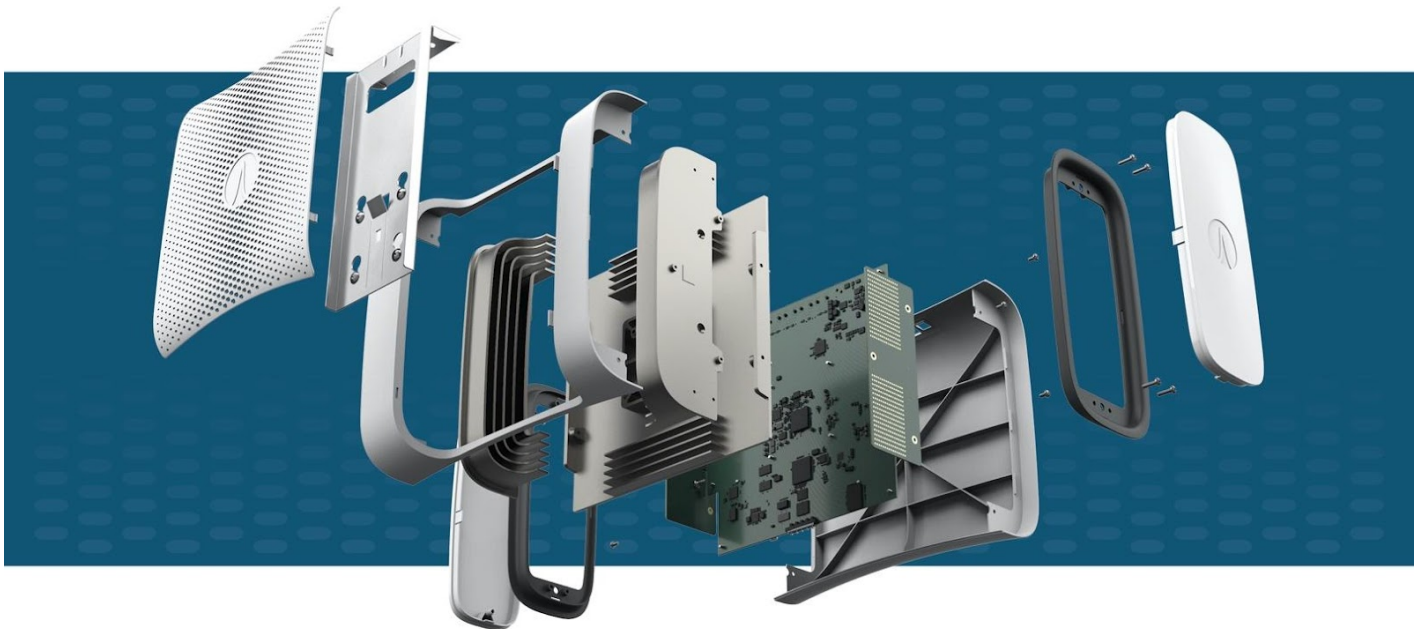




# Airvine Wave Tunnel

Configuration Guides



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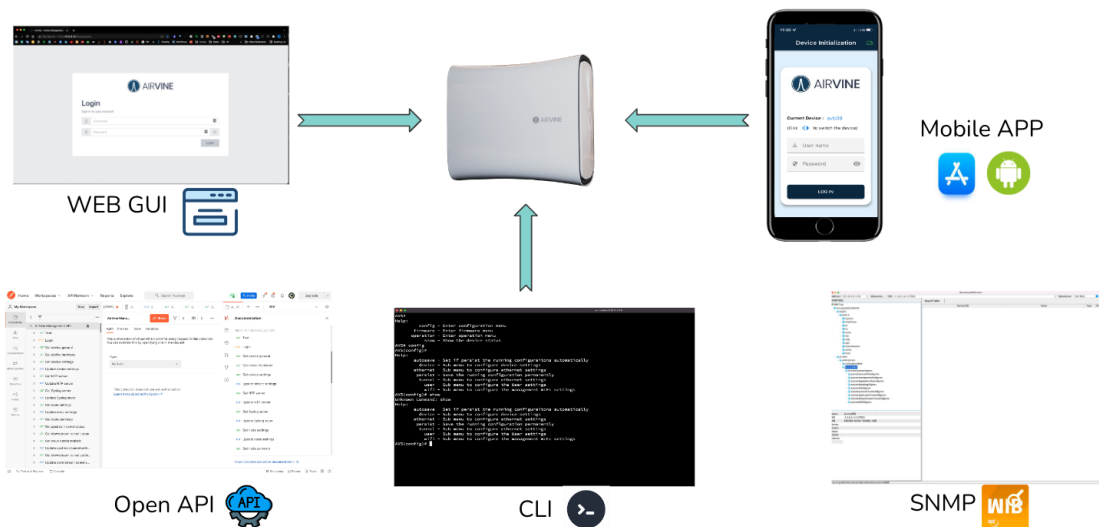
This document provides the instructions on how to configure and monitor your WaveTunnel network. You can follow the instructions described in each section to set up the WaveTunnel connections, change the configurations, monitor and troubleshoot your network.

## 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

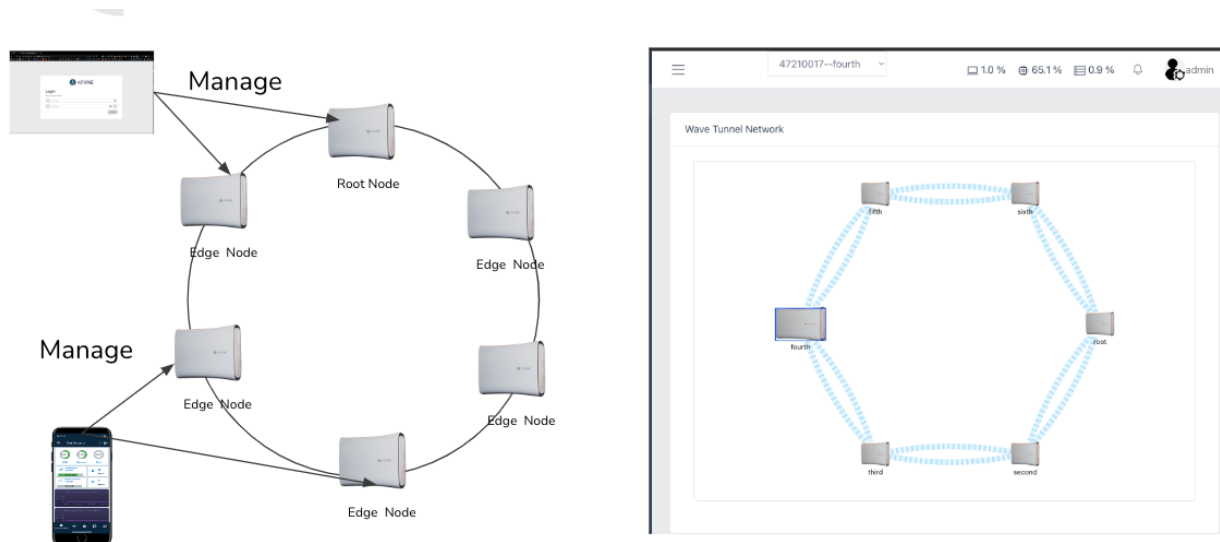
You can select the interfaces in your environment which are most appropriate to configure and monitor your network.



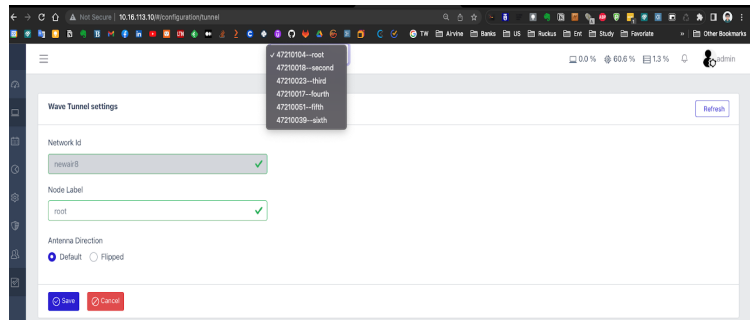
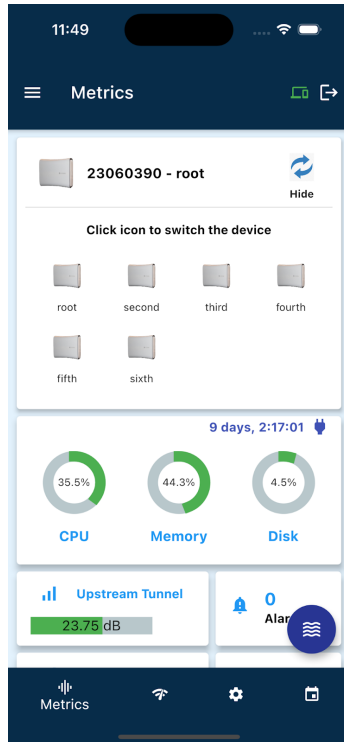
For Open API and SNMP, please refer to the API/SNMP documents for more detailed information.



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.



## Prerequisites for using the management interfaces

### Hardware Installation Package

A complete installation hardware package includes the items listed below:

- WaveTunnel device
- Mounting bracket
- Power supply

**Note: In accordance with FCC Part 15.21,** Changes or modifications not expressly approved by Airvine Scientific Inc. could void the user's authority to operate the equipment.

**Note: In accordance with FCC Part 15.105,** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

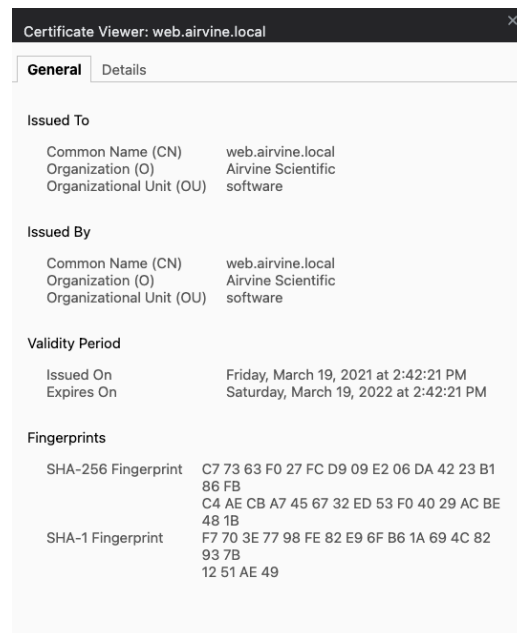
## Web GUI Prerequisites

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:

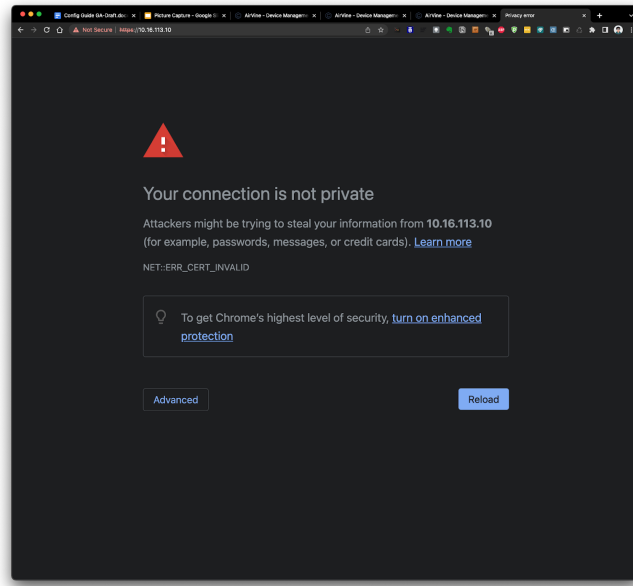
- Google Chrome
- Microsoft Edge
- Safari
- Firefox

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.



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



The default login credential of the WEB GUI are

User name: **admin**

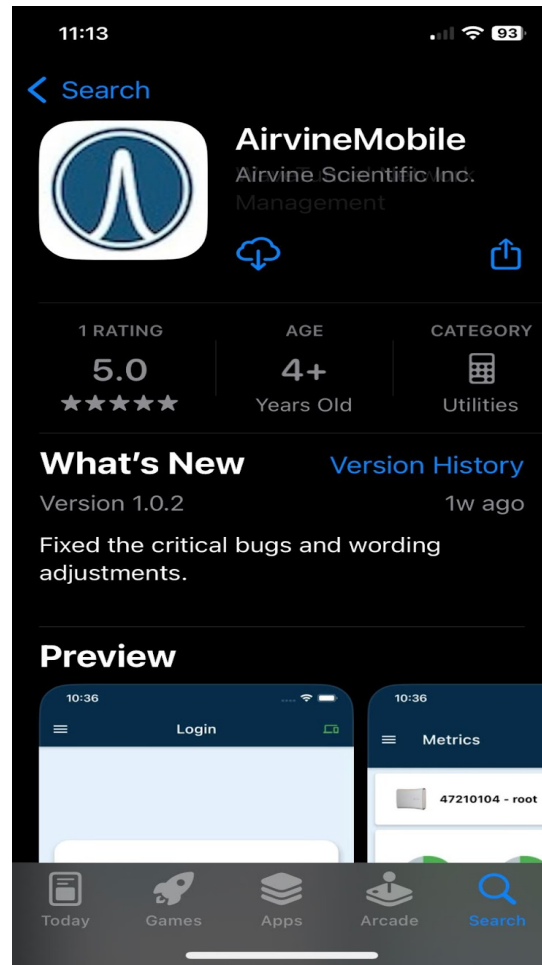
Password: **admin**

## Mobile App Prerequisites

**Download the “AirvineMobile” App from the App Store.**

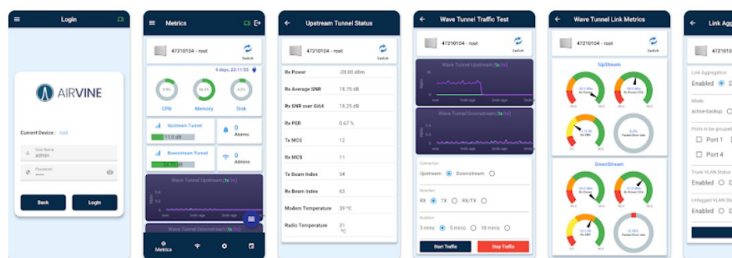
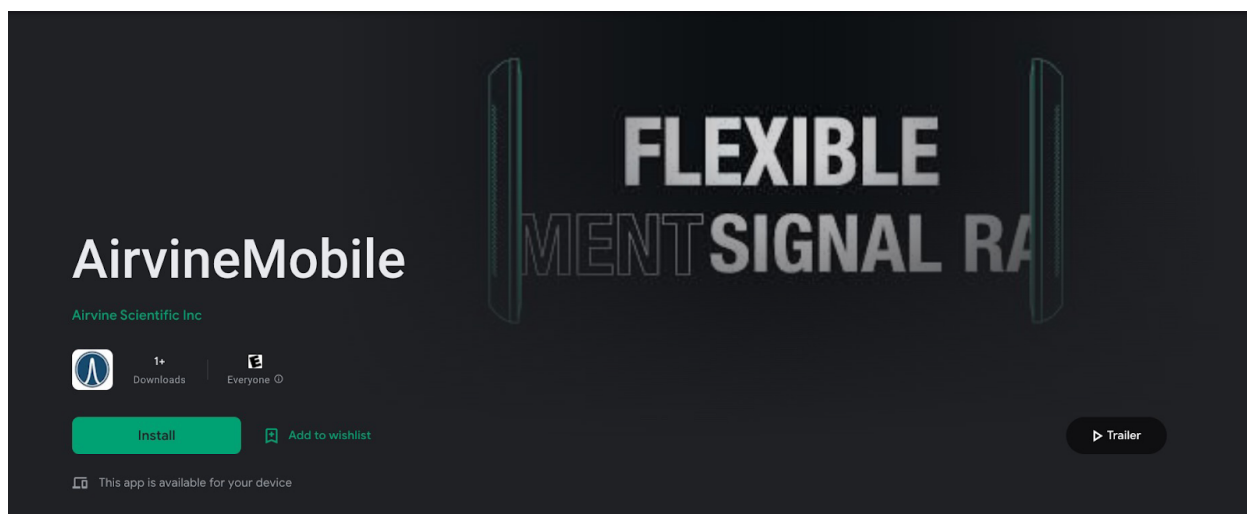
### **[Apple iOS]**

Search “AirvineMobile” from the App Store in your mobile device.



### [Android]

Search AirvineMobile and download the App from Google Play.



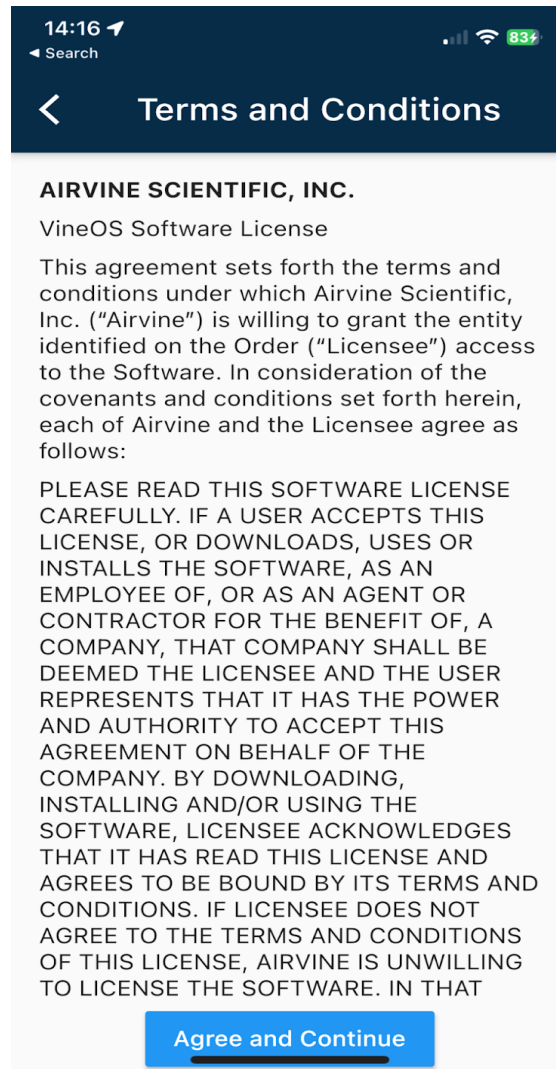
Developer contact ▾

The default login credential of the mobile App are

User name: **admin**

Password: **admin**

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



## 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

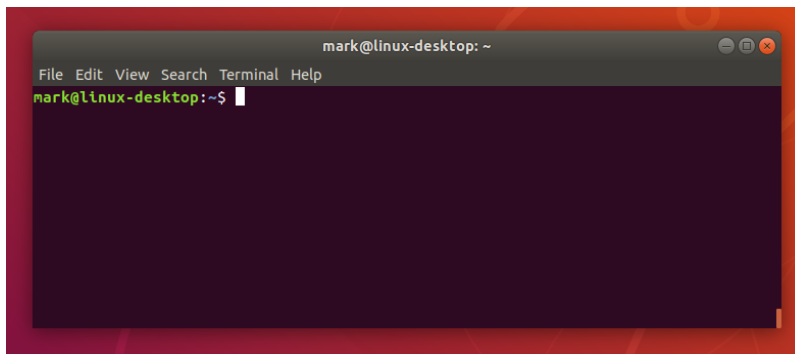
[CLI command keys]

| 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                            |

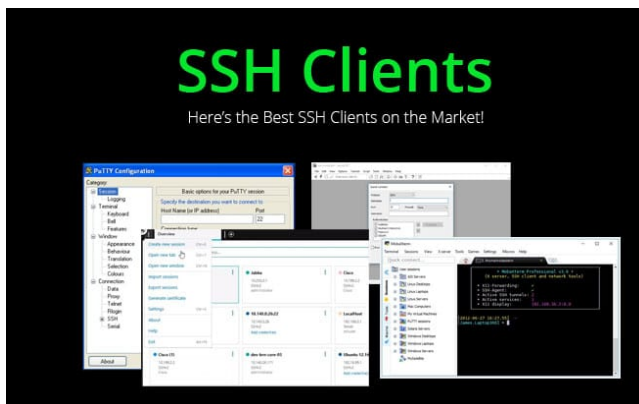
## [SSH Client]

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



### SSH Clients



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



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

```
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.

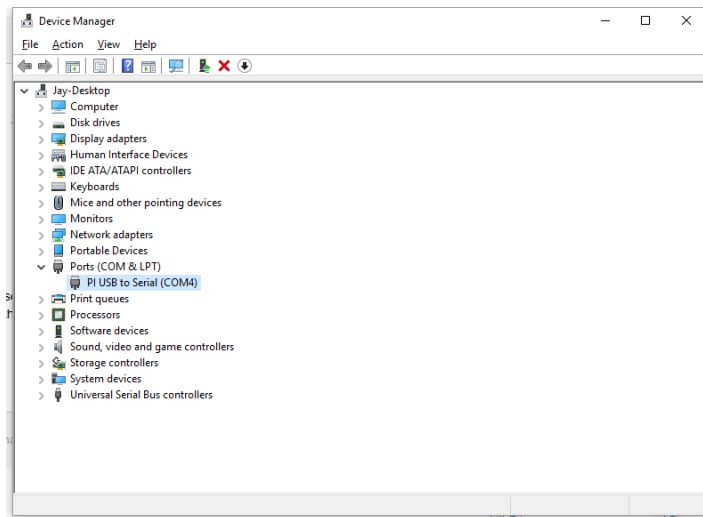


To use the serial cable connecting to the WaveTunnel device, you need to know the name of the serial port.

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



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

```
allen@allen-unc:~$ minicom

+-----+
| 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#

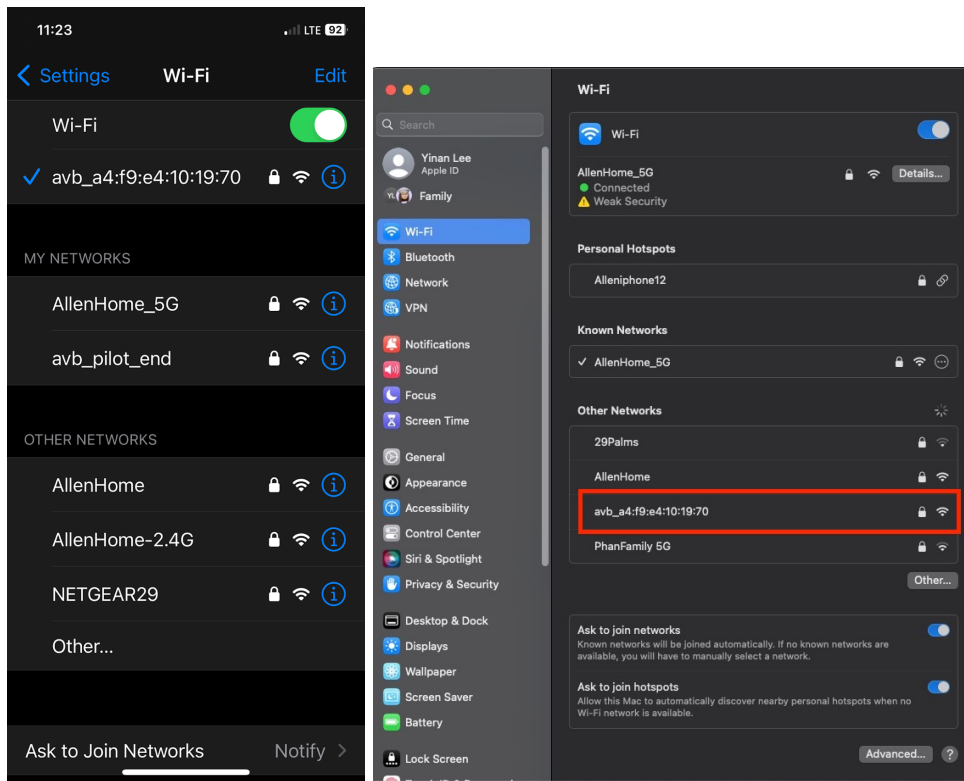
Help:
  show - Show the device status
  config - Enter configuration menu
  firmware - Enter firmware menu
  operation - Enter operation menu
  .. - Navigate up one category
  exit - Exit Command line interface

AVS# █
```

## How to connect to the new WaveTunnel device

### 1. 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.

### 2. 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.

### 3. Serial console cable

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

# Initialize the WaveTunnel device

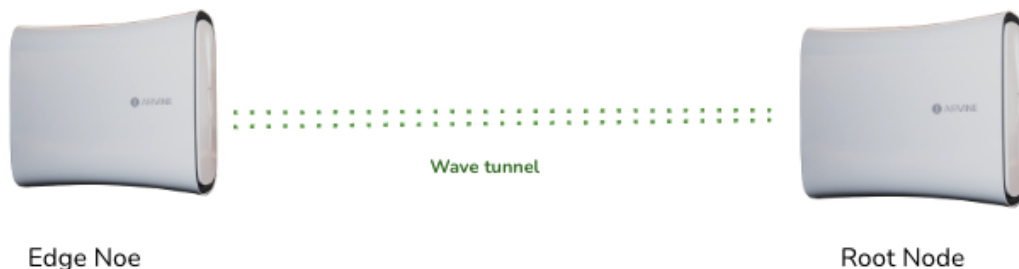
## Before You Begin you will need the following:

- 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”.**

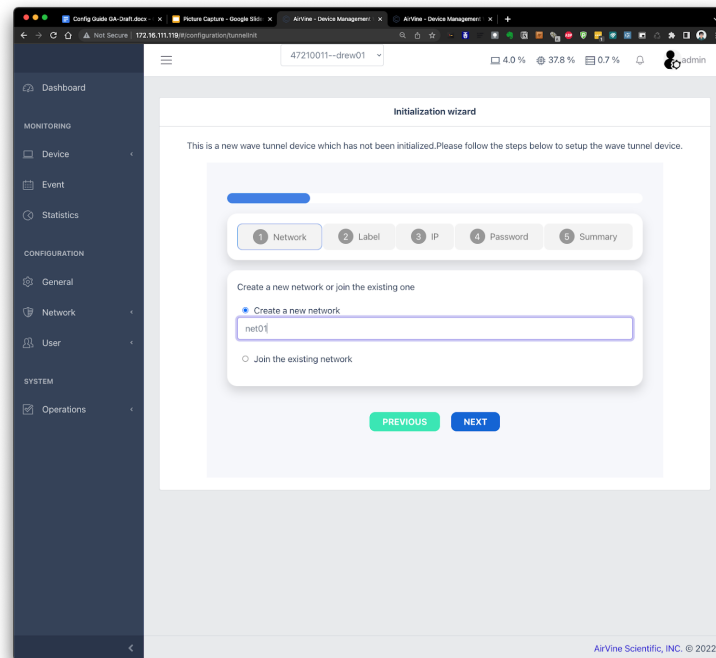
Take the example below to set up the wave tunnel connection between the first(root) and the second(edge) nodes.

## [WEB GUI]

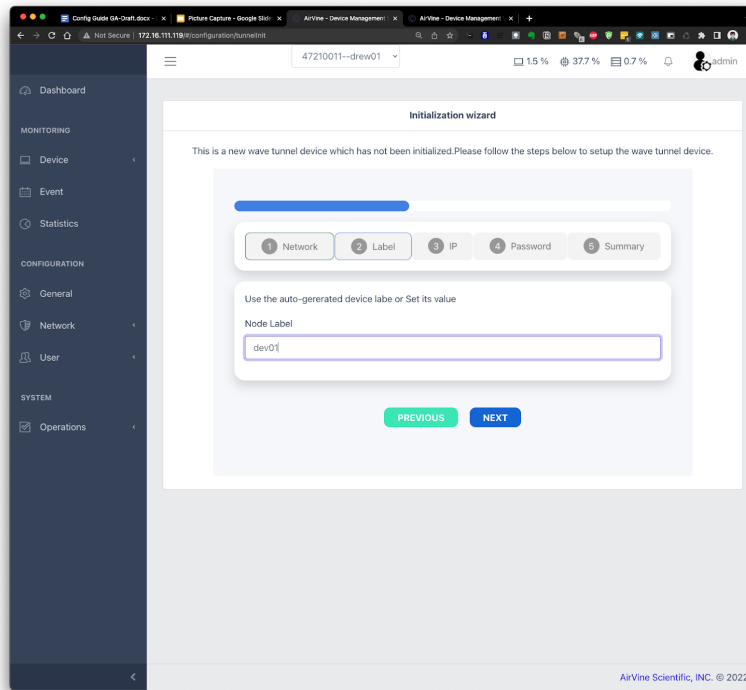
Connect the WEB GUI through the default management SSID or ethernet cable.

- Set up the Root Node

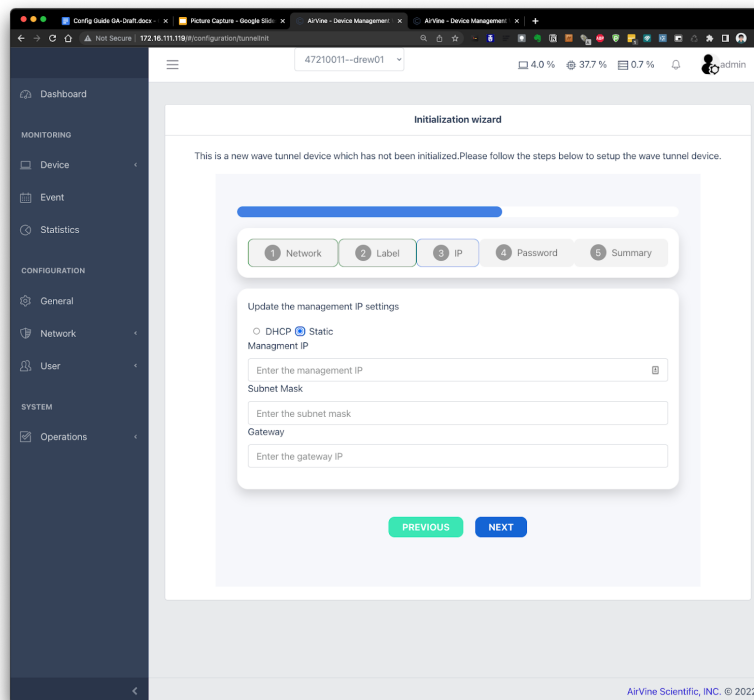
After logon to the WEB GUI, the initialization wizard is shown on the landing page. Following the Initialization wizard to set up the wave tunnel connection. The first step is selecting “Create a new network” and giving the name of this network.



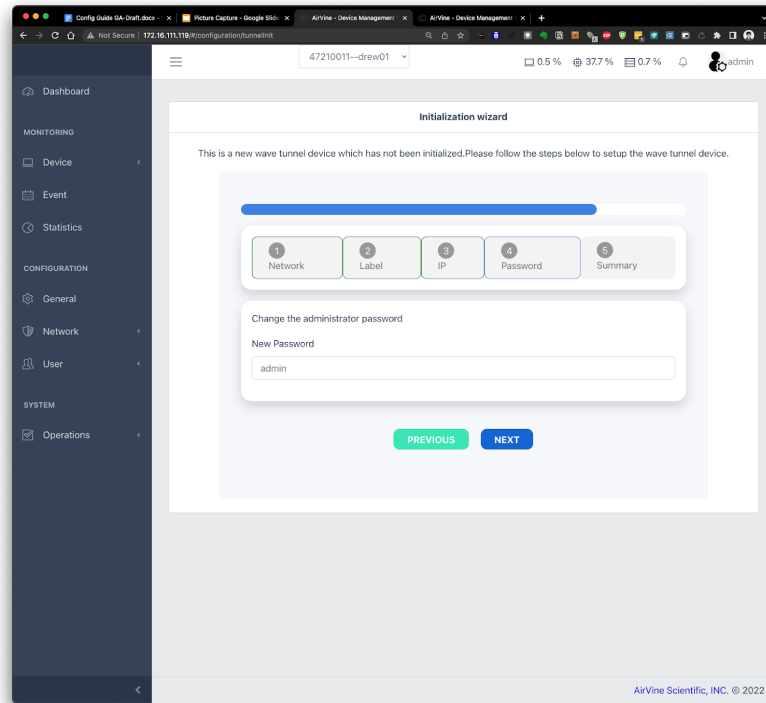
Input the label of this root node to recognize it later.



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

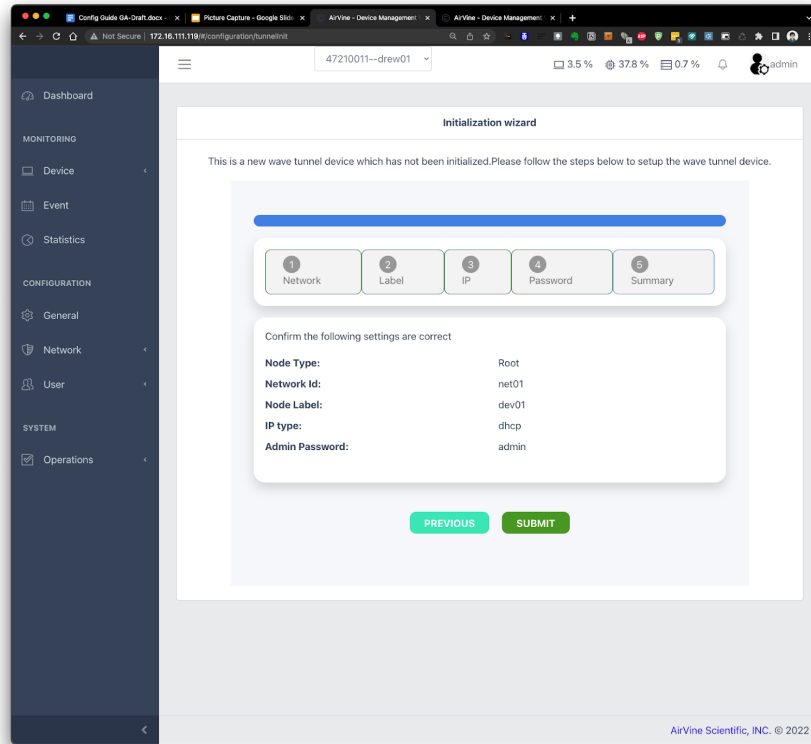


For security considerations, you can also change the default admin password in this step.



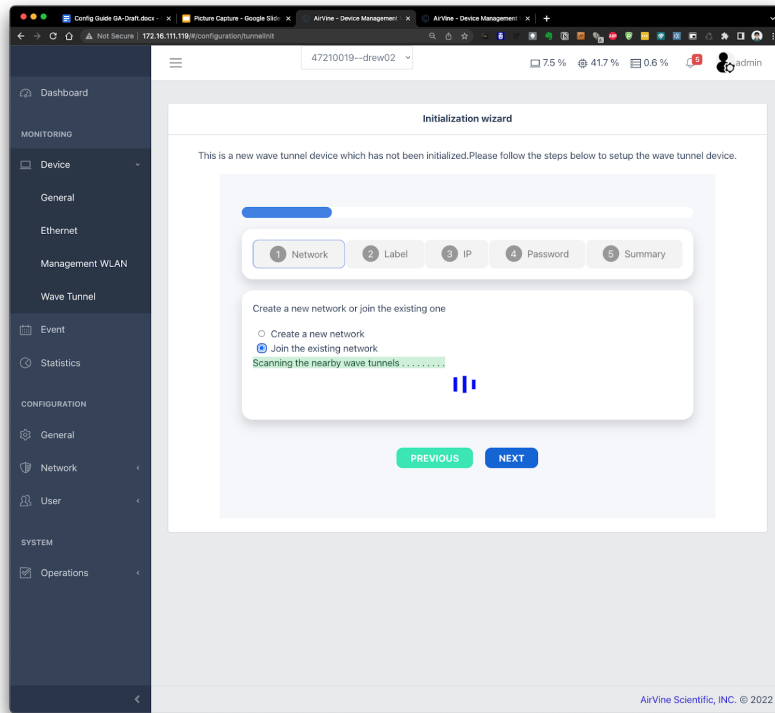
Review the settings and then click the “submit” button to finish the configurations. You can go back to the previous steps to change the setting before clicking the “submit” button. After setup successfully, you can see the Dashboard page in your browser.



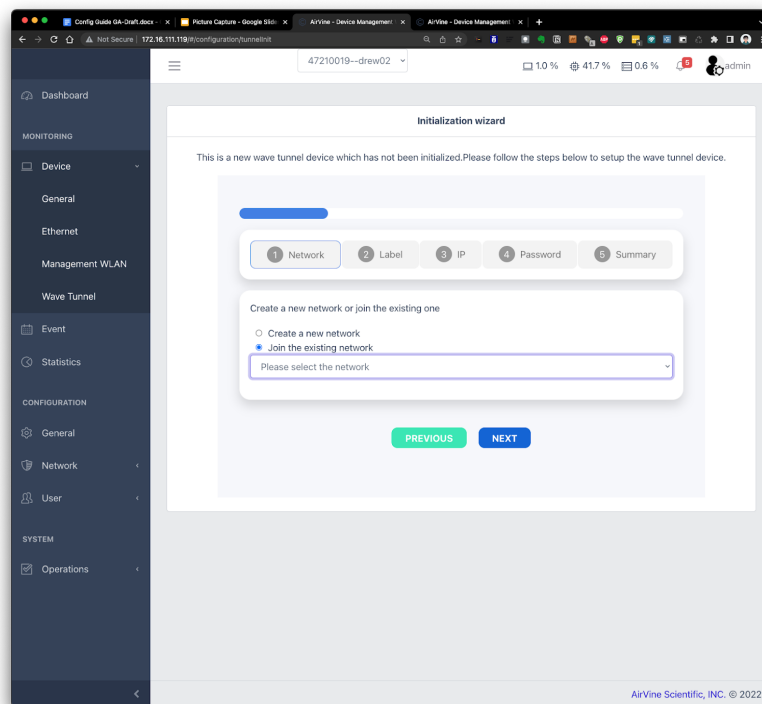


- Set up the Edge Node

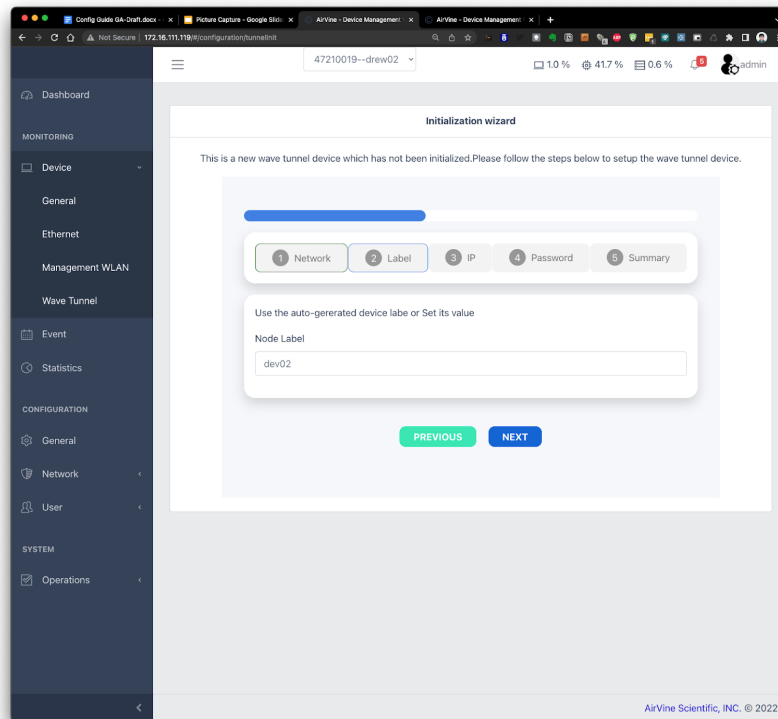
After login to the WEB GUI, the initialization wizard is shown on the landing page. Following the Initialization wizard to set up the wave tunnel connection. The first step is selecting “join the existing network”. The page automatically scans the nearby WaveTunnel network and shows the list in the dropdown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



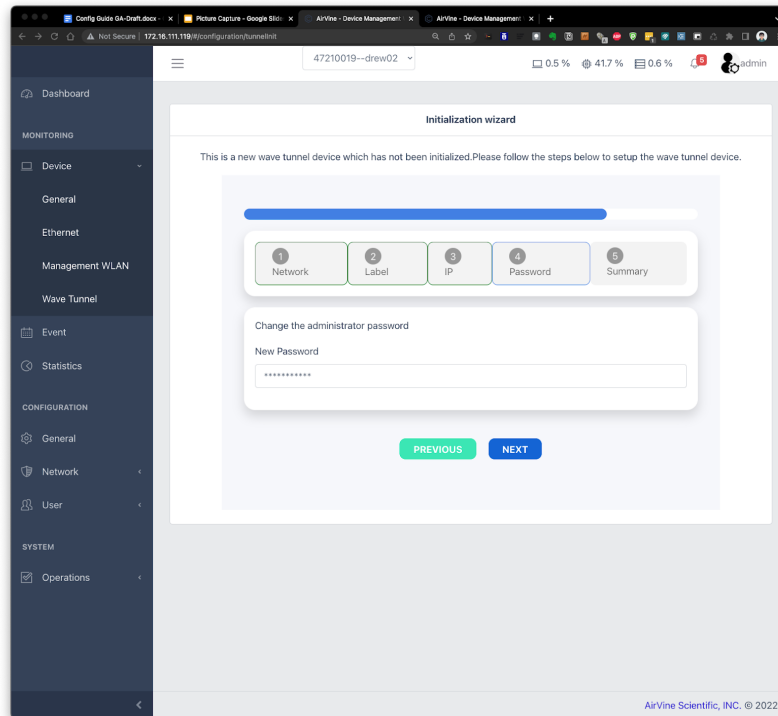
Select the network you want to connect from the drawdown list and then go to the “next” step.



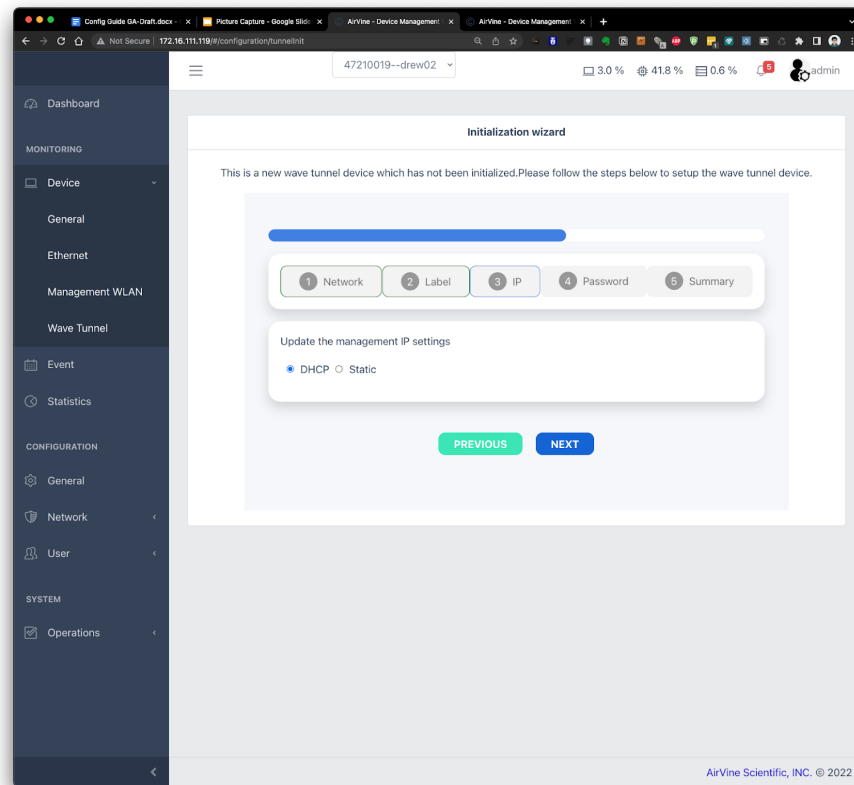
Input the label of this leaf node to recognize it later.



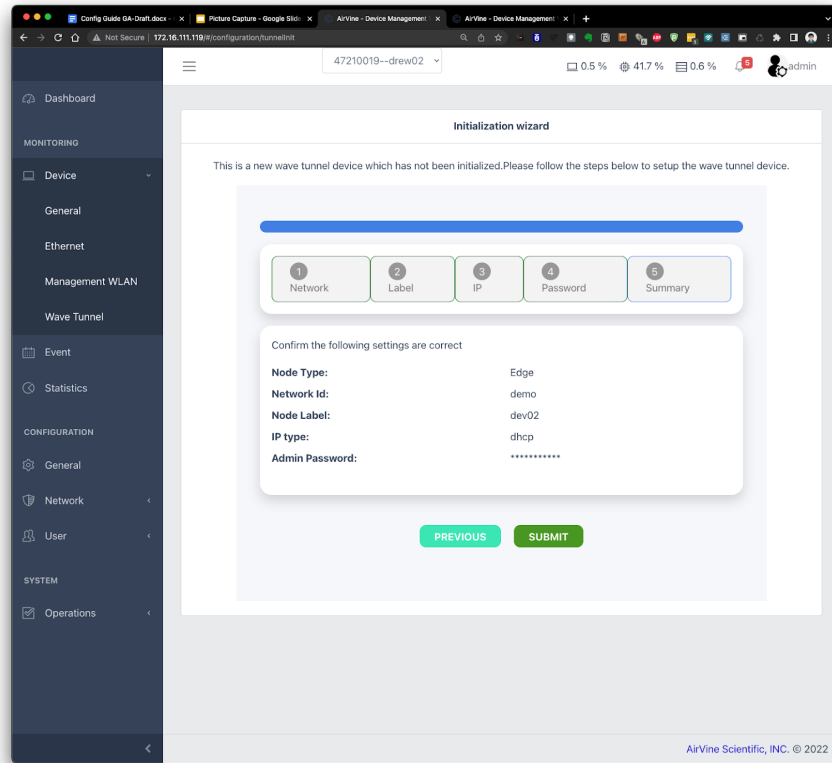
For security considerations, you can change the default admin password in this step.



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



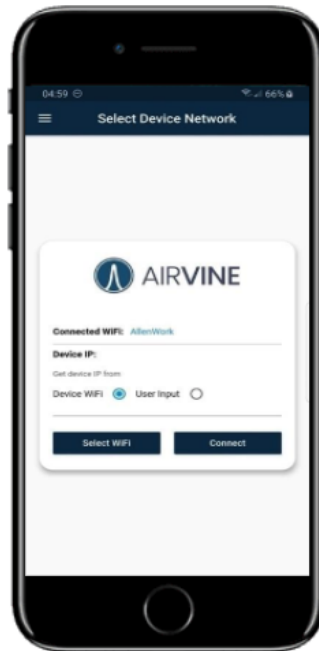
Review the settings and then click the “submit” button to finish the configurations. You can go back to the previous steps to change the setting before clicking the “submit” button. After setup successfully, you can see the Dashboard page in your browser.



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 “Select Wi-Fi” to select the management Wi-Fi SSID.

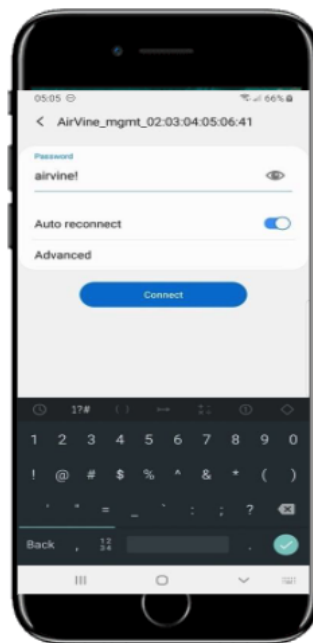
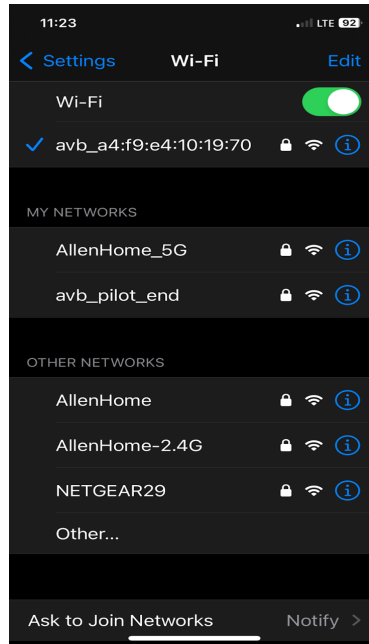


Connect the WaveTunnel node to be configured via the default management SSID which is “avb\_[Device MAC]”.

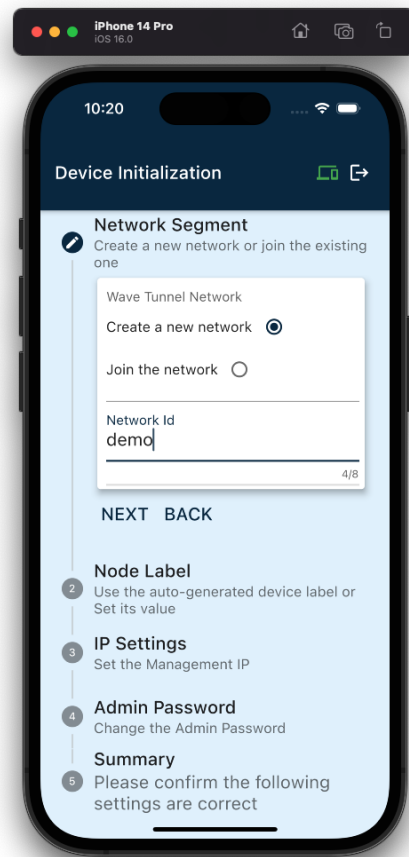
A WaveTunnel node's MAC address is included in the default SSID for aiding in the setup of a network when there are other WaveTunnels broadcasting SSIDs in the area. The MAC address is labeled on each WaveTunnel unit.

The default password for the management 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.



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 Initialization page.

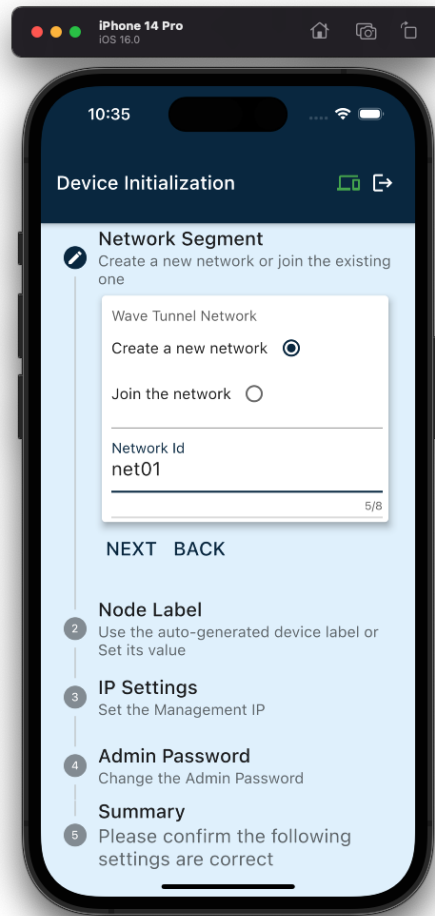


There are slight differences between the configurations of the root node and all other nodes. Please check the steps below.

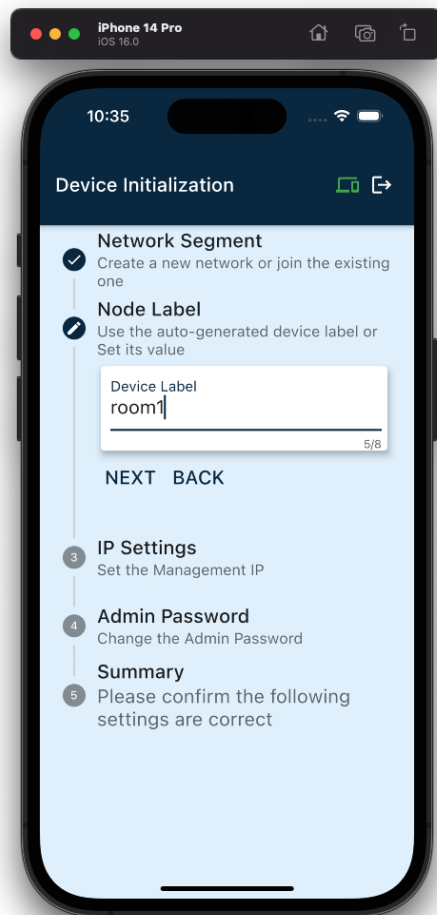
Initializing the root device:

- 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.

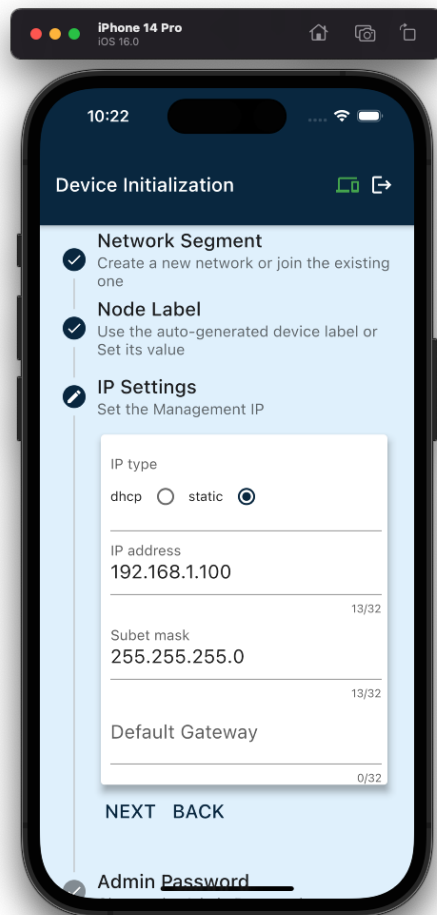




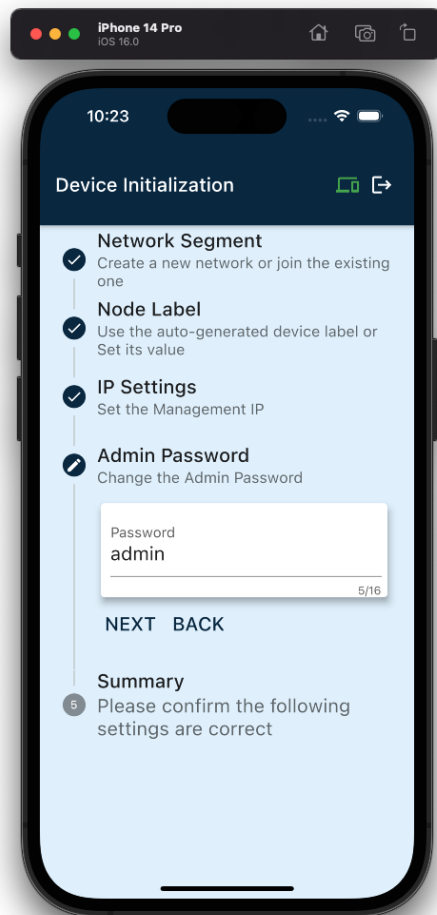
Input the “Device Label” for this device. It will be used to recognize your device later.



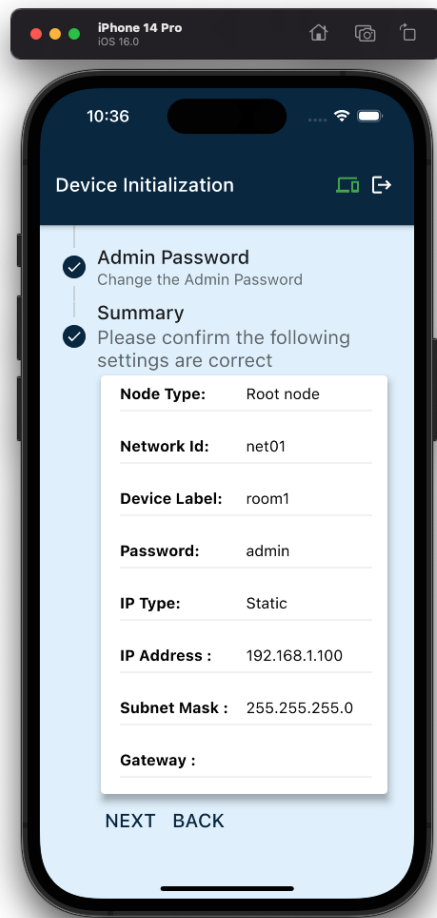
Click “Next” to set the management IP of your device.



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



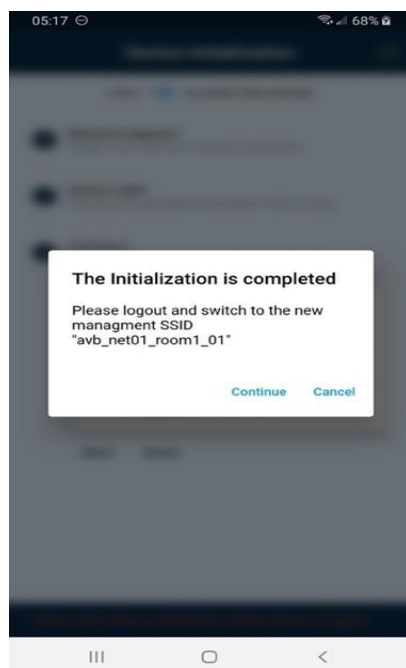
Click “Next” to check the summary of your configurations.



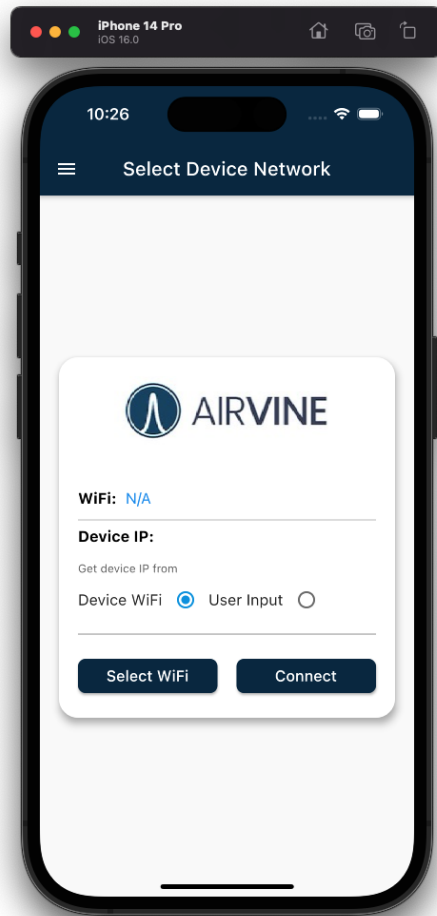
Once you confirm the configurations are correct, click “Next” to initialize the settings for this device.

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]**.

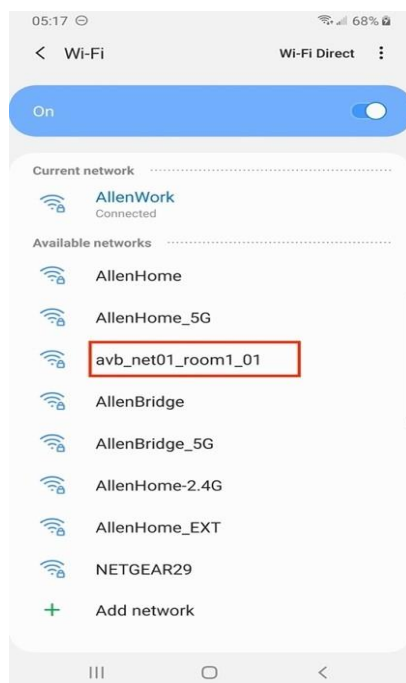


The “Select Device Network” page will be shown to you after completing the initialization step.



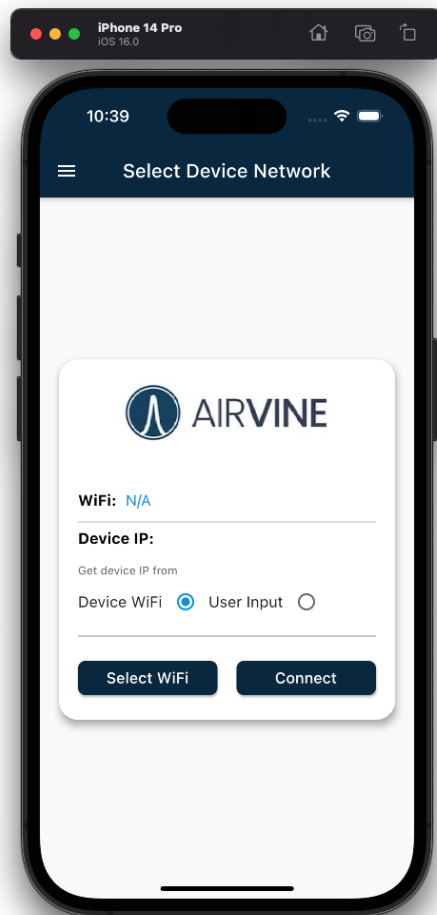
Click on “Select Wi-Fi” to switch to the newly configured management SSID “avb\_net01\_room1”.

The management SSID changes after completing the initialization process from a default SSID to an SSID based on network Id and node label.

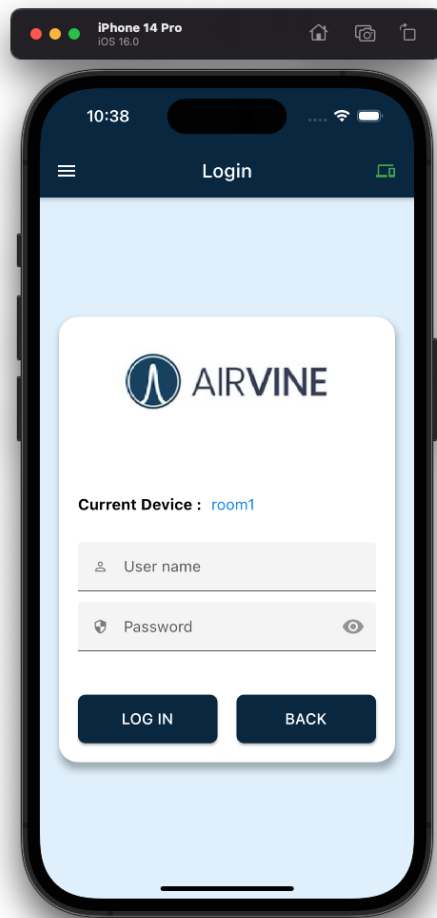


Click “Connect” to go to the Login page.





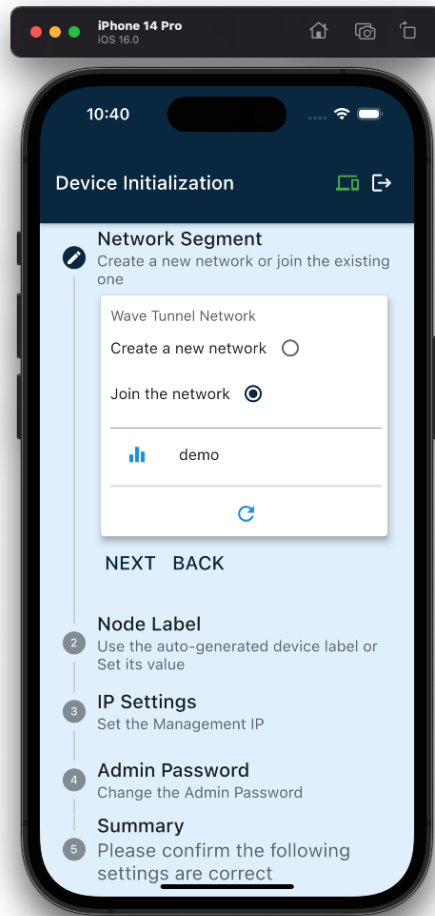
The root device has now been configured successfully. You can use the default username and password to login into the mobile App management pages.



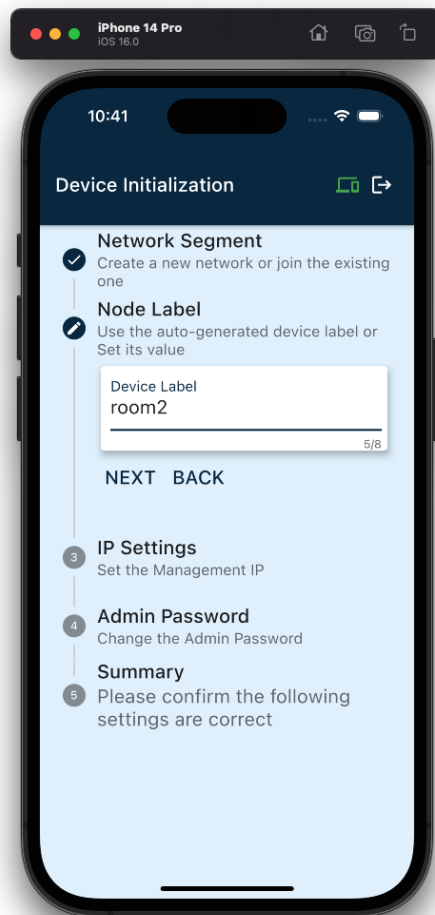
To configure the remaining devices in the network, select the “Join the network” option in the network segment step.

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.

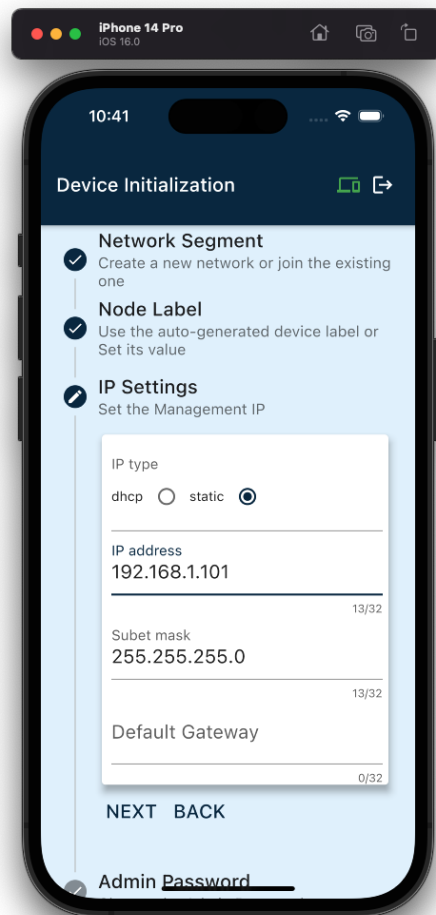
As each node is added to the network, traffic flows are automatically configured between that node and the root node. These flows can pass through relay nodes, but all traffic must flow to and from the root node.



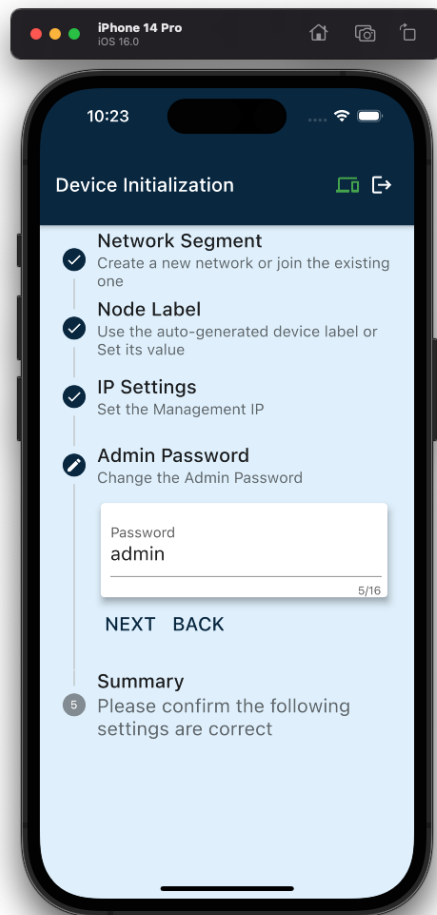
Enter the "Device Label" for this device. Your device can be recognized later using this information.



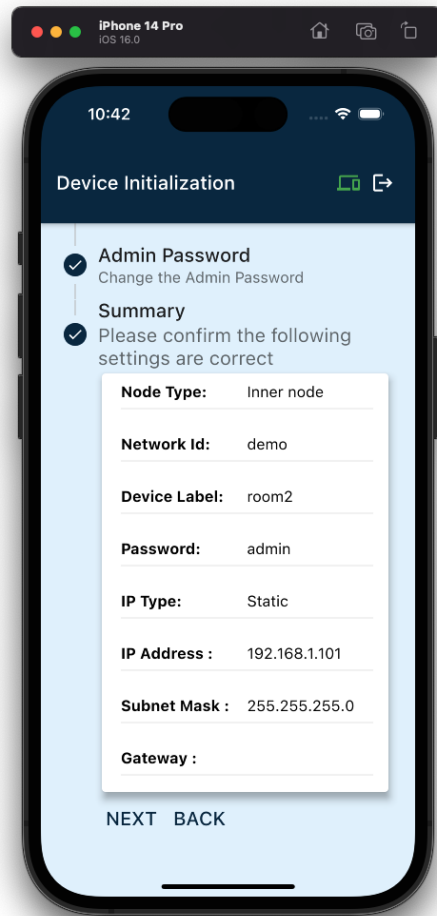
Click “Next” to set the management IP of your device.



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

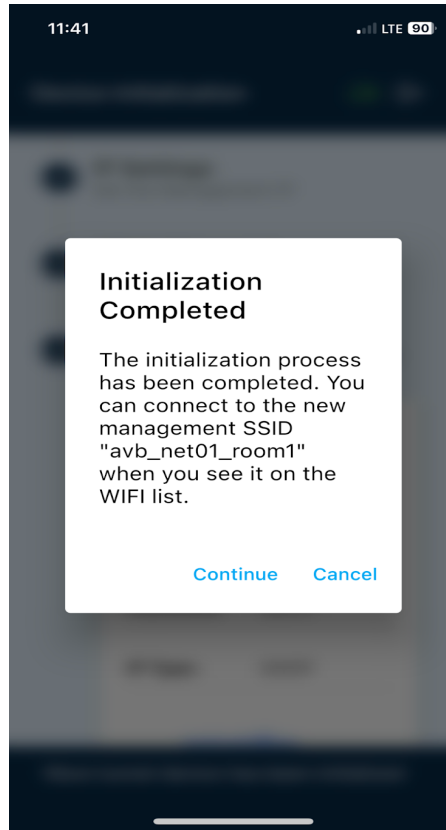


Click “Next” to check the summary of your configurations.

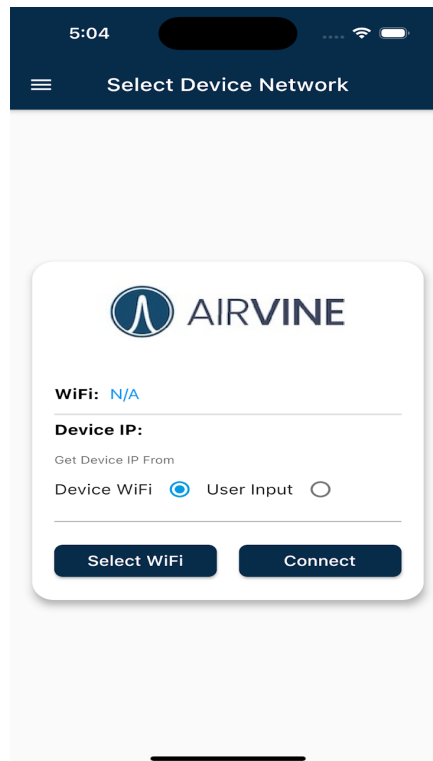


Once you confirm the configurations are correct, click “Next” to initialize the WaveTunnel settings for this device. When the initialization is completed, the popup window appears. Click “Continue” to finish the settings.

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

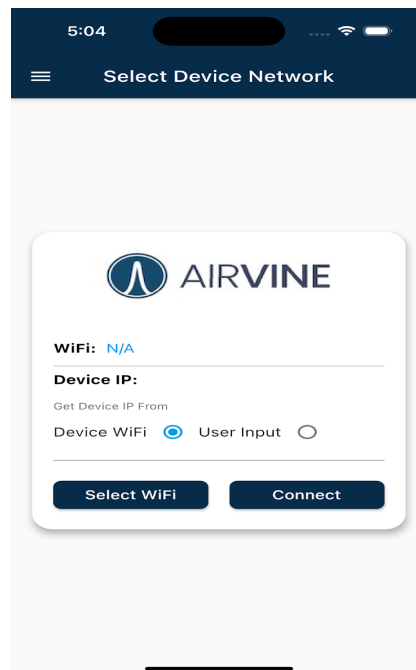
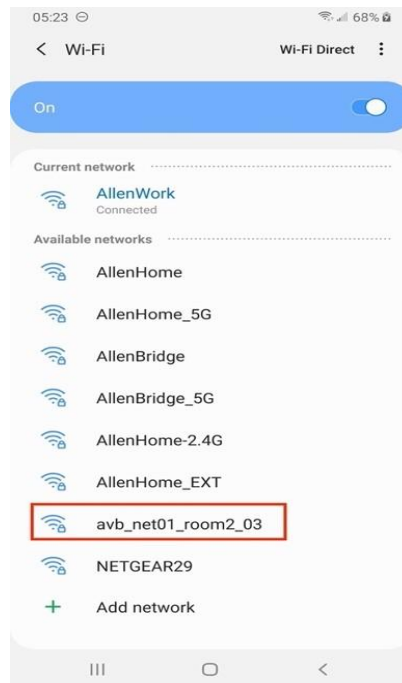


The "Select Device Network" page will be shown for you to switch the New Management SSID.

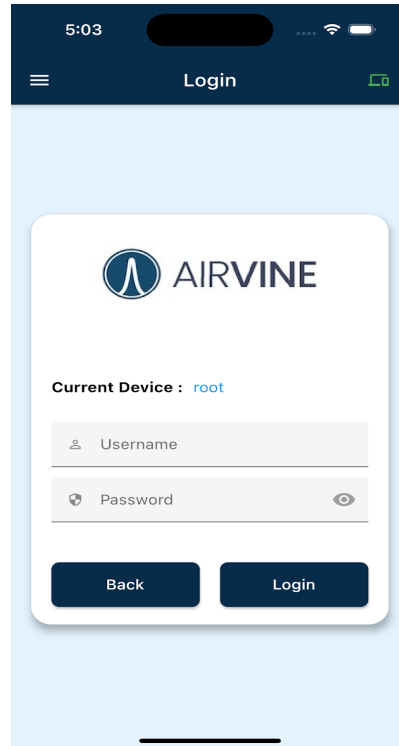




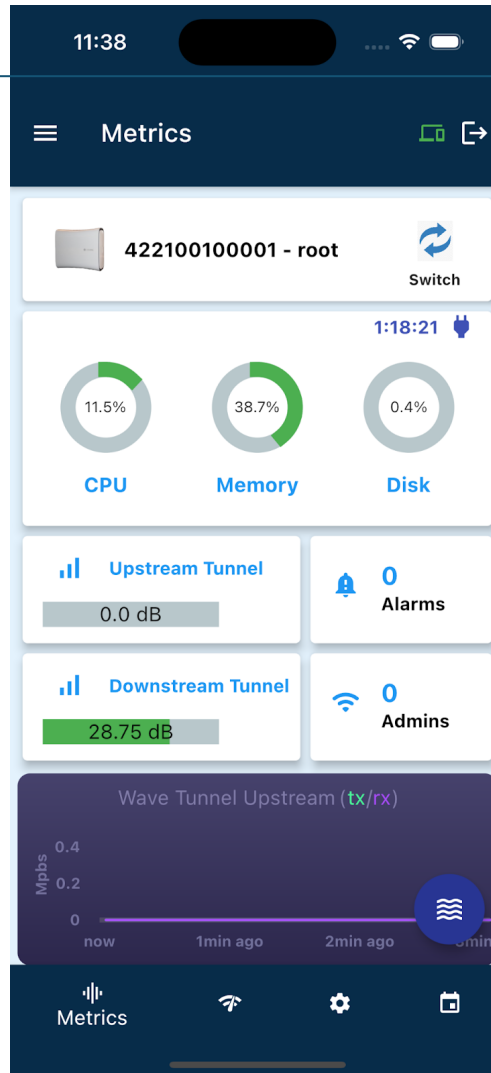
Click “Select Wi-Fi” to switch to the newly configured management SSID “avb\_net01\_room2”.



Click “Connect” to go to the Login page



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.



## Manage the WaveTunnel device firmwares

### 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.

## [WEB GUI]

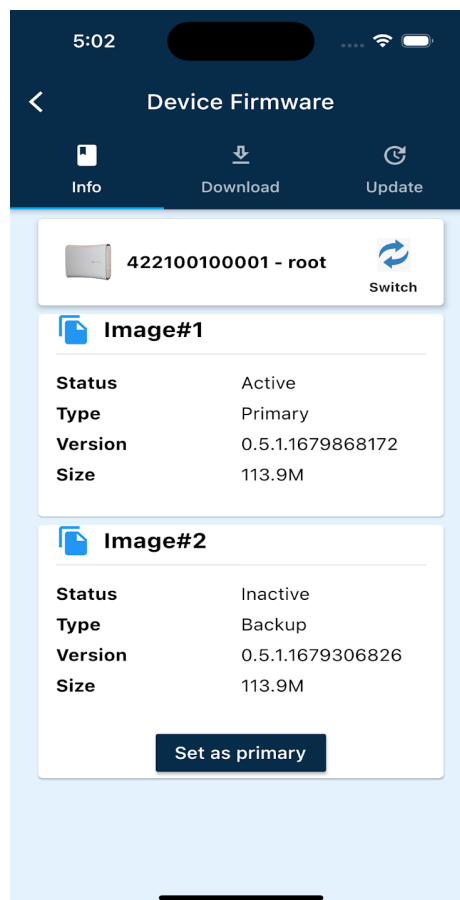
### Operation -> Firmware Update

| Current Firmware Information |          |         |                  |        |                                  | Refresh |
|------------------------------|----------|---------|------------------|--------|----------------------------------|---------|
| 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 |         |

Set As Primary

## [Mobile App]

### Settings -> Firmware -> Info



## [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 TFTP 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

Get the firmware from:

☒ HTTP ☐ FTP ☐ TFTP ☐ Local File

Server address  ✓

Server port  ✓

File path  ✓

User name

User password

[Download](#)

[Clear](#)

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.

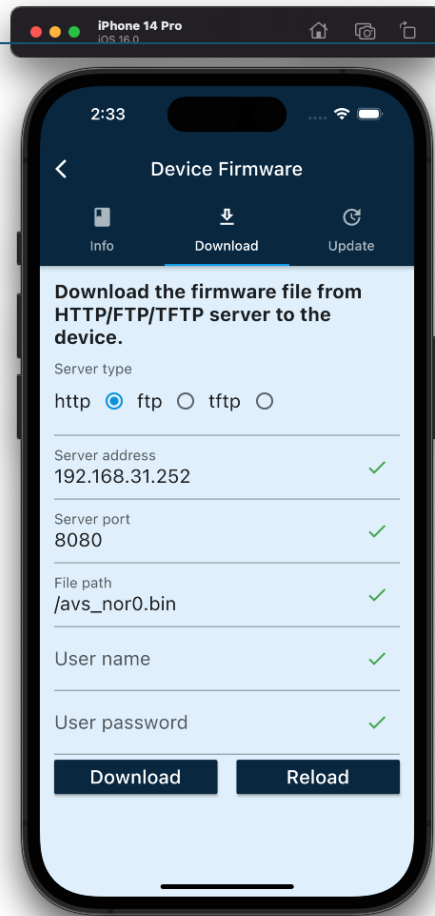
[Choose File](#) No file chosen

[Upload](#)

### [Mobile App]

**Settings -> Firmware -> Download**

Input the server setting and click download button

**[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

```





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

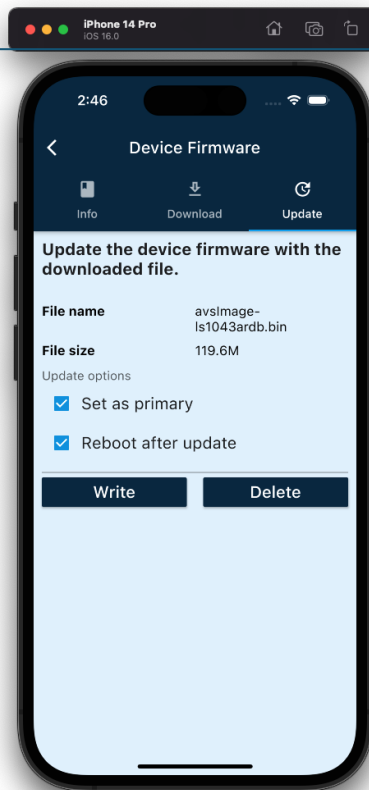
File Name: avslImage-Is1043ardb.bin (119.6M)

☒ Set as primary

☒ Reboot after update

### [Mobile App]

#### Settings -> Firmware -> 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

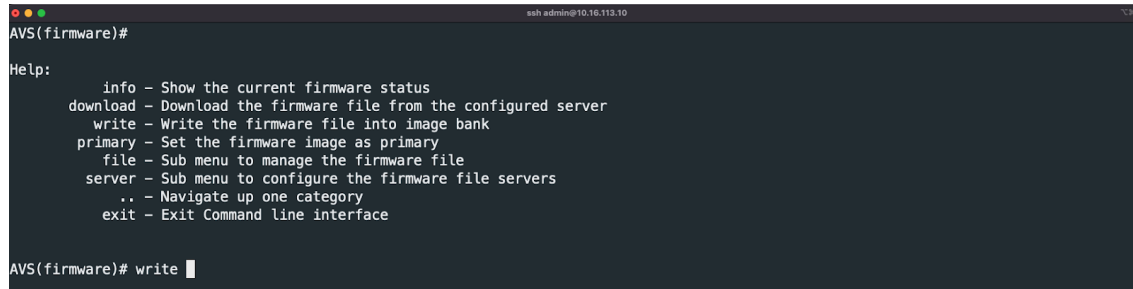
AVS(firmware)# file
AVS(firmware-file)#
Help:
  info - Show information of the downloaded firmware file
  verify - Verify the the downloaded firmware file
  delete - Delete the downloaded firmware file
  .. - Navigate up one category
  exit - Exit Command line interface

AVS(firmware-file)# info
Available firmware image file:


| Name                     | Size   |
|--------------------------|--------|
| avsImage-ls1043ar.db.bin | 119.6M |


AVS(firmware-file)#
```

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
```

## Configure the WaveTunnel device

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.

## Update the 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

Network Id

newair8 ✓

Node Label

root ✓

Antenna Direction

☒ Default ☐ Flipped

✓ Save

✗ Cancel

**Downstream Tunnel settings**

Connection

☒ Enabled ☐ Disable

Channel

1 ▾

Please set the channel

✓ Save

✗ Cancel

**Upstream Tunnel settings**

Connection

☒ Enabled ☐ Disable

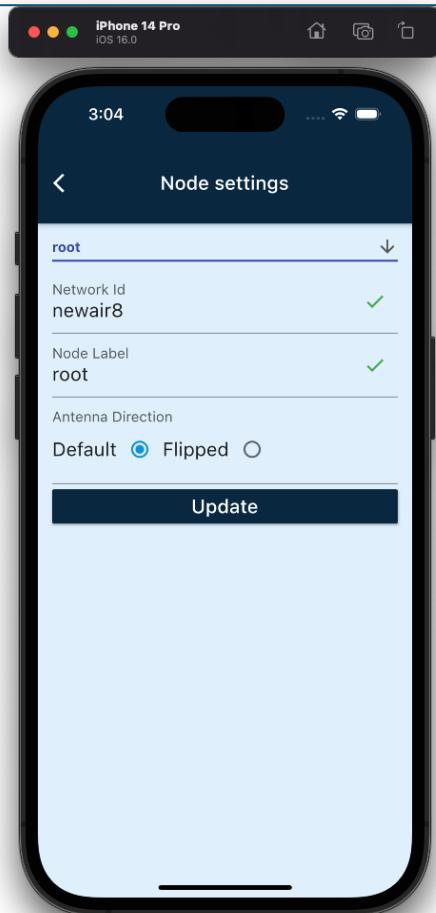
Connection Name

avb\_newair8\_06 ✓

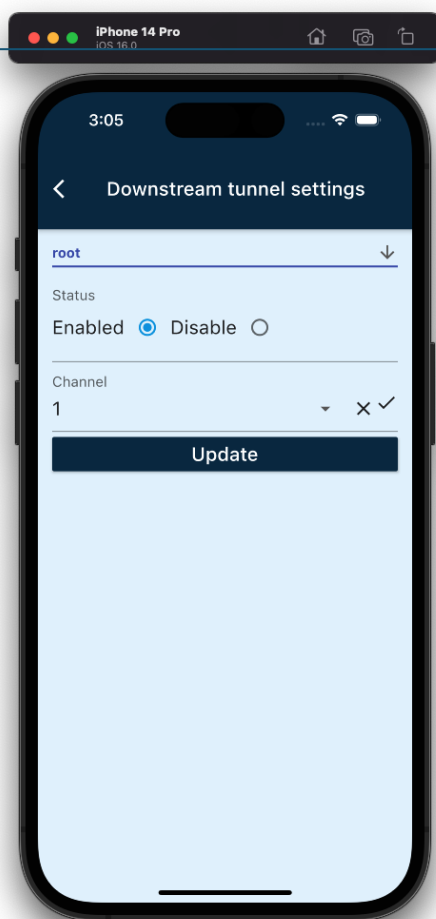
✓ Save

✗ Cancel

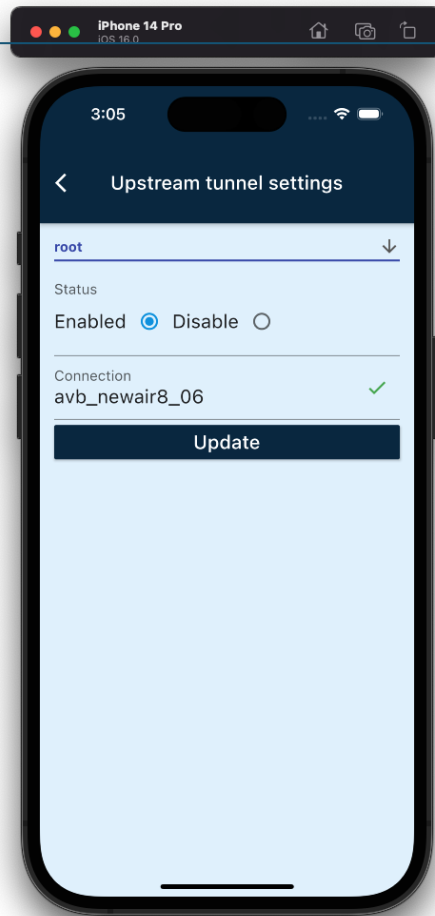
**[Mobile App]**  
**Settings -> Wave Tunnel settings**



**Settings -> Downstream Tunnel settings**



**Settings -> Upstream Tunnel settings**



**[CLI]**  
**config -> wavetunnel**

```
ssh admin@10.10.115.10
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 configurations 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)#
```

```
ssh admin@10.16.113.10
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
```

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

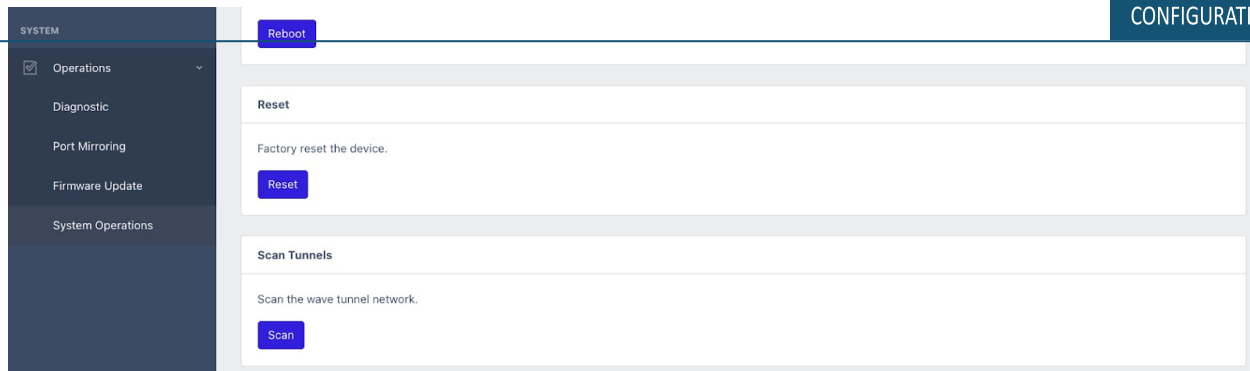
| Description     | Attribute Name | Current Value  | Modified Value |
|-----------------|----------------|----------------|----------------|
| Status          | enabled        | Enabled        |                |
| Connection Name | ssid           | avb_newair8_06 | avb_demo_06    |

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

## Scan the WaveTunnel network

If there is a WaveTunnel device removed from the network or you are seeing the abnormal network 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

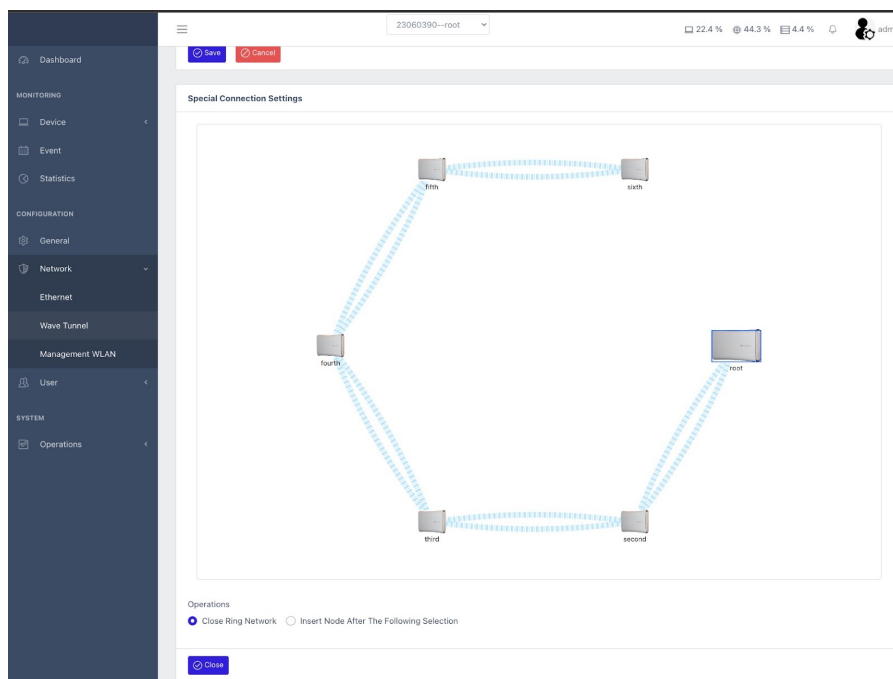


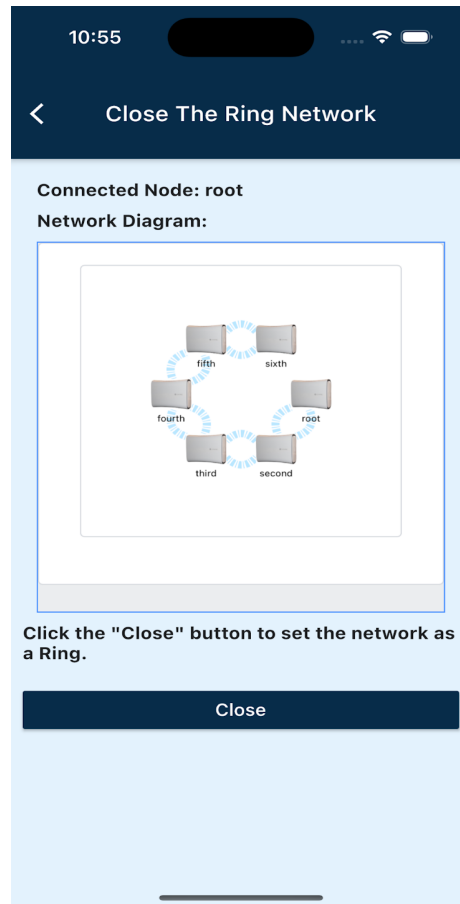
## Close the Ring Network

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]

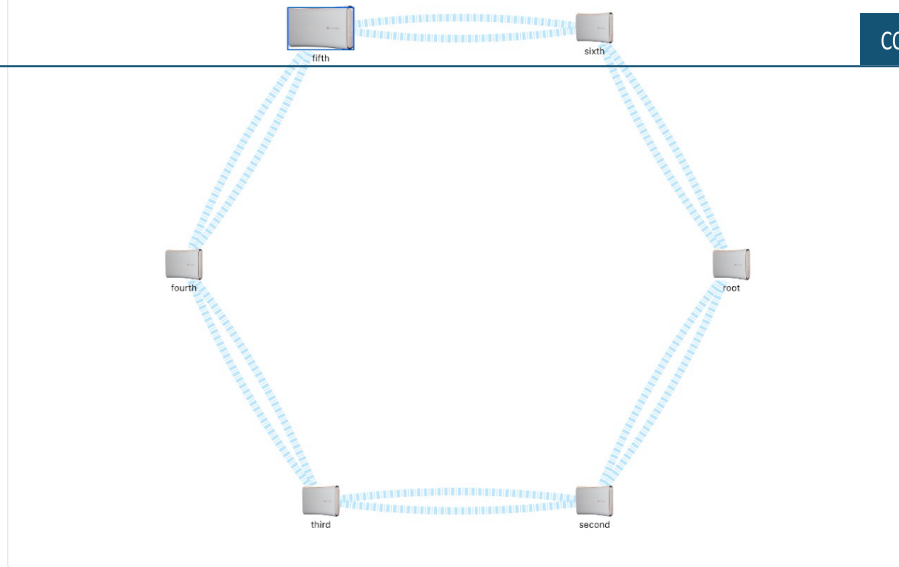
**Configuration -> Network -> Wave Tunnel**





## 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 Insertion Node

a4:f9:e4:10:

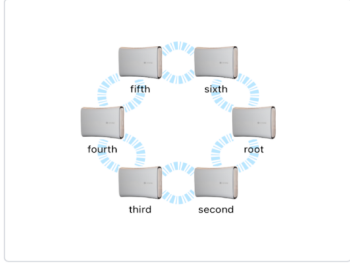
Insert

11:10

<
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:  :

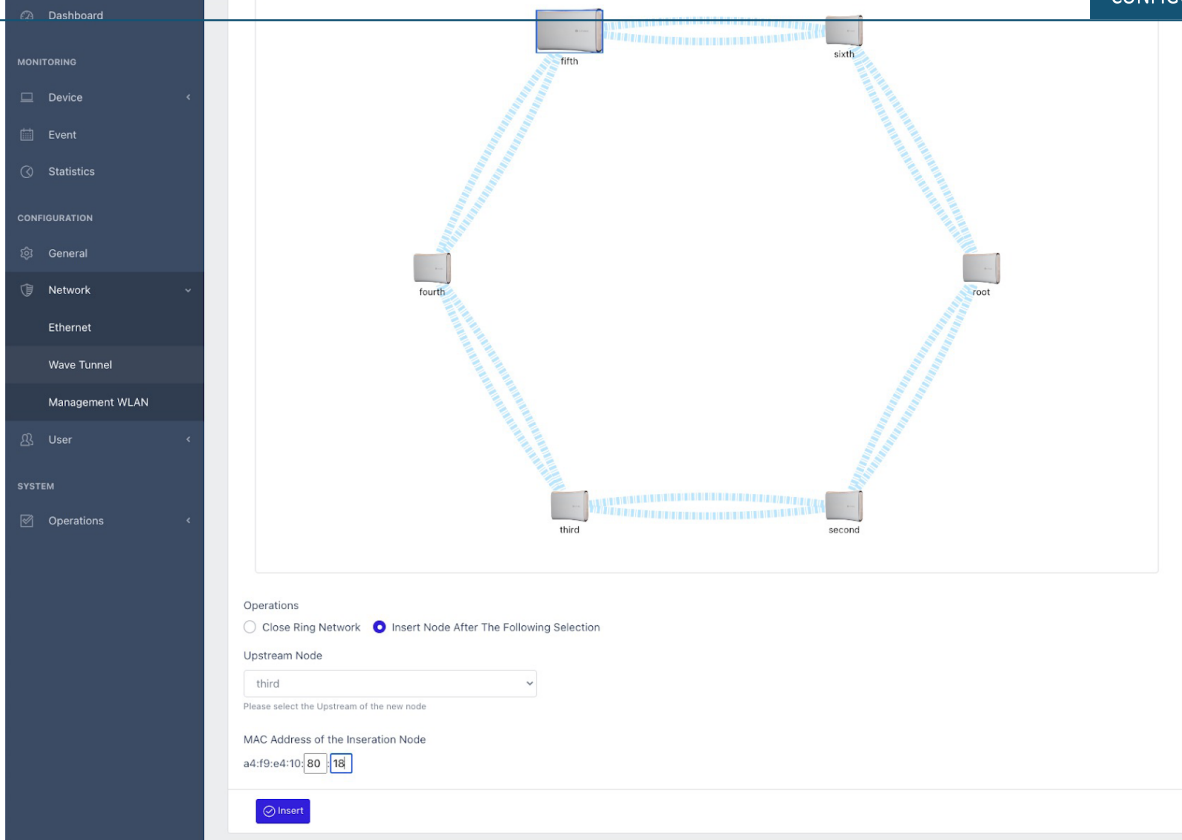
0/2      0/2

Mark the insertion position

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.

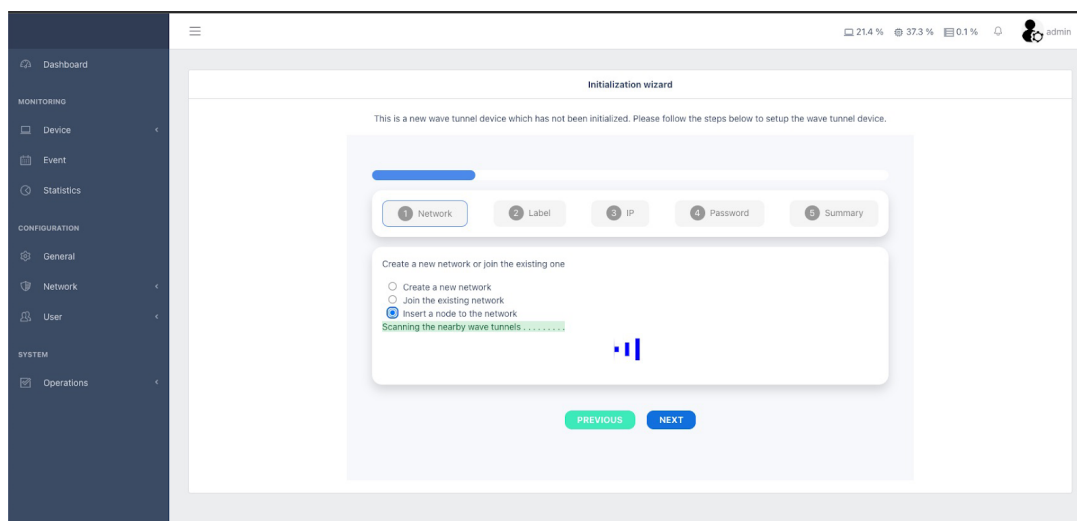


The screenshot displays the AIRVINE web interface. On the left is a dark sidebar with navigation menus: Dashboard, MONITORING (Device, Event, Statistics), CONFIGURATION (General, Network, Ethernet, Wave Tunnel, Management WLAN), User, and SYSTEM (Operations). The main content area shows a network topology diagram with six nodes labeled 'fifth', 'sixth', 'fourth', 'third', 'second', and 'root' connected in a ring. Below the diagram, the 'Operations' section has two radio buttons: 'Close Ring Network' (unselected) and 'Insert Node After The Following Selection' (selected). Under 'Insert Node After The Following Selection', the 'Upstream Node' dropdown is set to 'third'. A text prompt says 'Please select the Upstream of the new node'. Below that, the 'MAC Address of the Insertion Node' is shown as 'a4:f9:e4:10:80:18', with the last octet '18' highlighted in a blue box. An 'Insert' button is at the bottom.

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.



The screenshot shows the 'Initialization wizard' in the AIRVINE web interface. The title is 'Initialization wizard'. Below the title, it says 'This is a new wave tunnel device which has not been initialized. Please follow the steps below to setup the wave tunnel device.' There is a progress bar with five steps: 1. Network (active), 2. Label, 3. IP, 4. Password, and 5. Summary. Below the progress bar, there is a section titled 'Create a new network or join the existing one' with three radio buttons: 'Create a new network' (unselected), 'Join the existing network' (unselected), and 'Insert a node to the network' (selected). Below the radio buttons, it says 'Scanning the nearby wave tunnels .....'. At the bottom, there are 'PREVIOUS' and 'NEXT' buttons.

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

**Device Label**

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

**IP Settings**

3 Set the Management IP

**Admin Password**

4 Change the Admin Password

**Summary**

5 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.

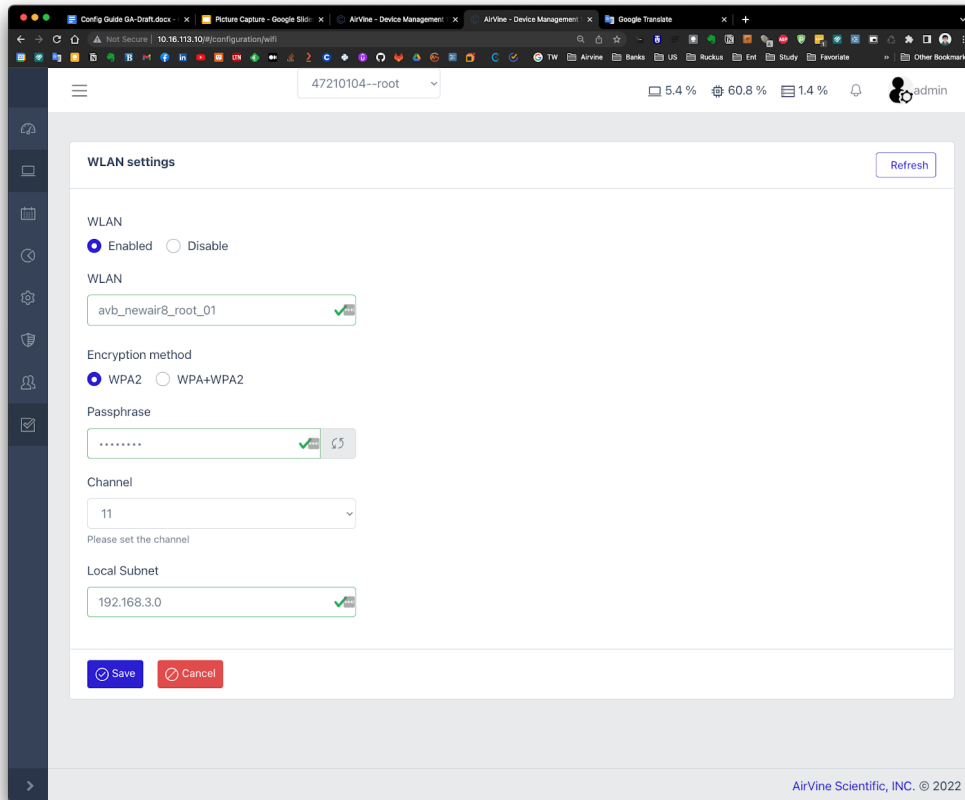
## Update the Management WLAN

The management WLAN is mainly for the management purposes. 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/d  
SSID name, encryption method, passphrase, channel and local subnet.

## [WEB GUI]

### Configuration -> Network -> Management WLAN



The screenshot displays the 'WLAN settings' page in the AirVine Web GUI. The page is accessed via a web browser at the URL 10.16.113.101/configuration/wifi. The user is logged in as 'admin'. The settings are as follows:

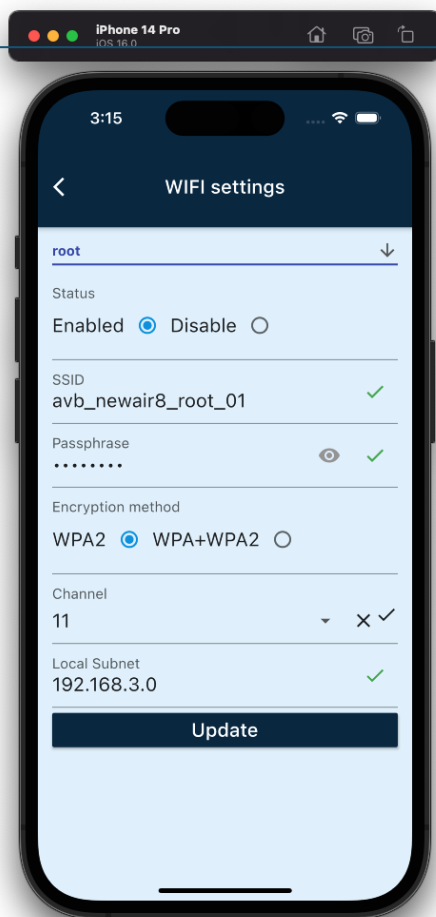
- WLAN:** Enabled (radio button selected), Disable (radio button unselected).
- WLAN:** avb\_newair8\_root\_01 (text field with a green checkmark icon).
- Encryption method:** WPA2 (radio button selected), WPA+WPA2 (radio button unselected).
- Passphrase:** [Redacted] (text field with a green checkmark icon and a copy icon).
- Channel:** 11 (dropdown menu).
- Local Subnet:** 192.168.3.0 (text field with a green checkmark icon).

At the bottom of the settings form, there are 'Save' and 'Cancel' buttons. A 'Refresh' button is located in the top right corner of the settings panel. The footer of the page reads 'AirVine Scientific, INC. © 2022'.

## [Mobile App]

### Settings -> WIFI settings





[CLI]  
config -> wifi

```

AVS(config)#
Help:
  device - Sub menu to configure the device settings
  ethernet - Sub menu to configure the ethernet settings
  wavelunnel - 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 configurations 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         |                |

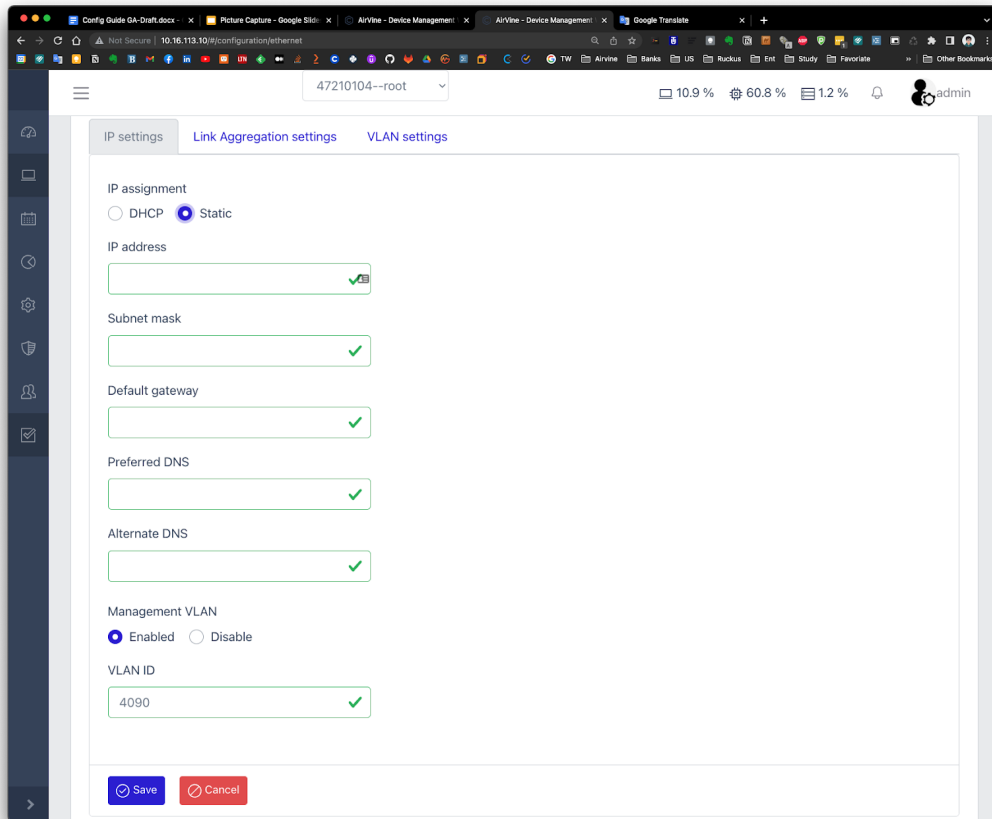
```
AVS(config-wifi)# save
```

## 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**



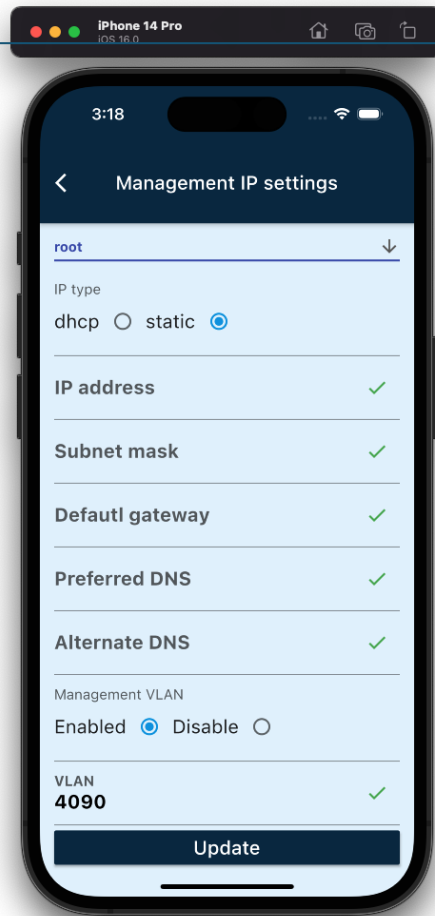
The screenshot displays the AirVine Web GUI interface for configuring IP settings. The browser address bar shows the URL `10.16.113.10/#configuration/ethernet`. The page title is `47210104--root`. The user is logged in as `admin`. The left sidebar contains navigation icons for various system functions. The main content area is titled **IP settings** and includes tabs for **Link Aggregation settings** and **VLAN settings**. The configuration fields are as follows:

- IP assignment:** Radio buttons for ☐ DHCP and ☒ Static.
- IP address:** Text input field with a green checkmark.
- Subnet mask:** Text input field with a green checkmark.
- Default gateway:** Text input field with a green checkmark.
- Preferred DNS:** Text input field with a green checkmark.
- Alternate DNS:** Text input field with a green checkmark.
- Management VLAN:** Radio buttons for ☒ Enabled and ☐ Disable.
- VLAN ID:** Text input field containing `4090` with a green checkmark.

At the bottom of the form are **Save** and **Cancel** buttons.

### [Mobile App]

**Settings-> Management**



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

```

AVS(config)#
Help:
  device - Sub menu to configure the device settings
  ethernet - Sub menu to configure the ethernet settings
  wavelunnel - 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 configurations 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)#

```

```
ssh admin@10.16.113.10
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**

IP settings

Link Aggregation settings

VLAN 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



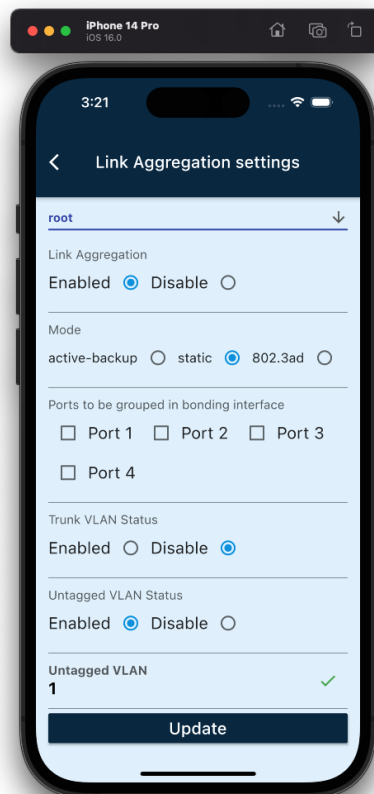
Native Untagged vlan

☐ Enabled ☒ Disable

Save

Cancel

## [Mobile App] Settings -> LAG



## [CLI]

```

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.

**Configuration-> Network ->Ethernet -> VLAN settings**

Ethernet settings
Refresh

IP settings
Link Aggregation settings
VLAN 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
 ✓

Native Untagged vlan
☒ Enabled
☐ Disable

Untagged VLAN
 ✓



Port

☒ Enabled ☐ Disable

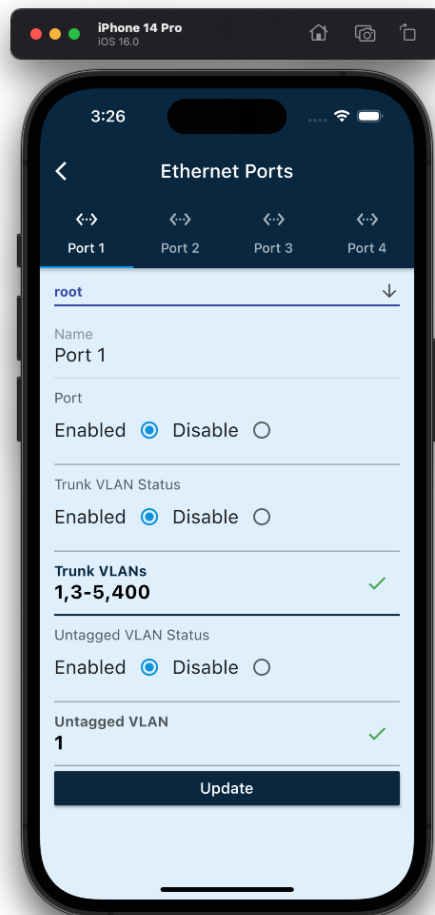
Management port

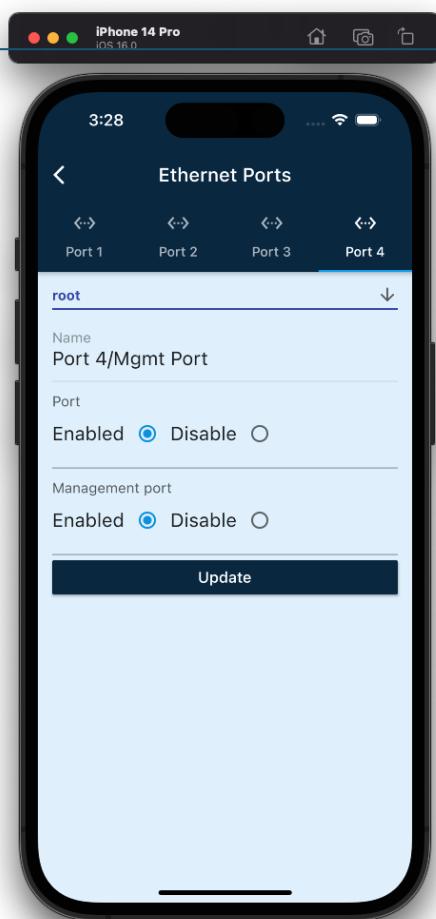
☒ Enabled ☐ Disable



**Port 4 can be configured as the dedicated management port.**

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





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

```
ssh admin@10.16.113.10
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
```

## PSE settings

If the WaveTunnel device is powered by AC power. The four ethernet ports can be configured to support the POE out. The max. Watt of the total power is limited to 120W. The default PSE is disabled. If you need to power the external device via the WaveTunnel, please configure the proper PSE settings.

### [WEB GUI]

**Configuration-> Network ->Ethernet -> PSE**

IP settings

Link Aggregation settings

VLAN settings

PSE settings

Port 1

30 W

Port 2

30 W

Port 3

30 W

Port 4

30 W

Save



Cancel

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

5:12

<

POE Out Settings

 47210011 - end   
Switch

Port 1 Power  
Disable

Port 2 Power  
Disable

Port 3 Power  
Disable

Port 4 Power  
Disable

Update

[CLI]  
config -> ethernet -> pse



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       |                |

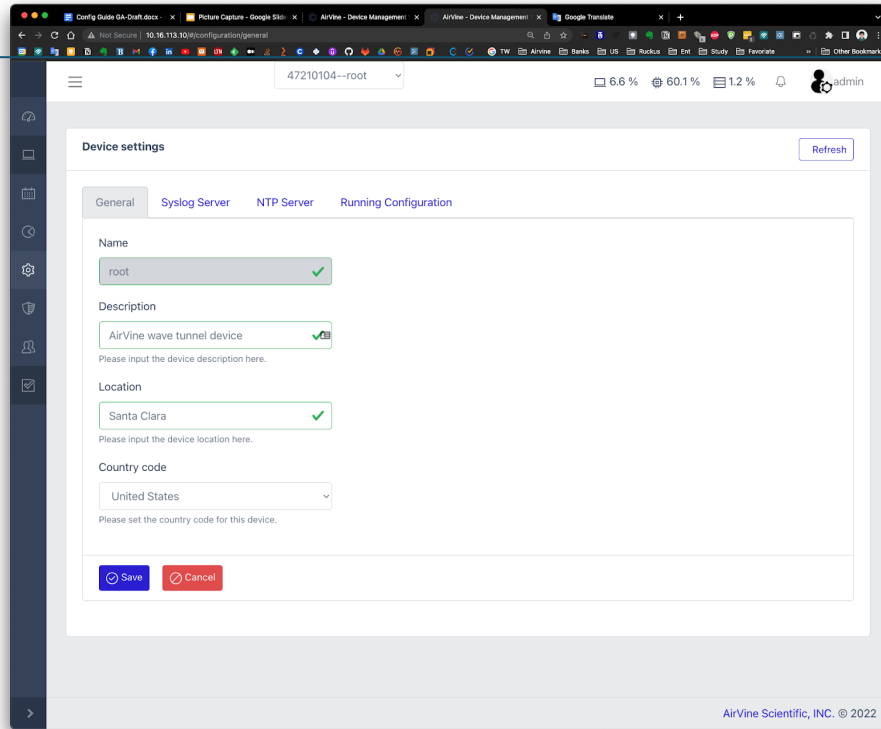
## Update the device settings

### General settings

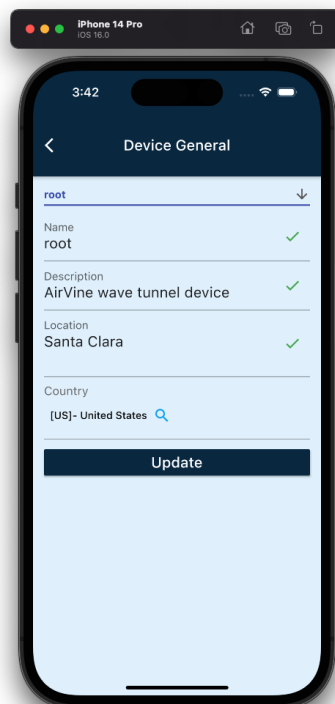
To update the description,location,Country code of the WaveTunnel device on this page.

**[WEB GUI]**

**Config -> General**



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

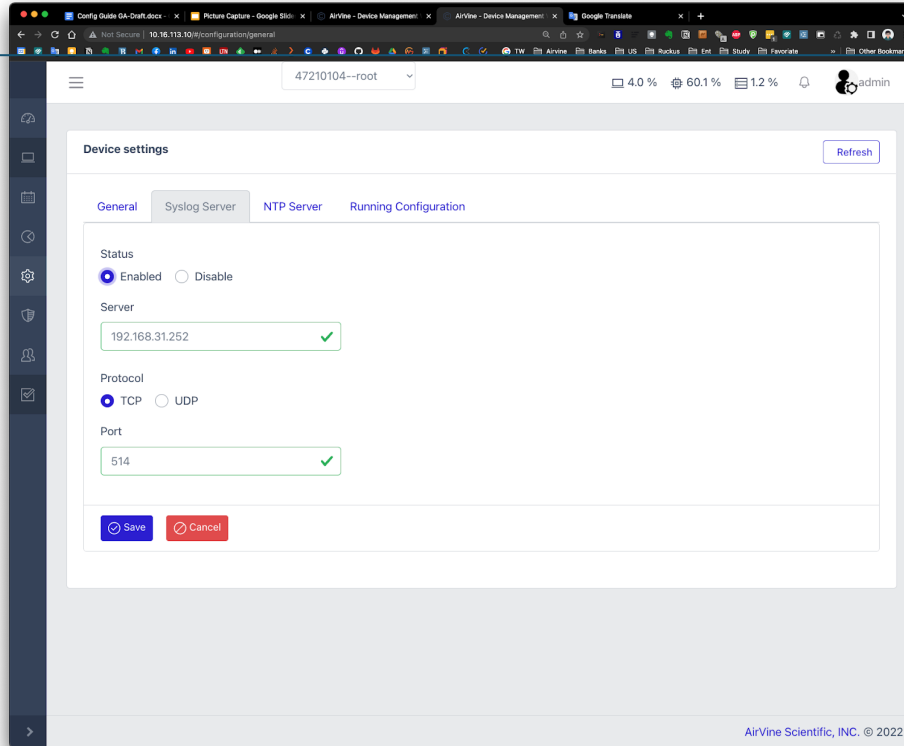
```

## Syslog settings

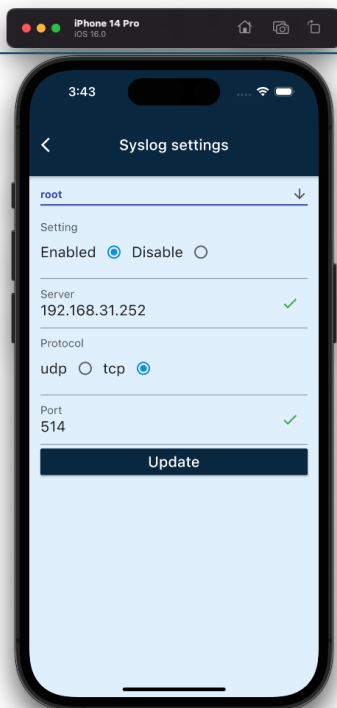
To export the log messages to the external syslog server, you can enable the syslog server on this page. The settings include enabled/disable, server address, port.

### **[WEB GUI]**

**Configuration-> General -> Syslog Server**



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



[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

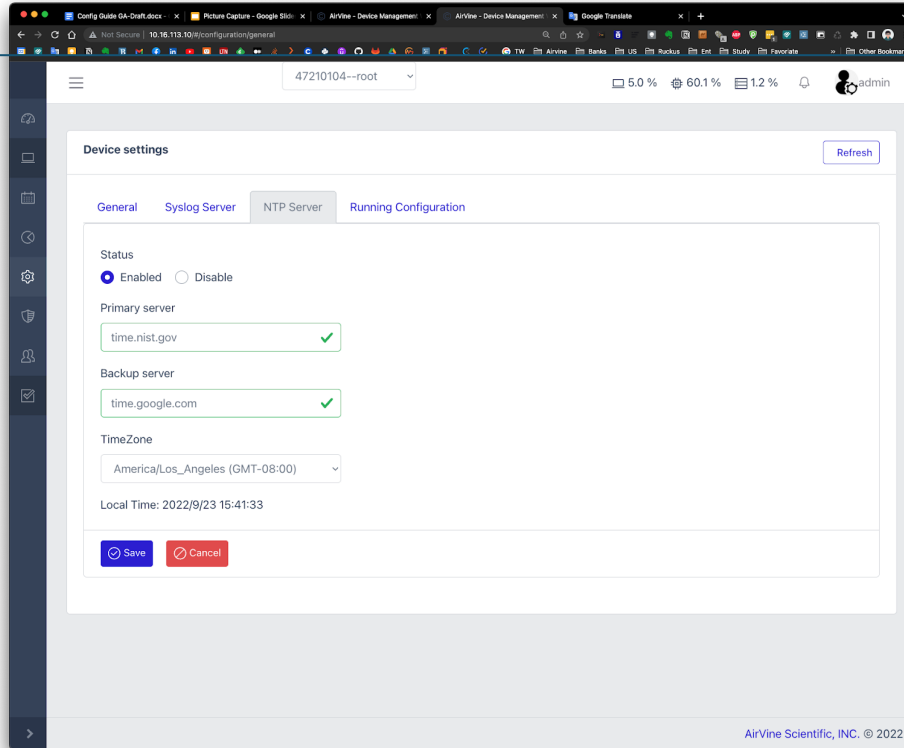
```

## NTP settings

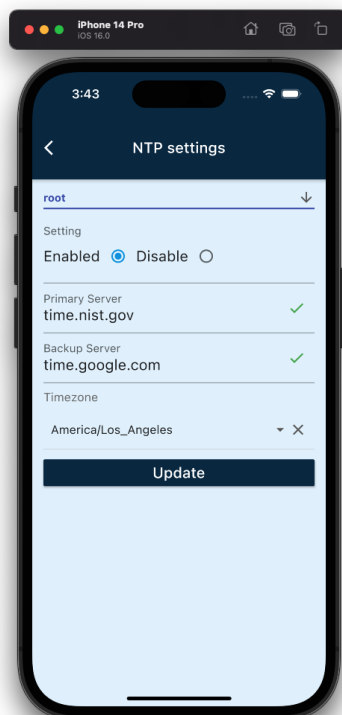
You can configure the NTP settings of the WaveTunnel to synchronize the date time with the external server. It requires that your WaveTunnel can reach the NTP server in your local network or Internet. If there is no NTP server available, the WaveTunnel sync up the date time with the user's client device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

### [WEB GUI]

**Configuration-> General ->NTP ->**



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



**[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 |                |



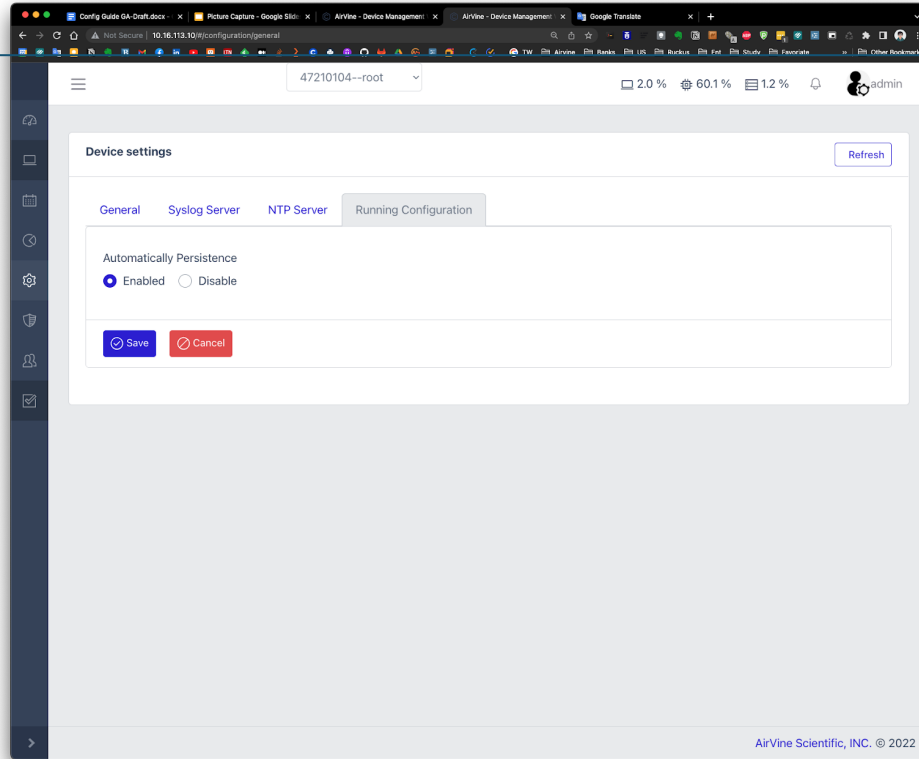
AVS(config-device-ntp)# save

```

## 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 ->**



**[CLI]**

**Config -> autosave**

```

alien@alien-unc: ~
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 configurations 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)#
  
```

```

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 usages

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

#### [WEB GUI]

#### Monitoring -> Device -> General

47210011--drew01

2.0 %

38.7 %

0.7 %

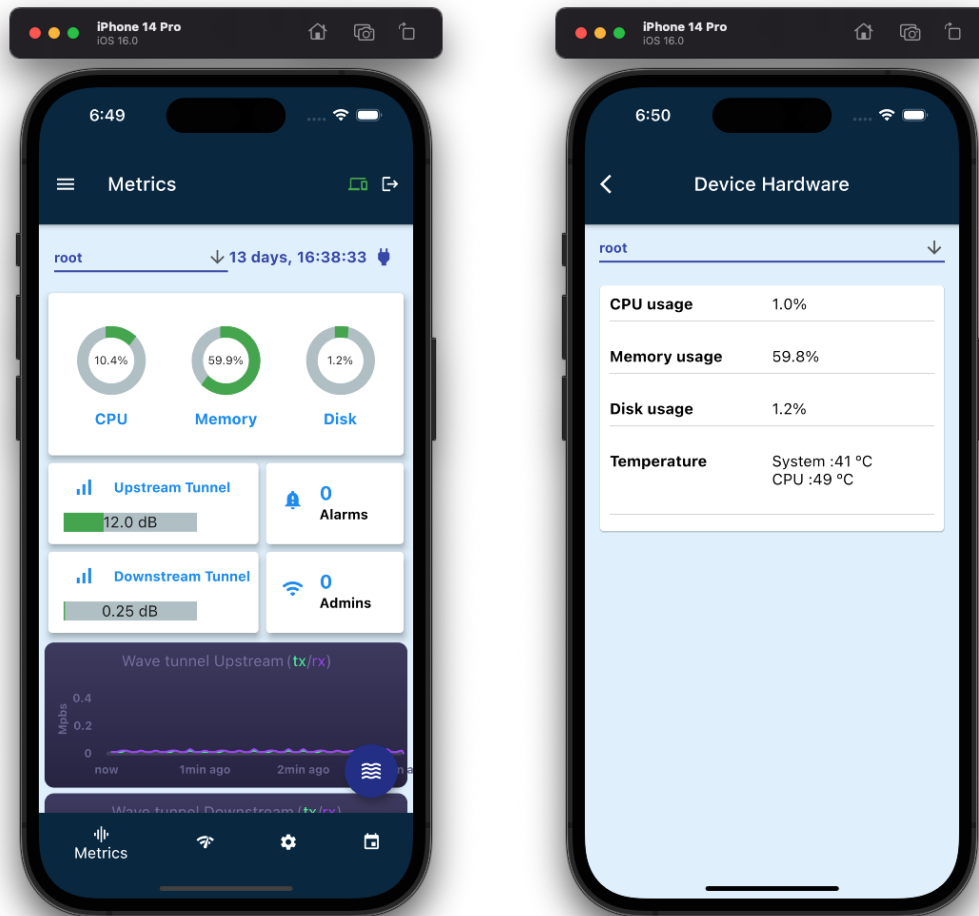
admin

Hardware status

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



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



**[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 °C<br>CPU :50 °C |

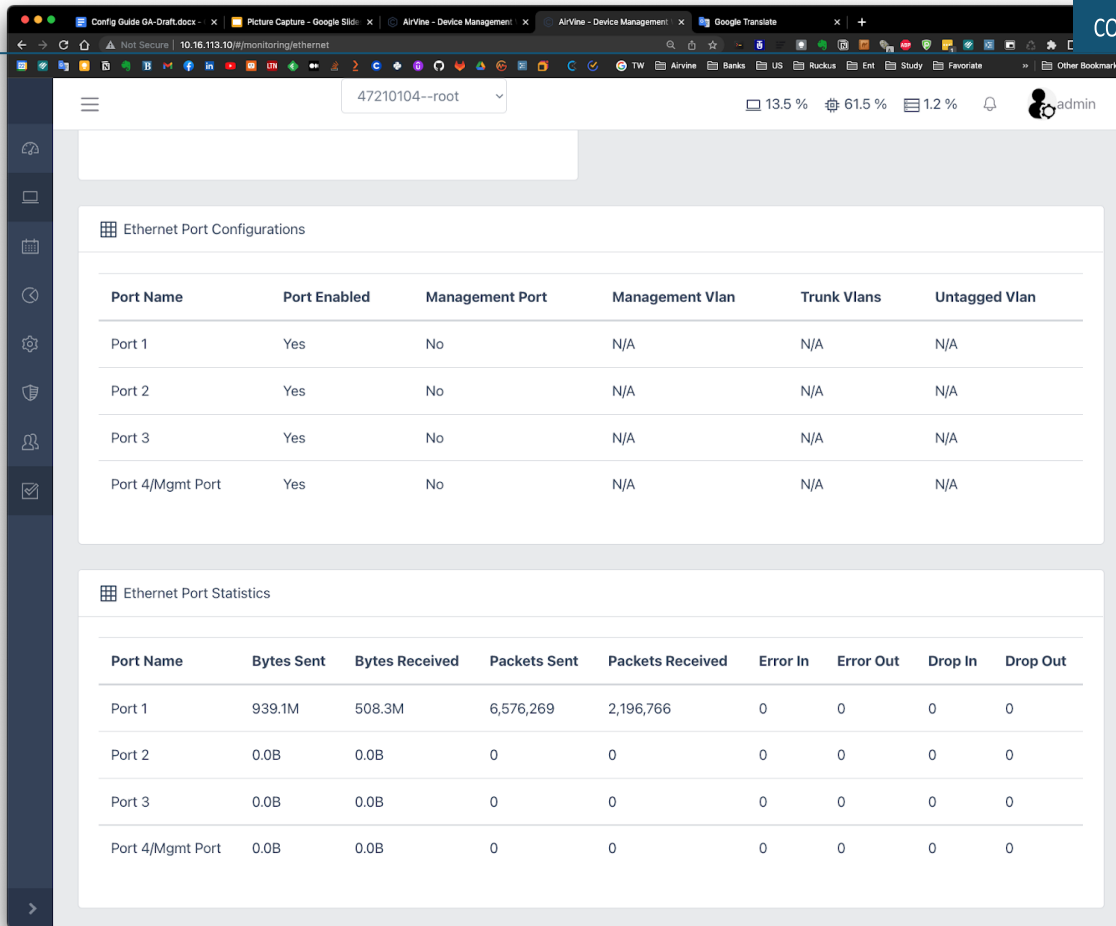
AVS# █

## 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**



The screenshot shows the AirVine web interface with the following data:

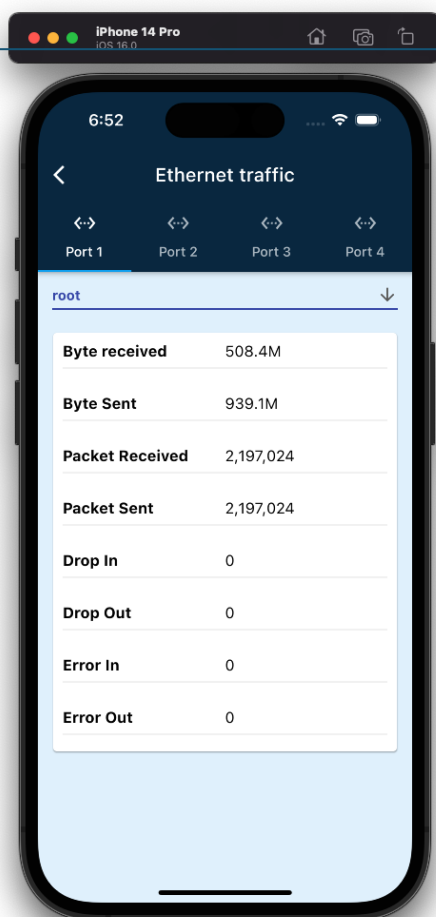
### Ethernet Port Configurations

| 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**



**[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        |

```

AVS#

```

## 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.

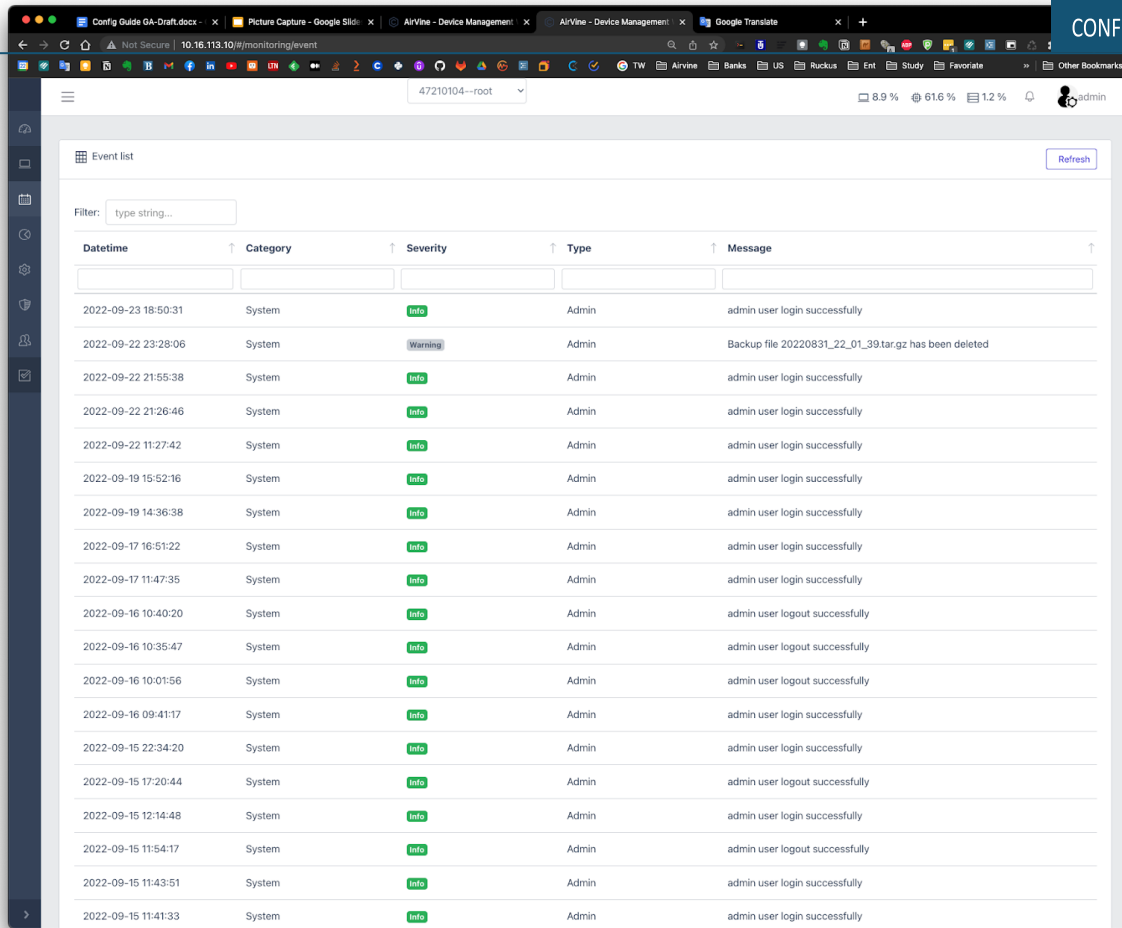
### [WEB GUI] Statistics



## 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

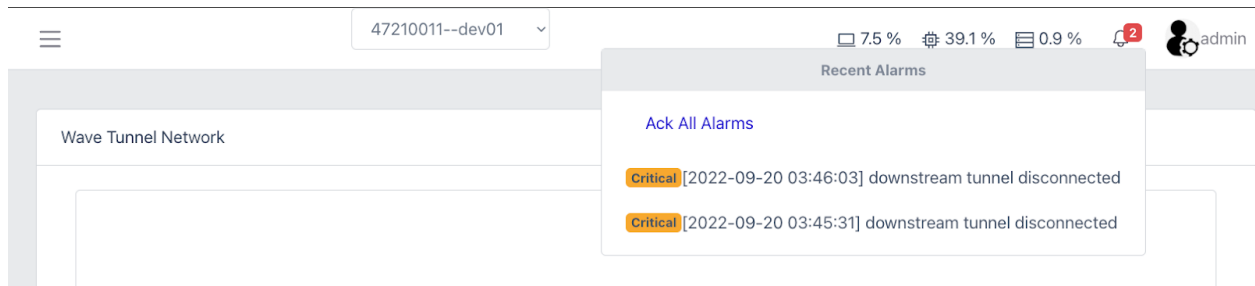


Event list

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 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 login 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 login 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.



Wave Tunnel Network

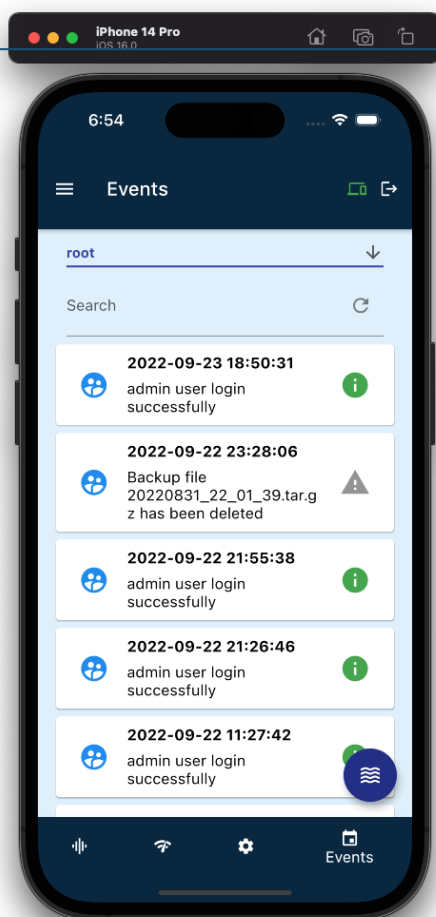
Recent Alarms

[Ack All Alarms](#)

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

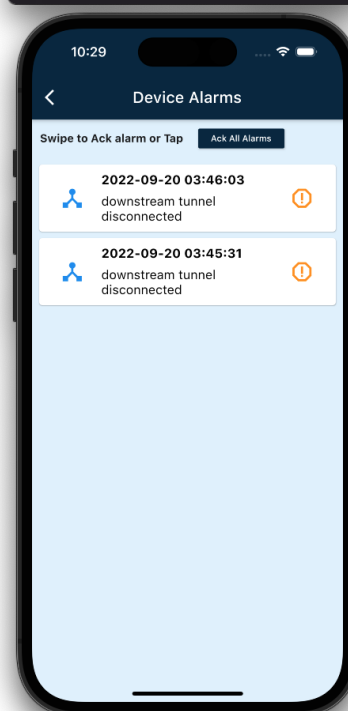
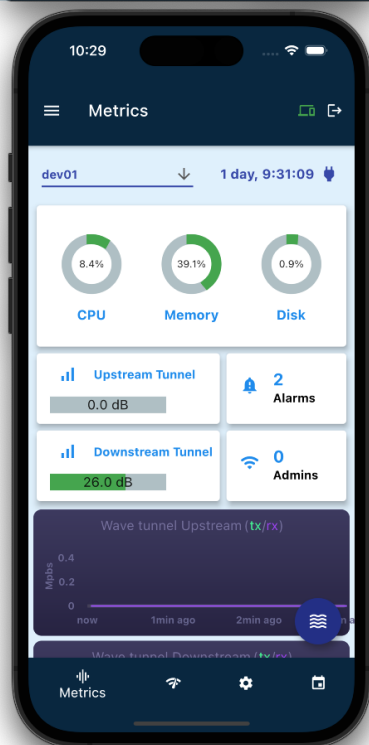
**Critical** [2022-09-20 03:45:31] downstream tunnel disconnected

## [Mobile App] Events



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





**[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 18:58:31 | 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 10:48:20 | Info     | Admin | System   | admin user logout successfully                        |

```

AVS#

```

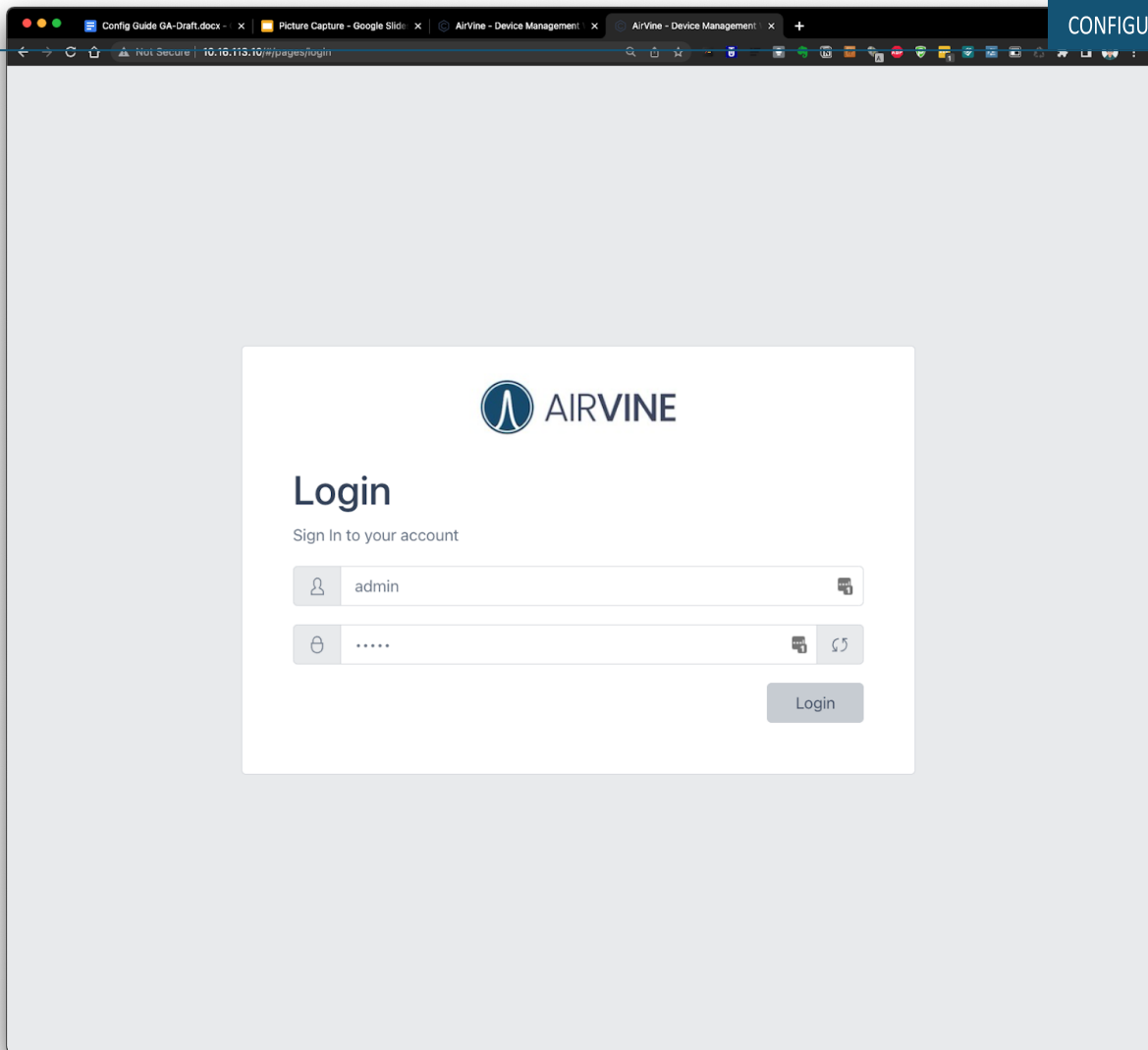
# User Management

## 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.

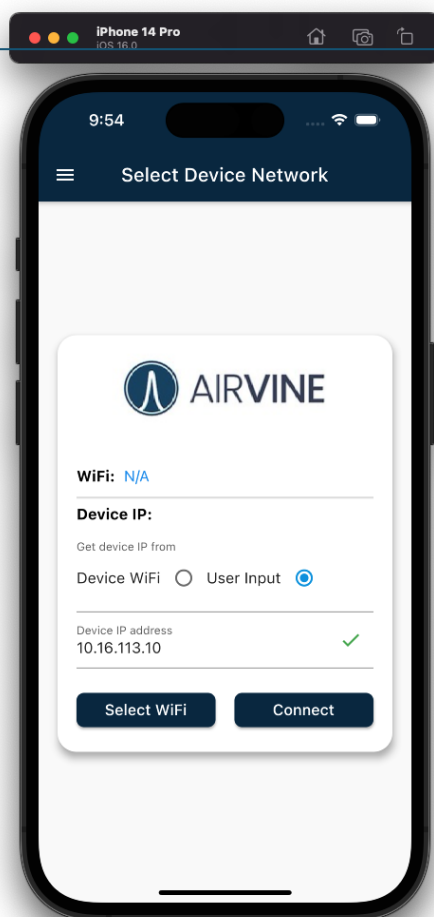
### [WEB GUI]

Type the `http://[management IP]` on your browser

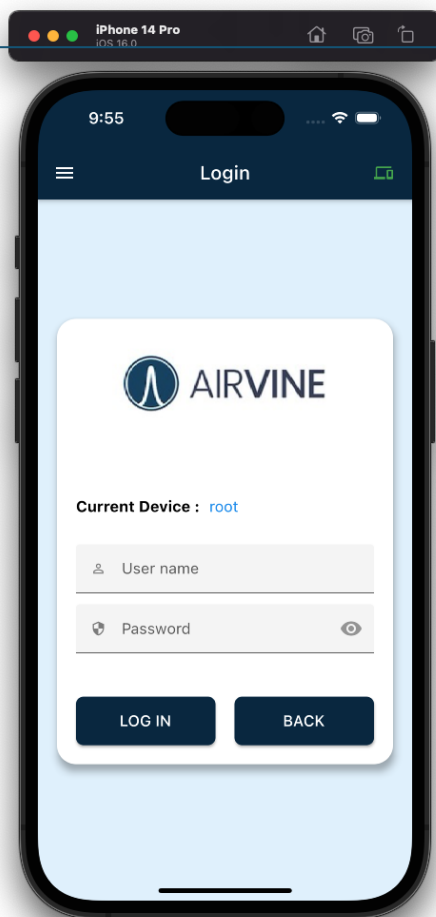


### [Mobile App]

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



Input the username and password to login the Mobile App.

**[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

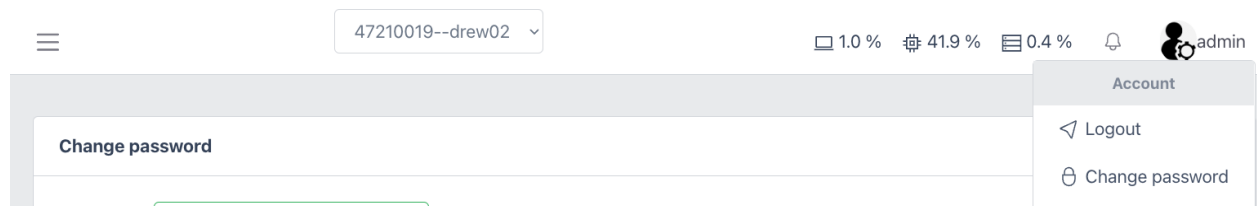
drew02 login: █

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

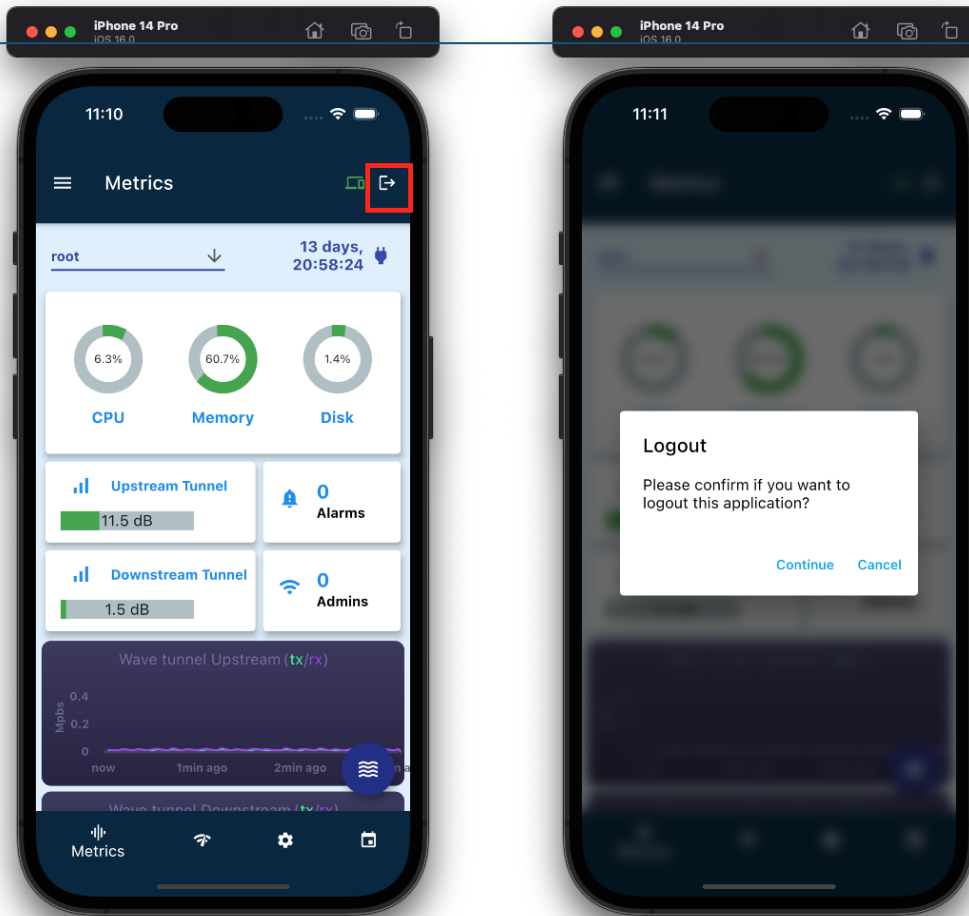
## User Logout

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]



### [Mobile App]



### [CLI]

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

```

allen@Allens-Mac-mini:~/bin
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

```



# AIRVINE

## Change the user password

CONFIGURATION GUIDES

You can change the password on this page

### [WEB GUI]

#### Change password

Current password

New password

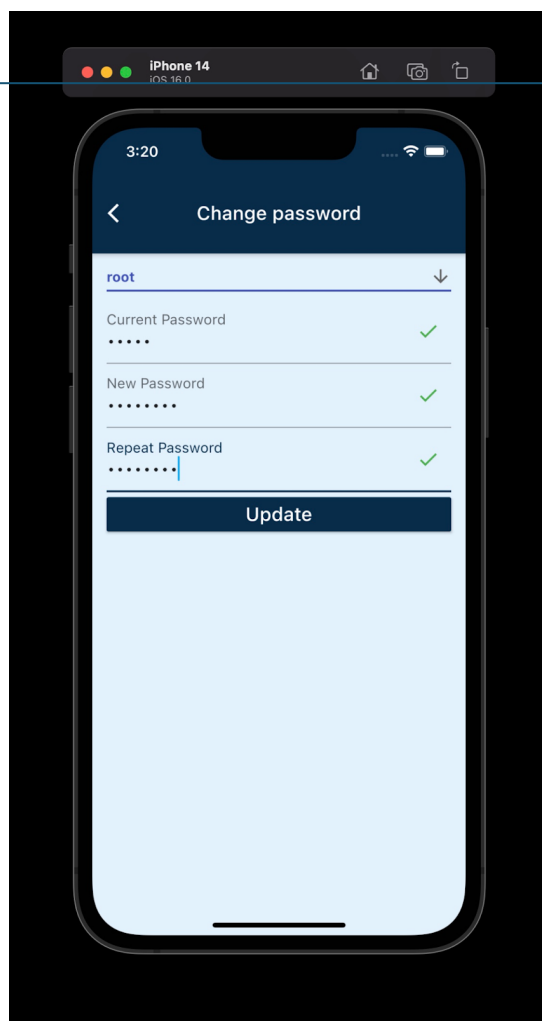
Repeat password

Update

Cancel

### [Mobile App]





[CLI]

```
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)# 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

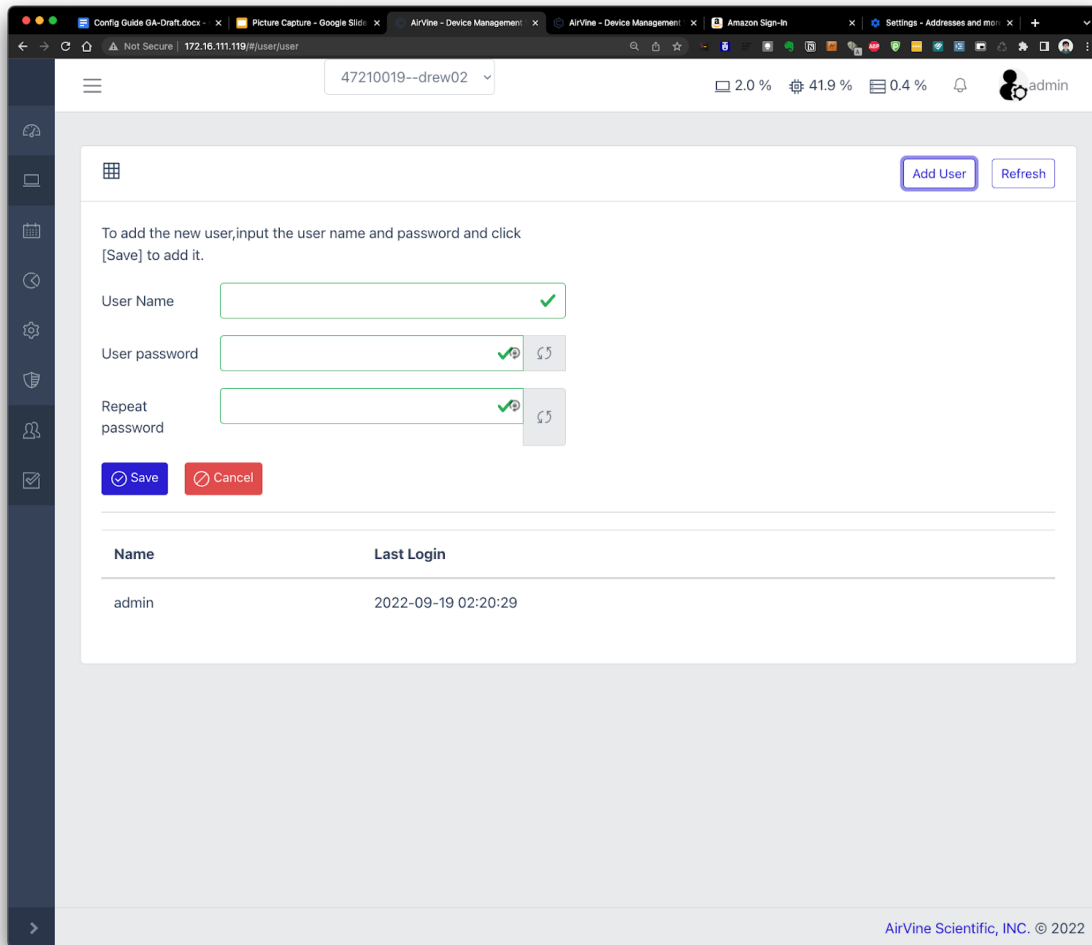
For CLI, there are two levels of command set. To enter the second level, you need to input the “enable” password. The default password is blank but you can change it via the following commands.

```
allen@allen-unc: ~
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> 
```

## Add New User

Add a new admin user to the connected WaveTunnel device.



47210019--drew02

2.0 % 41.9 % 0.4 % admin

**Add User** **Refresh**

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

User Name

User password

Repeat password

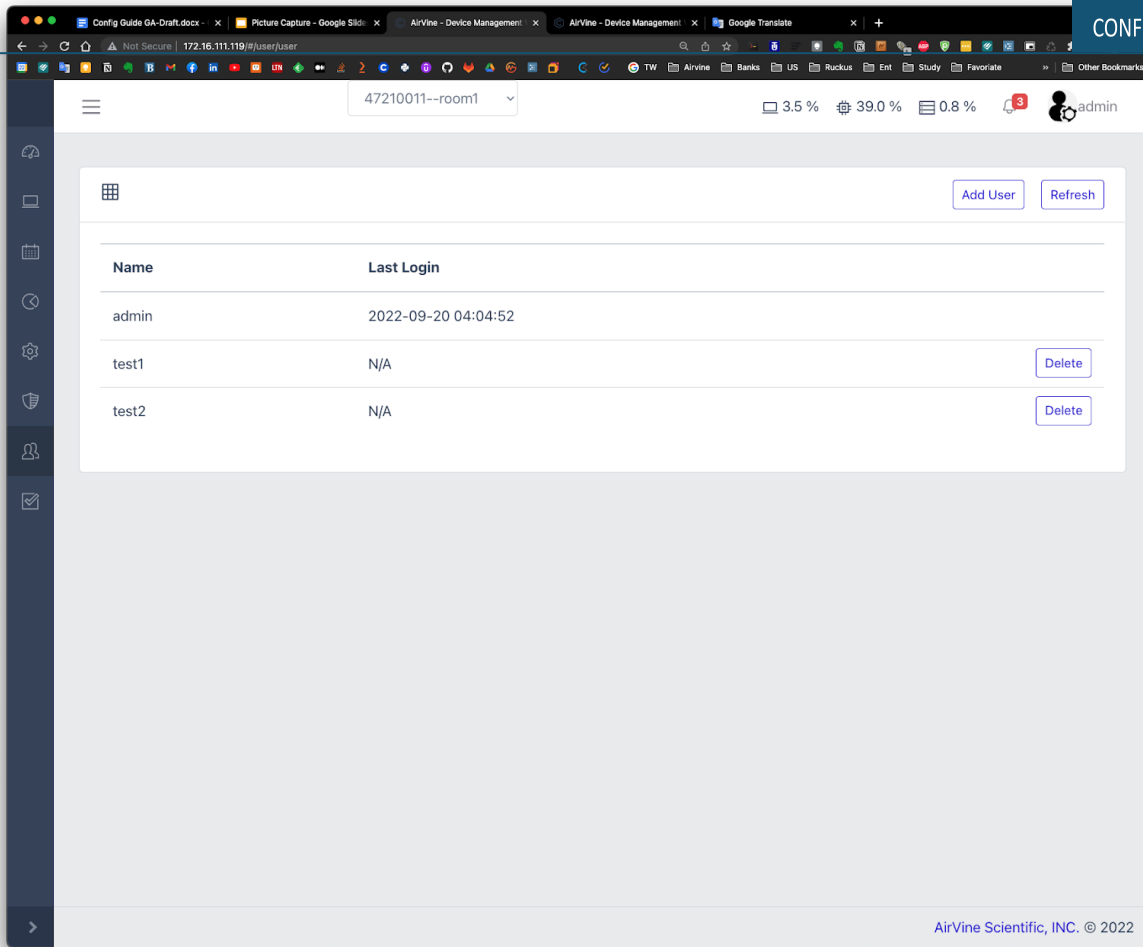
**Save** **Cancel**

| Name  | Last Login          |
|-------|---------------------|
| admin | 2022-09-19 02:20:29 |

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## Delete User

Delete a new admin user from the connected WaveTunnel device.



## 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 the device.

Reboot

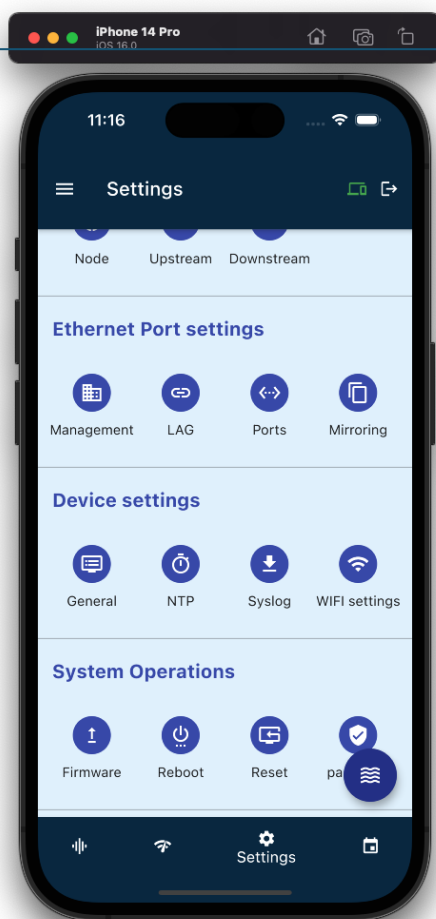
#### Confirmation

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

No

Yes

[Mobile App]  
Settings -> Reboot



## [CLI]

### Operation-> reboot

```
ssh admin@10.16.113.10
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):
```

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.

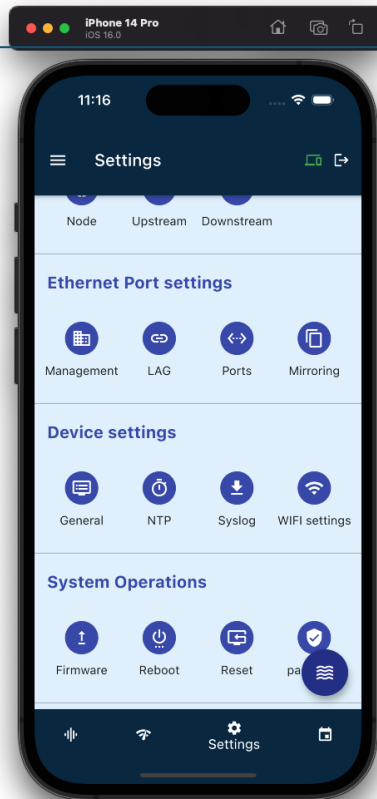
Reset

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

NoYes

**[Mobile App]**

**Settings -> Reset**



## [CLI]

Operation -> reset

```
ssh admin@10.16.113.10
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



## [WEB GUI]

### Operations-> System Operations-> Backup

Backup and Restore

Refresh

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

Backup

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

Upload

#### Restore the configurations from the old backup file.



| Number | Name                     | Size | Datetime            |                          |                         |                        |
|--------|--------------------------|------|---------------------|--------------------------|-------------------------|------------------------|
| 1      | 20220919_04_46_07.tar.gz | 1.4K | 2022-09-19 04:46:07 | <a href="#">Download</a> | <a href="#">Restore</a> | <a href="#">Delete</a> |
| 2      | 20220919_04_46_09.tar.gz | 1.4K | 2022-09-19 04:46:09 | <a href="#">Download</a> | <a href="#">Restore</a> | <a href="#">Delete</a> |

## [CLI]

### Operation-> restore

```
ssh admin@10.16.113.10
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

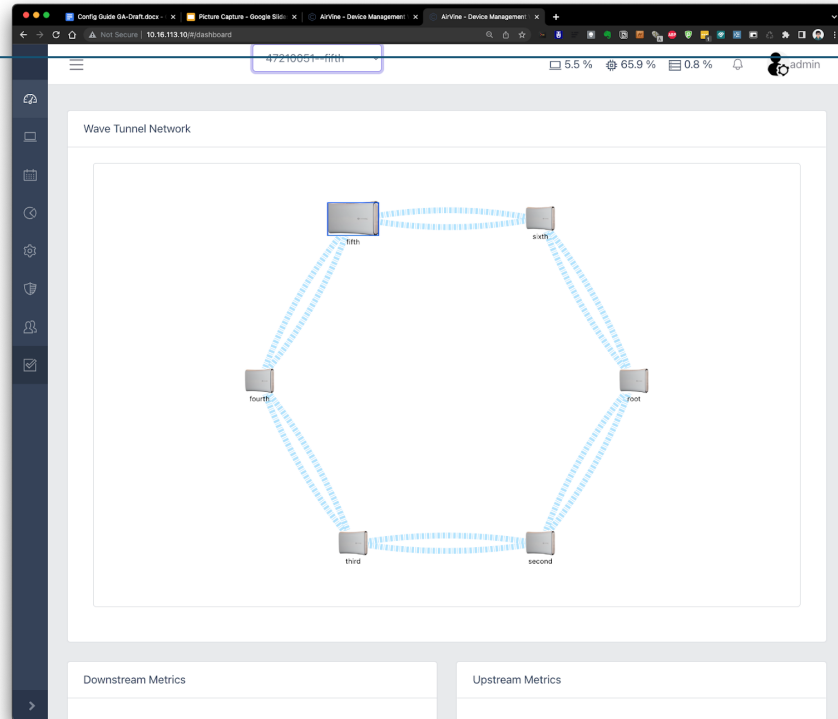
### Checking the Status of the WaveTunnel connections

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.

Config Guide SA Draft.docx

Picture Capture - Google Slides

AirVine - Device Management

47210019--drew02

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

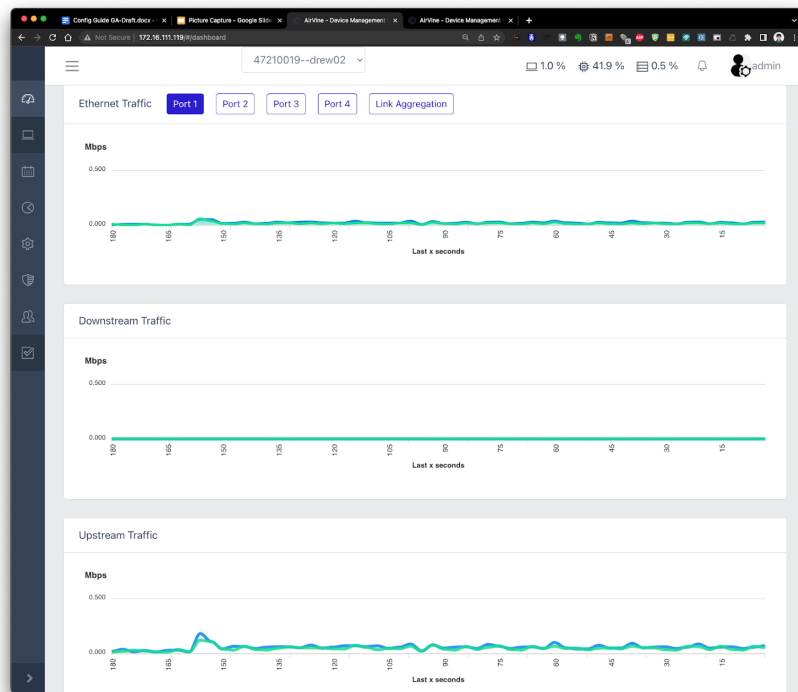
| Port Name         | Bytes Sent | Bytes Received | Packets Sent | Packets Received | Error In | Error Out | Drop In | Drop Out |
|-------------------|------------|----------------|--------------|------------------|----------|-----------|---------|----------|
| Upstream Tunnel   | 503.6M     | 405.3M         | 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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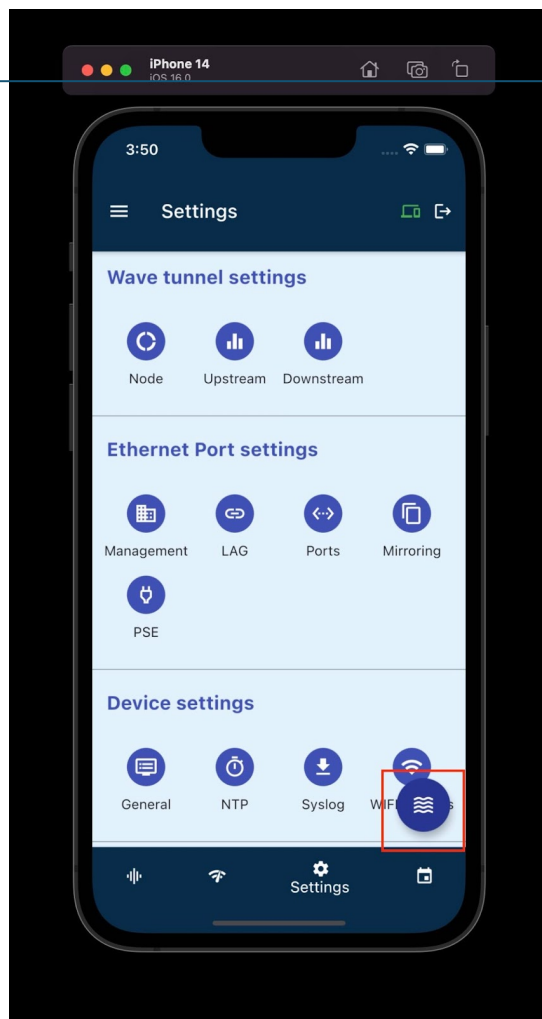
You can also check the realtime traffic widgets on the Dashboard to see the traffic/bandwidth of your wave tunnel connections.

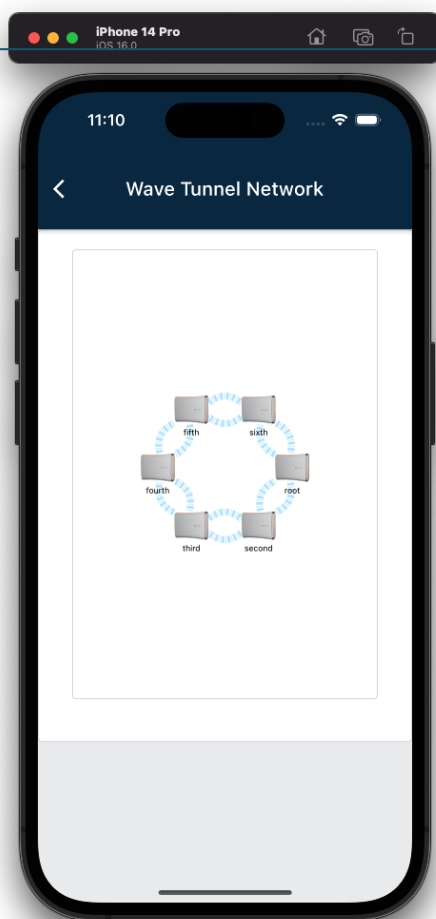
CONFIGURATION GUIDES



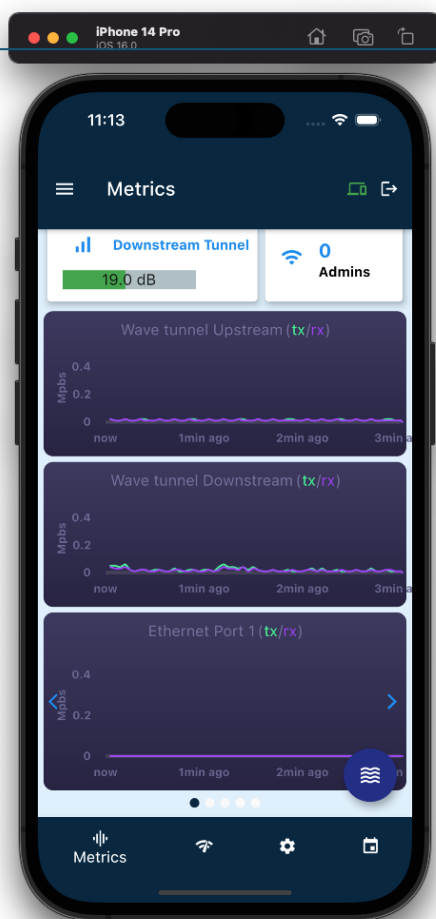
### [Mobile App]

Click the button to check the WaveTunnel connection status.



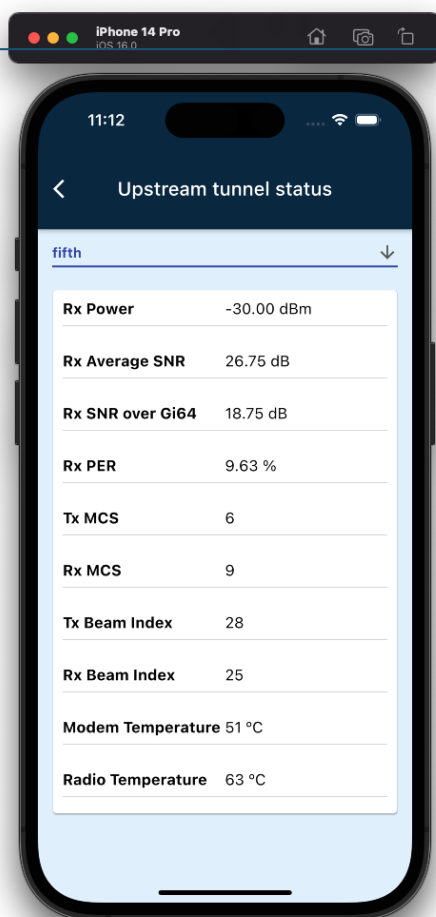


From Dashboard, you can check the real time traffic/bandwidth passing through the WaveTunnel connections.

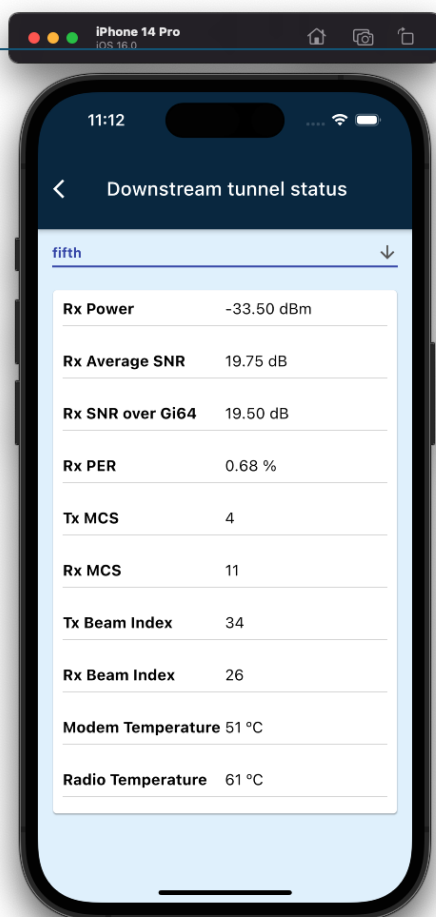


Check the upstream connection metrics



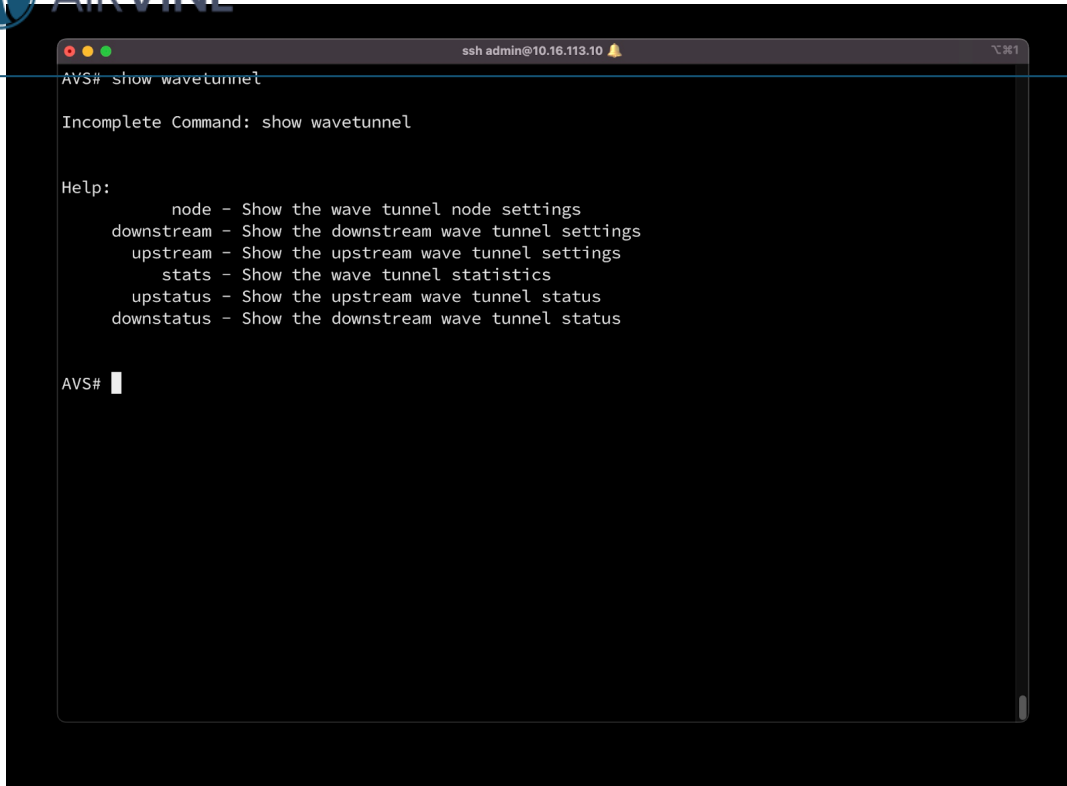


Check the downstream connection metrics



**[CLI]**

**show wavetunnel stats**  
**show wavetunnel upstatus**  
**show wavetunnel downstatus**



```
ssh admin@10.16.113.10
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

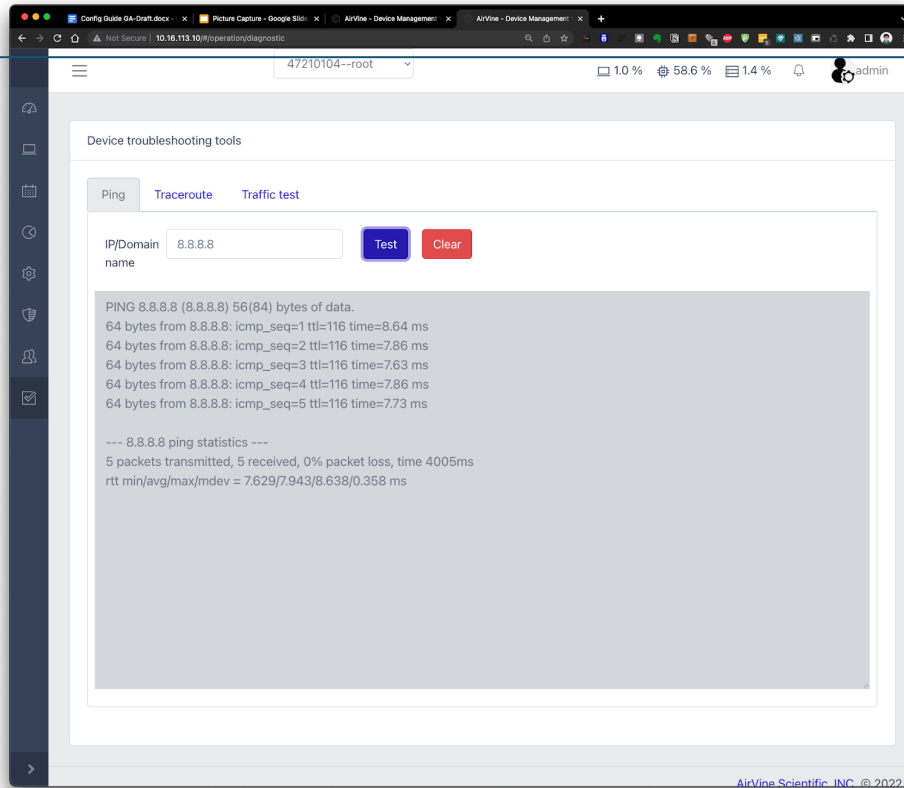
AVS#
```

## 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**



## [CLI]

```

allen@allen-unc: ~
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.

## [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>
  
```

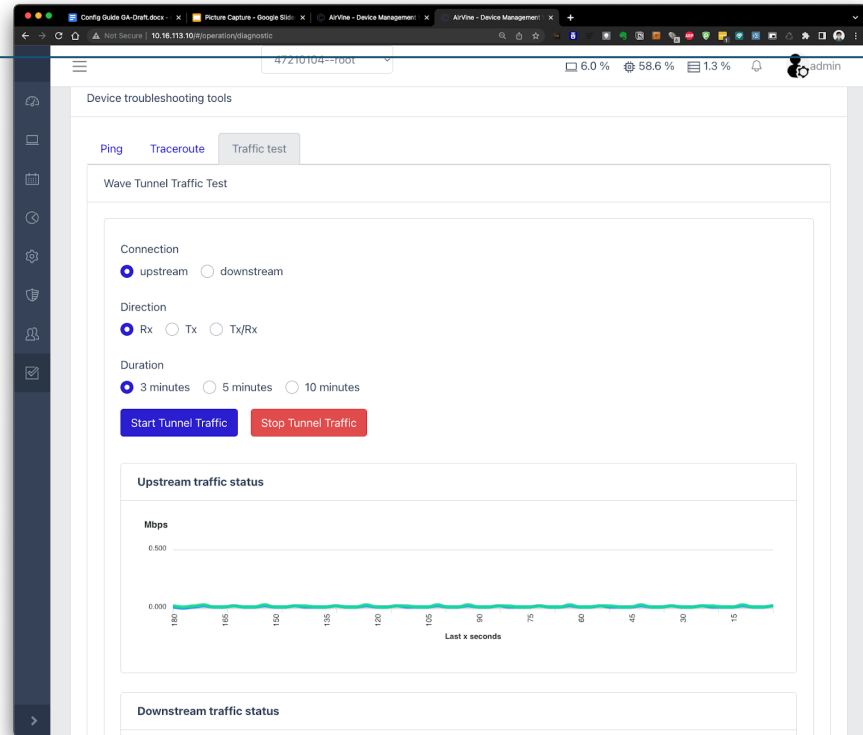
## Traffic Test

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

### [WEB GUI]

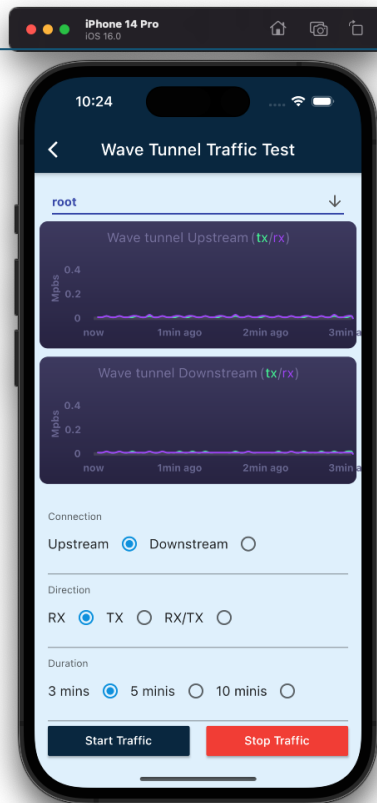
**System > Operations > Diagnostic > Traffic Test**

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



## [Mobile App] Monitoring > Link Traffic

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



## Mirroring the Ethernet Port traffic

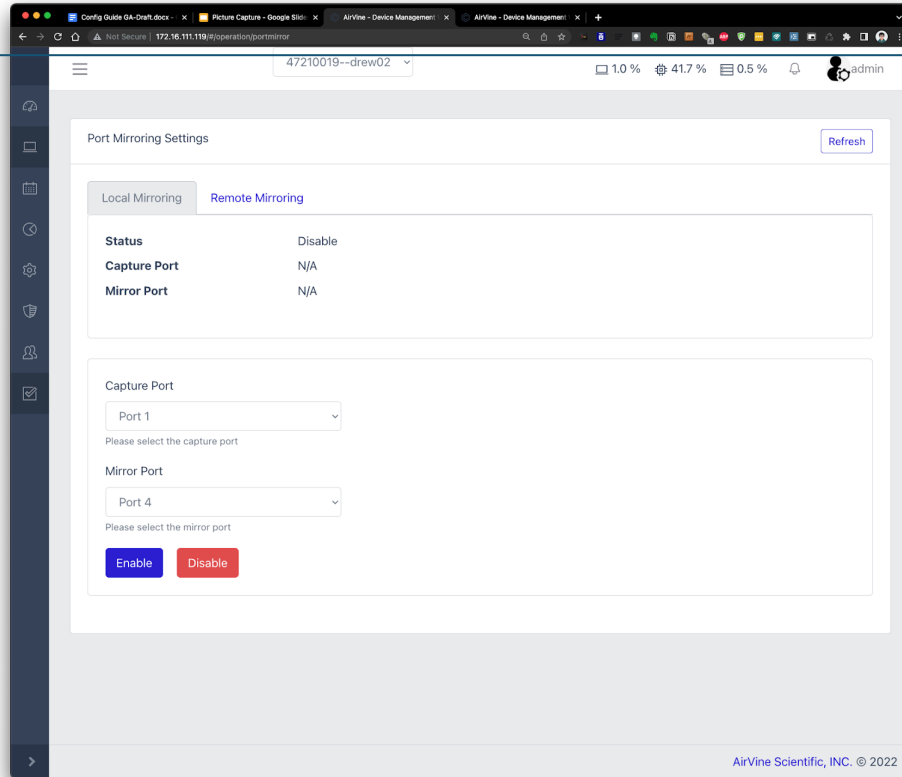
For the troubleshooting purposes, this function provides the capability to mirror the packets on a specific port to another port in the local or neighboring device. To be aware, the settings are not persisted which are cleaned up after system reboot.

### [WEB GUI]

**System > Operations > Port Mirroring**

#### Local Port Mirroring

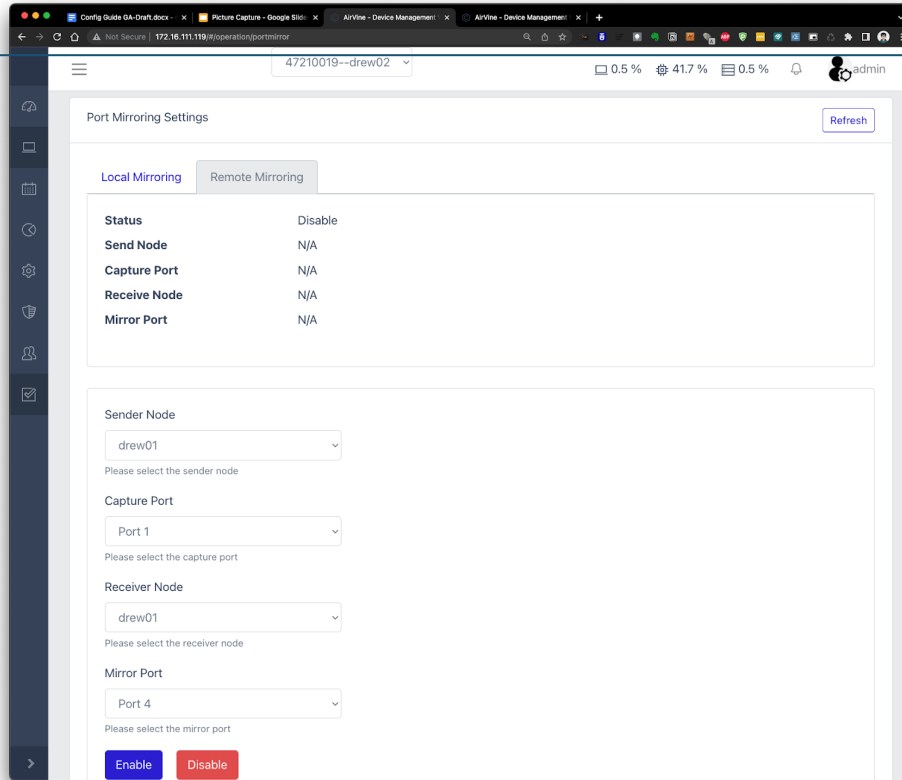
**Operations-> Port Mirroring-> Local**



## Remote Port Mirroring

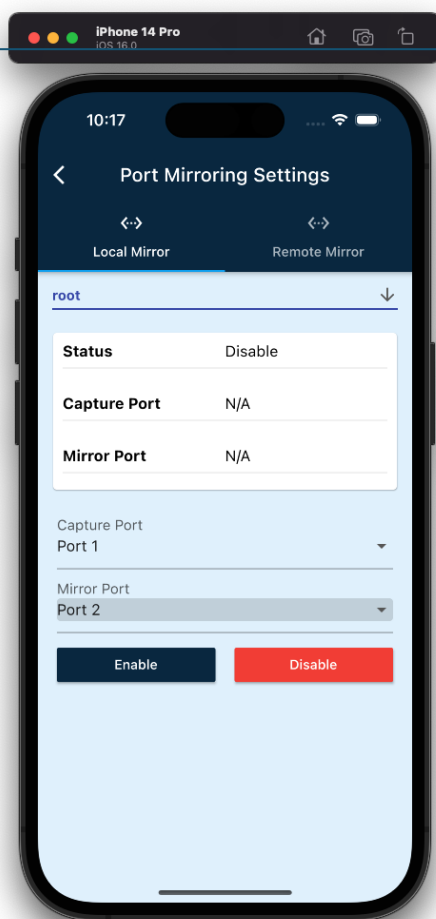
**Operations-> Port Mirroring-> Remote**



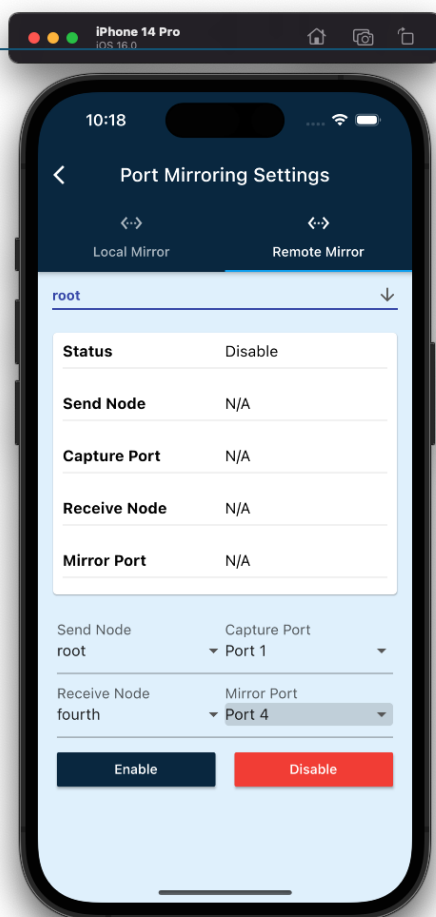


## [Mobile App]

**Settings > Mirroring > Local Mirroring**



**Settings > Mirroring > Remote Mirroring**



**[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.

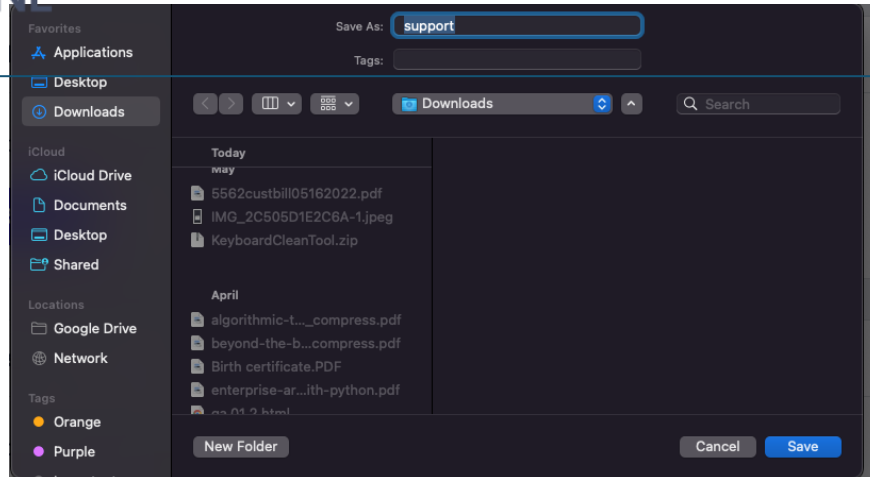
### [WEB GUI]

**System > Operations > System Operation > Download Logs**

Download Logs

Click to download the support logs from this device

Download



## Appendix

### Event 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"
},
"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"
},
"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"
},
"301": {
  "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": {
  "description": "weak upstream tunnel signal",
  "type": "Device",
  "severity": "Warning",
  "notification": "False",
  "category": "System"
},
"304": {
  "description": "weak downstream tunnel signal",
```



```
"type": "Device",
"severity": "Warning",
"notification": "False",
"category": "System"
},
"305": {
  "description": "upstream tunnel connected",
  "type": "Device",
  "severity": "Info",
  "notification": "False",
  "category": "System"
},
"306": {
  "description": "downstream tunnel connected",
  "type": "Device",
  "severity": "Info",
  "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",
```



```
,  
"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"  
}  
}
```

