# User Guide

## Manage Gateway via the Omada Controller

 1900002174 REV6.1.0

# About this Guide

Omada Controller offers centralized and efficient management for configuring enterprise networks comprised of gateways, switches, wireless access points (APs), optical line terminals (OLTs), and more. This guide provides information for centrally managing gateway via the Omada Controller. Please read this guide carefully before operation.
For instructions about how to use the Omada Controller, refer to the Omada Controller User Guide.
For instructions about how to manage other types of devices via the Omada Controller, refer to the relevant user guides.

## Intended Readers

This guide is intended for network managers familiar with IT concepts and network terminologies.

## Conventions

When using this guide, notice that:

- Features available in the Omada Controller may vary due to your region, controller type and version, and device model. All images, steps, and descriptions in this guide are only examples and may not reflect your actual experience.
- The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute the warranty of any kind, express or implied. Users must take full responsibility for their application of any products.
- This guide uses the specific formats to highlight special messages. The following table lists the notice icons that are used throughout this guide.

In this guide, the following conventions are used:

| | |
|---|---|
| Controller | Stands for the Omada On-Premises Controller and the Omada Cloud-Based Controller. |
| On-Premises Controller | Includes the Omada Software Controller (also referred to as the Omada Network Application), Omada Hardware Controller, and Omada Integrated Gateway (Controller). |
| Cloud-Based Controller/ Omada Central | The Omada Cloud-Based Controller is now referred to as the Omada Network system on the Omada Central.<br><br>Note that the Omada Central integrates the Omada Network system and Omada Guard system. The Omada Network system works as an Omada Controller to manage network devices (gateways, switches, access points, OLTs, and more), while the Omada Guard system works as a VMS system to manage surveillance devices (security cameras, NVRs, and more).<br><br>This guide involves instructions about the Omada Network system. For instructions about the Omada Guard system, refer to the Omada Guard User Guide. |
| Note: | The note contains the helpful information for a better use of the controller. |

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| Configuration Guidelines: | Provide guidelines for the feature and its configurations. |

## More Resources

| | |
|---|---|
| **Main Site** | https://www.omadanetworks.com/ |
| **Video Center** | https://support.omadanetworks.com/video/ |
| **Documents** | https://support.omadanetworks.com/document/ |
| **Product Support** | https://support.omadanetworks.com/product/ |
| **Technical Support** | https://support.omadanetworks.com/contact-support/ |

For technical support, the latest software, and management app, visit https://support.omadanetworks.com/.

# CONTENTS

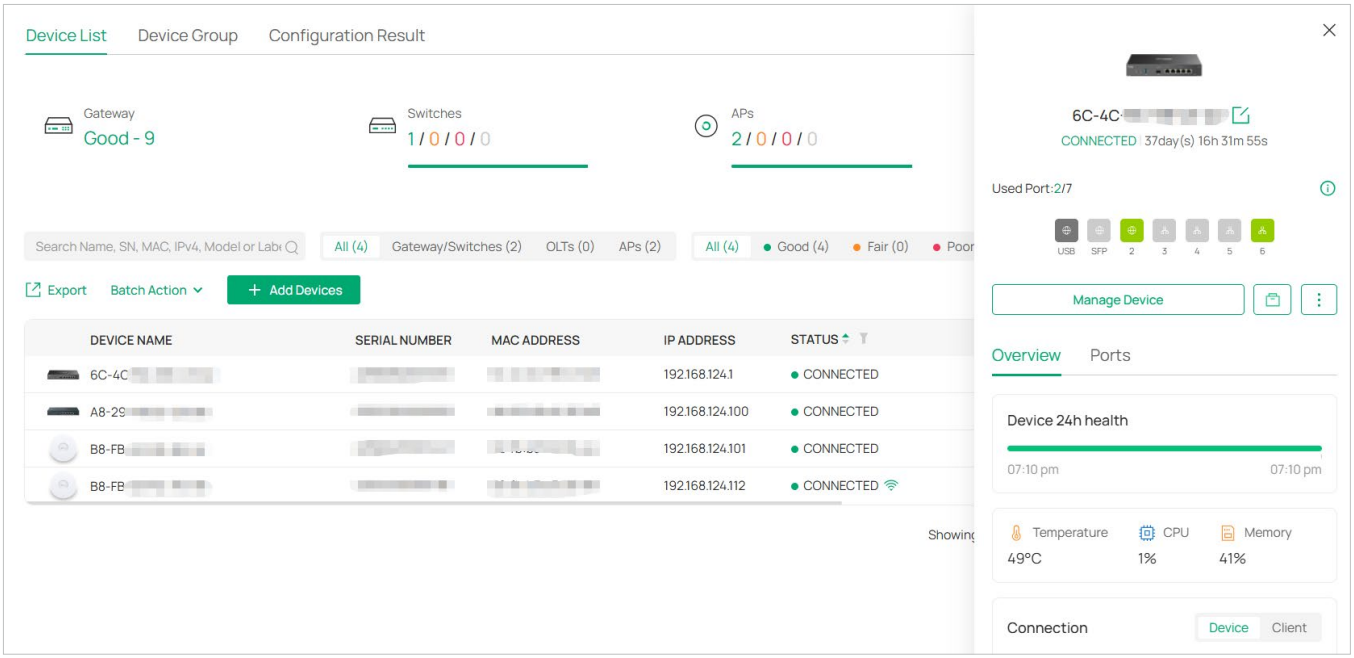
# 1 Manage the Gateway

Launch the controller and access a site. Go to Devices > Device List. In the device list, click the gateway, then you can monitor and manage it in the Properties window and Device Management window.

## 1. 1 Properties Window

The Properties window displays the device's basic information, port status, health status, connection information, and more.

**Note:** The available functions in the window may vary by device type, model, and status.




### Quick Operations

Click the ⋮ icon and choose an operation to quickly operate the device.

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| Custom Upgrade | Click Browse and choose a file from your computer to upgrade the device. After upgraded, the device will reboot and be readopted by the controller. |
| Download Device Info | If the device has an abnormality, you can download the device information and provide it to our R&D personnel to analyze the problem.<br><br>**Note:** Firmware updates are required for earlier devices to obtain complete information. |
| Move to Site | Select a site which the device will be moved to. After moving to another site, device configurations on the prior site will be replaced by that on the new site, and its traffic history will be cleared. |
| Force Provision | Click Force Provision to synchronize the configurations of the device with the controller. The device will lose connection temporarily, and be adopted to the controller again to get the configurations from the controller. |

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| Forget This Device | Click Forget and then the device will be removed from the controller. Once forgotten, all configurations and history related to the device will be wiped out. |
| ISP Upgrade | (Only for 4G/5G models)<br><br>Click Browse to select the ISP upgrade file and click Upgrade to upgrade the ISP information. You can download the latest ISP upgrade file from https://support.omadanetworks.com. |

### Network Tools

Click the icon and choose a network tool to analyze the network.

| | |
|---|---|
| Network Check | Test the device connectivity via ping or traceroute. |
| Terminal | Open Terminal to execute CLI or Shell commands. |

## 1. 2 Device Management Window

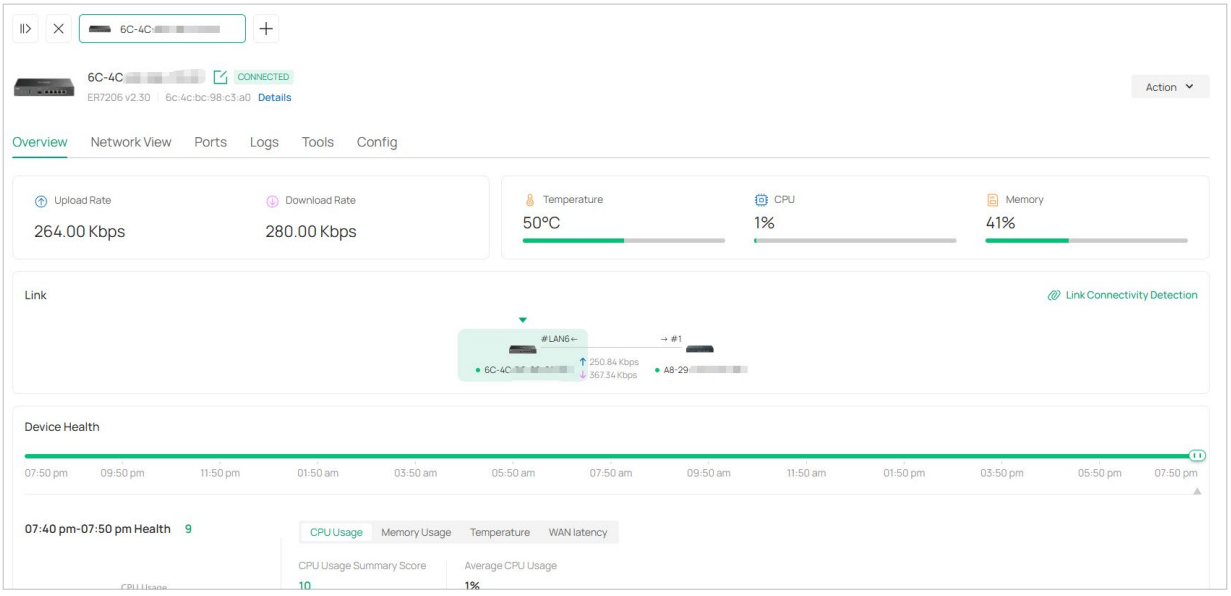
Click Manage Device to open the Device Management window to view more device details and change device settings.

In the management window, you can click + and select one or more devices to open new management windows, click the icon in the top left to minimize the windows to the icon in the right side, and click the icon to reopen the minimized windows.

You can also click each tab to monitor and manage the device. The tabs available may vary by model.

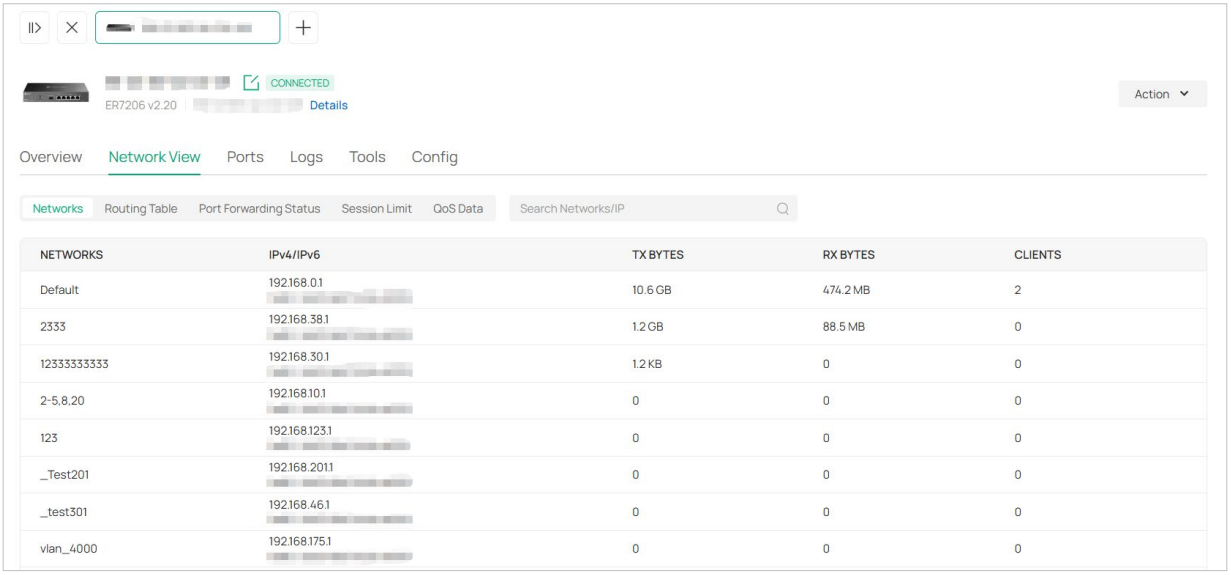
### Overview

In Overview, you can get an overview of the device, such as device status, link status, online time, current clients, and more.



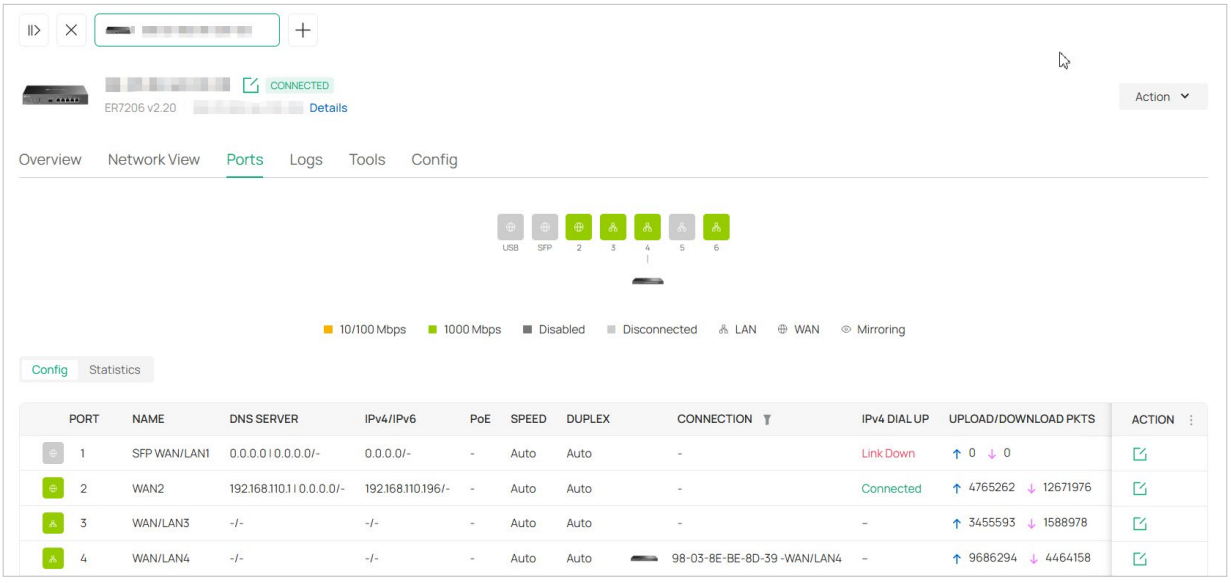
## Network View

In Network View, you can check the network information of the device, such as configured networks, routing table, port forwarding status, and more.




## Ports

In Ports, you can view the port status and statistics and edit port settings.




To configure a port, click the edit icon in the Action column. Port settings may vary by port type.

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| Status | Check the box to enable the port. |
| PoE Mode | Select the PoE mode: Off or 8.2.3at/af. |
| Link Speed | Select the speed mode for the port.<br>Auto: The port negotiates the speed and duplex automatically.<br>Manual: Specify the speed and duplex from the drop-down list manually. |

| | |
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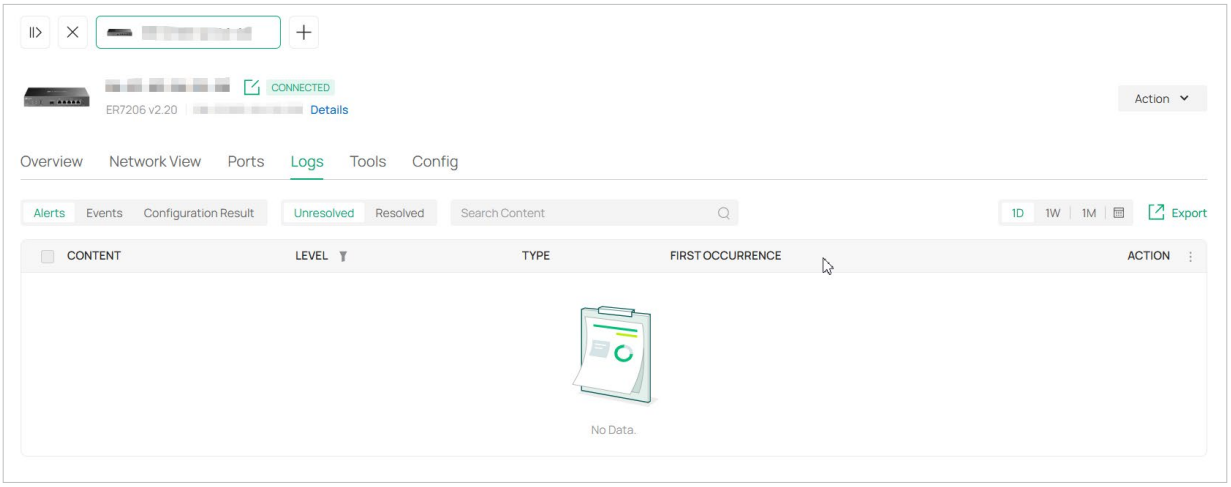
| Mirroring | Mirroring is used to analyze network traffic and troubleshoot network problems.<br><br>With Mirroring configured, the gateway will sends a copy of traffics passing through the specified mirrored ports to the current port.<br><br>To use this function, enable this option to set the current port as the mirroring port, specify one or multiple mirrored ports, and specify the directions of the traffic to be mirrored in the Mirror Mode:<br><br>Ingress and Egress: Both the incoming and outgoing packets through the mirrored ports will be copied to the mirroring port.<br><br>Ingress: The packets received by the mirrored ports will be copied to the mirroring port.<br><br>Egress: The packets sent by the mirrored ports will be copied to the mirroring port. |
| Native VLAN | Select the Port VLAN Identifier (PVID) for the port. |
| Flow Control | With this option enabled, when a device gets overloaded it will send a PAUSE frame to notify the peer device to stop sending data for a specified period of time, thus avoiding the packet loss caused by congestion. |

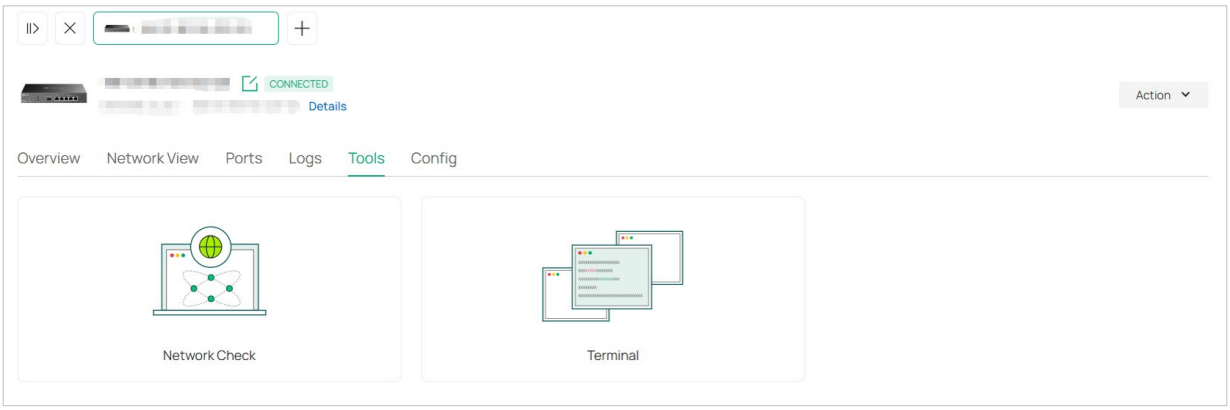
## Logs

In Logs, you can check the logs of the device, such as alerts, events, and configuration result.




## Tools

In Tools, you can use network tools to test the device connectivity and open Terminal to execute CLI or Shell commands.

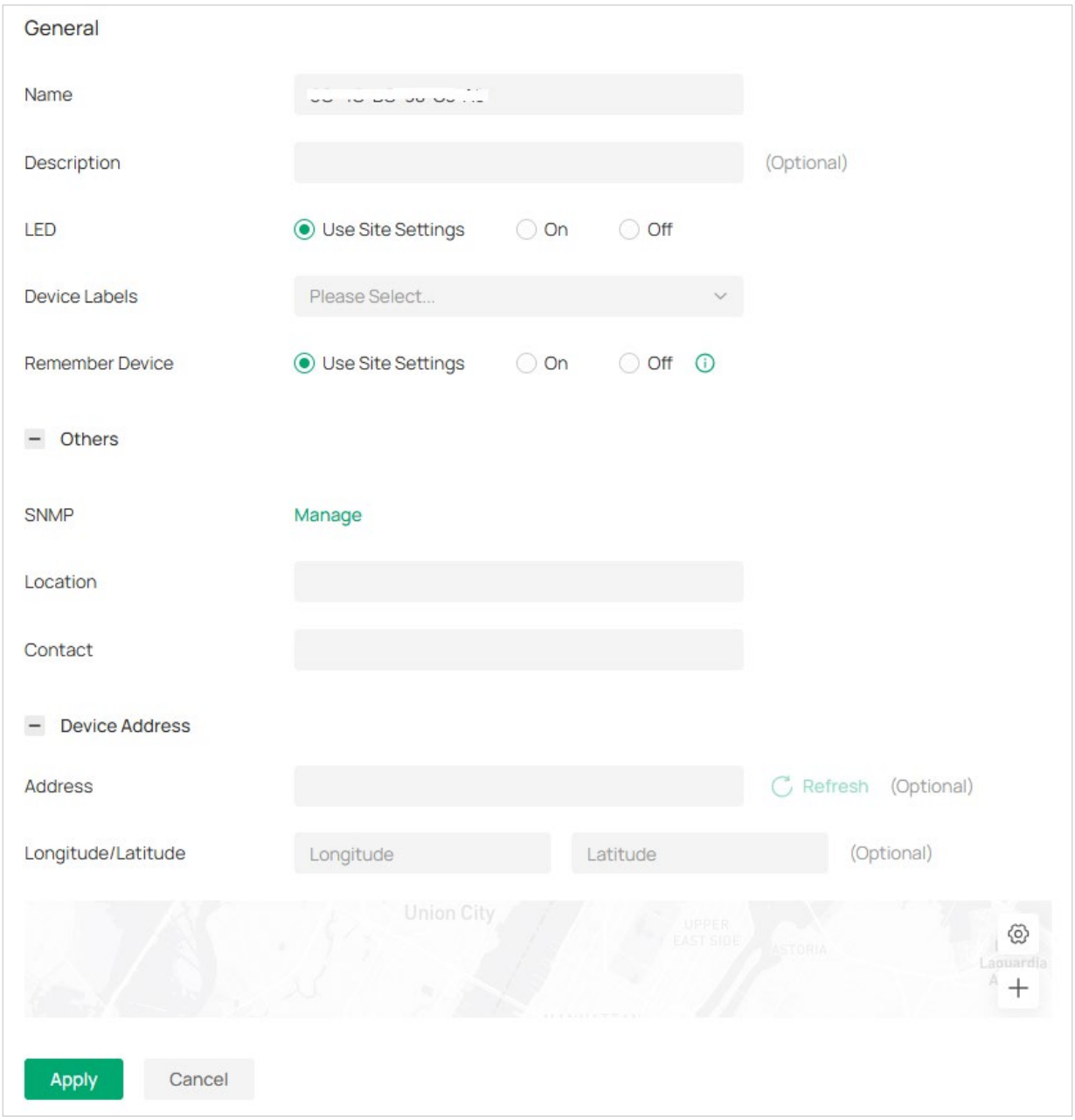



# 2 Configure General Settings

In General Settings, you can specify the device name, control the LED, configure the device address, and more.

To configure general settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > General.
3. Configure the parameters.




| | |
|---|---|
| Name | Specify a name of the device. |
| Description | (Optional) Enter a description for identification. |
| LED | Select the way that device's LEDs work.<br>Use Site Settings: The device's LED will work following the settings of the site.<br>On/Off: The device's LED will keep on/off. |
| Device Labels | Select a label from the drop-down list or create a new label to categorize the device. |
| Remember Device | With this function, the controller will remember this device. After device reset and power-on, the controller will automatically adopt the device if the controller can find it. |
| SNMP | Configure SNMP to write down the location and contact detail. You can also click Manage to jump to Network Config > General Settings > SNMP. |

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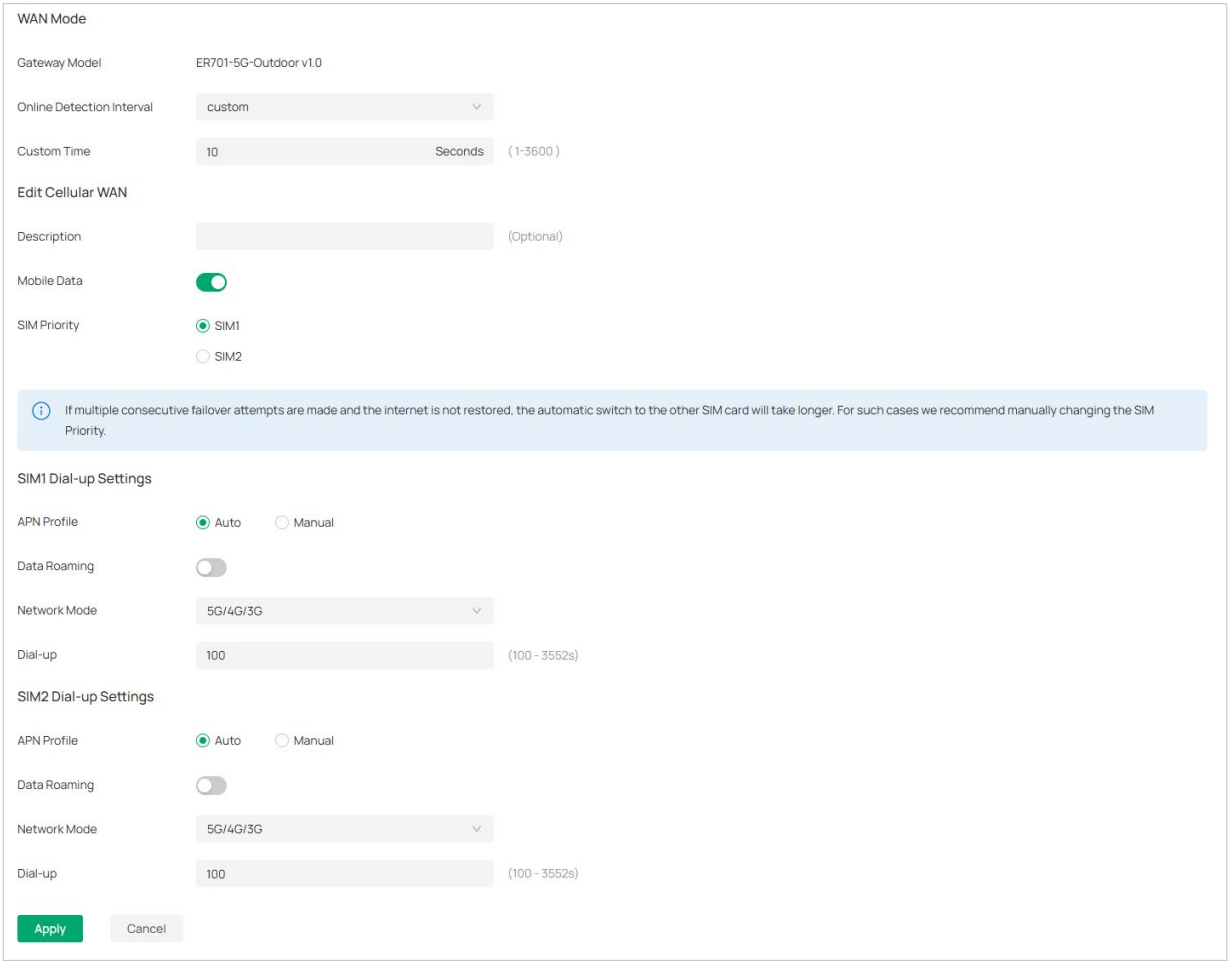
| Device Address | Configure the address, longitude, and latitude according to where the site is located. These fields are optional. |

# 3 Configure Internet Settings (Only for 5G Gateways)

In Radios, you can control how and what type of radio signals the wireless gateway emits.

To configure radio settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > Internet.
3. Configure the Cellular WAN and SIM dial-up settings as needed.

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| Online Detection Interval | Select how often the WAN ports detect WAN connection status. If you don't want to enable online detection, select Disable, and you can also select Custom to specify the time.<br><br>Online Detection results will influence whether Load Balancing and Link Backup features take effect. The smaller the online detection interval, the faster Load Balancing and Link Backup features will respond, and meanwhile more detection packets will be sent. |
| Description | (Optional) Enter a description for identification. |

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| Mobile Data | It is enabled by default. You can disable it to block internet access. |
| SIM Priority | Set which SIM card is used first. SIM Priority takes effect only when the device is powered on and the priority is changed. If only one SIM card is inserted, this card is used by default. |
| SIM1/SIM2 Dial-up Settings | |
| APN Profile | Select Auto or Manual. If auto is selected, the gateway will use the profile automatically assigned. If manual is selected, you can select the APN file you created before, and you can click Manage APN Profile to create new files. |
| Data Roaming | It is disabled by default. If disabled, data service usage is not allowed while roaming. If enabled, data service is allowed while roaming, but significant roaming charges may apply. |
| Network Mode | You can choose a network mode according to your mobile network standard and current network conditions. The following modes are supported, 5G/4G/3G, 5G-SA, 5G-NSA/4G, 4G/3G, 4G Only, and 3G Only. |
| Dial-up | Set the dial-up timeout (100 to 3552 seconds). If the connection is not successfully established within the specified time, the gateway will use the other SIM card to connect to the internet. |

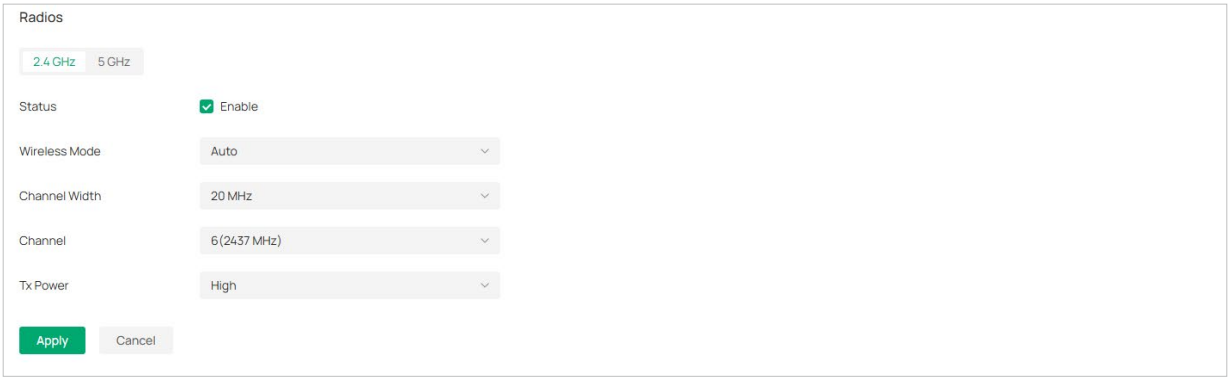
# 4 Configure Wireless Settings (Only for Certain Gateways)

## 4. 1 Radio Settings

In Radios, you can control how and what type of radio signals the wireless gateway emits.

To configure radio settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > Wireless > Radios.
3. Select each band and configure the parameters. Different models support different bands.

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| Status | If you disable the frequency band, the radio on it will turn off. |

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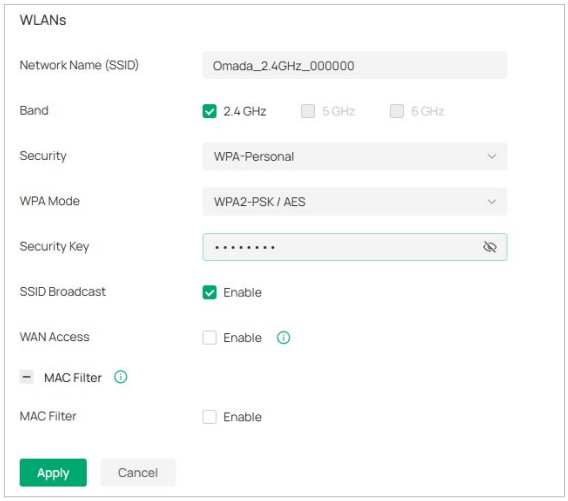
| Wireless Mode | Specify the wireless mode of the band. Different bands have different available options. We recommend using the default value. |
| Channel Width | Specify the channel width of the band. Different bands have different available options. We recommend using the default value. |
| Channel | Specify the operation channel of the device to improve wireless performance. If you select Auto for the channel setting, the device scans available channels and selects the channel where the least amount of traffic is detected. |
| Tx Power | Specify the Tx Power (Transmit Power) in the 4 options: Low, Medium, High and Custom. The actual power of Low, Medium and High are based on the minimum transmit power (Min. Txpower) and maximum transmit power (Max. TxPower), which may vary in different countries and regions.<br><br>Low: Min. TxPower + (Max. TxPower-Min. TxPower) * 20% (round off the value)<br><br>Medium: Min. TxPower + (Max. TxPower-Min. TxPower) * 60% (round off the value)<br><br>High: Max. TxPower<br><br>Custom: Specify the value manually. |

## 4. 2 WLAN Settings

To configure WLAN settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > Wireless > WLANs.
3. Configure the parameters.

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| Network Name (SSID) | Specify the network name (SSID) to identify the wireless network. The wireless clients choose the SSID on their WLAN settings page to connect to the wireless network. |
| Band | Select the wireless band. |

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| Security | Select the encryption method for the wireless network based on needs.<br><br>**None:** With None selected, the clients can access the wireless network without authentication, which is suitable for scenarios with lower security requirements.<br><br>**WPA-Personal:** WPA-Personal is based on a pre-shared key. It is characterized by high safety and simple settings, so it is mostly used by common households and small businesses. When this option is selected, set the WPA mode and the security key. |
| SSID Broadcast | When enabled, the gateway broadcast the SSID in the air, and the SSID will appear in the list of available wireless networks. When disabled, users must enter the SSID manually to connect to the wireless network. |
| WAN Access | When enabled, clients connected to the SSID can access the internet. |
| MAC Filter | Only 11ac and above products support this function. You can select a policy to allow or deny the connections from specific MAC addresses.<br><br>**Allow List:** Allow connections from MAC Address(es) below. Blocks all others.<br><br>**Deny List:** Blocks connections from MAC Address(es) below. Allows all others.<br><br>You can click Manage MAC Groups to add or delete MAC addresses. |

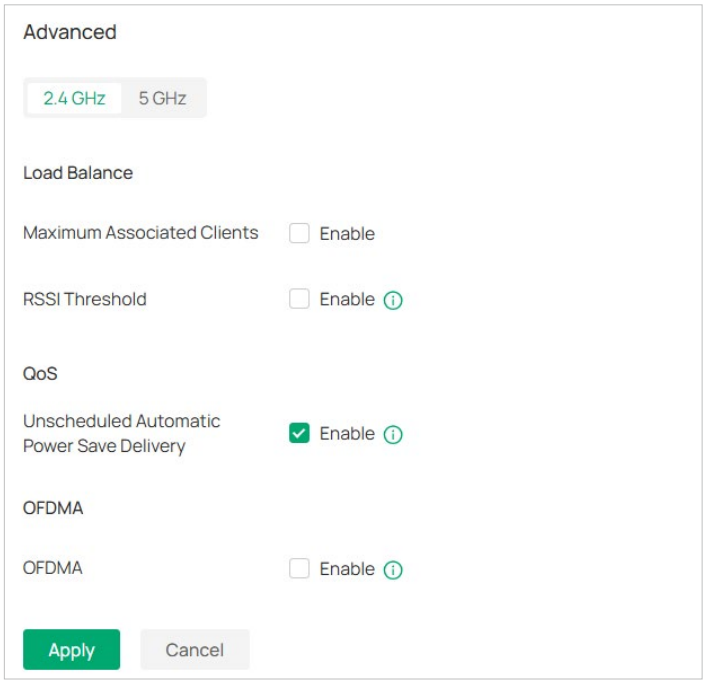
## 4. 3 Advanced Settings

In Advanced, you can configure Load Balance, QoS, and OFDMA to improve network performance.

To configure advanced wireless settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > Wireless > Advanced.

3. Select each band and configure the parameters. Different models support different bands.

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| Load Balance | Load Balance controls the clients associated to the device.<br><br>Max Associated Clients: Enable this function and specify the maximum number of connected clients. If the number of connected clients reaches the specified value, the device will disconnect those with weaker signals to make room for other clients requesting connections.<br><br>RSSI Threshold: Enable this function and enter the threshold of RSSI (Received Signal Strength Indication). If a client's signal strength is weaker than the threshold, the client will lose connection with the device. |
| QoS | QoS optimize the performance when handling differentiated wireless traffics, including traditional IP data, VoIP (Voice-over Internet Protocol), and other types of audio, video, streaming media.<br><br>Unscheduled Automatic Power Save Delivery: Abbreviation as U-APSD, this function greatly improves the energy-saving capacity of clients to extend their battery life, and reduces the latency of traffic flow that is delivered over the wireless media. |
| OFDMA | (Only for AP supporting 802.11 ax or later standards) Enable this feature to enable multiple users to transmit data simultaneously, and it will greatly improves speed and efficiency. Note that the benefits of OFDMA can be fully enjoyed only when the clients support OFDMA. |

# 5 SIM Configurations (Only for Gateways with SIM Card)

## 5. 1 PIN Management

In PIN Management, you can view the SIM card used and its status.

To view the SIM status, follow the steps below:

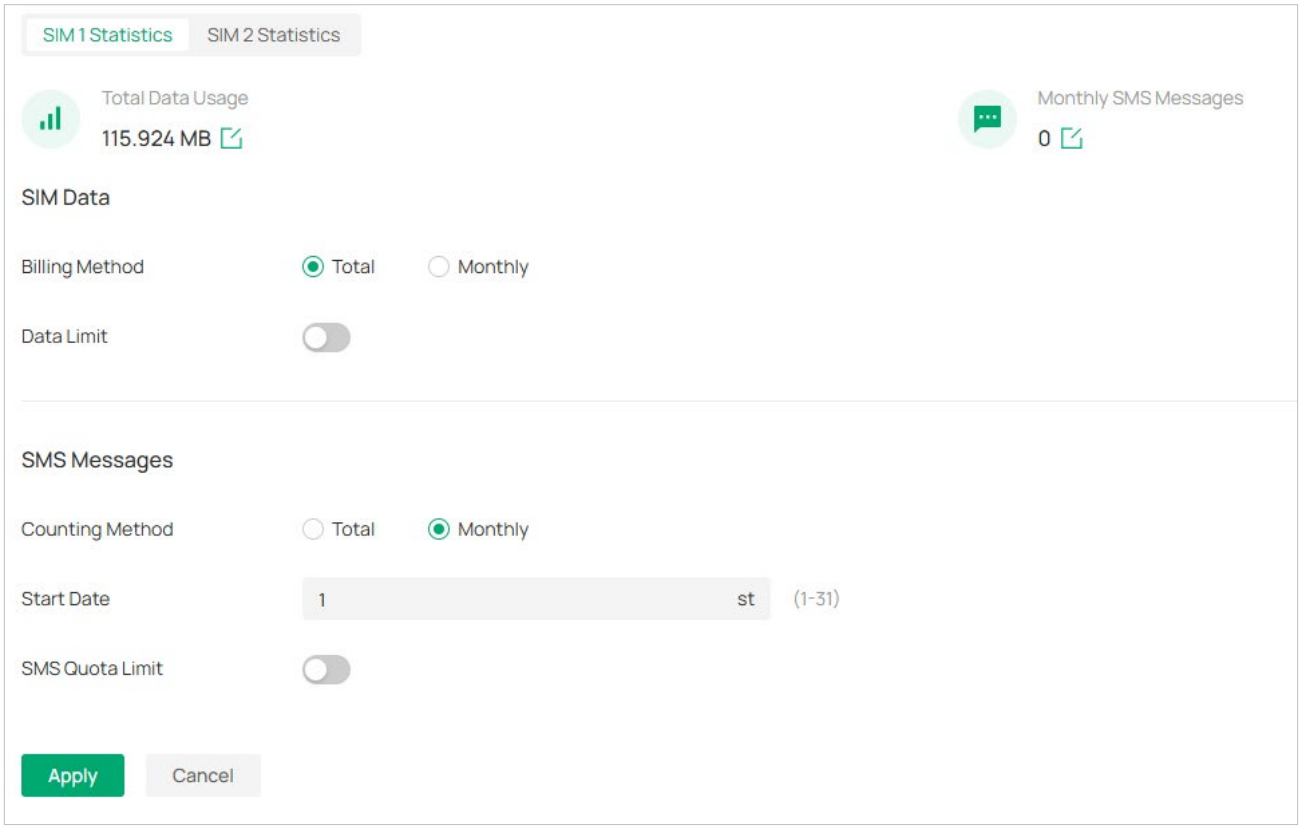
1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > SIM Config > PIN Management.

## 5. 2 Statistics

In Statistics, you can have a overview of the total/monthly statistics calculated according to the billing/counting method you set. You can click the edit icon to correct the statistics.

To configure WLAN settings of a gateway, follow the steps below:

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gatewa, click Manage Device and go to Config > SIM Config > Statistics.
3. Configure the parameters.




For SIM data settings, configure the following parameter:

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| Billing Method | Select the billing method, Total count or Monthly count.<br><br>If you select the Monthly count, select a Start Date for each monthly count cycle. For example, 2nd indicates that the monthly count cycle is from the 2nd of this month to the 1st of the next month. |
| Data Limit | Specify whether to enable the data limit function.<br><br>If turned on, the network will be disconnected when your data usage reaches the allowance. |
| Total Allowance/ Monthly Allowance | Enter the total/monthly allowance provided by your carrier.<br><br>The device will automatically disconnect from the internet when your data usage reaches the allowance. |
| Data Limit Alert | Specify whether to enable the SMS alert of data limit.<br><br>If turned on, the alert message will be sent when your data usage reaches the set allowance percentage or the set allowance. |
| Usage Alert | Set the usage alert percentage.<br><br>The alert message will be sent when your data usage reaches the set allowance percentage. |
| Alert SMS Phone Number | Enter the phone number to receive the SMS alert message when your data usage reaches the set allowance percentage or the set allowance. |
| Send Test Message | Send a test SMS to confirm that the number can receive the SMS alert message. |

For SIM message settings, configure the following parameter:

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|---|---|
| Counting Method | Select the counting method, Total count or Monthly count.<br><br>If you select the Monthly count, select a Start Date for each monthly count cycle. For example, 2nd indicates that the monthly count cycle is from the 2nd of this month to the 1st of the next month. |
| SMS Quota Limit | Specify whether to enable the SMS quota limit function.<br><br>If turned on, your device will be unable to send SMS messages when your SMS quantity reaches the allowance. |
| Total Allowance/ Monthly Allowance | Enter the total/monthly allowance provided by your carrier.<br><br>Your device will be unable to send SMS messages when your SMS quantity reaches the allowance. |
| SMS Quota Alert | Specify whether to enable the SMS alert of SMS limit.<br><br>If turned on, the alert message will be sent when your SMS quantity reaches the set allowance percentage.<br><br>Note that the alert messages will also be counted in your SMS quantity. |

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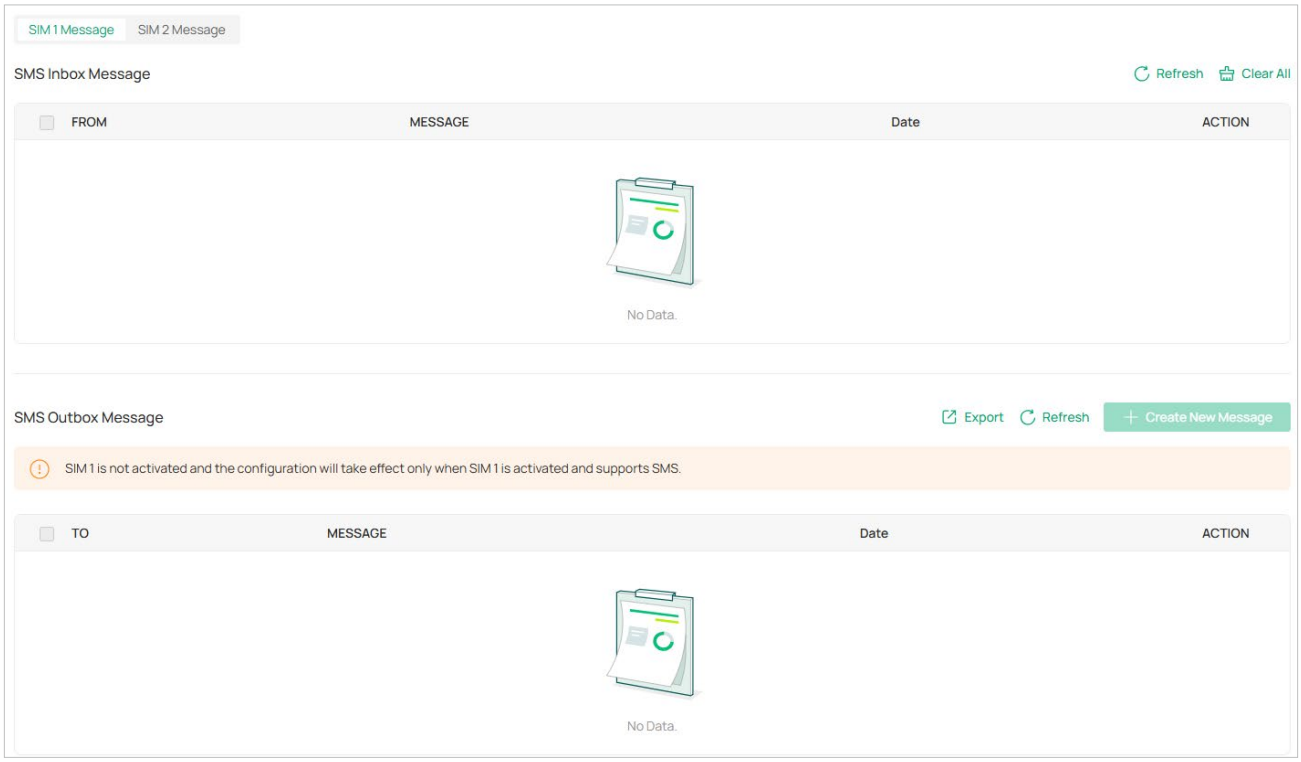
| Usage Alert | Set the usage alert percentage.<br><br>The alert message will be sent when your SMS quantity reaches the set allowance percentage. |
| Alert SMS Phone Number | Enter the phone number to receive the SMS alert message when your SMS quantity reaches the set allowance percentage. |
| Send Test Message | Send a test SMS to confirm that the number can receive the SMS alert message. |

## 5. 3 SMS Message

In this section, you check the messages you have received and sent for each card.

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > SIM Config > SMS Message.
3. Configure the parameters.

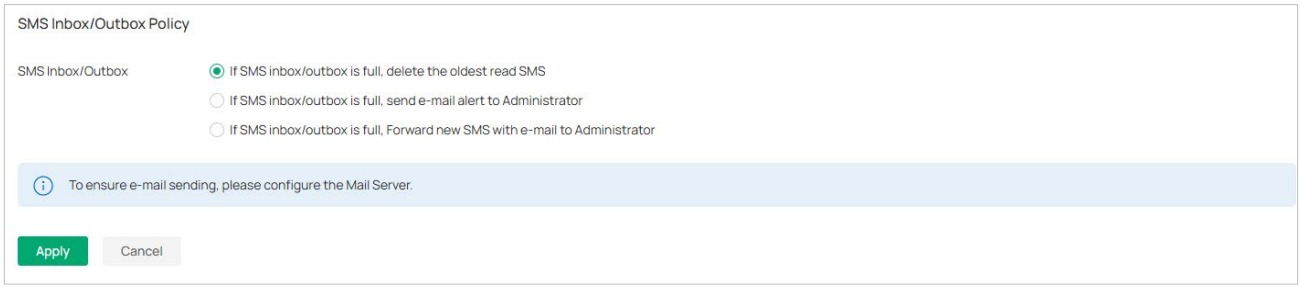



| | |
|---|---|
| SMS Inbox Message | Displays the messages you have received. You can click the Detail icon to view the SMS details. |
| SMS Outbox Message | Displays the messages you have successfully sent. You can click the Detail icon to view the SMS details, click Export to save outbox messages of specific time period locally, or click Create New Message to send a message. |

# 5. 4 SMS Settings

In SMS Inbox/Outbox Policy, you can set policies related to receiving inboxes.

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > SIM Config > SMS Settings.
3. Configure the parameters.

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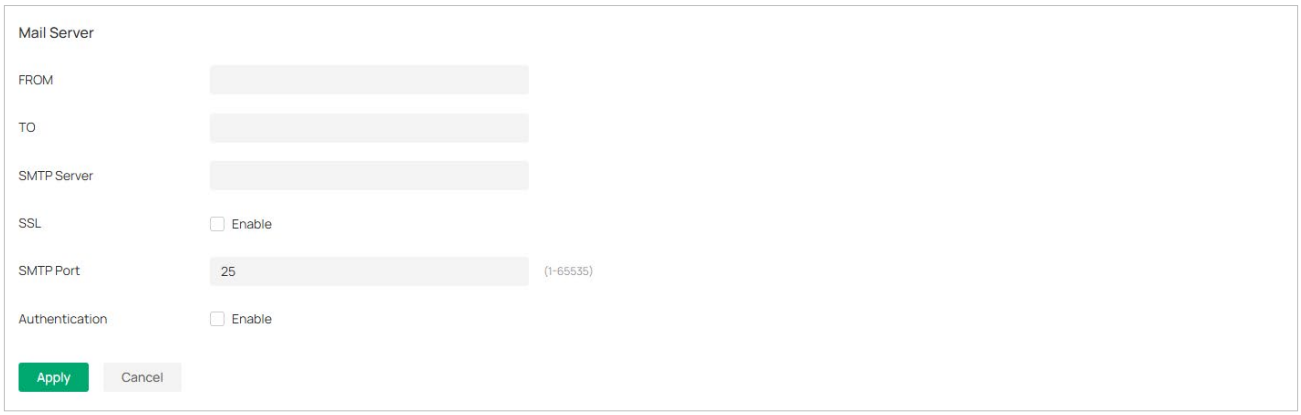
| SMS Inbox/Outbox | Select the SMS Inbox/Outbox Policy.<br><br>If SMS inbox/outbox is full, delete the oldest read SMS: When the inbox/outbox is full, delete the oldest read SMS to receive the new SMS.<br><br>If SMS inbox/outbox is full, send e-mail alert to Administrator: When the inbox/outbox is full, send an email to the administrator, and does not receive the new SMS. To ensure email sending, please configure the Mail Server.<br><br>If SMS inbox/outbox is full, forward new SMS with e-mail to Administrator: When the inbox/outbox is full, forward the new SMS to the administrator via email. To ensure email sending, please configure the Mail Server. |

In Mail Server, you can configure mail-related parameters. The SMS Inbox/Outbox Policy module will use the configuration information to send emails.




| | |
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| FROM | Enter the email address of the sender. |
| TO | Enter the email address of the receiver, which can be the same as or different from the sender's email address. |

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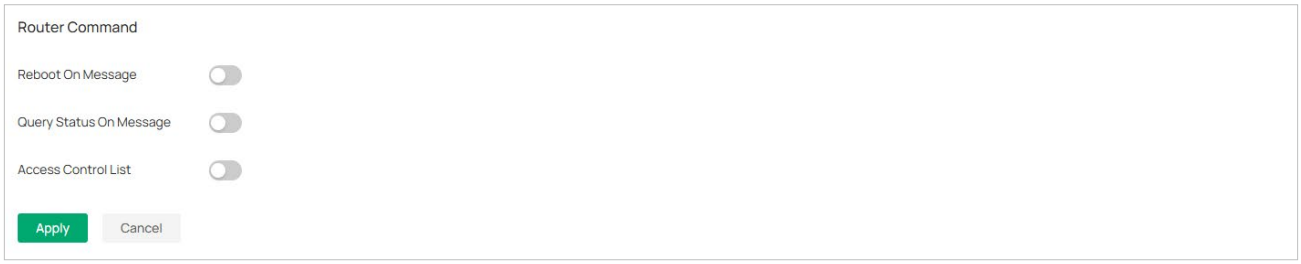
| SMTP Server | Enter the domain name or IP address of the SMTP server. |
| SSL | When enabled, the data will be transmitted based on the SSL protocol. |
| SMTP Port | Enter the port used by the SMTP server according to the instructions of your email service provider. |
| Authentication | If the login of the mailbox requires a username and authorization code, enable this option and configure the following parameters:<br><br>User Name: Enter your email address as the username.<br><br>Authorization Code: Enter the authorization code that enables a third party to log into the mailbox according to the instructions of your email service provider. Note that the authorization code is not the mailbox's password. |

In Router Command, you can send specific commands via SMS to interact with the router, and only specific users are allowed to perform these interactions.




| | |
|---|---|
| Reboot On Message | This feature is used to reboot the router via SMS.<br><br>Enable this feature and enter the router's Password/PIN. Then you can send a message starting with "LTE Router Reboot", followed by the router's Password/PIN (e.g. LTE Router Reboot 1234) to reboot the router. |
| Query Status On Message | This feature is used to get status information from the router via SMS.<br><br>Enable this feature, enter the router's Password/PIN, and choose the query contents. Then you can send a message starting with "LTE Router Status", followed by the router's Password/PIN (e.g. LTE Router Status 1234) to get status information from the router. |
| Access Control List | This feature is used to configure the allow phone number list of the above functions.<br><br>Enable this feature, select the international telephone area code, and enter the phone number. You can add one or more phone numbers, and only these phone numbers can interact with the router via SMS. |

# 6 Transmission Settings

For configuration instructions, refer to **Configure Network Transmission Settings** in the Omada Controller guide.

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|---|---|
| Routing | You can configure the following routing functions for the device.<br><br>Static Route: Network traffic is oriented to a specific destination, and Static Route designates the next hop or interface where to forward the traffic.<br><br>Policy Routing: Policy Routing designates which WAN port the router uses to forward the traffic based on the source, the destination, and the protocol of the traffic. |
| NAT | You can configure the following NAT functions for the device.<br><br>Port Forwarding: Port Forwarding helps establish network connections between a host on the internet and the other in the LAN by letting the traffic pass through the specific port of the gateway. Without Port Forwarding, hosts in the LAN are typically inaccessible from the internet for the sake of security.<br><br>ALG: ALG ensures that certain application-level protocols function appropriately through your gateway.<br><br>One-to-One NAT: One-to-One NAT will establish a correspondence between a private IP and a public IP, allowing access to the device with the private IP through the corresponding public IP.<br><br>Disable NAT: Disable NAT allows internal devices to obtain public IP addresses. |
| DHCP Reservation | DHCP Reservation allows you to reserve specific IP addresses for devices in your network, and centrally manage the IP addresses. |
| Bandwidth Control | Bandwidth Control optimizes network performance by limiting the bandwidth of specific sources. |
| Session Limit | Session Limit optimizes network performance by limiting the maximum sessions of specific sources. |
| Gateway QoS | Gateway QoS allows you to define service entries that will appear as matching conditions for you to choose when configuring the rules of related modules like QoS. |

# 7 Network Security settings:

For configuration instructions of the following functions, refer to **Configure Network Security** in the Omada Controller guide.

| | |
|---|---|
| ACL | ACL (Access Control List) allows a network administrator to create rules to restrict access to network resources. ACL rules filter traffic based on specified criteria such as source IP addresses, destination IP addresses, and port numbers, and determine whether to forward the matched packets. |
| URL Filtering | URL Filtering allows a network administrator to create rules to block or allow certain websites, which protects it from web-based threats, and deny access to malicious websites. |
| Application Control | DPI (Deep Packet Inspection) helps you identify, analyze, and control the traffic at the application layer in the network. DPI engine includes the latest application identification signatures to track which applications are using the most bandwidth. You can better manage and distribute network traffic usage through DPI. |

| | |
|---|---|
| IDS/IPS | IDS/IPS is a security mechanism that detects intrusions based on attack characteristics. It can detect malware, Trojan horses, worms, ActiveX and other attacks to protect the network security of users. |
| Firewall | Firewall is used to enhance the network security. |

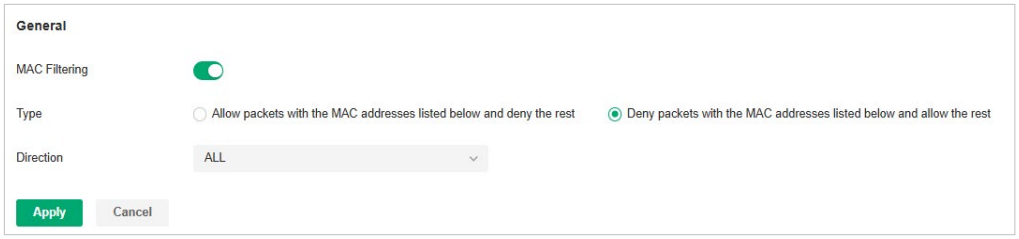
# 7. 1 MAC Filtering

## Overview

MAC Filtering can drop or allow packets from certain devices passing through the router based on the MAC address of the devices. After the MAC filtering policy and MAC filtering list are configured, the router will apply the filter policy to the packets matching the MAC address, and thus limit network traffic and manage network access behaviors.

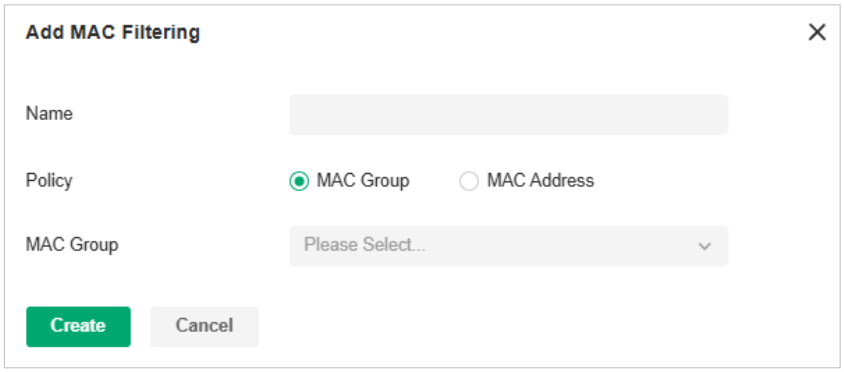
## Configuration

1. Launch the controller and access a site.
2. Go to Device Config > Gateway > MAC Filtering for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Network Security > MAC Filtering for a specific gateway.
3. Enable MAC Filtering and configure the parameters.




| | |
|---|---|
| Type | Select the mode of MAC Filtering.<br><br>Allow packets with the MAC addresses listed below and deny the rest: Select to allow packets with the listed MAC address to pass through the router, and packets with other MAC addresses will be dropped.<br><br>Deny packets with the MAC addresses listed below and allow the rest: Select to drop packets with the listed MAC address, and packets with other MAC addresses will be allowed to pass through the router. |
| Direction | Select All when you want to apply the policy to traffic both from LAN to LAN and from LAN to WAN. Select LAN -> WAN when you want to apply the policy only to traffic from LAN to WAN. |

4. Click Add MAC Filtering to add MAC addresses or groups to the list.




| | |
|---|---|
| Name | Specify the name for the entry. |
| Policy | Choose MAC Group and specify the MAC groups of devices, then the MAC filtering policy will be applied to traffic with the MAC groups.<br><br>Choose MAC Address and specify the MAC addresses of devices, then the MAC filtering policy will be applied to traffic with the MAC addresses. |

# 7. 2 IP-MAC Binding

## Overview

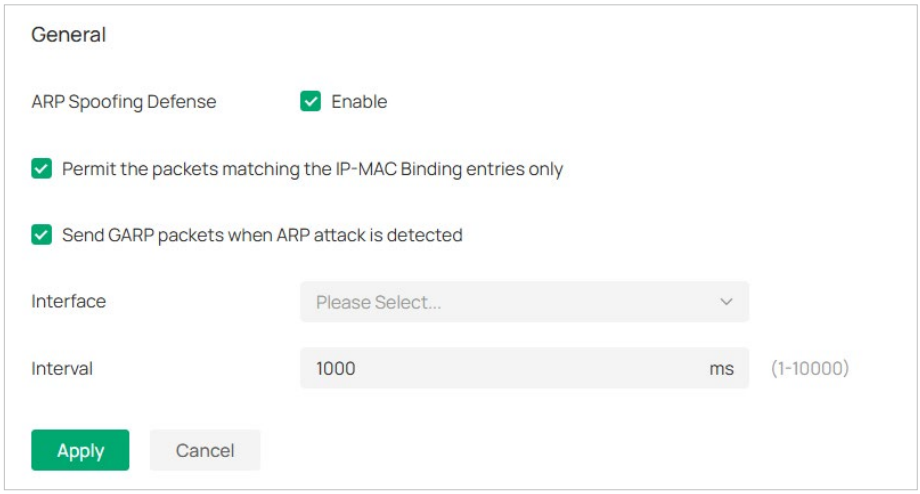
ARP (Address Resolution Protocol) is used to map IP addresses to the corresponding MAC addresses so that packets can be delivered to their destinations. However, if attackers send ARP spoofing packets with false IP address-to-MAC address mapping entries, the device will update the ARP table based on the false ARP packets and record wrong mapping entries, which results in a breakdown of normal communication.

Anti ARP Spoofing can protect the network from ARP spoofing attacks. It works based on the IP-MAC Binding. These entries record the correct one-to-one relationships between IP addresses and MAC addresses. When receiving an ARP packet, the gateway checks whether it matches any of the IP-MAC Binding entries. If not, the gateway will ignore the ARP packets. In this way, the gateway maintains the correct ARP table.

## Configuration

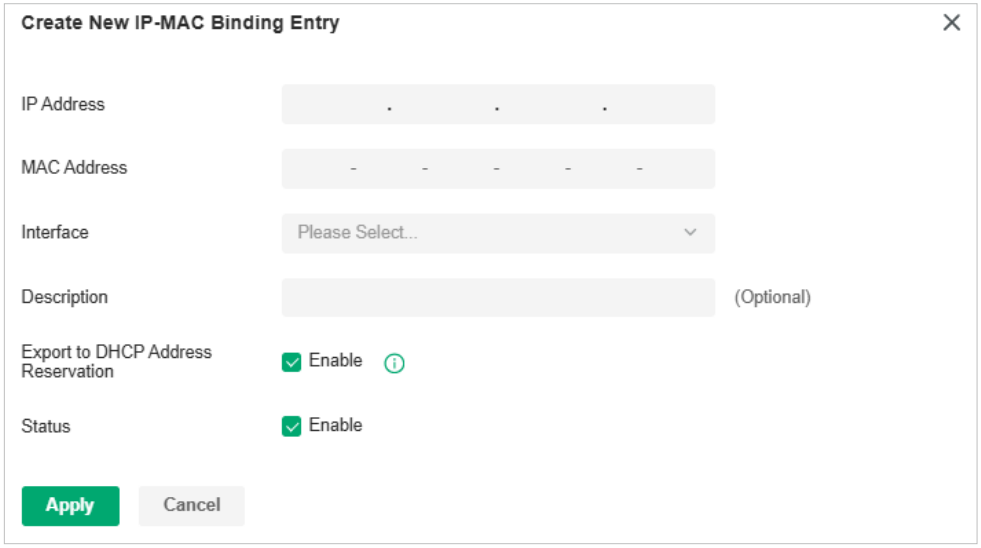
1. Launch the controller and access a site.
2. Go to Device Config > Gateway > IP-MAC Binding for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Network Security > IP-MAC Binding for a specific gateway.

3. Enable ARP Spoofing Defense and configure general settings. Click Apply.




| | |
|---|---|
| ARP Spoofing Defense | Check the box to globally enable ARP Spoofing Defense. |
| Permit the packets matching the IP-MAC Binding entries only | With this option enabled, when receiving a packet, the router will check whether the IP address, MAC address and receiving interface match any of the IP-MAC Binding entries. Only the matched packets will be forwarded. This feature can be enabled only when ARP Spoofing Defense is enabled. |
| Send GARP packets when ARP attack is detected | With this option enabled, the router will send GARP packets to the hosts if it detects ARP spoofing packets on the network. The GARP packets will inform the hosts of the correct ARP information, which is used to replace the wrong ARP information in the hosts. This feature can be enabled only when ARP Spoofing Defense is enabled. |
| Interface | Select the interface on which the entries will take effect. |
| Interval | Specify the time interval for sending GARP packets. The valid values are from 1 to 10000. |

4. Click Create New IP-MAC Binding Entry and add an IP-MAC binding entry. Click Apply.




| | |
|---|---|
| IP Address | Specify the IP address to be bound. |

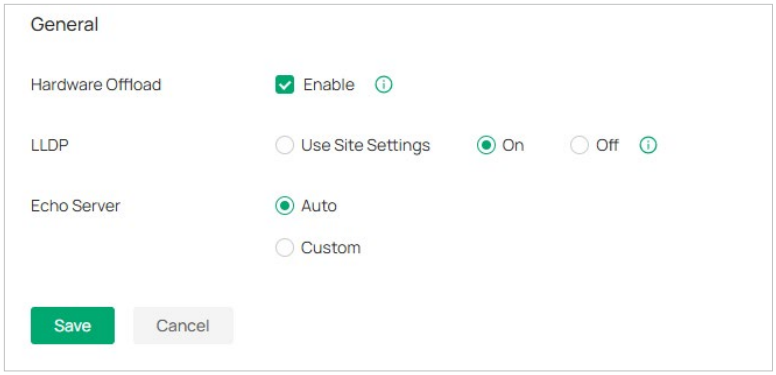
| | |
|---|---|
| MAC Address | Specify the MAC address to be bound. |
| Interface | Select the interface on which the entries will take effect. |
| Description | (Optional) Enter a description for identification. |
| Export to DHCP Address Reservation | When enabled, the newly created IP-MAC Binding entry will be synchronized to DHCP Reservation list |
| Status | Enable the entry. Only when the status is enabled will the entry take effect. |

# 8 Configure Advanced Settings

## 8. 1 General

You can configure advanced settings to make better use of network resources.

1. Launch the controller and access a site.
2. Go to Devices > Device List. In the device list, click a gateway, click Manage Device and go to Config > Advanced > General.
3. Configure the parameters.




| | |
|---|---|
| Hardware Offload | With this feature enabled, packet forwarding performance will be improved and CPU utilization will be reduced. Note that this feature cannot take effect if the QoS is enabled. |
| LLDP | LLDP (Link Layer Discovery Protocol) can help discover devices.. |
| Echo Server | Echo Server is used to test the connectivity and monitor the latency of the network automatically or manually. If you click Custom, enter the IP address or hostname of your custom server. |

# 8. 2 DNS

## 8. 2. 1 Dynamic DNS

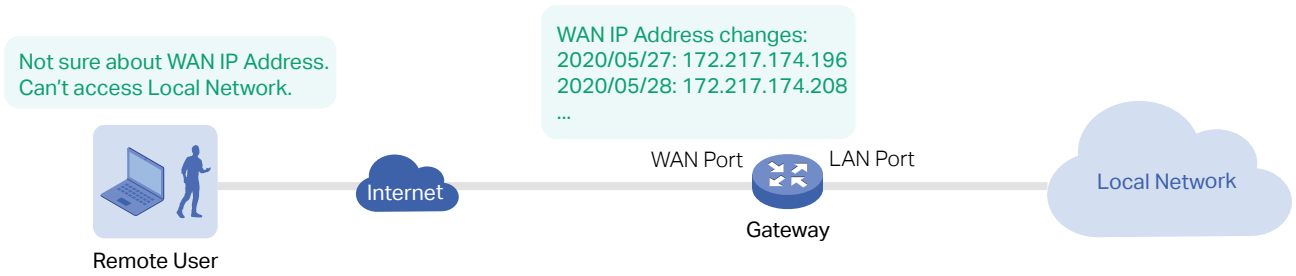
### Overview

WAN IP Address of your gateway can change periodically because your ISP typically employs DHCP among other techniques. This is where Dynamic DNS comes in. Dynamic DNS assigns a fixed domain name to the WAN port of your gateway, which facilitates remote users to access your local network through WAN Port.

Let's illustrate how Dynamic DNS works with the following figures.

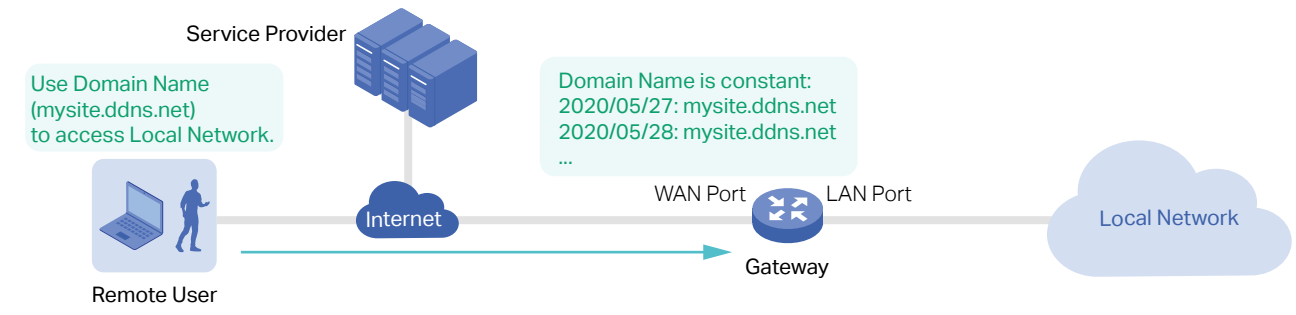
**Before:**

- WAN IP Address can change periodically, if it's dynamically assigned by the ISP using DHCP among other techniques.
- Remote User doesn't know what WAN IP Address is exactly at the moment, and cannot access Local Network.




**After:**

- Remote User can simply use Domain Name to access Local Network through WAN Port.
  In this example, Domain Name is mysite.ddns.net.

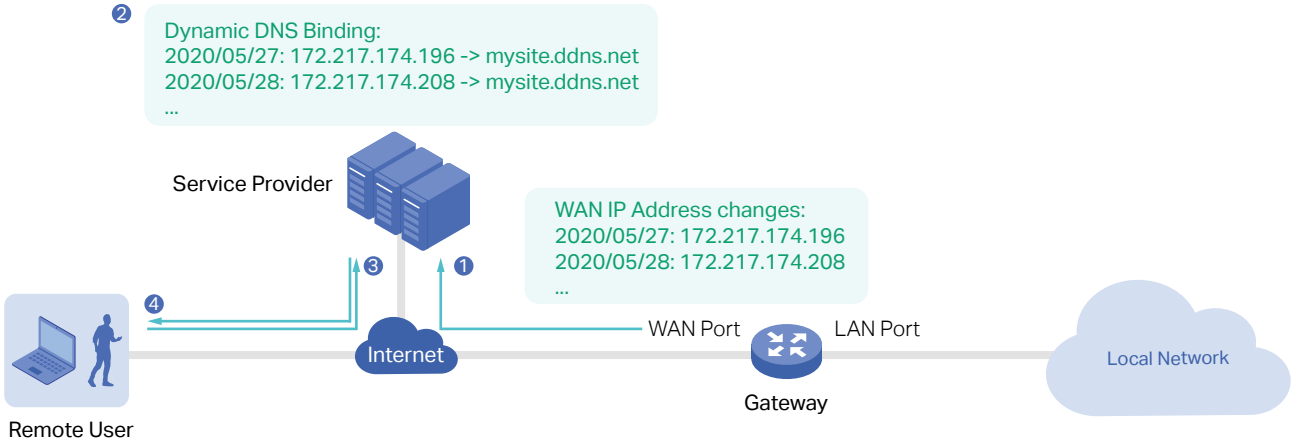


### Prerequisite:

- Choose one Service Provider from the four that the controller supports, i.e. DynDNS, No-IP, Peanuthull, Comexe, TP-Link Dynamic DNS.
- Register at your Service Provider, then you get your Username and Password.
- Get your Domain Name from your Service Provider.

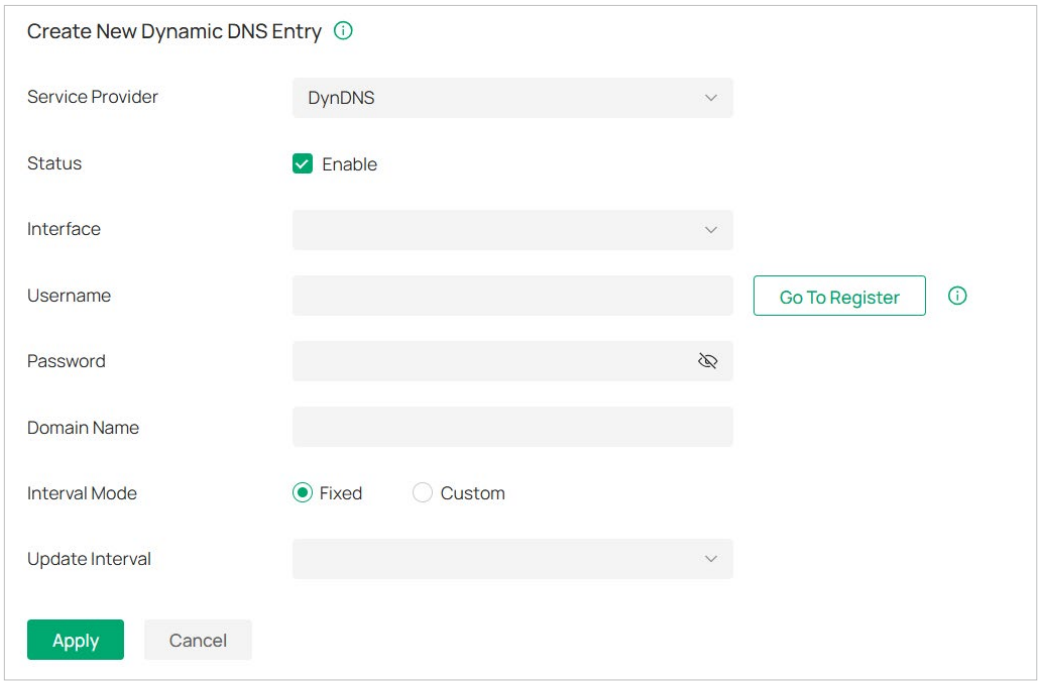
### How Dynamic DNS works:

1. Gateway informs Service Provider of WAN IP Address.
2. Service Provider binds WAN IP Address with Domain Name and keeps it updated as WAN IP Address changes.
3. Remote User requests for WAN IP Address by sending Domain Name to Service Provider.
4. Service Provider replies with WAN IP Address, which Remote User actully uses to access Local Network through WAN Port.




## Configuration

1. Launch the controller and access a site.
1. Go to Device Config > Gateway > DNS > Dynamic DNS for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Advanced > DNS > Dynamic DNS for a specific gateway.
2. Click Create New Dynamic DNS Entry, to load the following page. Configure the parameters.




| | |
|---|---|
| Service Provider | Select your service provider of Dynamic DNS. The Controller supports DynDNS, NO-IP, Peanuthull, Comexe and Custom. |
| Status | Enable or disable the Dynamic DNS entry. |
| Interface | Select the WAN Port which the Dynamic DNS entry applies to. |
| Username | Enter your username for the service provider. If you haven't registered at the service provider, click Go To Register. |
| Password | Enter your password for the service provider. |
| Domain Name | Enter the Domain Name which is provided by your service provider. Remote users can use the Domain Name to access your local network through WAN port. |
| Interval Mode | Choose to use fixed or custom interval. |
| Update Interval | Specify the update interval to report the changes of the WAN IP address for the DDNS service. |
| Update URL | Enter the URL provided by your DDNS service provider in format of "http://[USERNAME]:[PASSWORD]@api.cp.easydns.com/dyn/tomato.php?hostname=[DOMAIN]&myip=[IP]". The router will automatically update user information to the service provider. |

3. Click Create. The new entry will be listed. You can check the Dynamic DNS status in the STATUS column.

## 8. 2. 2 DNS Proxy

### Overview

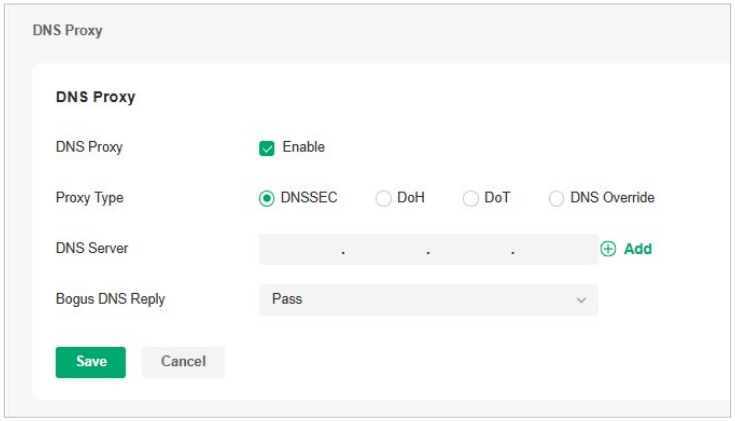
DNS Proxy provides the LAN side clients with the DNS query service. It forwards the DNS request from the LAN side clients to the selected upstream DNS server and forwards the DNS reply accordingly.

DNSSEC (DNS Security Extensions), DoT (DNS over TLS), DoH (DNS over Https), and DNS Override are security options for DNS Proxy. DNSSEC will verify the integrity of DNS records, and DoT / DoH will encrypt the query. DNS Override lets you choose your preferred DNS servers.

All the options need an upstream DNS server that supports them.

### Configuration

1. Launch the controller and access a site.
2. Go to Device Config > Gateway > DNS > DNS Proxy for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Advanced > DNS > DNS Proxy for a specific gateway.
3. Enable DNS Proxy and configure the parameters, then save the settings.




| | |
|---|---|
| Proxy Type | Specify a security option to apply. |
| DNS Server | Specify the upstream DNS server which the DNS requests will be forwarded to. For DoT and DoH, the system provides some known public DNS servers that support these security options. For DoH, the upstream DNS servers are usually websites with https URLs. For DNSSEC and DoT, servers are usually IP address. |
| Bogus DNS Reply | This is an special option for DNSSEC. Choose to pass/drop the bogus reply if the integrity of DNS records failed to be verified (which means the DNS record may be modified and is not trustable). |
| Primary DNS Server | Specify the primary upstream DNS server. |
| Secondary DNS Server | Specify the secondary upstream DNS server. |
| Apply Network | Specify the effective LAN network to apply DNS Override. |

### 8. 2. 3 DNS Cache

#### Overview

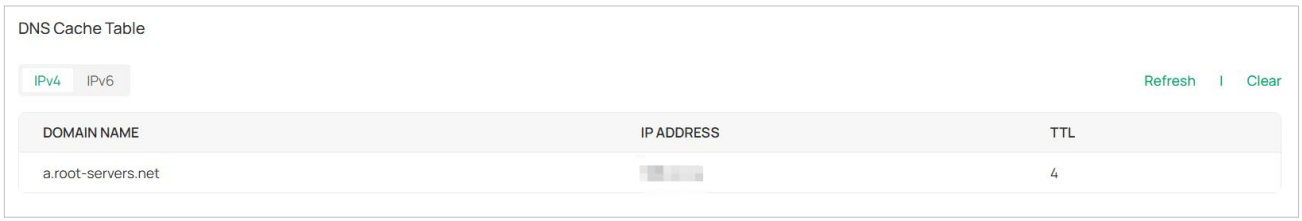
DNS caching further speeds up domain name translation/resolution by handling it for recently visited addresses before the request is sent to the internet. Even if your network can use a large number of public DNS servers for translation/resolution, it's still faster to have a local copy.

#### Configuration

1. Launch the controller and access a site.
2. Go to Device Config > Gateway > DNS > DNS Cache for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Advanced > DNS > DNS Cache for a specific gateway.
3. Enable DNS Cache and set a TTL value according to your needs. Then save the settings.


| | |
|---|---|
| TTL | Specify the time to live (TTL) value in seconds. When the life cycle of the DNS entry exceeds the TTL value, the DNS cache will be automatically cleared. The range is 1-86400. If it's not specified, the system will use the default TTL value of each DNS message. |

4. Refresh the DNS Cache Table and check the DNS cache status. You can clear the cache information if necessary.




For a wireless gateway, you can configure Load Balance and QoS to make better use of network resources. Load Balance can control the client number associated to the device, while QoS can optimize the performance when handling differentiated wireless traffics, including traditional IP data, VoIP (Voice-over Internet Protocol), and other types of audio, video, streaming media.

Select each band and configure the following parameters and features.

| | |
|---|---|
| Max Associated Clients | Enable this function and specify the maximum number of connected clients. If the connected client reaches the maximum number, the device will disconnect those with weaker signals to make room for other clients requesting connections. |
| RSSI Threshold | Enable this function and enter the threshold of RSSI (Received Signal Strength Indication). If the client's signal strength is weaker than the threshold, the client will lose connection with the device. |
| Unscheduled Automatic Power Save Delivery | When enabled, this function can greatly improve the energy-saving capacity of clients. |
| OFDMA | (Only for AP supporting 802.11 ax or later standards) Enable this feature to enable multiple users to transmit data simultaneously, and it will greatly improves speed and efficiency. Note that the benefits of OFDMA can be fully enjoyed only when the clients support OFDMA. |

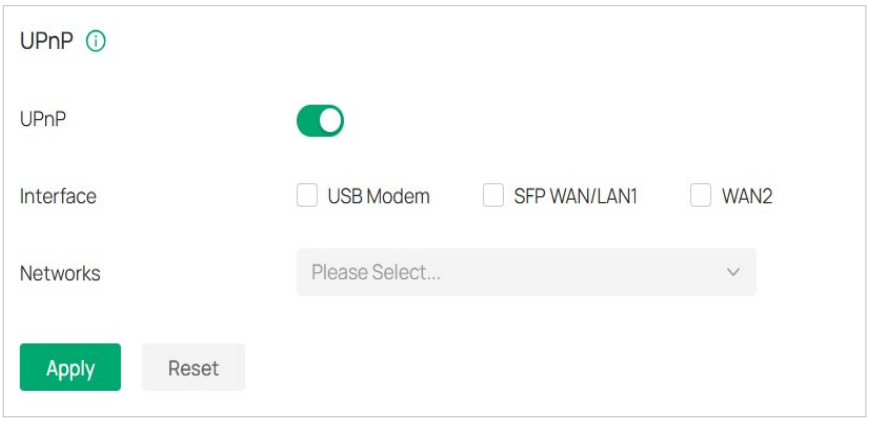
# 8. 3 UPnP

## Overview

UPnP (Universal Plug and Play) is essential for applications including multiplayer gaming, peer-to-peer connections, real-time communication (such as VoIP or telephone conference) and remote assistance, etc. With the help of UPnP, the traffic between the endpoints of these applications can freely pass the gateway, thus realizing seamless connections.

## Configuration

1. Launch the controller and access a site.
2. Go to Device Config > Gateway > UPnP for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Advanced > UPnP for a specific gateway.
3. Enable UPnP globally and configure the parameters. Then click Apply.




| | |
|---|---|
| Interface | Select the WAN port where UPnP takes effect. |
| Networks | Select the LAN interface where UPnP takes effect. |

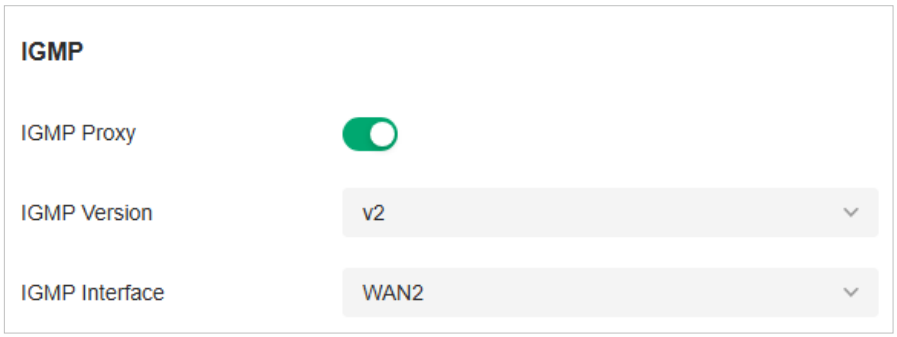
# 8. 4 IPTV

## Overview

IPTV includes two sections: IGMP and IPTV. In IGMP settings, you can enable IGMP proxy to detect multicast group membership information and thus the router is able to forward multicast packets based upon the information. IPTV settings allows you to enable Internet/IPTV/Phone service provided by your ISP.

## Configuration

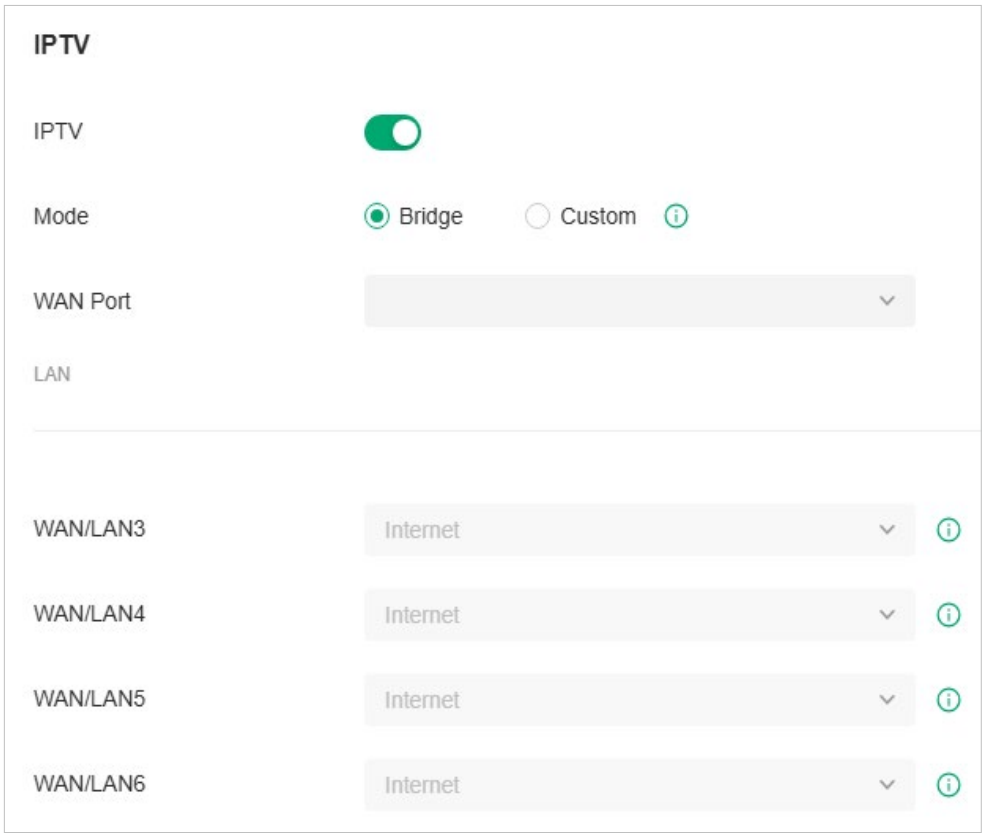
1. Launch the controller and access a site.
2. Go to Device Config > Gateway > IPTV for all gateways in the site, or go to Devices > Device List, and in the device list, click a gateway, click Manage Device and go to Config > Advanced > IPTV for a specific gateway.
3. Enable IGMP Proxy and configure the parameters.




| | |
|---|---|
| IGMP Proxy | Enable IGMP Proxy.<br><br>IGMP Proxy sends IGMP querier packets to the LAN ports to detect if there is any multicast member connected to the LAN ports. |
| IGMP Version | Select the IGMP version as V2 or V3. The default is IGMP V2. |
| IGMP Interface | Select the WAN port on which the IGMP Proxy takes effect. |

4. If you want to configure the IPTV settings, enable IPTV and choose the mode as Bridge or Custom according to your ISP. Then configure the corresponding parameters.

**Note:** The IPTV section will be hidden if your device is an earlier version that does not support this feature.




| | |
|---|---|
| IPTV | Enable IPTV feature. |
| Mode | Select the appropriate Mode according to your ISP.<br>Bridge: Select this mode if your ISP requires no other parameters.<br>Custom: Select this mode if your ISP provides necessary parameters, and configure the parameters according to the requirements of your ISP. |
| WAN Port | Select the WAN port on which the IPTV settings take effect. |
| Port Mode | Select the appropriate Port Mode of the LAN ports to determine which port is used to support Internet service, IPTV service, or IP Phone service. |

5. Click Save.