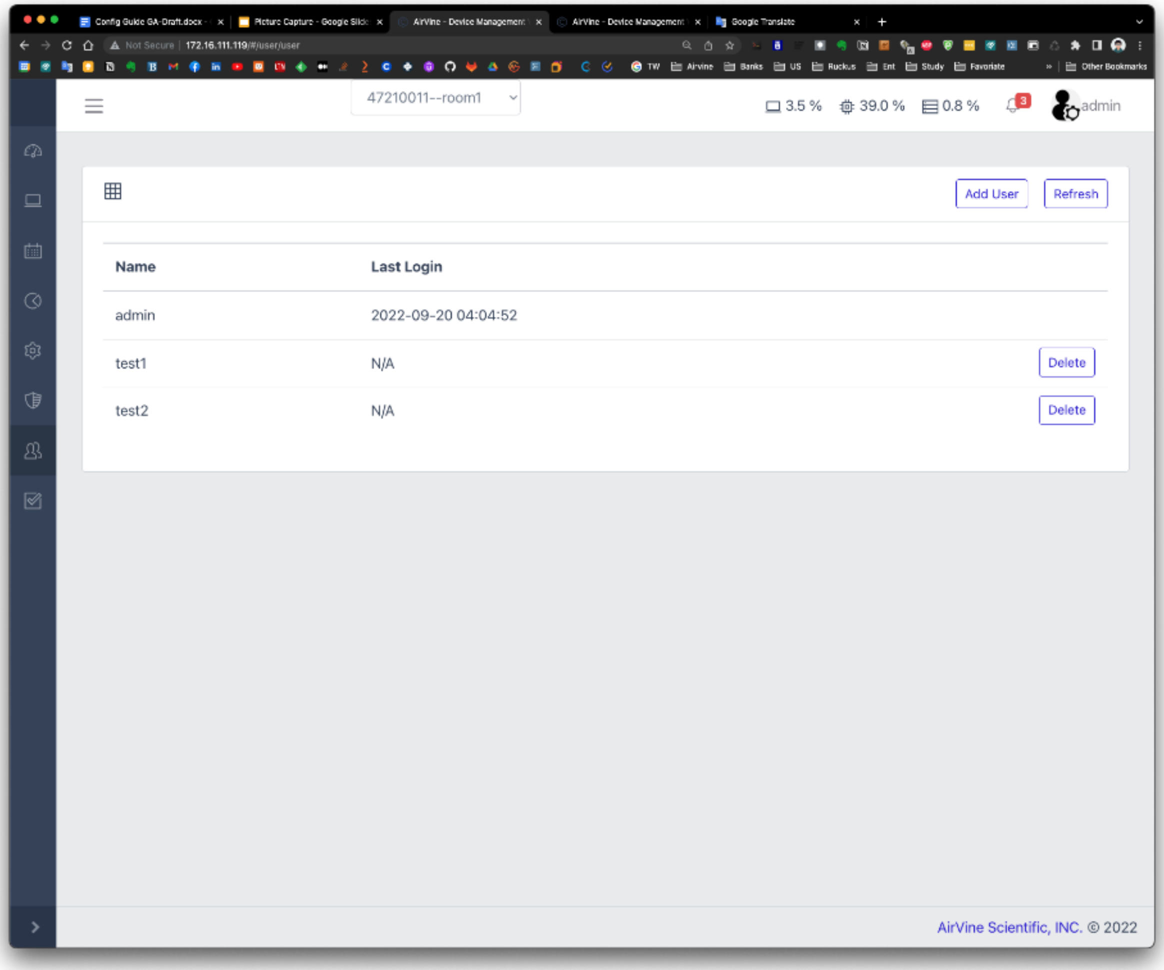
If **Radius server** is selected, the user login credentials will be authenticated by the RADIUS server selected from the drop-down screen. To configure a radius server, use



Note: Before RADIUS is selected and “Save” is clicked, be sure that the WaveTunnel already first has a valid connection to the external RADIUS server. Once “Save” is clicked, all Management interfaces (HTTP, CLI, Mobile App) will then use RADIUS authentication. If the RADIUS server connection is not available and the user is logged out of the WaveTunnel, then there will be no way to log back into the WaveTunnel and a factory reset may be needed. To avoid this potential issue, it is best to ping the RADIUS server IP address from the WaveTunnel (**System > Operations > Troubleshooting > Ping**) before clicking “Save”.

Delete User

Delete a new admin user from the connected WaveTunnel device.



Not Secure | 172.16.111.119/#/user/user
47210011--room1
3.5 %
39.0 %
0.8 %
3
admin
Add User
Refresh
Delete
Delete
AirVine Scientific, INC. © 2022

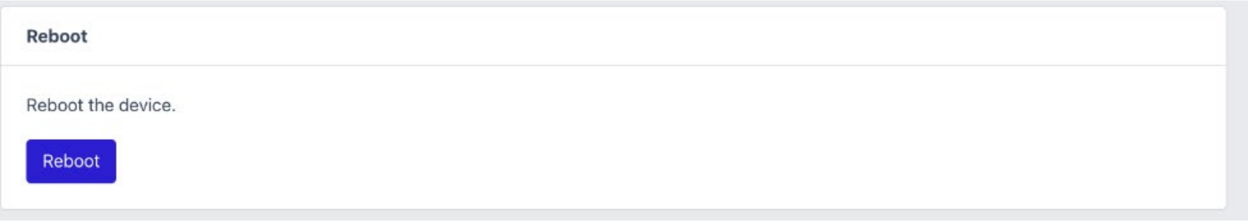
Name	Last Login
admin	2022-09-20 04:04:52
test1	N/A
test2	N/A

System Operations

Reboot the WaveTunnel device

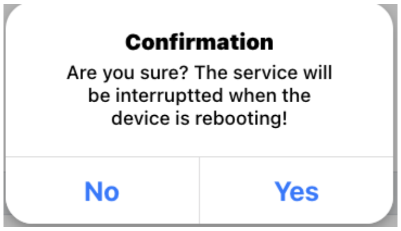
To reboot the WaveTunnel device, you can issue the request from the interfaces below. It takes a few minutes for the WaveTunnel device to come back.

[WEB GUI]
Operations-> System Operations-> Reboot



Reboot

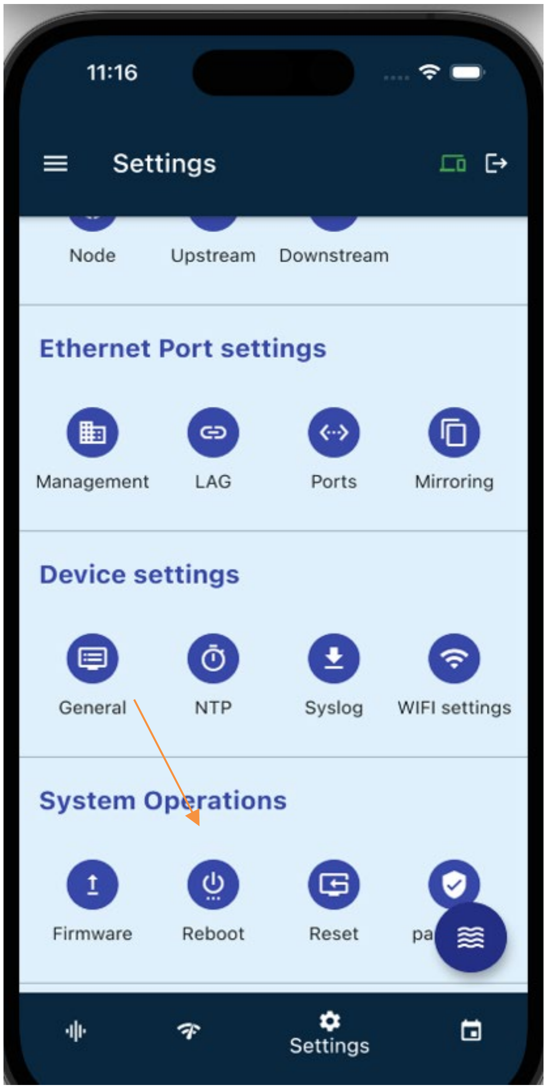
Reboot the device.



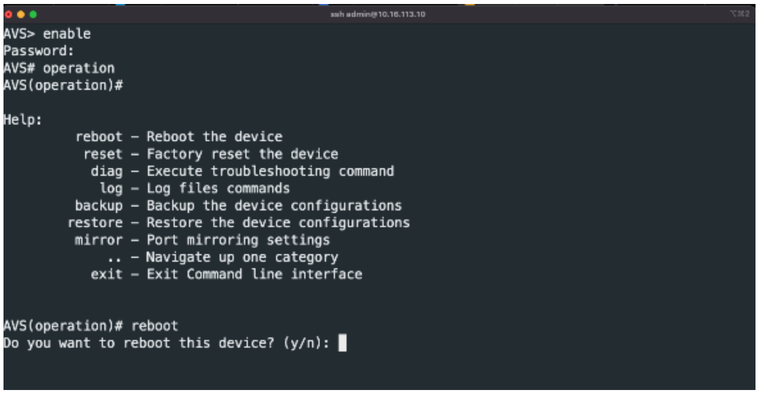
Confirmation

Are you sure? The service will be interruptted when the device is rebooting!

[Mobile App] Settings -> Reboot



[CLI] Operation-> reboot



```
AVS> enable
Password:
AVS# operation
AVS(operation)#

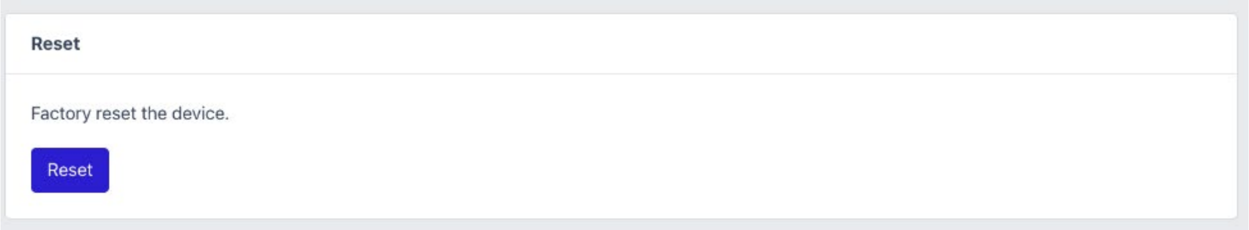
Help:
         reboot - Reboot the device
          reset - Factory reset the device
           diag - Execute troubleshooting command
            log - Log files commands
         backup - Backup the device configurations
        restore - Restore the device configurations
         mirror - Port mirroring settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation)# reboot
Do you want to reboot this device? (y/n):
```

Reset the WaveTunnel device

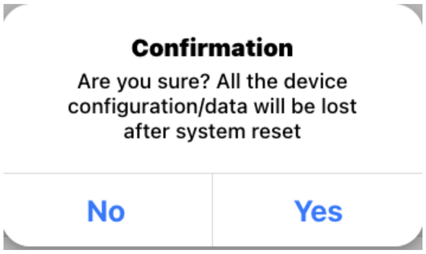
To reset the WaveTunnel device, you can issue the request from the interfaces below. To be aware that all the configurations and user data will be lost after this reset operation.

[WEB GUI] Operations-> System Operations-> Reset



Reset

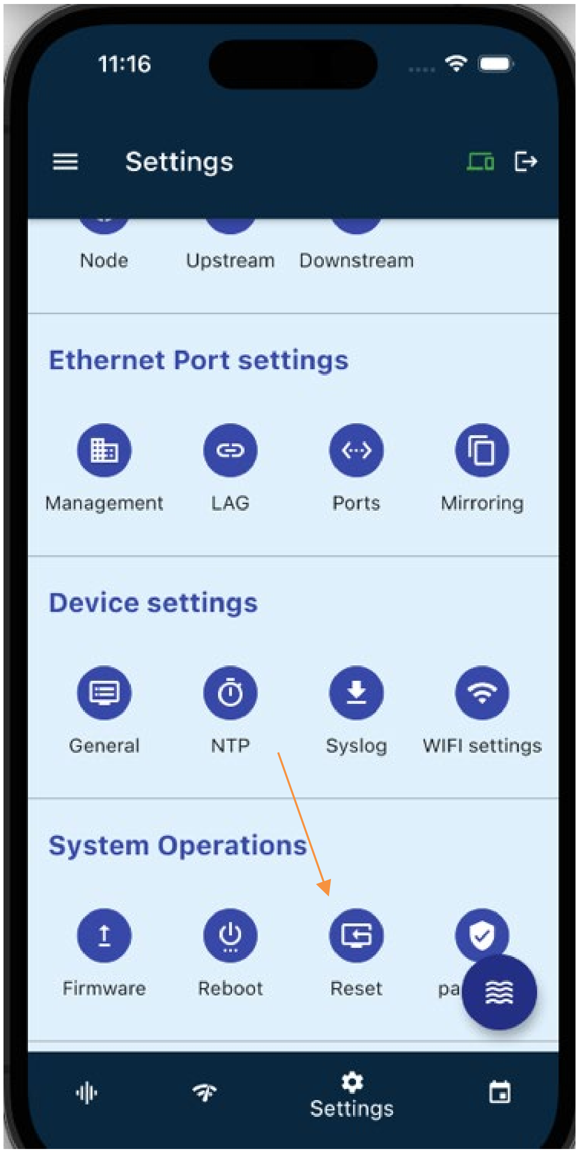
Factory reset the device.



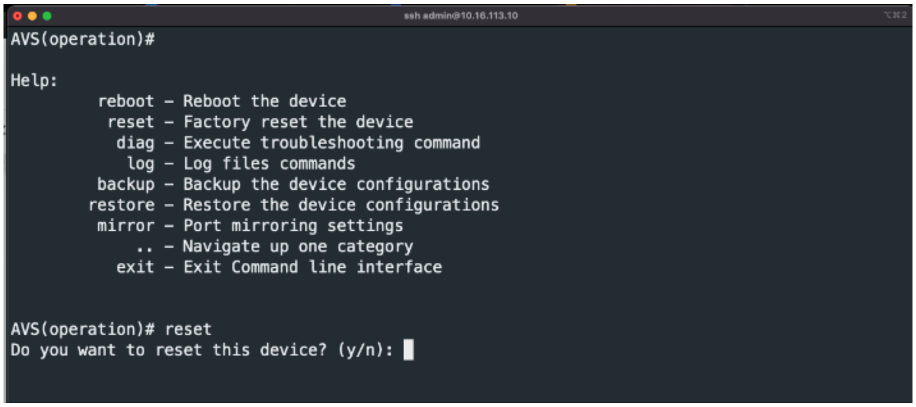
Confirmation

Are you sure? All the device configuration/data will be lost after system reset

[Mobile App] Settings -> Reset



[CLI] Operation -> reset



```
AVS(operation)#

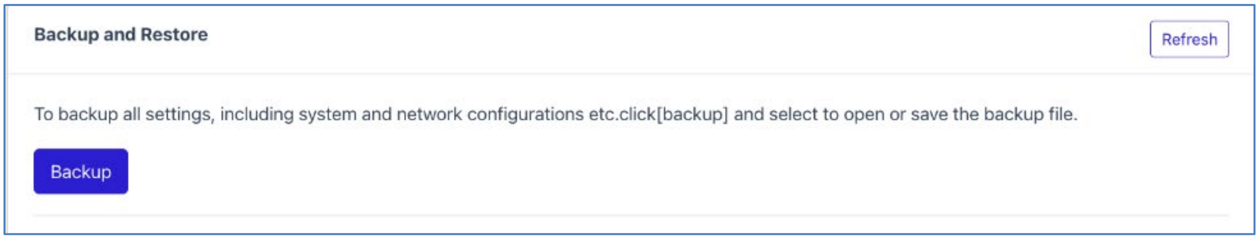
Help:
         reboot - Reboot the device
          reset - Factory reset the device
           diag - Execute troubleshooting command
            log - Log files commands
         backup - Backup the device configurations
        restore - Restore the device configurations
         mirror - Port mirroring settings
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation)# reset
Do you want to reset this device? (y/n):
```

Backup the configurations of the WaveTunnel device

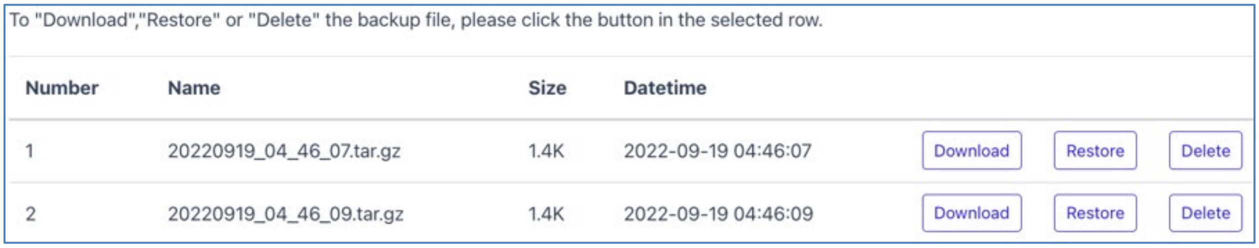
On this page, you can back up the configurations of the WaveTunnel device for future use.For example, rollback to the earlier settings or restore it to another replacement device. You can also download the backup file to your local computer to avoid losing the configurations if the device runs into the abnormal state. The maximum number of configurations that can be backup is up to 10.

[WEB GUI] Operations-> System Operations-> Backup



Backup and Restore

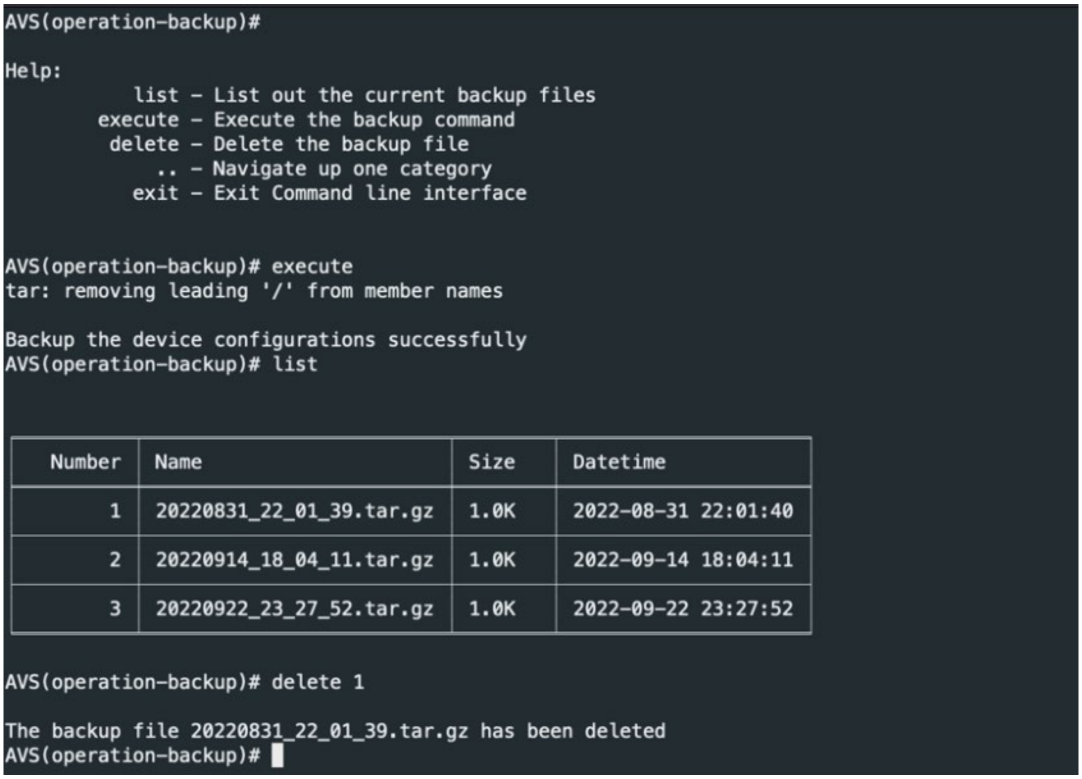
To backup all settings, including system and network configurations etc.click[backup] and select to open or save the backup file.



To "Download","Restore" or "Delete" the backup file, please click the button in the selected row.

Number	Name	Size	Datetime			
1	20220919_04_46_07.tar.gz	1.4K	2022-09-19 04:46:07	Download	Restore	Delete
2	20220919_04_46_09.tar.gz	1.4K	2022-09-19 04:46:09	Download	Restore	Delete

[CLI] Operation -> backup



```
AVS(operation-backup)#

Help:
           list - List out the current backup files
        execute - Execute the backup command
         delete - Delete the backup file
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-backup)# execute
tar: removing leading '/' from member names

Backup the device configurations successfully
AVS(operation-backup)# list


 | Number | Name                    | Size | Datetime            |
 |--------|-------------------------|------|---------------------|
 |      1 | 20220831_22_01_39.tar.gz | 1.0K | 2022-08-31 22:01:40 |
 |      2 | 20220914_18_04_11.tar.gz | 1.0K | 2022-09-14 18:04:11 |
 |      3 | 20220922_23_27_52.tar.gz | 1.0K | 2022-09-22 23:27:52 |

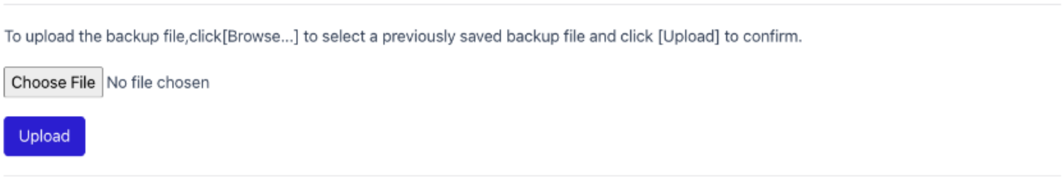
AVS(operation-backup)# delete 1

The backup file 20220831_22_01_39.tar.gz has been deleted
AVS(operation-backup)# █
```

Restore the configurations from the Backup file

[WEB GUI]
Operations-> System Operations-> Restore

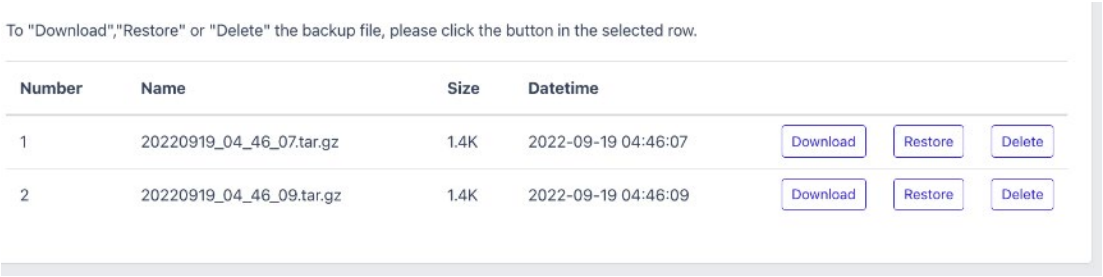
Upload the backup file from your laptop.



To upload the backup file,click[Browse...] to select a previously saved backup file and click [Upload] to confirm.

Choose File No file chosen

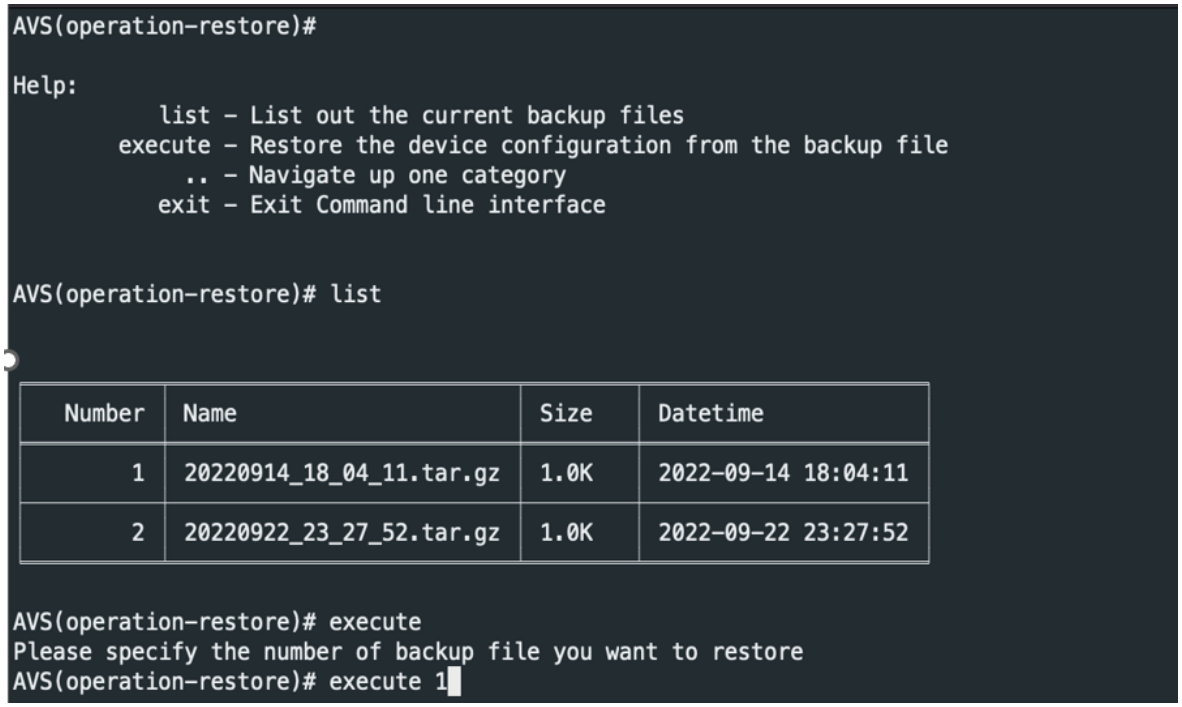
Restore the configurations from the old backup file.



To "Download","Restore" or "Delete" the backup file, please click the button in the selected row.

Number	Name	Size	Datetime			
1	20220919_04_46_07.tar.gz	1.4K	2022-09-19 04:46:07	Download	Restore	Delete
2	20220919_04_46_09.tar.gz	1.4K	2022-09-19 04:46:09	Download	Restore	Delete

[CLI] Operation-> restore



```
AVS(operation-restore)#

Help:
           list - List out the current backup files
        execute - Restore the device configuration from the backup file
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-restore)# list


 +--------+--------------------------+------+---------------------+
 | Number | Name                     | Size | Datetime            |
 +--------+--------------------------+------+---------------------+
 |      1 | 20220914_18_04_11.tar.gz | 1.0K | 2022-09-14 18:04:11 |
 +--------+--------------------------+------+---------------------+
 |      2 | 20220922_23_27_52.tar.gz | 1.0K | 2022-09-22 23:27:52 |
 +--------+--------------------------+------+---------------------+

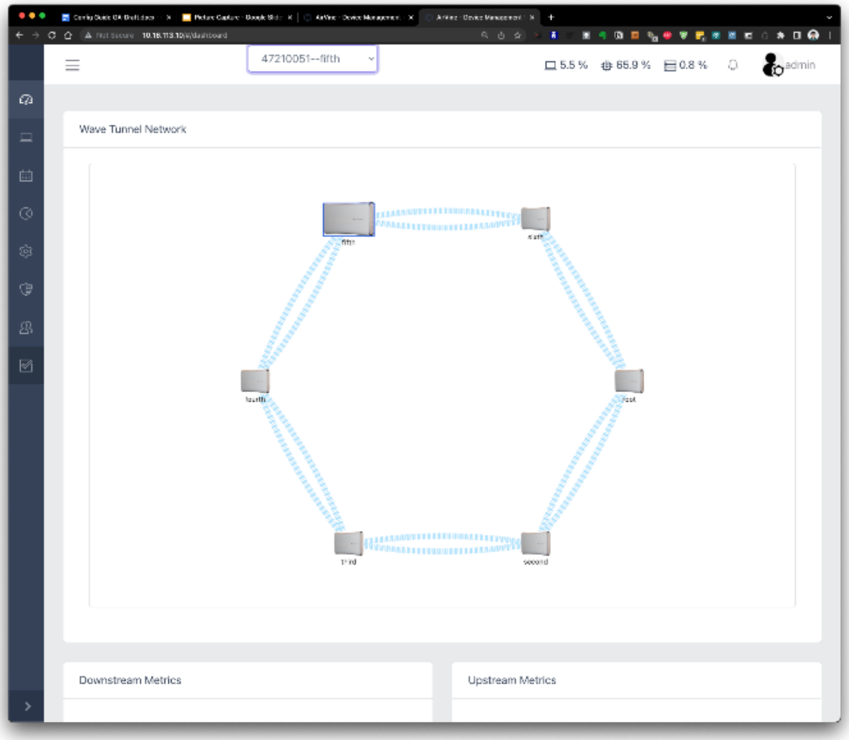
AVS(operation-restore)# execute
Please specify the number of backup file you want to restore
AVS(operation-restore)# execute 1
```

Diagnostic and troubleshooting

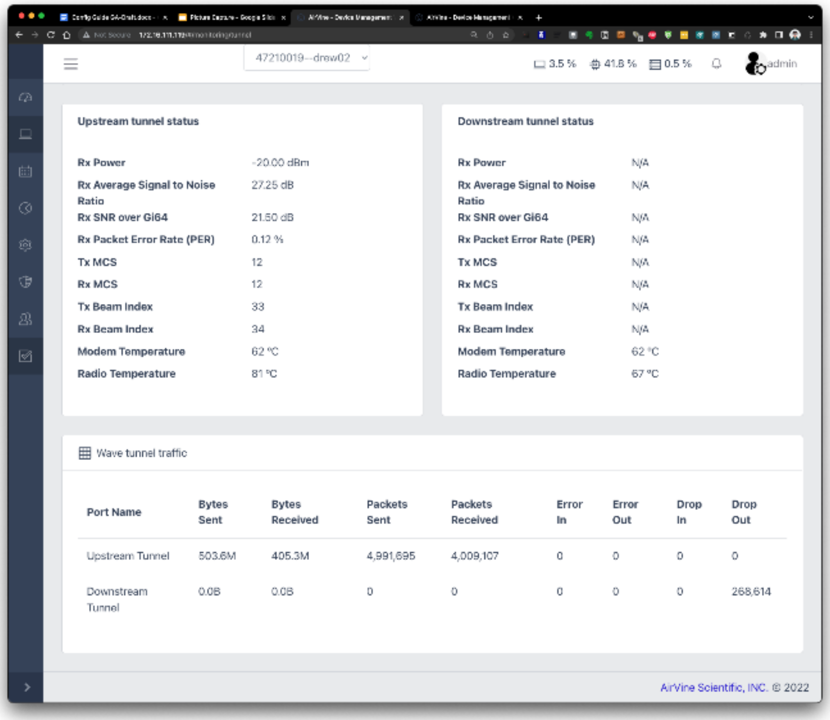
Checking the Status of the WaveTunnel connections

To check the status of the connections of WaveTunnel devices, there are several pages you can visit to get the information. See the explanations in the following sections.

[WEB GUI] Tunnel Topology
Check the status of connections of your devices and how they are connected. Mouse hover to the device or the link to see more information.



You can check the upstream/downstream tunnel metrics from the “Monitoring-> Wave Tunnel” page.



47210019--drsw02
3.5 % 41.8 % 0.5 % admin

Upstream tunnel status

Rx Power	-20.00 dBm
Rx Average Signal to Noise Ratio	27.25 dB
Rx SNR over Gi64	21.50 dB
Rx Packet Error Rate (PER)	0.12 %
Tx MCS	12
Rx MCS	12
Tx Beam Index	33
Rx Beam Index	34
Modem Temperature	62 °C
Radio Temperature	81 °C

Downstream tunnel status

Rx Power	N/A
Rx Average Signal to Noise Ratio	N/A
Rx SNR over Gi64	N/A
Rx Packet Error Rate (PER)	N/A
Tx MCS	N/A
Rx MCS	N/A
Tx Beam Index	N/A
Rx Beam Index	N/A
Modem Temperature	62 °C
Radio Temperature	67 °C

Wave tunnel traffic

Port Name	Bytes Sent	Bytes Received	Packets Sent	Packets Received	Error In	Error Out	Drop In	Drop Out
Upstream Tunnel	503.6M	405.3M	4,991,695	4,009,107	0	0	0	0
Downstream Tunnel	0.0B	0.0B	0	0	0	0	0	268,614

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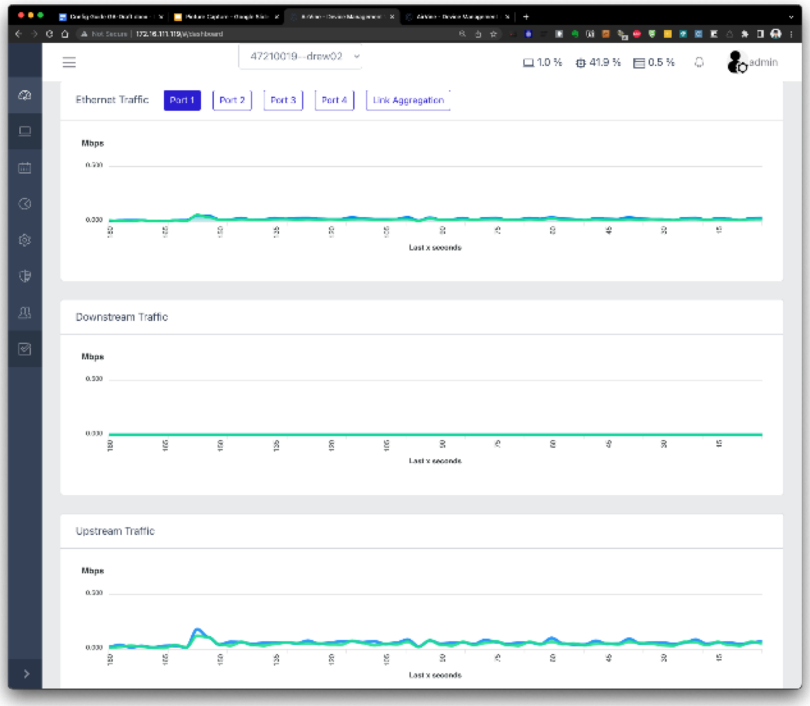
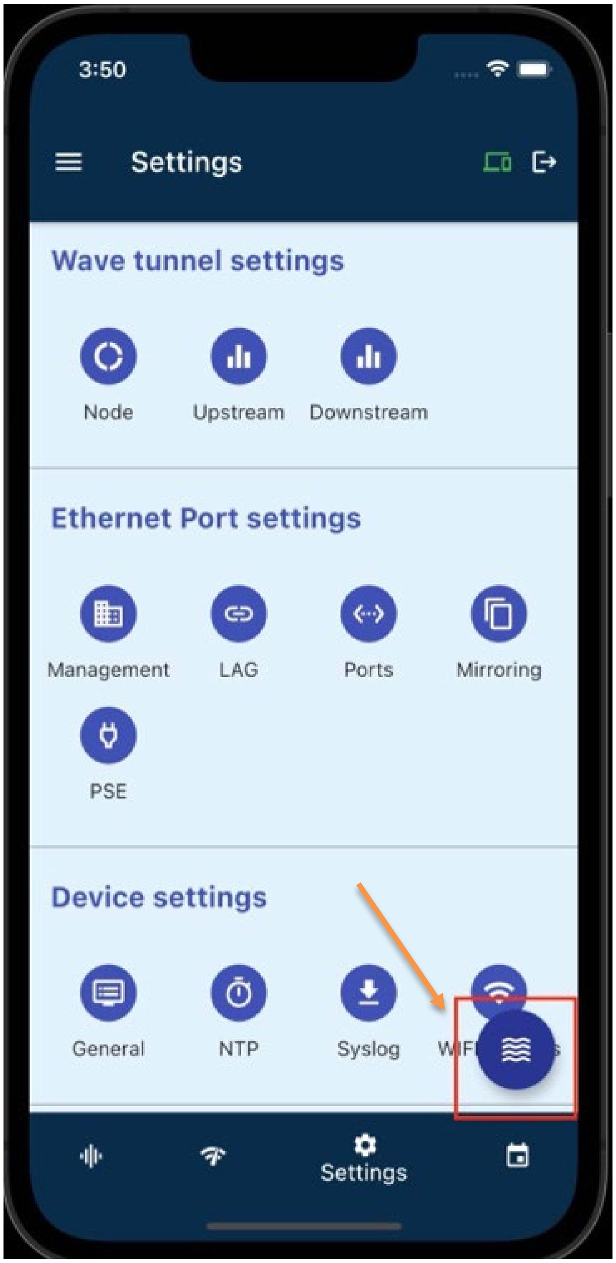
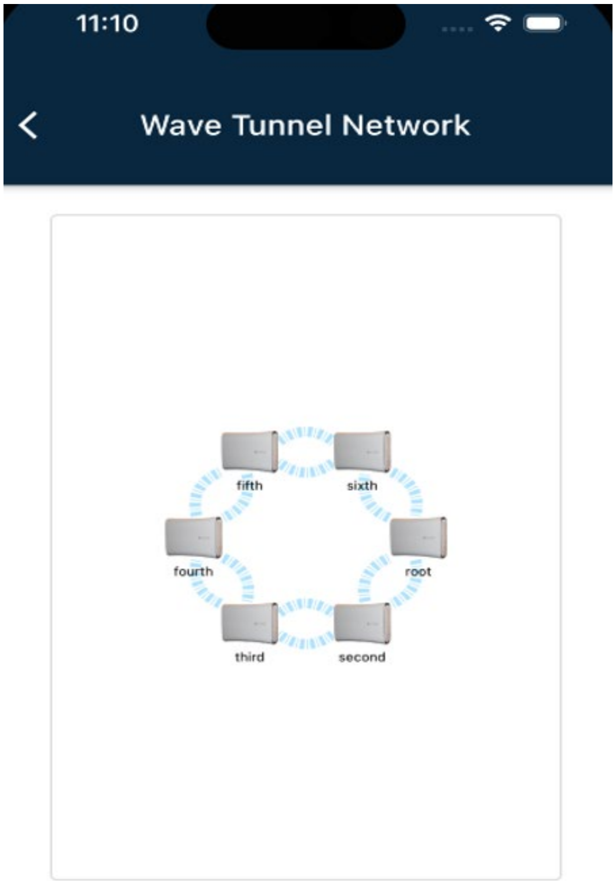
You can also check the realtime traffic widgets on the Dashboard to see the traffic/bandwidth of your wave tunnel connections.



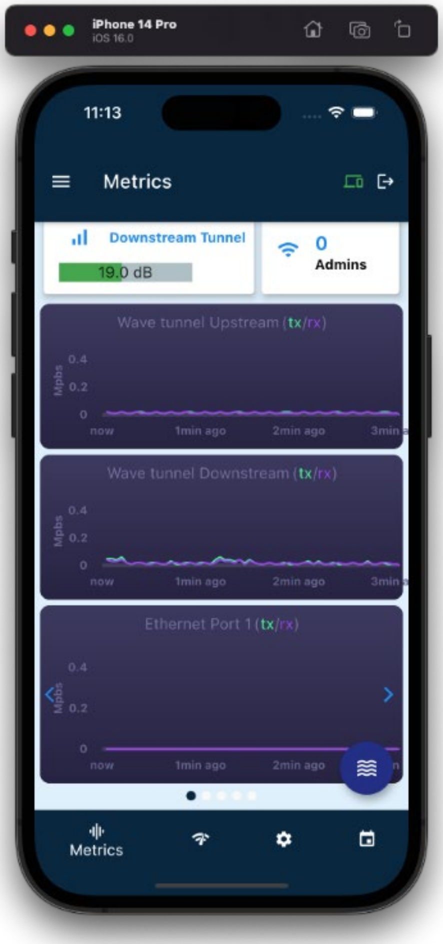
[Mobile App]

Click the button to check the WaveTunnel connection status in the Topology Screen

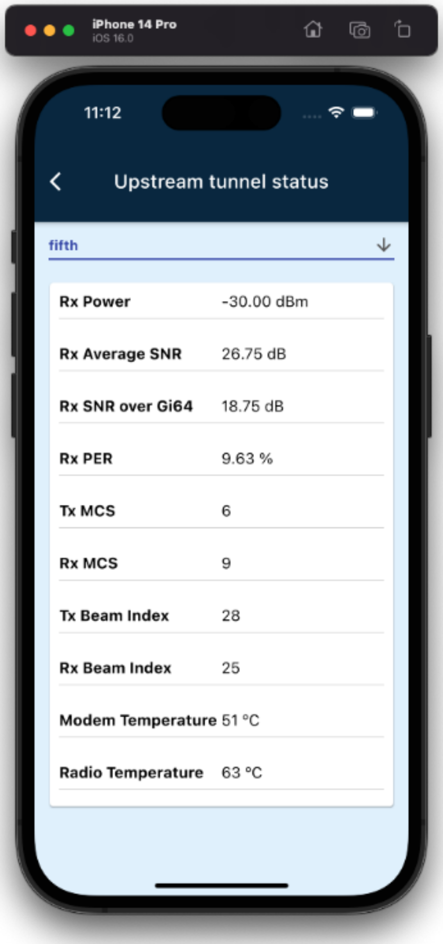




From Dashboard, you can check the real time traffic/bandwidth passing through the WaveTunnel connections.

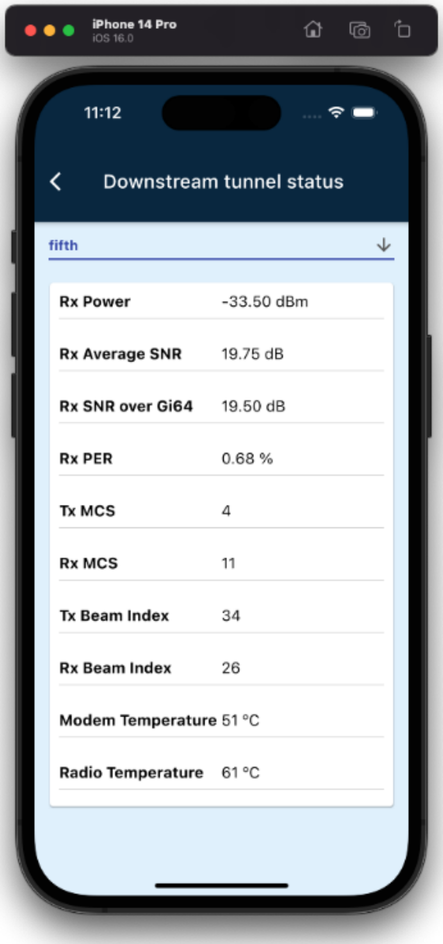


Check the upstream connection metrics



Rx Power	-30.00 dBm
Rx Average SNR	26.75 dB
Rx SNR over Gi64	18.75 dB
Rx PER	9.63 %
Tx MCS	6
Rx MCS	9
Tx Beam Index	28
Rx Beam Index	25
Modem Temperature	51 °C
Radio Temperature	63 °C

Check the downstream connection metrics



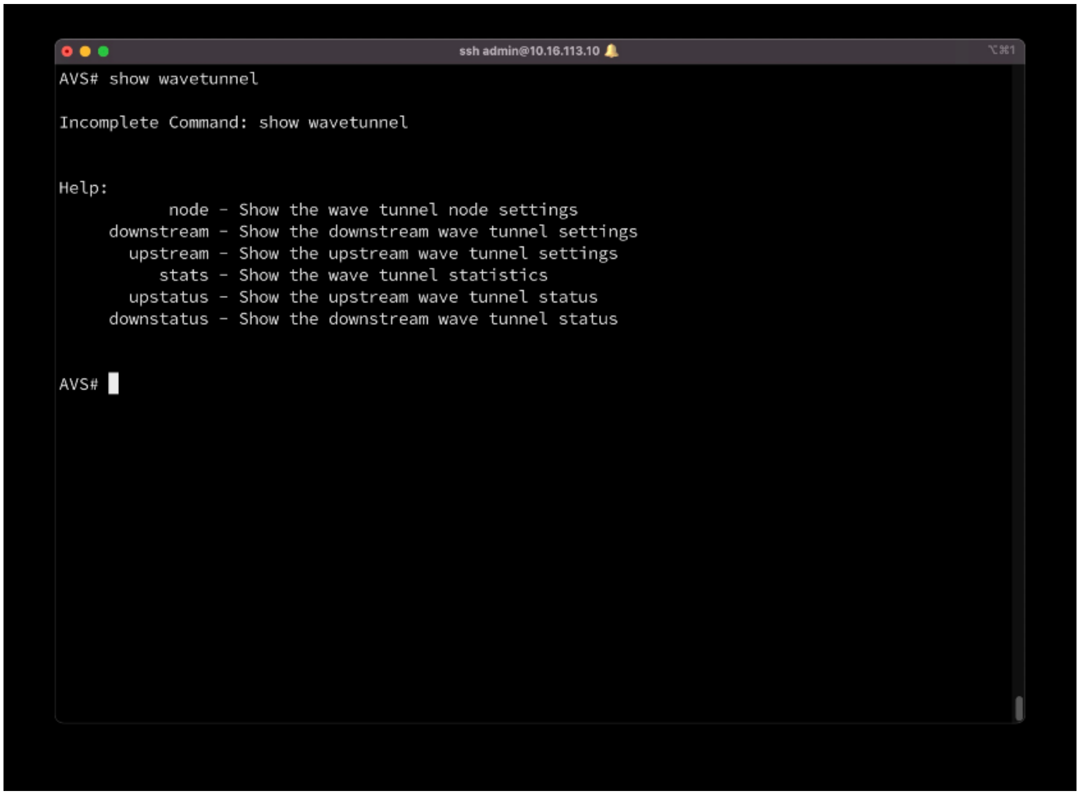
Downstream tunnel status

fifth

Rx Power	-33.50 dBm
Rx Average SNR	19.75 dB
Rx SNR over Gi64	19.50 dB
Rx PER	0.68 %
Tx MCS	4
Rx MCS	11
Tx Beam Index	34
Rx Beam Index	26
Modem Temperature	51 °C
Radio Temperature	61 °C

[CLI]

```
show wavetunnel stats
show wavetunnel upstatus
show wavetunnel downstatus
```



```
AVS# show wavetunnel

Incomplete Command: show wavetunnel

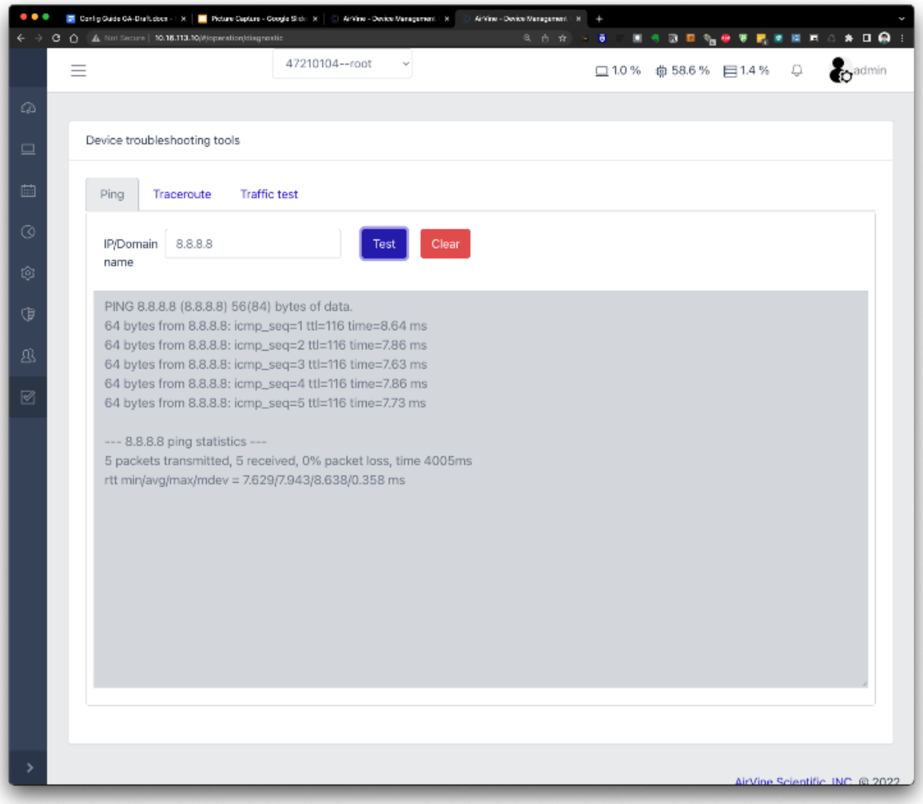

Help:
           node - Show the wave tunnel node settings
     downstream - Show the downstream wave tunnel settings
       upstream - Show the upstream wave tunnel settings
          stats - Show the wave tunnel statistics
       upstatus - Show the upstream wave tunnel status
     downstatus - Show the downstream wave tunnel status


AVS# 
```

Ping Test

You can run a “Ping” test to check if the traffic can be sent to the destination.

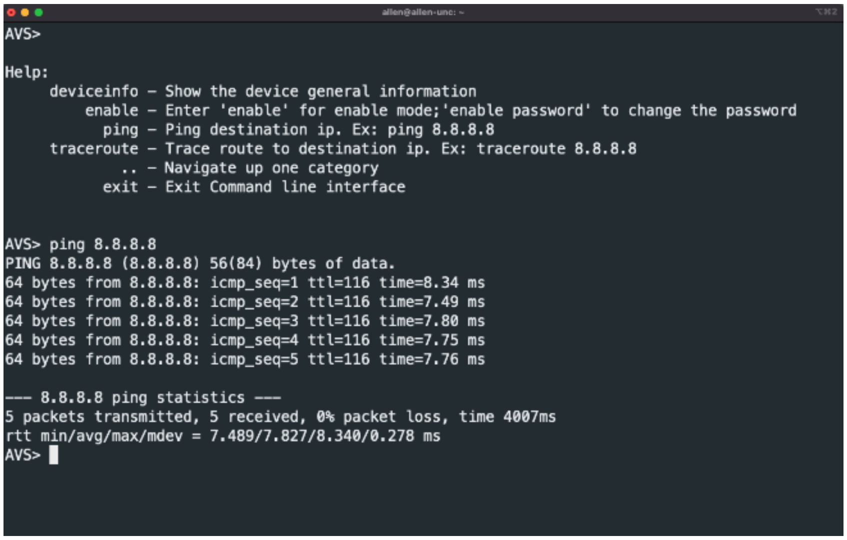
[WEB GUI]
System > Operations > Diagnostic > Ping


10.18.113.10/#/operation/diagnostic
47210104--root
1.0 %
58.6 %
1.4 %
admin
Device troubleshooting tools
Ping
Traceroute
Traffic test
IP/Domain name
8.8.8.8
Test
Clear
AirVine Scientific, INC. © 2022

```
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=8.64 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=7.86 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=7.63 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=7.86 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=7.73 ms

--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4005ms
rtt min/avg/max/mdev = 7.629/7.943/8.638/0.358 ms
```

[CLI]



```
AVS>

Help:
     deviceinfo - Show the device general information
         enable - Enter 'enable' for enable mode;'enable password' to change the password
           ping - Ping destination ip. Ex: ping 8.8.8.8
     traceroute - Trace route to destination ip. Ex: traceroute 8.8.8.8
             .. - Navigate up one category
           exit - Exit Command line interface


AVS> ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=8.34 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=7.49 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=7.80 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=7.75 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=7.76 ms

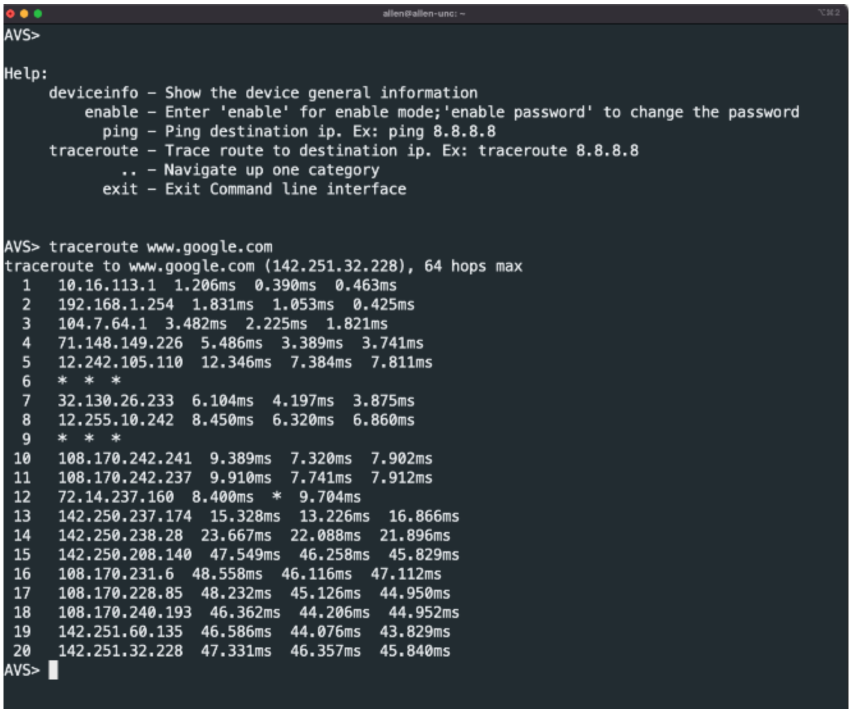
--- 8.8.8.8 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4007ms
rtt min/avg/max/mdev = 7.489/7.827/8.340/0.278 ms
AVS> 
```

Traceroute Test

You can run a “Traceroute” test to check how the packets are routed to the destination.

[WEB GUI]

[CLI]



```
AVS>

Help:
     deviceinfo - Show the device general information
         enable - Enter 'enable' for enable mode;'enable password' to change the password
           ping - Ping destination ip. Ex: ping 8.8.8.8
     traceroute - Trace route to destination ip. Ex: traceroute 8.8.8.8
             .. - Navigate up one category
           exit - Exit Command line interface

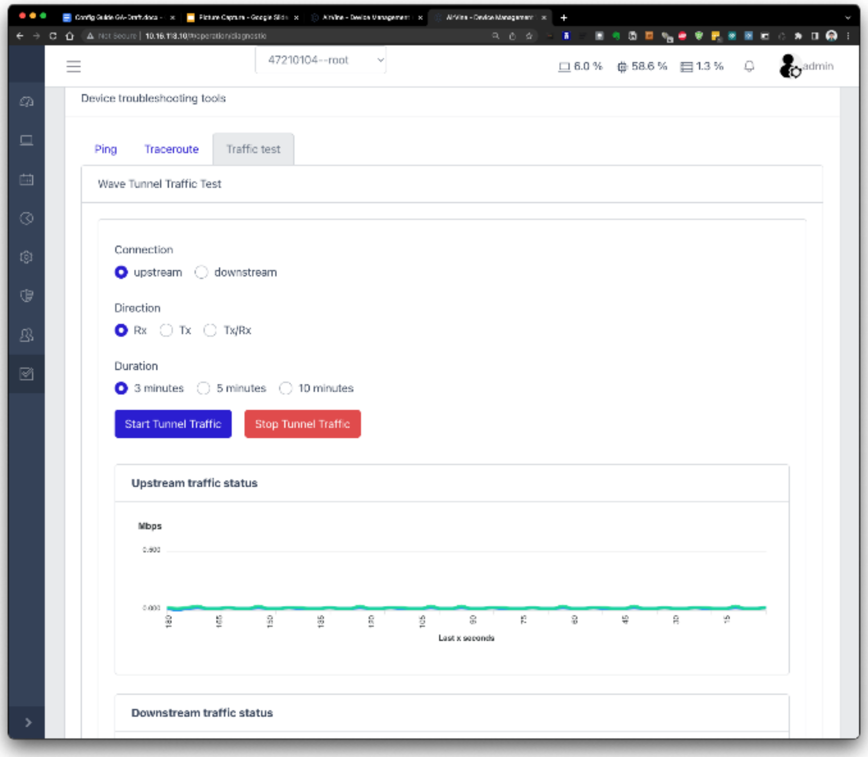

AVS> traceroute www.google.com
traceroute to www.google.com (142.251.32.228), 64 hops max
  1   10.16.113.1  1.206ms  0.390ms  0.463ms
  2   192.168.1.254  1.831ms  1.053ms  0.425ms
  3   104.7.64.1  3.482ms  2.225ms  1.821ms
  4   71.148.149.226  5.486ms  3.389ms  3.741ms
  5   12.242.105.110  12.346ms  7.384ms  7.811ms
  6   *  *  *
  7   32.130.26.233  6.104ms  4.197ms  3.875ms
  8   12.255.10.242  8.450ms  6.320ms  6.860ms
  9   *  *  *
 10   108.170.242.241  9.389ms  7.320ms  7.902ms
 11   108.170.242.237  9.910ms  7.741ms  7.912ms
 12   72.14.237.160  8.400ms  *  9.704ms
 13   142.250.237.174  15.328ms  13.226ms  16.866ms
 14   142.250.238.28  23.667ms  22.088ms  21.896ms
 15   142.250.208.140  47.549ms  46.258ms  45.829ms
 16   108.170.231.6  48.558ms  46.116ms  47.112ms
 17   108.170.228.85  48.232ms  45.126ms  44.950ms
 18   108.170.240.193  46.362ms  44.206ms  44.952ms
 19   142.251.60.135  46.586ms  44.076ms  43.829ms
 20   142.251.32.228  47.331ms  46.357ms  45.840ms
AVS> █
```

Traffic Test

There is an internal tool in the WaveTunnel we can use to generate the traffic on the WaveTunnel connections.

[WEB GUI]
System > Operations > Diagnostic > Traffic Test

Specify the criteria and traffic direction before generating the traffic and monitor the result on the widgets.



Device troubleshooting tools

Wave Tunnel Traffic Test

Connection
● upstream ○ downstream

Direction
● Rx ○ Tx ○ Tx/Rx

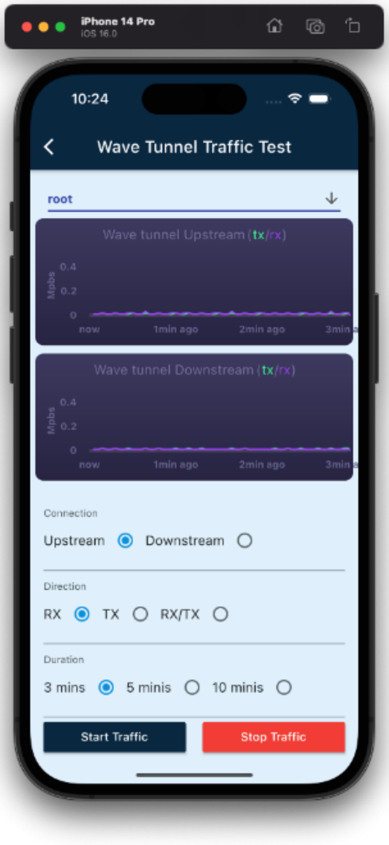
Duration
● 3 minutes ○ 5 minutes ○ 10 minutes

Upstream traffic status

Downstream traffic status

[Mobile App]
Monitoring > Link Traffic

Specify the criteria before generating the traffic and monitor the result on the widgets.



Connection

Upstream ● Downstream ○

Direction

RX ● TX ○ RX/TX ○

Duration

3 mins ● 5 minis ○ 10 minis ○

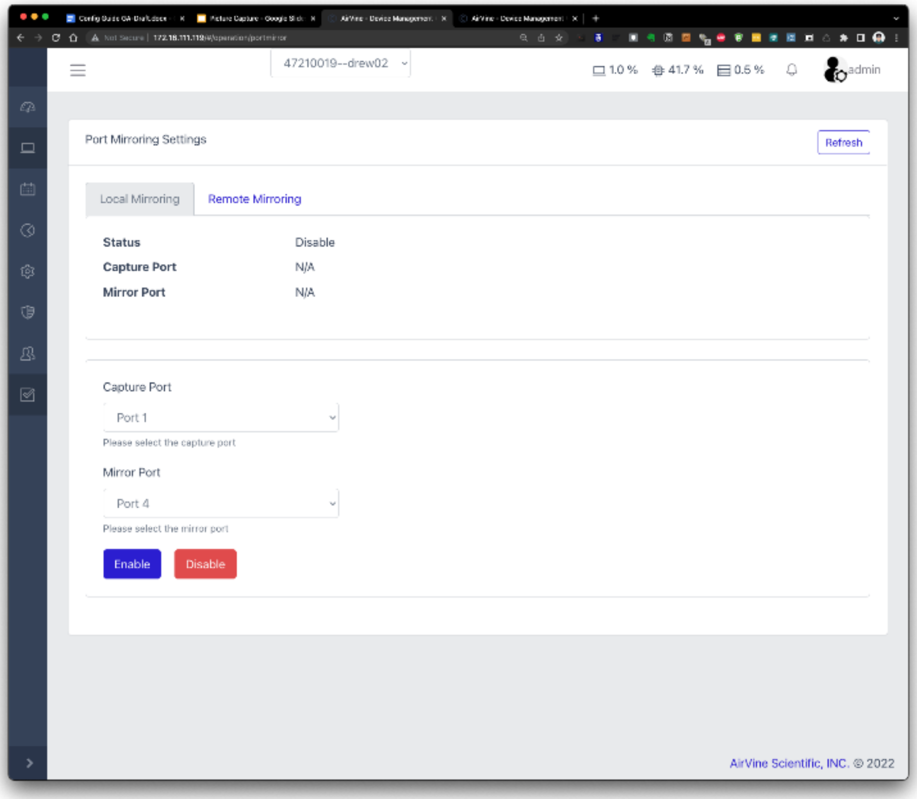
Mirroring the Ethernet Port traffic

For the troubleshooting purposes, this function provides the capability to mirror the packets on a specific port to another port in the local or neighboring device. To be aware, the settings are not persisted which are cleaned up after system reboot.

[WEB GUI]
System > Operations > Port Mirroring

Local Port Mirroring

Operations-> Port Mirroring-> Local



Port Mirroring Settings

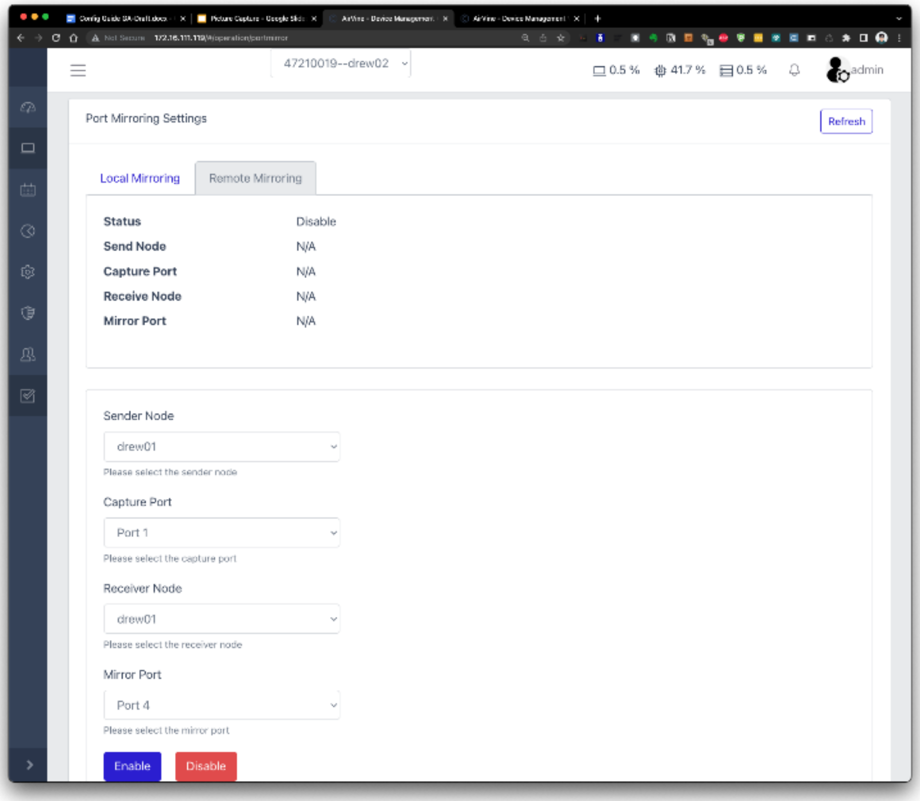
Status	Disable
Capture Port	N/A
Mirror Port	N/A

Capture Port: Port 1
Please select the capture port

Mirror Port: Port 4
Please select the mirror port

Remote Port Mirroring

Operations-> Port Mirroring-> Remote



Port Mirroring Settings

Status	Disable
Send Node	N/A
Capture Port	N/A
Receive Node	N/A
Mirror Port	N/A

Sender Node: drew01
Please select the sender node

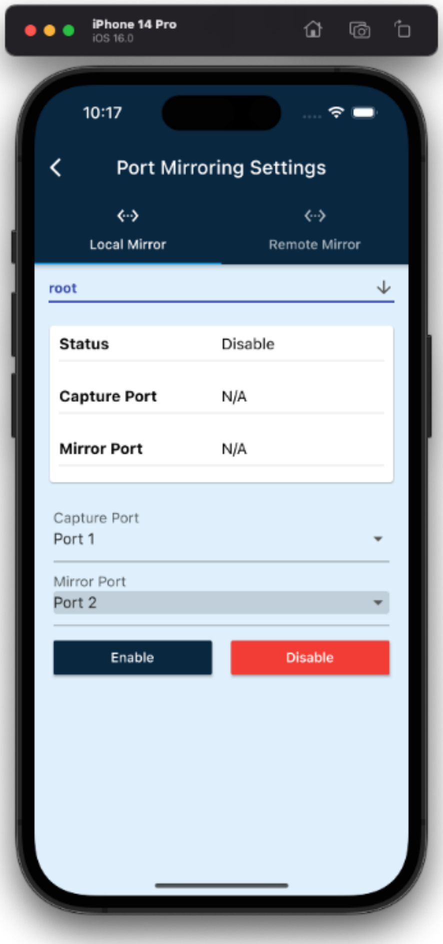
Capture Port: Port 1
Please select the capture port

Receiver Node: drew01
Please select the receiver node

Mirror Port: Port 4
Please select the mirror port

[Mobile App]

Settings > Mirroring > Local Mirroring

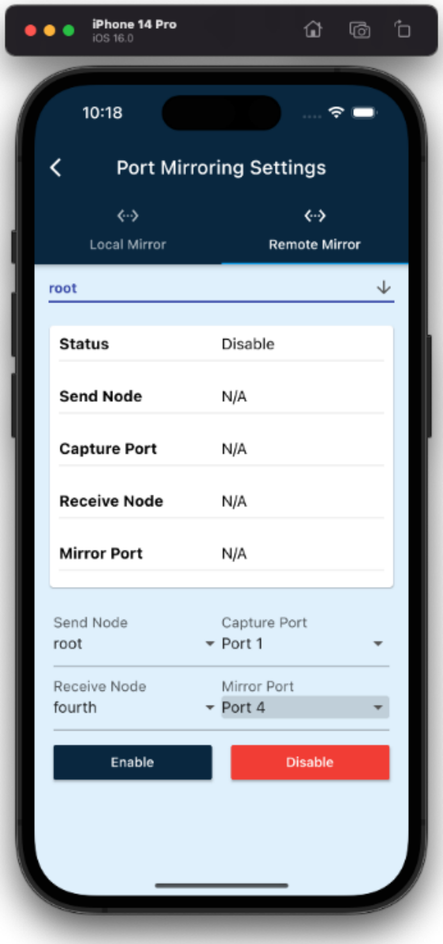


Status	Disable
Capture Port	N/A
Mirror Port	N/A

Capture Port: Port 1

Mirror Port: Port 2

Settings > Mirroring > Remote Mirroring



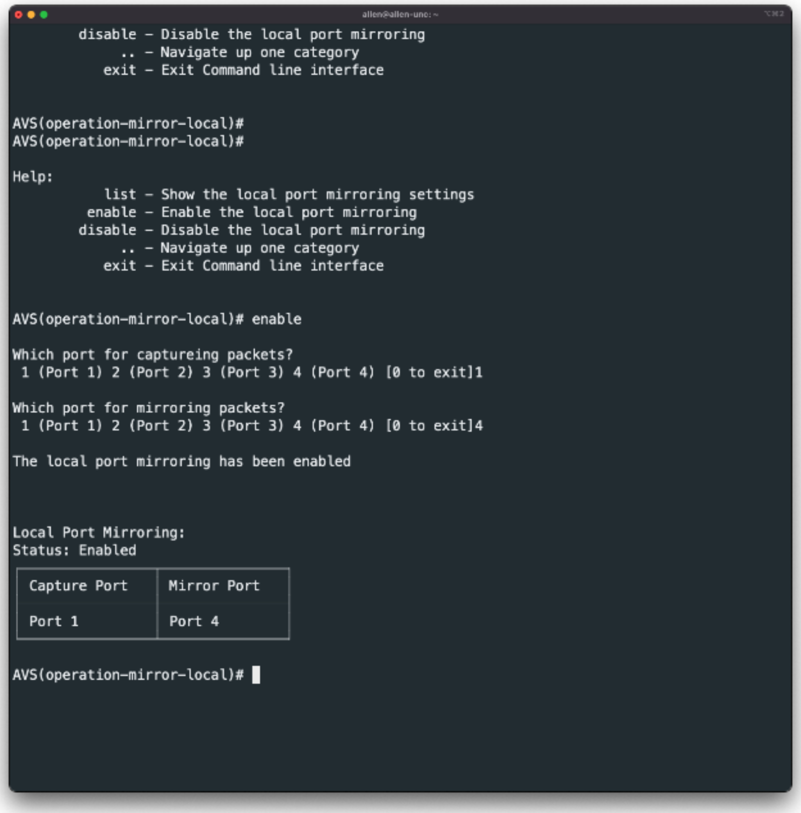
root

Status	Disable
Send Node	N/A
Capture Port	N/A
Receive Node	N/A
Mirror Port	N/A

Send Node: root
Capture Port: Port 1
Receive Node: fourth
Mirror Port: Port 4

[CLI]

AVS(operation-mirror-local)#



```
        disable - Disable the local port mirroring
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-mirror-local)#
AVS(operation-mirror-local)#

Help:
           list - Show the local port mirroring settings
         enable - Enable the local port mirroring
        disable - Disable the local port mirroring
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-mirror-local)# enable

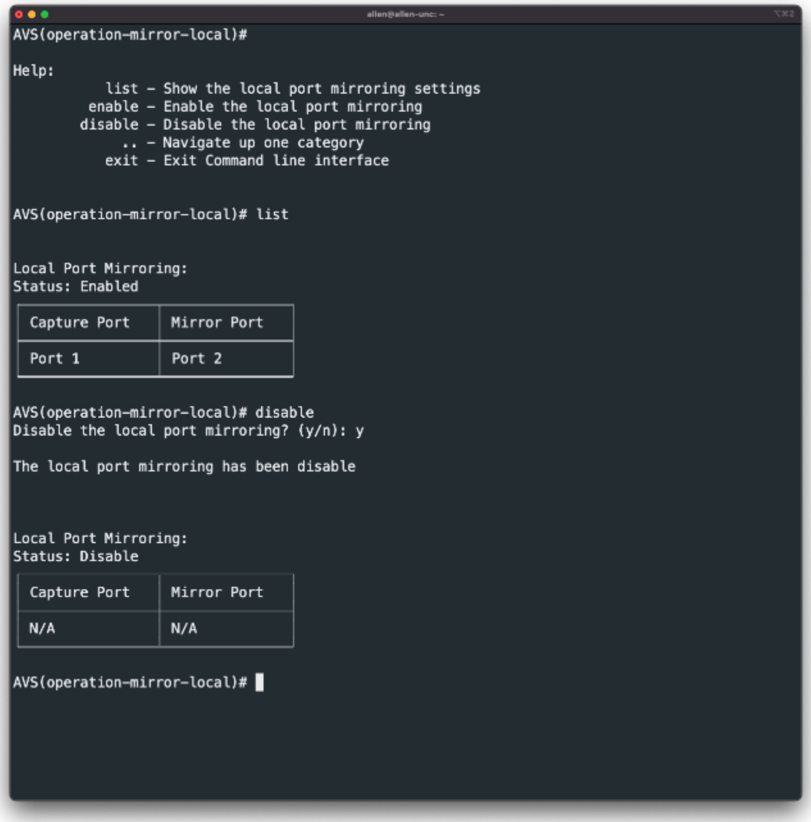
Which port for captureing packets?
 1 (Port 1) 2 (Port 2) 3 (Port 3) 4 (Port 4) [0 to exit]1

Which port for mirroring packets?
 1 (Port 1) 2 (Port 2) 3 (Port 3) 4 (Port 4) [0 to exit]4

The local port mirroring has been enabled


Local Port Mirroring:
Status: Enabled
┌────────────────┬────────────────┐
│ Capture Port   │ Mirror Port    │
│                │                │
│ Port 1         │ Port 4         │
└────────────────┴────────────────┘

AVS(operation-mirror-local)# █
```



```
AVS(operation-mirror-local)#

Help:
           list - Show the local port mirroring settings
         enable - Enable the local port mirroring
        disable - Disable the local port mirroring
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-mirror-local)# list


Local Port Mirroring:
Status: Enabled
┌────────────────┬────────────────┐
│ Capture Port   │ Mirror Port    │
├────────────────┼────────────────┤
│ Port 1         │ Port 2         │
└────────────────┴────────────────┘

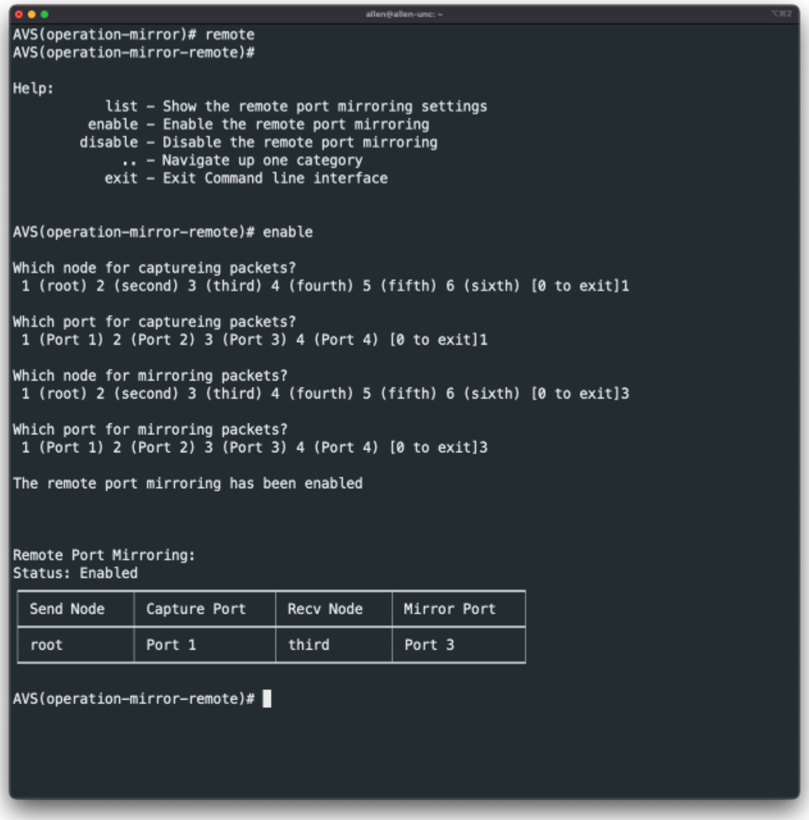
AVS(operation-mirror-local)# disable
Disable the local port mirroring? (y/n): y

The local port mirroring has been disable


Local Port Mirroring:
Status: Disable
┌────────────────┬────────────────┐
│ Capture Port   │ Mirror Port    │
├────────────────┼────────────────┤
│ N/A            │ N/A            │
└────────────────┴────────────────┘

AVS(operation-mirror-local)# █
```

AVS(operation-mirror-remote)#



```
AVS(operation-mirror)# remote
AVS(operation-mirror-remote)#

Help:
           list - Show the remote port mirroring settings
         enable - Enable the remote port mirroring
        disable - Disable the remote port mirroring
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-mirror-remote)# enable

Which node for captureing packets?
 1 (root) 2 (second) 3 (third) 4 (fourth) 5 (fifth) 6 (sixth) [0 to exit]1

Which port for captureing packets?
 1 (Port 1) 2 (Port 2) 3 (Port 3) 4 (Port 4) [0 to exit]1

Which node for mirroring packets?
 1 (root) 2 (second) 3 (third) 4 (fourth) 5 (fifth) 6 (sixth) [0 to exit]3

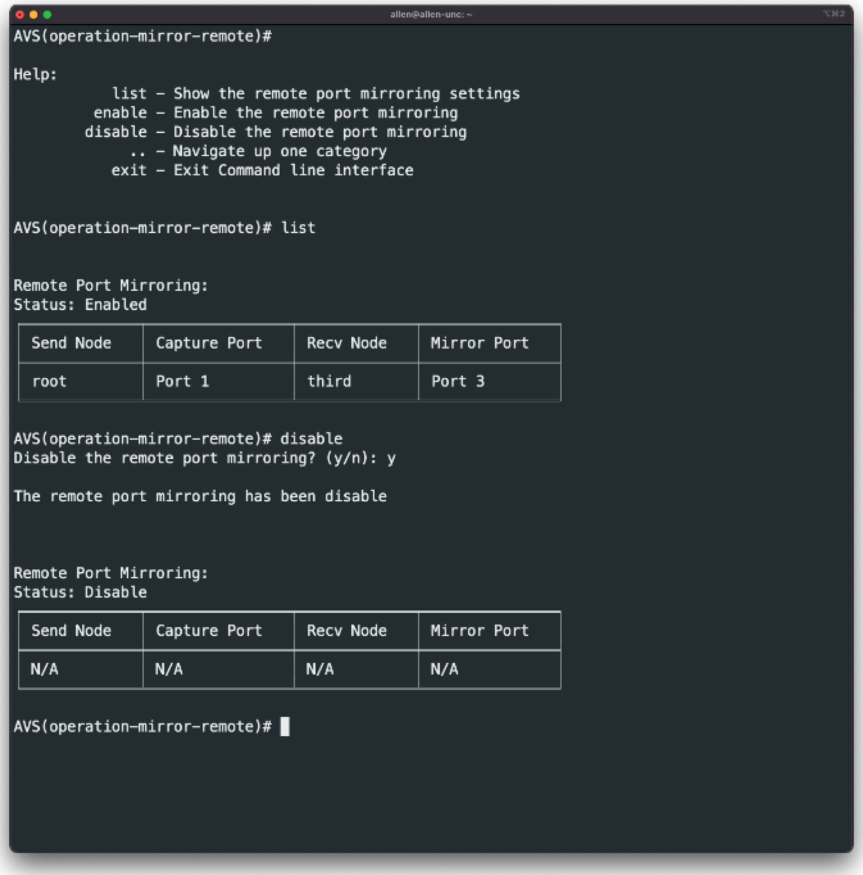
Which port for mirroring packets?
 1 (Port 1) 2 (Port 2) 3 (Port 3) 4 (Port 4) [0 to exit]3

The remote port mirroring has been enabled



Remote Port Mirroring:
Status: Enabled
┌─────────────┬────────────────┬─────────────┬─────────────┐
│ Send Node   │ Capture Port   │ Recv Node   │ Mirror Port │
├─────────────┼────────────────┼─────────────┼─────────────┤
│ root        │ Port 1         │ third       │ Port 3      │
└─────────────┴────────────────┴─────────────┴─────────────┘

AVS(operation-mirror-remote)# █
```



```
AVS(operation-mirror-remote)#

Help:
           list - Show the remote port mirroring settings
         enable - Enable the remote port mirroring
        disable - Disable the remote port mirroring
             .. - Navigate up one category
           exit - Exit Command line interface


AVS(operation-mirror-remote)# list


Remote Port Mirroring:
Status: Enabled
 ┌─────────────┬────────────────┬─────────────┬──────────────┐
 │ Send Node   │ Capture Port   │ Recv Node   │ Mirror Port  │
 ├─────────────┼────────────────┼─────────────┼──────────────┤
 │ root        │ Port 1         │ third       │ Port 3       │
 └─────────────┴────────────────┴─────────────┴──────────────┘

AVS(operation-mirror-remote)# disable
Disable the remote port mirroring? (y/n): y

The remote port mirroring has been disable



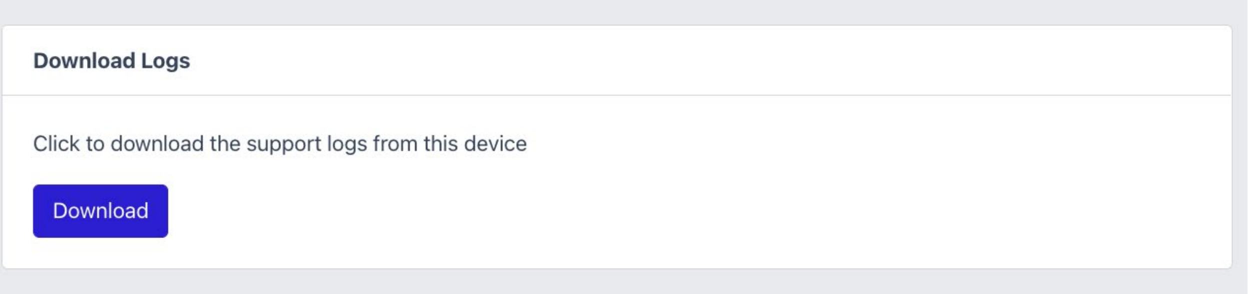
Remote Port Mirroring:
Status: Disable
 ┌─────────────┬────────────────┬─────────────┬──────────────┐
 │ Send Node   │ Capture Port   │ Recv Node   │ Mirror Port  │
 ├─────────────┼────────────────┼─────────────┼──────────────┤
 │ N/A         │ N/A            │ N/A         │ N/A          │
 └─────────────┴────────────────┴─────────────┴──────────────┘

AVS(operation-mirror-remote)# █
```

Download the Support Logs

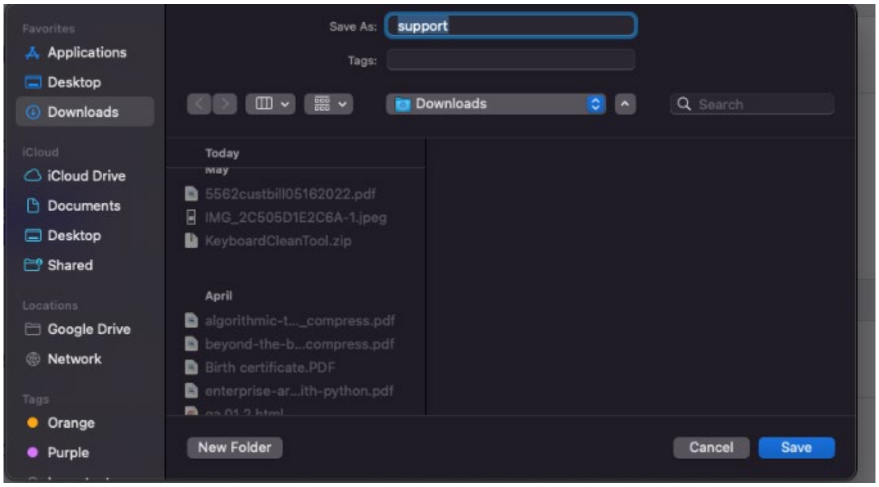
You can download the support logs from this page and send it to Airvine support for further investigations.

[WEB GUI]
System > Operations > System Operation > Download Logs



Download Logs

Click to download the support logs from this device



Save As: support

Tags:

Appendix 1
Event/Alarm Code Definition

```
{
  "101": {
    "description": "update configuration successfully",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "Configuration"
  },
  "102": {
    "description": "update configuration failed",
    "type": "Admin",
    "severity": "Error",
    "notification": "True",
    "category": "Configuration"
  },
  "103": {
    "description": "country code changed",
    "type": "Admin",
    "severity": "Warning",
    "notification": "False",
    "category": "Configuration"
  },
  "104": {
    "description": "timezone changed",
    "type": "Admin",
    "severity": "Warning",
    "notification": "False",
    "category": "Configuration"
  },
  "105": {
    "description": "user added",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "User"
  },
  "106": {
    "description": "user deleted",
    "type": "Admin",
    "severity": "Info",
  "notification": "False",
  "category": "User"
},
"107": {
  "description": "configuration backup",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "Configuration"
},
"108": {
  "description": "configuration restored successfully",
  "type": "Admin",
  "severity": "Warning",
  "notification": "False",
  "category": "Configuration"
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"109": {
  "description": "configuration restored failed",
  "type": "Admin",
  "severity": "Error",
  "notification": "True",
  "category": "Configuration"
},
"110": {
  "description": "Device support log files have been downloaded",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"111": {
  "description": "firmware upgraded successfully ",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"112": {
  "description": "firmware upgraded failed",
  "type": "Admin",
  "severity": "Error",
  "notification": "True",
  "category": "System"
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"113": {
  "description": "firmware image corrupted",
  "type": "Admin",
  "severity": "Error",
  "notification": "True",
  "category": "System"
},
"114": {
  "description": "Configuration rollback",
  "type": "Admin",
  "severity": "Warning",
  "notification": "False",
  "category": "Configuration"
},
"115": {
  "description": "Change primary firmware blank",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"116": {
  "description": "Change primary firmware blank failed",
  "type": "Admin",
  "severity": "Critical",
  "notification": "True",
  "category": "System"
},
"117": {
  "description": "Download the firmware image from server",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"118": {
  "description": "Download the firmware image from server failed",
  "type": "Admin",
  "severity": "Warning",
  "notification": "False",
  "category": "System"
},
"119": {
  "description": "Delete the firmware image file from the device",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"120": {
  "description": "Download the backup file",
  "type": "Admin",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"121": {
  "description": "Delete the backup file",
  "type": "Admin",
  "severity": "Warning",
  "notification": "False",
  "category": "System"
},
"122": {
  "description": "Set DHCP IP failed",
  "type": "Admin",
  "severity": "Critical",
  "notification": "True",
  "category": "System"
},
"201": {
  "description": "high CPU usage",
  "type": "Device",
  "severity": "Critical",
  "notification": "False",
  "category": "System"
},
"202": {
  "description": "high memory usage",
  "type": "Device",
  "severity": "Critical",
  "notification": "False",
  "category": "System"
},
"203": {
  "description": "insufficient disk space",
  "type": "Device",
  "severity": "Critical",
  "notification": "True",
  "category": "System"
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"204": {"description": "PoE priority changed",
"type": "Device",
"severity": "Info",
"notification": False,
"category": "System"
},
"205": {"description": "Failed to change PoE priority",
"type":"Device",
"severity": "Critical",
"notification": True, "category":
"System"
},
"301":
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"description": "upstream tunnel disconnected",
"type": "Device",
"severity": "Critical",
"notification": "True",
"category": "System"
},
"302":
{
"description": "downstream tunnel disconnected",
"type": "Device",
"severity": "Critical",
"notification": "True",
"category": "System"
},
"303":
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"description": "weak upstream tunnel signal",
"type": "Device",
"severity": "Warning",
"notification": "False",
"category": "System"
},
"304":
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"description": "weak downstream tunnel signal",
"type": "Device",
"severity": "Warning",
"notification": "False",
"category": "System"
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"305": {
    "description": "upstream tunnel connected",
    "type": "Device",
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    "notification": "False",
    "category": "System"
  },
  "306": {
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    "type": "Device",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  },
"307": {
"description": "The WaveTunnel inteface is not responding",
"type": "Device",
"severity": "Critical",
"notification": False,
"category": "System"
},
  "401": {
    "description": "new wifi client",
    "type": "Device",
    "severity": "Info",
    "notification": "False",
    "category": "User"
  },
  "402": {
    "description": "management SSID disable",
    "type": "Admin",
    "severity": "Warning",
    "notification": "False",
    "category": "Configuration"
  },
  "501": {
    "description": "device reboot",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  },
  "502": {
    "description": "device critical reboot",
    "type": "Device",
    "severity": "Warning",
    "notification": "False",
    "category": "System"
  },
  "601": {
    "description": "user login success",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  },
  "602": {
    "description": "use login failed",
    "type": "Admin",
    "severity": "Warning",
    "notification": "False",
    "category": "System"
  },
  "603": {
    "description": "user logout",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  },
  "604": {
    "description": "Add User",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  },
  "605": {
    "description": "Delete User",
    "type": "Admin",
    "severity": "Info",
    "notification": "False",
    "category": "System"
  }
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"606": {
"description": "User authentication method changed to Radius",
"type": "Admin",
"severity": "Info",
"notification": False,
"category": "System"
},
"607": {
"description": "User authentication method changed to local",
"type": "Admin",
"severity": "Info",
"notification": False,
"category": "System"
},
"608": {
"description": "Failed to change the user authentication method",
"type": "Admin",
"severity":
"Critical", "notification":True,
"category": "System"
},
"609": {
"description": "The user authentication method is not changed.Skip.",
"type": "Admin",
"severity": "Info",
"notification": False,
"category": "System"},
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