Ruijie Reyee ES, NBS, NIS Series Switch

Cookbook

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Preface

Intended Audience

This document is intended for:

- Network engineers
- Technical support and servicing engineers
- Network administrators

Technical Support

- The official website of Ruijie Reyee: https://www.ruijienetworks.com/products/reyee

Conventions

1. GUI Symbols

Interface symbol	Description	Example
Boldface	1. Button names 2. Window names, tab name, field name and menu items 3. Link	1. Click **OK**. 2. Select **Config Wizard**. 3. Click the **Download File** link.
>	Multi-level menus items	Select **System** > **Time**.

2. Signs

This document also uses signs to indicate some important points during the operation. The meanings of these signs are as follows:

Warning

An alert that calls attention to important rules and information that if not understood or followed can result in data loss or equipment damage.

Caution

An alert that calls attention to essential information that if not understood or followed can result in function failure or performance degradation.

Note

An alert that contains additional or supplementary information that if not understood or followed will not lead to serious consequences.

Specification

An alert that contains a description of product or version support.

3. Instruction

This manual is used to guide users to understand the product, install the product, and complete the configuration.

The example of the port type may be different from the actual situation. Please proceed with configuration according to the port type supported by the product.

The example of display information may contain the content of other product series (such as model and description). Please refer to the actual display information.

The routers and router product icons involved in this manual represent common routers and layer-3 switches running routing protocols.

The manual offers configuration information (including model, description, port type, software interface) for indicative purpose only. In case of any discrepancy or inconsistency between the manual and the actual version, the actual version prevails.

Contents

1 Product Introduction

1.1 Reyee ES2 Series Switch

Ruijie Reyee smart surveillance switches offer a variety of port options to meet the needs of video surveillance networks of different scales. Ruijie Reyee smart surveillance switches support full-power PoE output to ensure that all cameras can be powered simultaneously when connected to the switch at maximum capacity. In addition, Ruijie Real-easy Series smart surveillance switches provide simple and easy-to-use management features while offering plug and play with default factory configuration, which can quickly locate the surveillance network faults, initiate PoE port restart, perform VLAN configuration, etc. Ruijie Cloud app and Ruijie Cloud platform remote management is also supported, making the operation and maintenance of the surveillance network easier and more convenient, while reducing operation and maintenance costs.

1.1.1 Product List

Model	10/100 Base-T Auto-sensing Ethernet Port	10/100/1000 Base-T Auto-sensing Ethernet Port	1000Base-X SFP Port	Console Port
RG-ES205GC-P	N/A	5 (Ports 1-4 support PoE+/PoE)	N/A	N/A
RG-ES209GC-P	N/A	9 (Ports 1-8 support PoE+/PoE)	N/A	N/A
RG-ES218GC-P	N/A	16 (Support PoE+/PoE)	2	N/A
RG-ES226GC-P	N/A	24 (Support PoE+/PoE)	2	N/A

Model	10/100 Base-T Auto-sensing Ethernet Port	10/100/1000 Base-T Auto-sensing Ethernet Port	1000Base-X SFP Port	Console Port
RG-ES224GC	N/A	24	N/A	N/A
RG-ES216GC	N/A	16	N/A	N/A
RG-ES106D-P V2	6	N/A	N/A	N/A
RG-ES126S-LP V2	24	1	1 combo port	N/A
RG-ES126S-P V2	24	1	1 combo port	N/A

The SPF ports cannot be downward compatible with 100Base-FX.

1000Base-T is compatible with 100Base-TX and 10Base-T in the downlink direction.

1.1.2 LED Indicator

LED	State	Meaning
System status LED	Off	The switch is not receiving power.
	Blinking green	The PoE power exceeds the power of the entire device (370 W). The new connected PD cannot be powered up due to insufficient power. The switching function is operational.
	Solid green	The switch is operational.
RJ45 port PoE status LED	Off	PoE is not enabled.
	Solid green	PoE is enabled. The port is operational.
	Blinking green	Indicates PoE overload.
1000Mbps RJ-45 port status LED	Off	The port is not connected.
	Solid green	The port is connected at 10/100/1000 Mbps.
	Blinking green	The port is receiving or transmitting traffic at 10/100/1000 Mbps.
SFP port status LED	Off	The port is not connected.
	Solid green	The port is connected at 1000 Mbps.
	Blinking green	The port is receiving or transmitting traffic at 1000 Mbps.

1.1.3 Button

Botton	Description
Port mode LED Switch-Over button	When the button is turned to the left position (Mode 1), the LED indicates the switching status of the port: when the LED is solid green, it indicates that the link is up; when the LED blinks green, data is being transmitted or received. When the button is turned to the right position (Mode 2), the LED indicates the PoE status of ports: when the LED is solid green, it indicates that the PoE-supported ports are supplying power; when the LED blinks green, the power of the ports is overloaded.
System reset button	The switch reboots after the reset button is pressed for less than 2 seconds. The switch restores the default factory settings after the reset button is pressed for more than 5 seconds (until the status LED blinks).

1.2 Reyee NBS Series Switch

Reyee RG-NBS3100 series of managed switches are Reyee's 4 switches tailored for SME customer applications, which can meet the different levels of network access needs of SME customers. Covering basic VLAN division and advanced security features such as ACL,etc. The model with the suffix '-P' is a model that supports PoE output, and can meet the PoE power supply requirements of wireless APs, digital cameras and other devices in various occasions.

RG-NBS3200 series switch is a new generation of high-performance, strong security and integrated multi-service layer 2 Ethernet switch launched by Reyee. This series of switches adopts an efficient hardware architecture design, providing larger entry specifications and faster Hardware processing performance, more convenient operation experience. The RG-NBS3200 series provides flexible Gigabit access to 10 Gigabit uplink ports. The entire series of switches all have 4-port 10 Gigabit optical and high-performance port uplink capabilities.

Ruijie RG-NBS5100&5200 Series Switches are the next-generation high-performance, high-security and multi-service Layer 3 Ethernet switches. Adopting an efficient hardware architecture design, this switch series provides larger MAC address table size, faster hardware processing performance, and more convenient operating experience. RG-NBS5100 series provides Gigabit access and Gigabit uplink, while RG-NBS5200 series provides Gigabit access and 10G uplink ports. Every switch of this series offers 4 fixed 10G fiber ports with high-performance uplink capability.

RG-NBS5100&5200 series switches provide comprehensive end-to-end QoS as well as flexible and rich security settings for small and medium-sized networks at an extremely high price-performance ratio to meet the needs of high-speed, secure and smart enterprise networks.

RG-NBS6002 switch is 1U swappable box-type network switch independently developed by Ruijie Networks. It provides two line card slots for four types of line cards and two power supply module slots for 1+1 power redundancy. The following table describes components of an RG-NBS6002 switch.

The RG-NBS7000 series switches are next-generation switches launched by Ruijie independently. The switch comes into two models: RG-NBS7006 and RG-NBS7006. RG-NBS7003: Any line card can work as a supervisor

engine in slot 1 (slot 1 must be occupied). The switch provides three line card slots. RG-NBS7006: The switch provides two supervisor engine slots and six line card slots.

1.2.1 Product List

Model	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port	Console Port	Power Supply
RG-NBS3100-24GT4SFP	24	4	N/A	N/A	Single
RG-NBS3100-24GT4SFP-P	24 (Support PoE+)	4	N/A	N/A	Single
RG-NBS3100-8GT2SFP	8	2	N/A	N/A	Power adapter
RG-NBS3100-8GT2SFP-P	8 (Support PoE+)	2	N/A	N/A	Single
RG-NBS3200-24GT4XS	24	N/A	4	N/A	Single

Model	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port	Console Port	Power Supply
RG-NBS3200-24SFP/8GT4XS	8 (combo)	24	4	N/A	Single
RG-NBS3200-24GT4XS-P	24 (Support PoE+)	N/A	4	N/A	Single
RG-NBS3200-48GT4XS	48	N/A	4	N/A	Single
RG-NBS3200-48GT4XS-P	48 (Support PoE+)	N/A	4	N/A	Single
RG-NBS5100-24GT4SFP	24	4	N/A	N/A	Single
RG-NBS5100-48GT4SFP	48	4	N/A	N/A	Single
RG-NBS5200-24GT4XS	24	N/A	4	N/A	Single
RG-NBS5200-24SFP/8GT4XS	8 (combo)	24	4	N/A	Single
RG-NBS5200-48GT4XS	48	N/A	4	N/A	Single
RG-NBS3100-48GT4SFP-P	48	4	N/A	N/A	Single

Model	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port	Console Port	Power Supply
RG-NBS5100-24GT4SFP-P	24	4	N/A	N/A	Single
RG-NBS5200-24GT4XS-P	24	N/A	4	N/A	Single
RG-NBS5200-48GT4XS-UP	48	N/A	4	N/A	Single
RG-NBS6002 Two service module slots	N/A	N/A	N/A	N/A	2, 1+1 power redundancy is supported
M6000-24GT2XS	24	N/A	2	N/A	N/A
M6000-24SFP2XS	N/A	24	2	N/A	N/A
M6000-16GT8SFP2XS	16	8	2	N/A	N/A
M6000-16SFP8GT2XS	8	16	2	N/A	N/A

Model	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port	Console Port	Power Supply
RG-NBS7003 Three line card slots Any line card can work as a supervisor engine in slot 1 (slot 1 must be occupied).	N/A	N/A	N/A	No console but has one management port	2, 1+1 power supply redundancy
RG-NBS7006 Two supervisor engine slots and six line card slots **Supervisor Engine** M7006-CM	N/A	N/A	N/A	N/A	4, Supports 1+1 and 2+2 power supply redundancy
M7006-CM The supervisor engine of the RG-NBS7006 switch	N/A	N/A	N/A	10/100 Mbps MGMT port	N/A
M7000-16XS-EA	N/A	N/A	16	N/A	N/A
M7000-24GT24SFP2XS-EA	24	24	2	N/A	N/A
M7000-48GT2XS-EA	48	N/A	2	N/A	N/A
M7000-24GT2XS-EA	24	N/A	2	N/A	N/A

Model	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port	Console Port	Power Supply
M7000-48SFP2XS-EA	N/A	48	2	N/A	N/A
M7000-24SFP2XS-EA	N/A	24	2	N/A	N/A
M7000-8XS-EA	N/A	N/A	8	N/A	N/A

SFP port is downward compatible with 100Base-FX.

1000Base-T is downward compatible with 100Base-TX and 10Base-T.

Combo port consists of one 1000Base-X SFP port and one 10/100/1000Base-T Ethernet port. That is, only one port of them is available at a particular time.

Line Cards for 7K Series	10/100/1000 Base-T Ethernet Port	1000Base-X SFP Port	10G SFP+ Port
M7000-16XS-EA	-	-	16
M7000-24GT24SFP2XS-EA	24	24	2
M7000-48GT2XS-EA	48	-	2
M7000-48SFP2XS-EA	-	48	2
M7000-24SFP2XS-EA	-	24	2
M7000-8XS-EA	-	-	8

RG-NBS6002 switch is 1U swappable box-type network switch independently developed by Ruijie Networks. It provides two line card slots for four types of line cards and two power supply module slots for 1+1 power redundancy. The following table describes components of an RG-NBS6002 switch.

The RG-NBS7000 series switches are next-generation switches launched by Ruijie independently. The switch comes into two models: RG-NBS7006 and RG-NBS7006. RG-NBS7003: Any line card can work as a supervisor engine in slot 1 (slot 1 must be occupied). The switch provides three line card slots. RG-NBS7006: The switch provides two supervisor engine slots and six line card slots.

1.2.2 LED Indicator

LED	State	Meaning
System status LED	Off	The switch is not receiving power.
	Blinking green (0.5 Hz)	The switch is running, but the alarm of insufficient PoE power prompts.
	Blinking green (10Hz)	The switch is being upgraded or initialized.
	Solid green	The switch is connected to Ruijie Cloud.
10/100/1000Base-T Ethernet port status LED	Off	The port is not connected.
	Solid green	The port is connected at 10/100/1000 Mbps.
	Blinking green	The port is receiving or transmitting traffic at 10/100/1000 Mbps.
RJ45 port PoE status LED	Off	PoE is not enabled.
	Solid green	PoE is enabled. The port is operational.
	Blinking green	The port has a PoE fault of overload.
SFP port status LED	Off	The port is not connected.
	Solid green	The port is connected.
	Blinking green	The port is receiving or transmitting traffic.
SFP+ port status LED	Off	The port is not connected.
	Solid green	The port is connected.
	Blinking green	The port is receiving or transmitting traffic.

1.2.3 Button

Botton	Description
PoE mode switch-over button	Press PoE Mode Switch-Over Button for above 3 seconds to switch the display mode between PoE mode and port rate mode.
Reset button	The switch reboots after the reset button is pressed for less than 2 seconds. The switch restores the default factory settings after the reset button is pressed for more than 5 seconds (until the status LED blinks).

1.3 Reyee NIS Series Switch

1.3.1 Product List

Model	10/100/1000BASE-T Ethernet Port with Auto-Negotiation	1000BASE-X SFP Port	Console Port	10GE SFP+ Port	Power Supply
RG-NIS3100-8GT4SFP-HP	8	4	N/A	N/A	1+1 redundancy

RG-NIS3100-8GT2SFP-HP	8	2	N/A	N/A	1+1 redundancy
RG-NIS3100-4GT2SFP-HP	4	2	N/A	N/A	1+1 redundancy

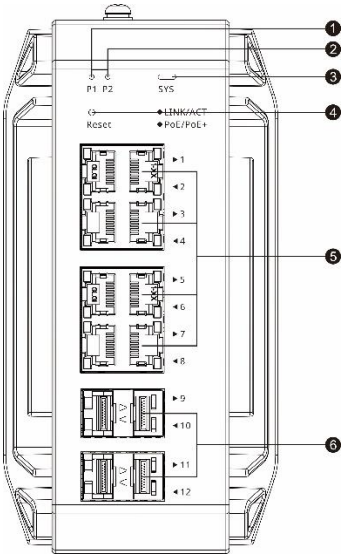
Note

1000BASE-T ports are downward compatible with 100BASE-T and 10BASE-T.

1.3.2 LED Indicator

1. Front Panel

Figure 1-1 Front Panel of RG-NIS3100-8GT4SFP-HP



1. Power status LED P1
2. Power status LED P2
3. System status LED
4. Reset button
5. 10/100/1000BASE-T Ethernet ports with auto-negotiation
6. GE SFP ports

Reset button: Press and hold the button for less than 2 seconds to restart the system. Press and hold the button for over 5 seconds until the system status LED starts blinking to restore factory settings and restart the system.

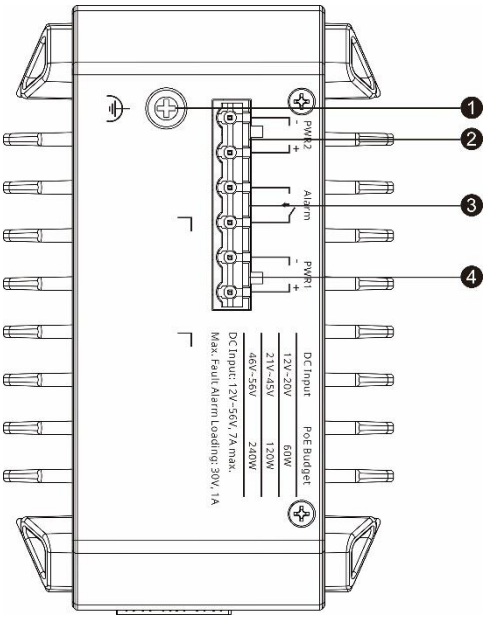
2. LEDs

LED	Silkscreen Label	Status	Description

System status LED	SYS	Off	The switch is not powered on.
		Fast blinking green (8–10 Hz)	The switch is starting up.
		Solid green	The switch is running properly.
		Slow blinking green (0.5 Hz)	The switch is not connected to the cloud.
		Blinking green (2 Hz)	The switch is restoring factory settings and will be powered off or is being upgraded.
		Blinking green at different time points (cycle: 1s on and 1s off, 0.25s on and 0.25s off, 0.25s on and 0.25s off, 0.25s on and 1.75s off)	The main program is lost or damaged, or specific functions are abnormal.
Electrical port and optical port LEDs	LINK/ACT	Off	The port is Down.
		Solid green	The port is Up.
		Blinking green	The port is Up and is receiving or sending data.
	PoE/PoE+	Off	PoE power supply is off.
		Solid yellow	PoE power supply is on.
Power status LEDs	P1	Off	PWR1 power supply is off.
		Solid on	PWR1 power supply is on.
	P2	Off	PWR2 power supply is off.
		Solid on	PWR2 power supply is on.

3. Top Panel

Figure 1-2 Top Panel of NIS3100-8GT4SFP-HP



1. Grounding stud	2. DC power connector PWR2
3. Alarm port	4. DC power connector PWR1

4. Rear Panel

The switch supports two installation modes: DIN rail mounting and wall mounting.

Figure 1-3 Rear Panel for DIN Rail Mounting

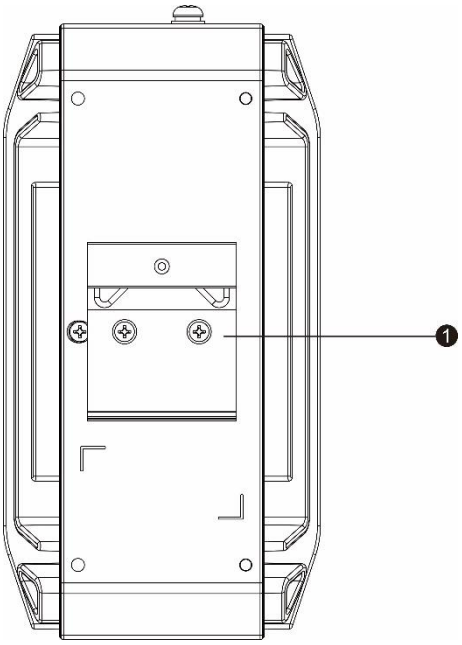
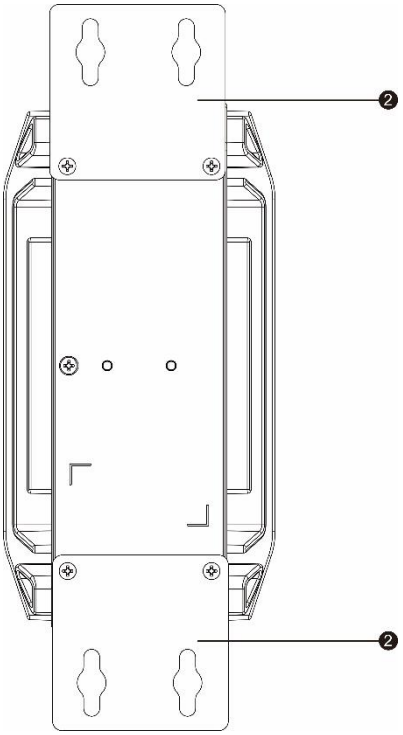


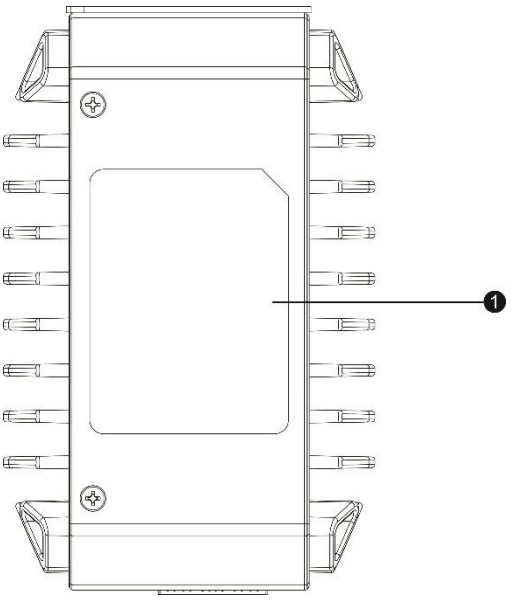
Figure 1-4 Rear Panel for Wall Mounting



1. DIN rail clamp	2. Mounting holes

1.3.3 Bottom Panel

Figure 1-5 Bottom Panel of NIS3100-8GT4SFP-HP



1. Nameplate

1.3.4 Cooling

The RG-NIS3100-8GT4SFP-HP adopts natural cooling to ensure that it works properly in a specified environment. Maintain a minimum clearance of 100 mm (3.94 in.) around the device to ensure proper ventilation.

2 Device Management

2.1 Logging in

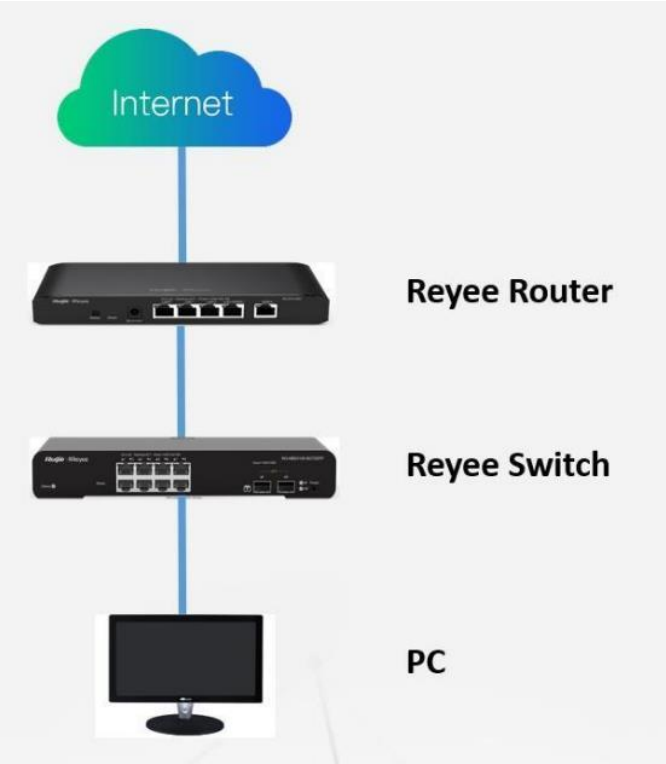
Web is a Web-based network management system used to manage or configure devices. You can access eWeb via browsers such as Google Chrome.Web-based management involves a Web server and a Web client. The Web server is integrated in a device, and is used to receive and process requests from the client, and return processing results to the client. The Web client usually refers to a browser, such as Google Chrome IE, or Firefox.

The Reyee managed switches not only support Web interface management, but also support life-time-free Ruijie Cloud App and Ruijie Cloud platform remote management. Users can view the network status, modify the configuration, and troubleshooting at home.

2.1.1 Case Demonstration

Network Topology

As shown in the figure below, you can access the eWeb management system of an access or aggregation switch via PC browser to manage and configure the device.

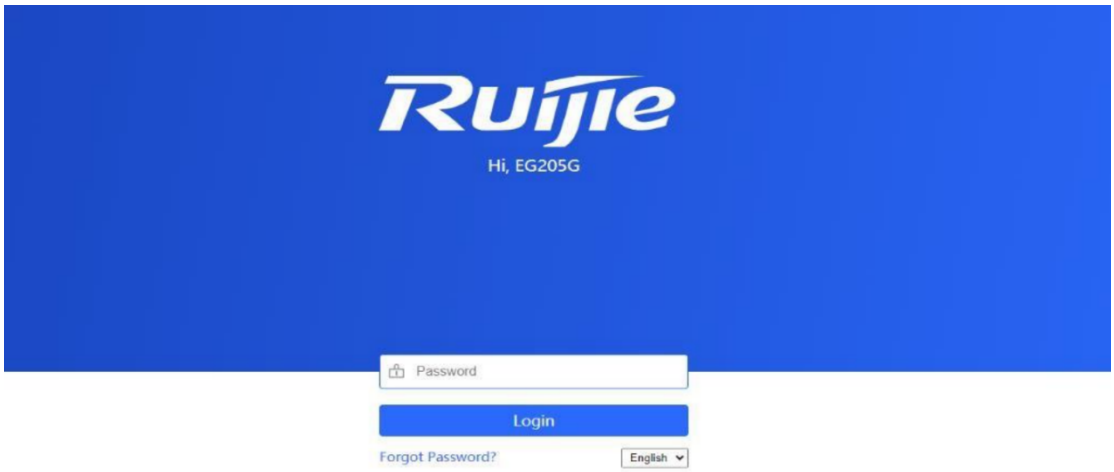


Set PC's IP assignment mode to obtain the IP address automatically.

Visit http://192.168.110.1 by Chrome browser.

Enter the password on the login page and click "Login".

Default Password: admin



For the **Reyee EG device**, you may use either 192.168.110.1 or 10.44.77.254 to access the device.

For the **Reyee switches**, you may use 10.44.77.200 to access the device.

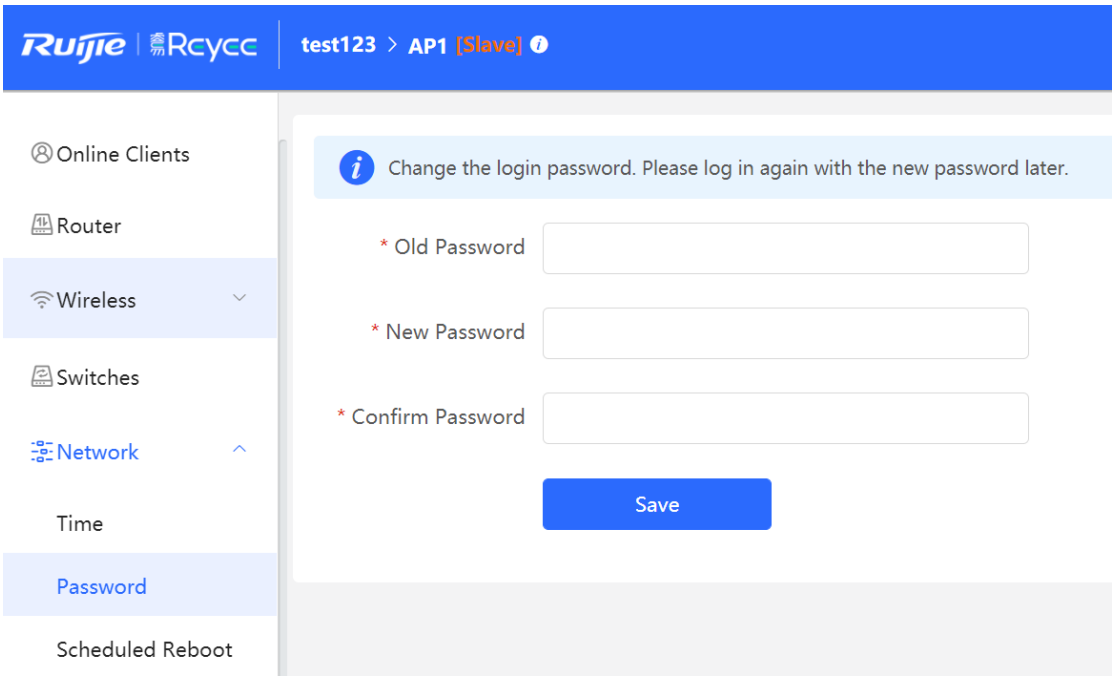
For the **Reyee AP**, you may use either 192.168.120.1 or 10.44.77.254 to access the device.

For the **EST**, you may use 10.44.77.254 to access the device.

The default login password for all Reyee devices is admin.

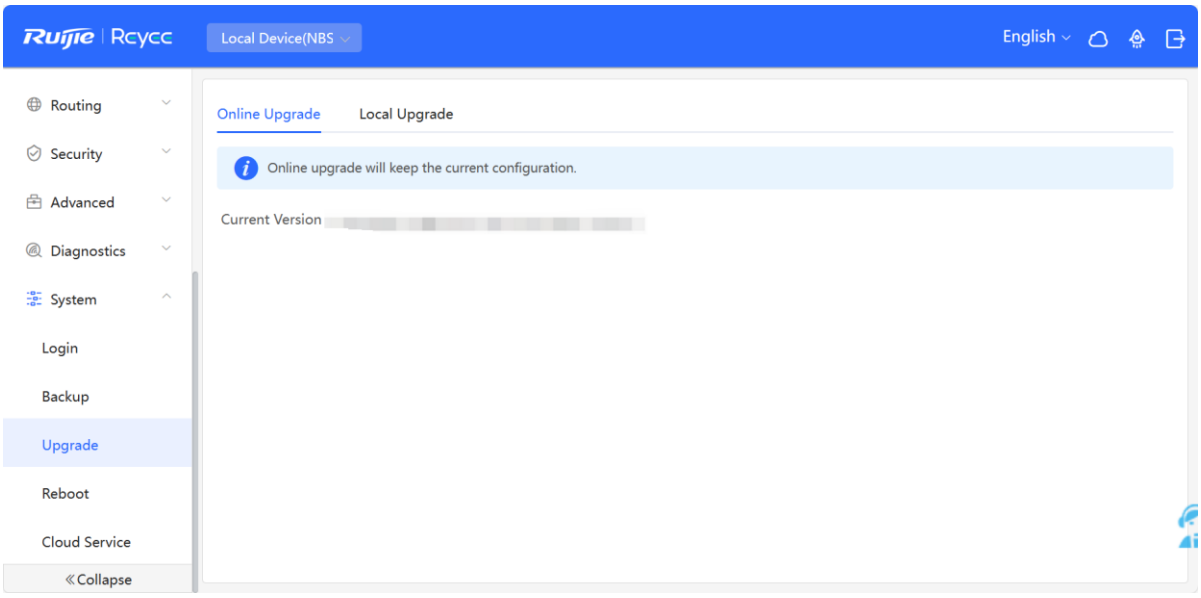
You may visit https://10.44.77.253 to login to the master device of Reyee network.

2.2 Configuring Password



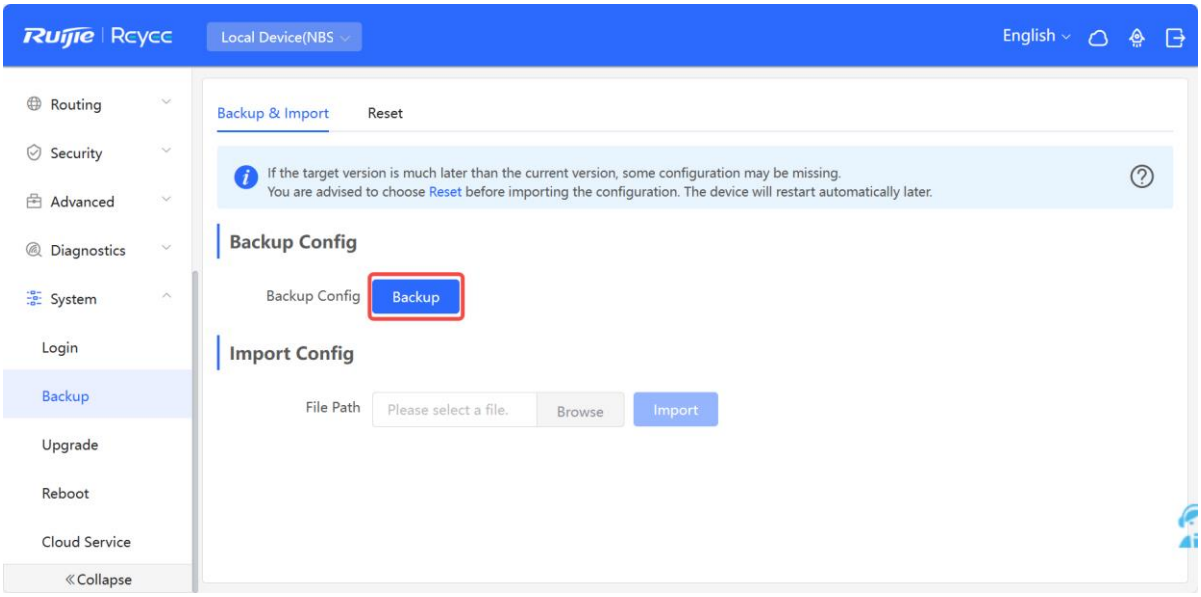
2.3 Upgrading

Login to the eWeb of the device and choose **Local Device > System > Upgrade**.

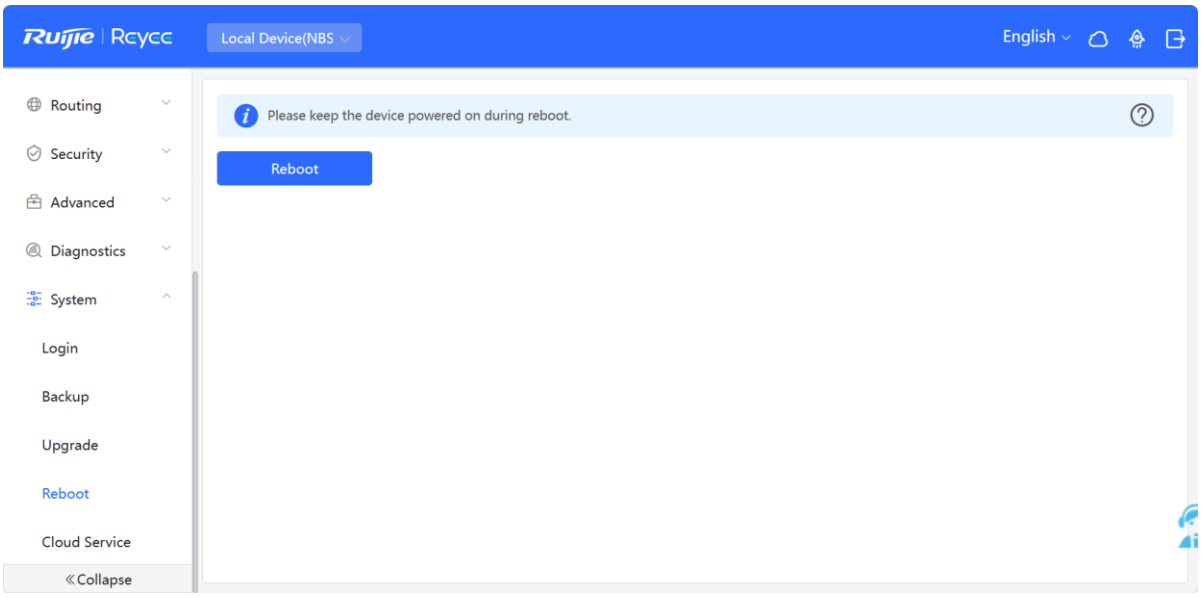


2.4 Backing up and Resetting

Login in the eWeb of the device and choose **Local Device > System > Backup**.

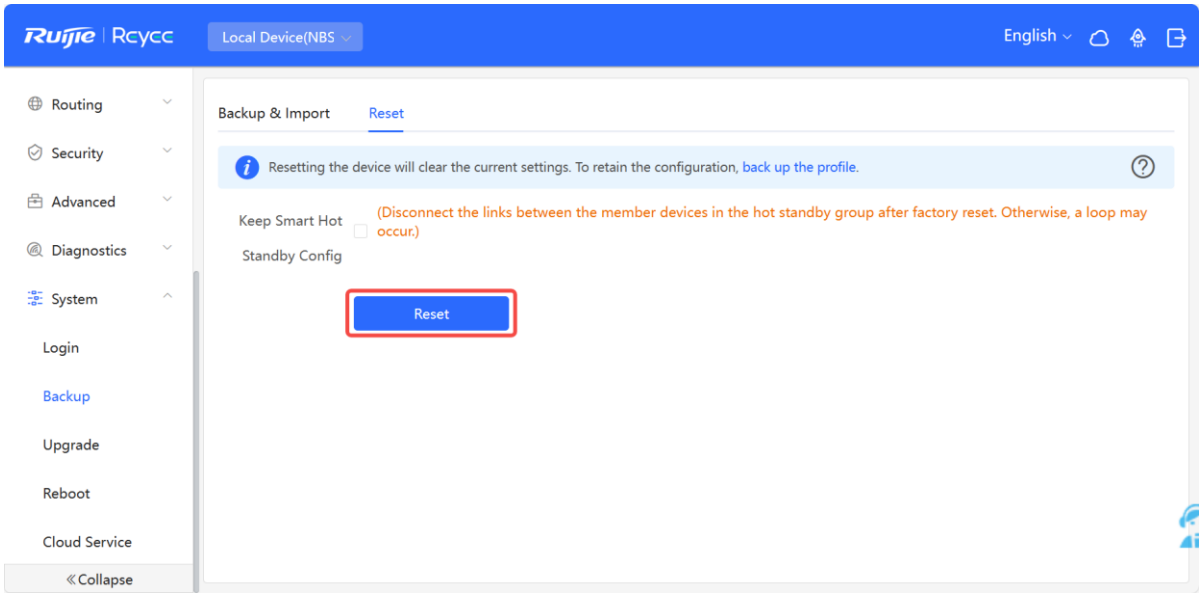


Login in the eWeb of the device and click **Local Device > System > Reboot**, then you can reset your devices.



2.5 Restoring Factory Settings

Login in the eWeb of the device Reset all device in the network.



3 Getting Start

3.1 Preparing for Installation

3.1.1 Safety Suggestions

To avoid personal injury and equipment damage, please carefully read the safety suggestions before you install each device. The following safety suggestions do not cover all possible dangers

1. Installation

a) Keep the chassis clean and free from any dust.

b) Do not place devices in a walking area.

c) Do not wear loose clothes or accessories that may be hooked or caught by devices during installation and maintenance

2. Movement

a) Do not frequently move devices.

b) When moving devices, note the balance and avoid hurting legs and feet or straining the back.

c) Before moving devices, turn off all power supplies and dismantle all power modules.

3. Electricity

a) Observe local regulations and specifications when performing electric operations. Relevant operators must be qualified.

b) Before installing the device, carefully check any potential danger in the surroundings, such as ungrounded power supply, and damp/wet ground or floor.

c) Before installing the device, find out the location of the emergency power supply switch in the room. First cut off the power supply in the case of an accident.

d) Try to avoid maintaining the switch that is powered-on alone.

e) Be sure to make a careful check before you shut down the power supply.

f) Do not place the equipment in a damp location. Do not let any liquid enter the chassis

4. Static Discharge Damage Prevention

To prevent damage from static electricity, pay attention to the following:

a) Proper grounding of grounding screws on the back panel of the device. Use of a three-wire single-phase socket with protective earth wire (PE) as the AC power socket.

b) Indoor dust prevention

c) Proper humidity conditions

5. Laser

Some devices support varying models of optical modules sold on the market which are Class I laser products. Improper use of optical modules may cause damage. Therefore, pay attention to the following when you use them:

a) When a fiber transceiver works, ensure that the port has been connected with an optical fiber or is covered with a dust cap, to keep out dust and avoid burning your eyes.

b) When the optical module is working, do not pull out the fiber cable and stare into the transceiver interface or you may hurt your eyes.

3.1.2 Installation Site Requirement

To ensure the normal working and a prolonged durable life of the equipment, the installation site must meet the following requirements

1. Ventilation

For installing devices, a sufficient space (at least 10 cm distances from both sides and the back plane of the cabinet) should be reserved at the ventilation openings to ensure the normal ventilation. After various cables have been connected, they should be arranged into bundles or placed on the cabling rack to avoid blocking the air inlets. It is recommended to clean the switch at regular intervals (like once every 3 months). Especially, avoid dust from blocking the screen mesh on the back of the cabinet.

2. Temperature and Humidity

To ensure the normal operation and prolong the service life of router, you should keep proper temperature and humidity in the equipment room.

If the equipment room has temperature and humidity that do not meet the requirements for a long time, the equipment may be damaged.

In an environment with relatively high humidity, the insulating material may have bad insulation or even leak electricity. Sometimes the materials may suffer from mechanical performance change and metallic parts may get rusted.

In an environment with relatively low humidity, however, the insulating strip may dry and shrink. Static electricity may occur easily and endanger the circuit on the equipment.

In an environment with high temperature, the equipment is subject to even greater harm, as its performance may degrade significantly and various hardware faults may occur.

3. Cleanness

Dust poses a severe threat to the running of the equipment. The indoor dust falling on the equipment may be adhered by the static electricity, causing bad contact of the metallic joint. Such electrostatic adherence may occur more easily when the relative humidity is low, not only affecting the useful life of the equipment, but also causing communication faults.

4. Grounding

A good grounding system is the basis for the stable and reliable operation of devices. It is the chief condition to prevent lightning stroke and resist interference. Please carefully check the grounding conditions on the installation site according to the grounding requirements, and perform grounding operations properly as required

Lightning Grounding

The lightning protection system of a facility is an independent system that consists of the lightning rod, download conductor and the connector to the grounding system, which usually shares the power reference ground and yellow/green safety cable ground. The lightning discharge ground is for the facility only, irrelevant to the equipment.

EMC Grounding

The grounding required for EMC design includes shielding ground, filter ground, noise and interference suppression, and level reference. All the above constitute the comprehensive grounding requirements. The resistance of earth wires should be less than 1Ω

5. EMI

Electro-Magnetic Interference (EMI), from either outside or inside the equipment or application system, affects the system in the conductive ways such as capacitive coupling, inductive coupling, and electromagnetic radiation.

There are two types of electromagnetic interference: radiated interference and conducted interference, depending on the type of the transmission path.

When the energy, often RF energy, from a component arrives at a sensitive component via the space, the energy is known as radiated interference. The interference source can be either a part of the interfered system or a completely electrically isolated unit. Conducted interference results from the electromagnetic wire or signal cable connection between the source and the sensitive component, along which cable the interference conducts from one unit to another. Conducted interference often affects the power supply of the equipment, but can be controlled by a filter. Radiated interference may affect any signal path in the equipment and is difficult to shield.

a) For the AC power supply system TN, single-phase three-core power socket with protective earthing conductors (PE) should be adopted to effectively filter out interference from the power grid through the filtering circuit.

b) The grounding device of the switch must not be used as the grounding device of the electrical equipment or anti-lightning grounding device. In addition, the grounding device of the switch must be deployed far away from the grounding device of the electrical equipment and anti-lightning grounding device.

c) Keep the equipment away from high-power radio transmitter, radar transmitting station, and high-frequency large-current device.

d) Measures must be taken to shield static electricity.

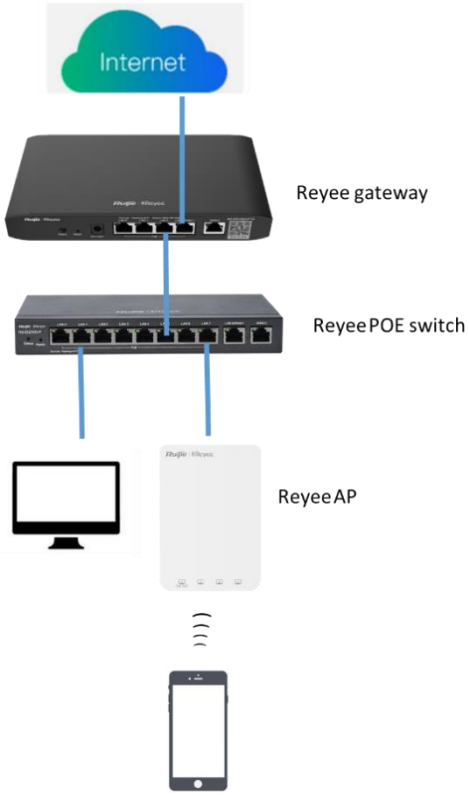
e) Interface cables should be laid inside the equipment room. Outdoor cabling is prohibited, avoiding damages to device signal interfaces caused by over-voltage or over-current of lightning

3.1.3 Network Planning

The DHCP server has two address pools on the egress gateway:

192.168.110.0/24 in VLAN 1 for devices of this network

192.168.10.0/24 in VLAN 10 for clients of this network



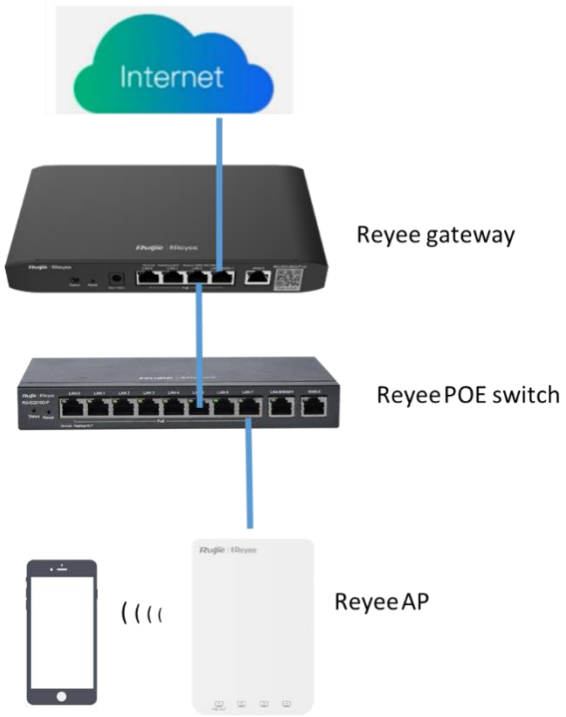
Following ports are used for Ruijie Cloud management. To let devices go online on Ruijie Cloud, ensure these ports are available and the data stream is permitted in this network.

Domain name (Cloud-as)	DST.IP	Domain name (Cloud-eu，Cloud-me)	DST.IP	DST.TCP	DST.UDP
Device Online Related:		Device Online Related:			
devicereg.ruijienetworks.com	35.197.150.240	devicereg.ruijienetworks.com	35.190.10.141	80,443	
ryrc.ruijienetworks.com	35.197.150.240	ryrc.ruijienetworks.com	35.234.108.108	80,443	
stunrc.ruijienetworks.com	35.197.150.240	stunrc.ruijienetworks.com	35.234.108.108		34,783,479
stunsvr-as.ruijienetworks.com	34.126.80.150	stunsvr-eu.ruijienetworks.com	35.246.237.78		34,783,479
stunb-as.ruijienetworks.com	34.126.80.150	cwmpsvr-eu.ruijienetworks.com	34.159.112.239		34,783,479
stunc-as.ruijienetworks.com	34.87.169.209	cwmpcp-eu.ruijienetworks.com	34.120.73.71		34,783,479
cwmpsvr-as.ruijienetworks.com	35.197.136.171	cwmpb-eu.ruijienetworks.com	34.159.112.239	80, 443	
cwmpcp-as.ruijienetworks.com	34.160.143.162				
cwmpb-as.ruijienetworks.com	35.197.136.171				
Log Upload:		Log Upload:			
34.87.93.12	34.87.93.12	cloudlog-eu.ruijienetworks.com	35.246.247.49	80,443	
Advanced Service:		Advanced Service:			
firmware.ruijienetworks.com	34.87.32.36	firmware.ruijienetworks.com	34.89.153.55	80,443	
cloudweb.ruijienetworks.com	34.87.32.36	cloudweb.ruijienetworks.com	34.89.153.55	80,443	
fastonline.ruijienetworks.com	34.87.32.36	fastonline.ruijienetworks.com	34.89.153.55	80,443	
cloudapi.ruijienetworks.com	35.197.150.240	cloudapi.ruijienetworks.com	35.234.108.108	80,443	
cdn.ruijienetworks.com	35.201.94.110	cdn.ruijienetworks.com	35.190.93.193	80,443	
ES Series Switch		ES Series Switch			
iotrc.ruijienetworks.com	34.87.101.31	iotrc.ruijienetworks.com	34.107.106.56		7683
iotsvr-as.ruijienetworks.com	35.247.161.22	iotsvr-eu.ruijienetworks.com	35.242.228.40		5683
iotlog-as.ruijienetworks.com	35.240.167.168	iotlog-eu.ruijienetworks.com	35.198.144.180		6683
iotdl-as.ruijienetworks.com	34.87.141.45	iotdl-eu.ruijienetworks.com	35.234.118.145		8683
MQTT Devices with P206 version		MQTT Devices with P206 version			
ryrcmq.ruijienetworks.com	34.120.84.165	ryrcmq.ruijienetworks.com	34.149.186.87	25857	
ehrrcmq.ruijienetworks.com	34.120.84.165	ehrrcmq.ruijienetworks.com	34.149.186.87	25857	
mqclt001-as.rj.link	34.160.191.165	mqclt001-eu.rj.link	34.120.138.185	25857	

3.2 Quick Provisioning

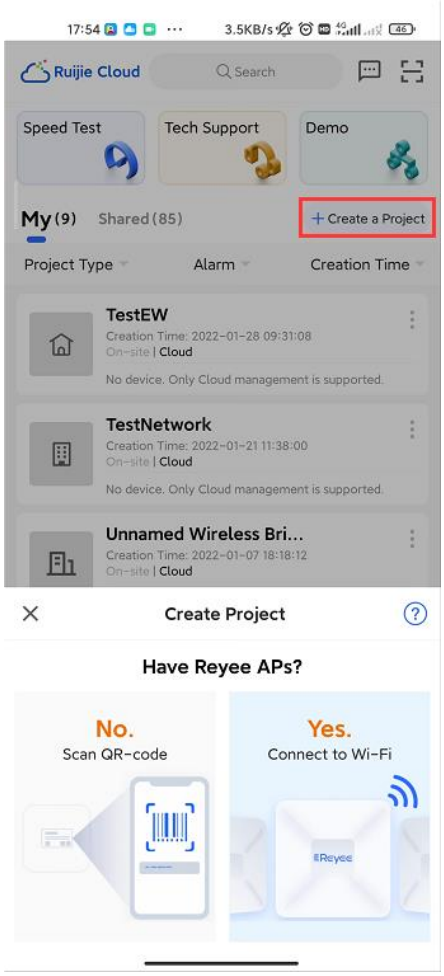
3.2.1 Quick provisioning via Ruijie Cloud APP

The network topology shown in the below picture includes the Reyee gateway, Reyee POE switch and Reyee RAP.



1. Create a project

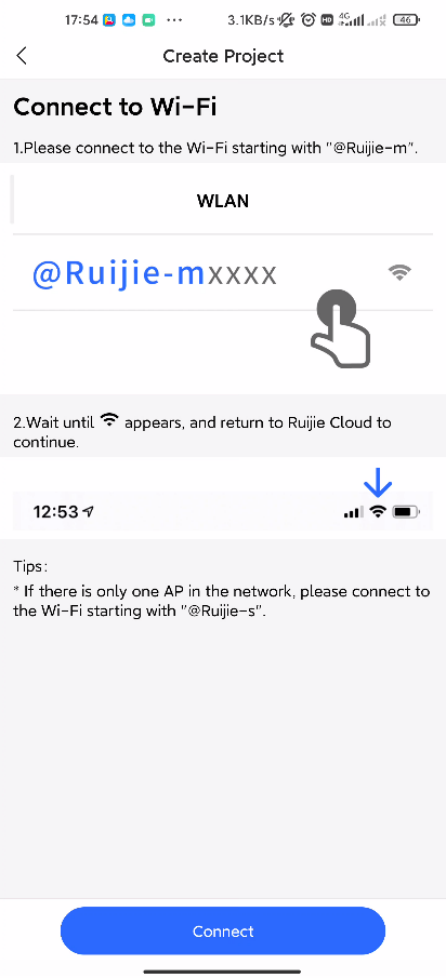
Open Ruijie Cloud App and Click **Create a Project,** then select **Connect to Wi-Fi.**



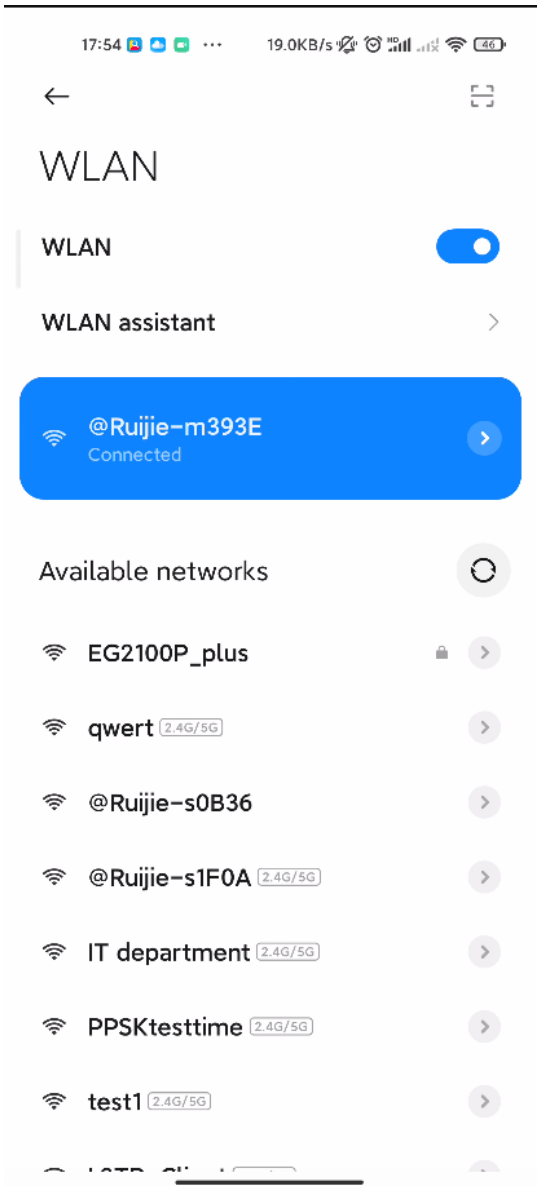
After click **Yes**, then Cloud App will prompt you to connect @Ruijie-mxxxx SSID.

Note:

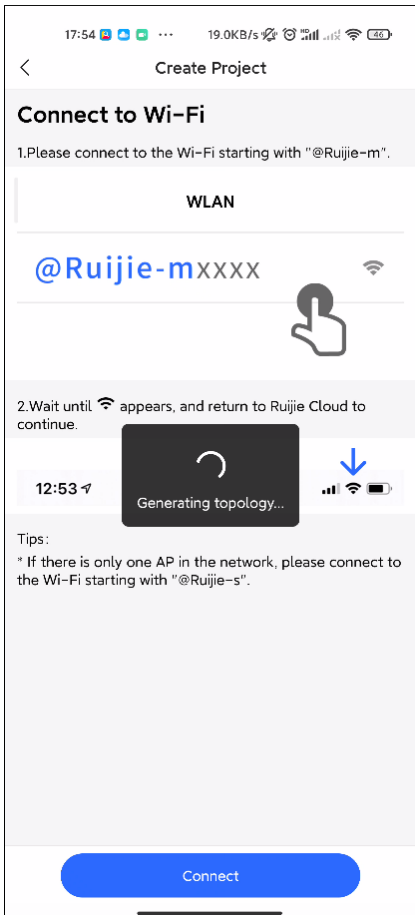
@Ruijie-mxxxx is generated after network self-organization established successfully, while @Ruijie-sxxxx is generated on a standalone device, xxxx is the last four letters of mac address of device.

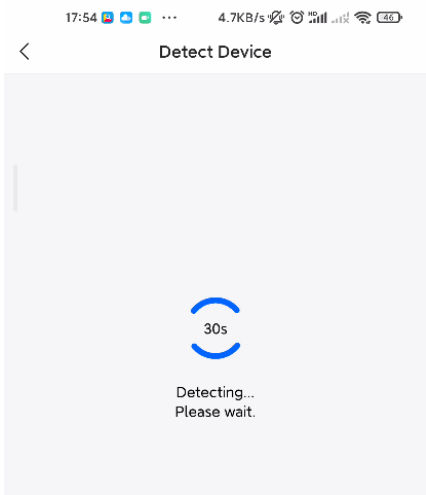


Connect the @Ruijie-mxxxx SSID on your phone.

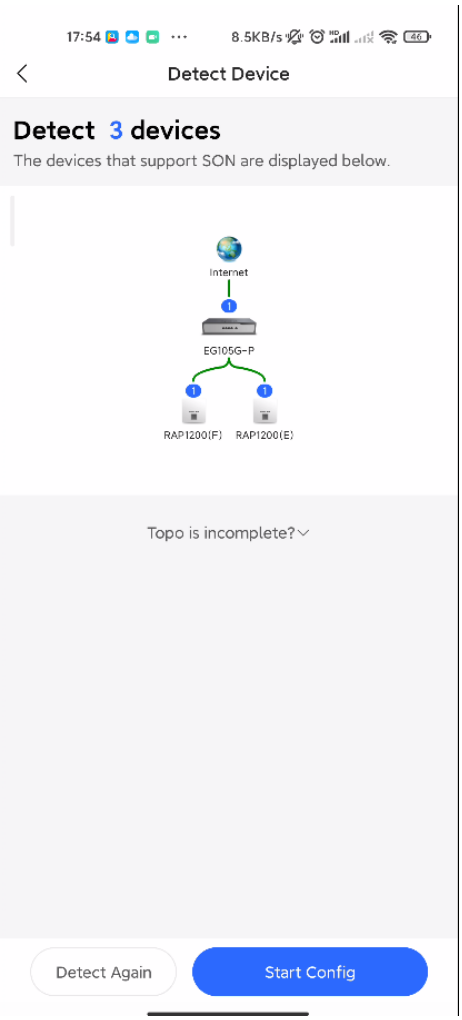


After connected the @Ruijie-mxxxx SSID, the Cloud App will prompt to generate topology and detect all devices in this SON.



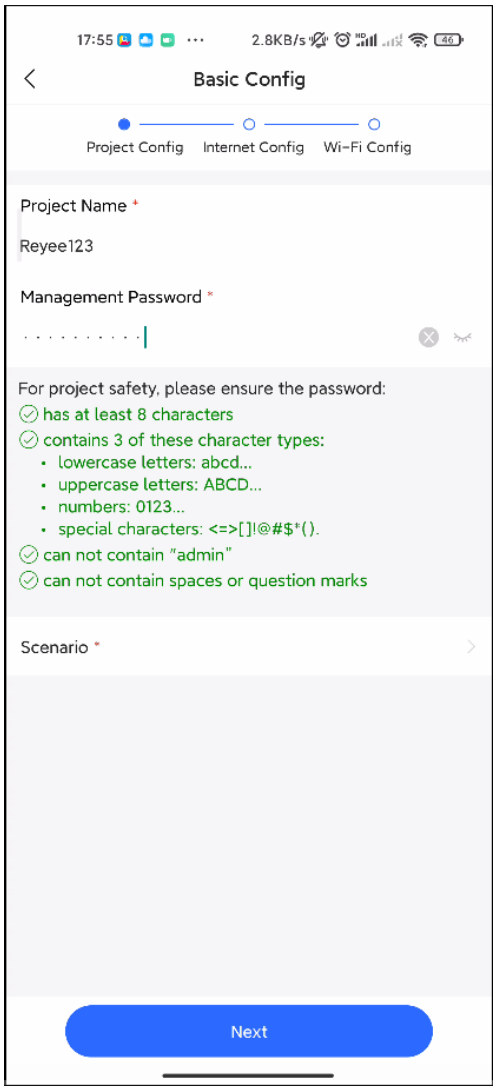


After all devices were detected, Cloud App will display them and show the topology, shown in the below picture. Click **Start Config** to perform the basic configuration of this project.

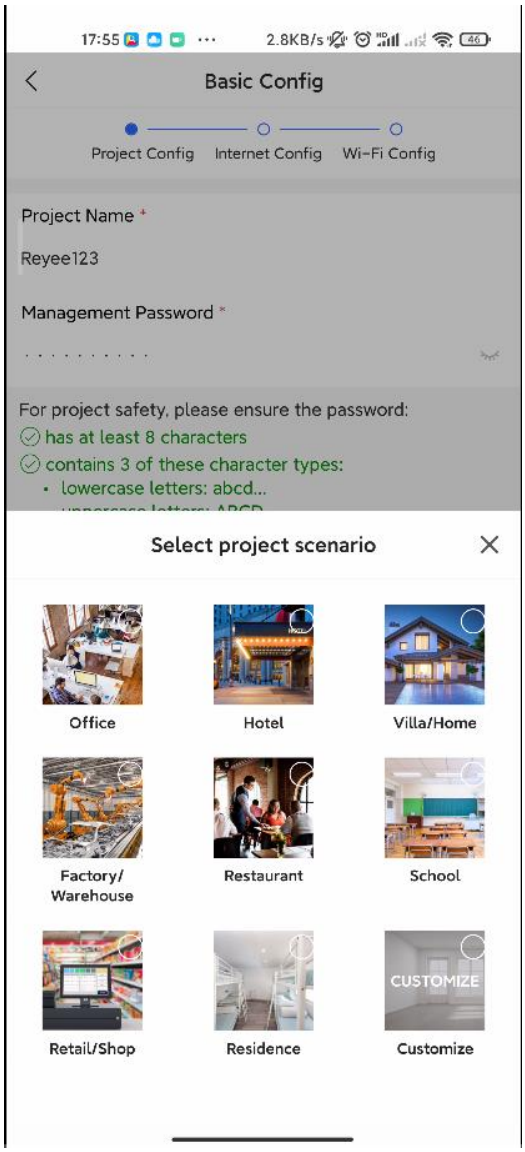


2. Configure the project

Input the Project Name and Management Password.

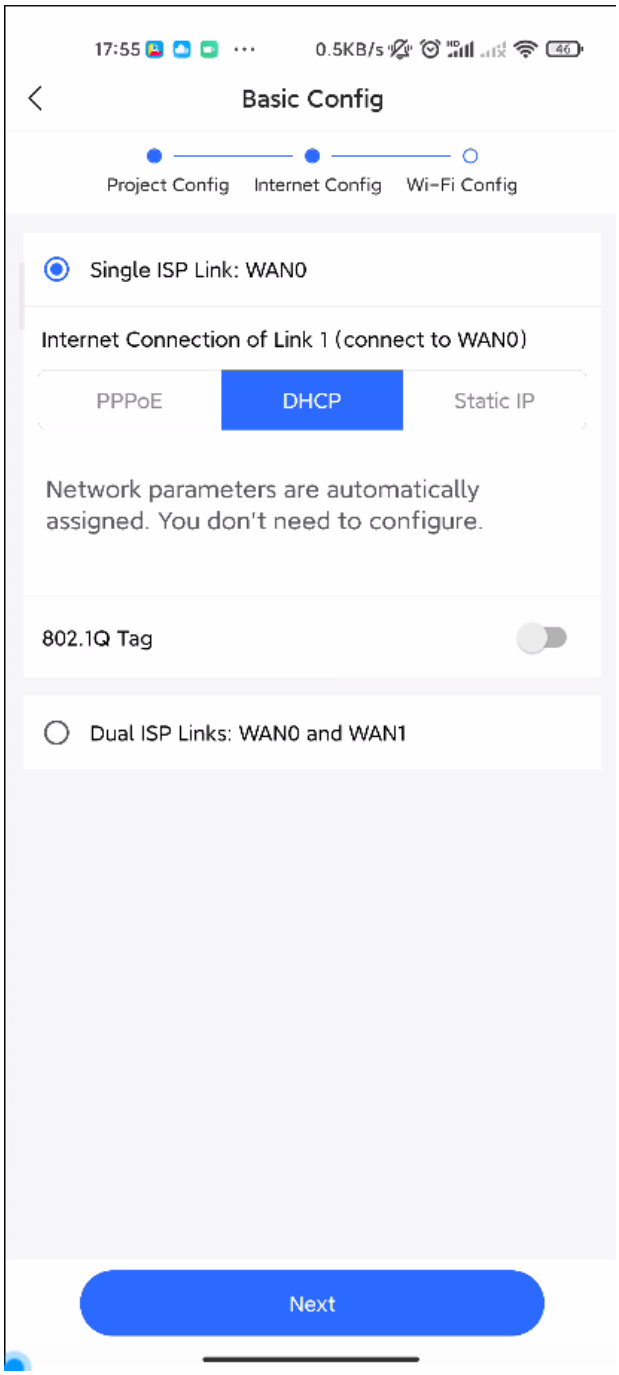


Then select the scenario of this project based on your requirement.



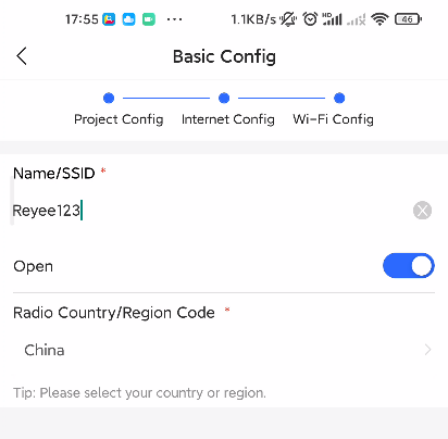
3. Configure the internet

For configuring WAN, you can chose PPPoE, DHCP and Static IP.

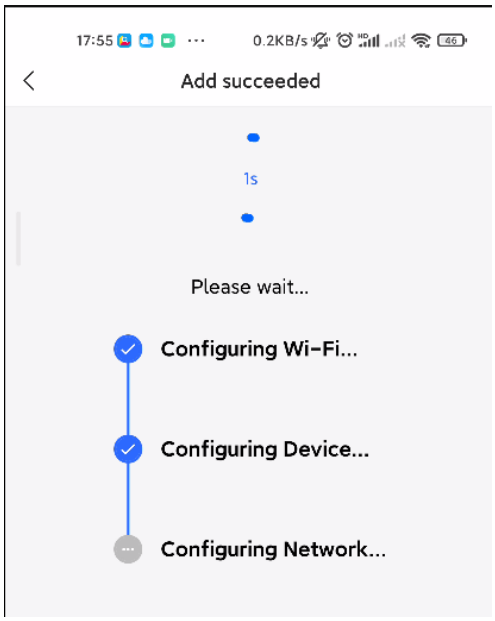


4. Configure the SSID

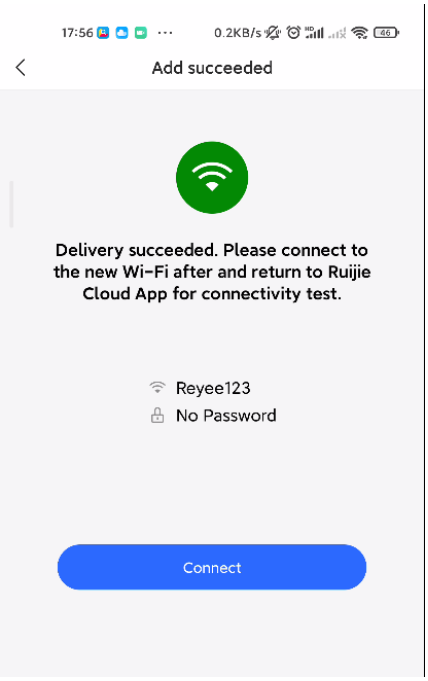
For SSID settings, input the name of SSID and configure it as open or configure password for this SSID. Select the region code.



The configuration will be synchronized to the network



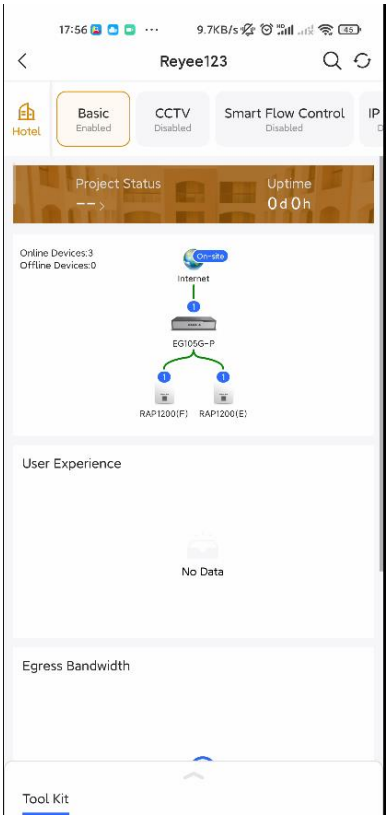
After about 3s, Ruijie Cloud App will prompt that the configuration is delivery succeed.

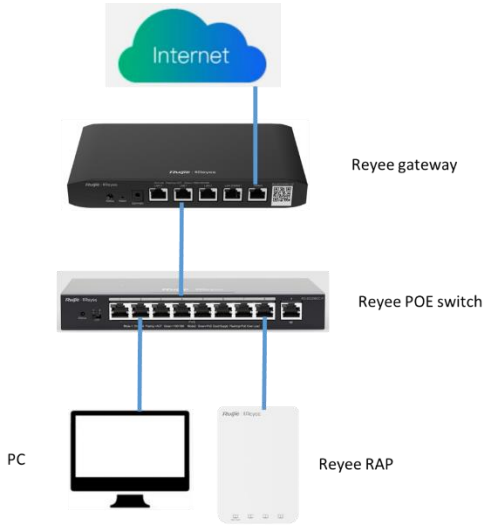


Connect to the SSID created just now to manage the whole network on Cloud App.

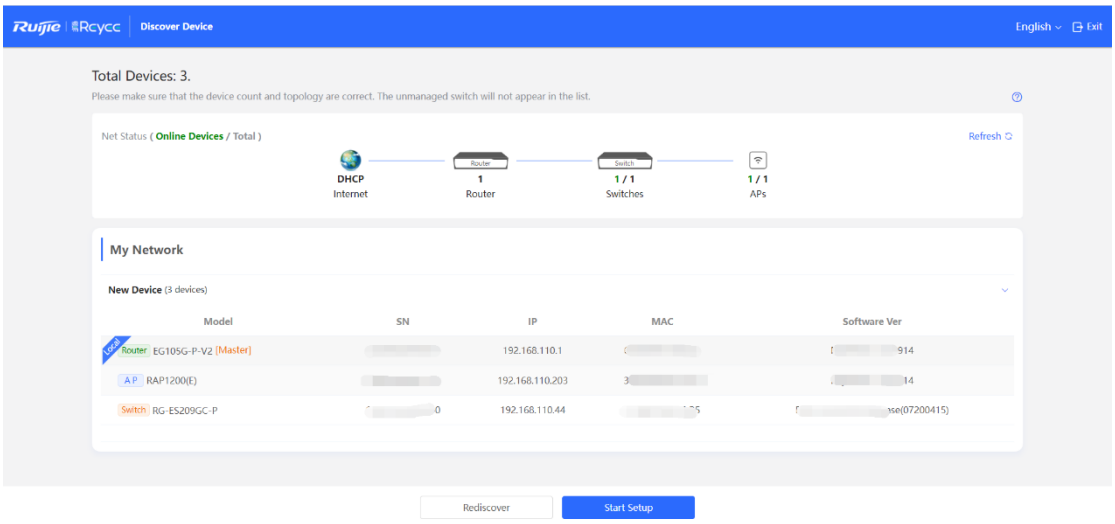
3.2.2 Quick provisioning via Reyee EWeb

The network topology shown in the below picture includes the Reyee gateway, Reyee POE switch and Reyee RAP.

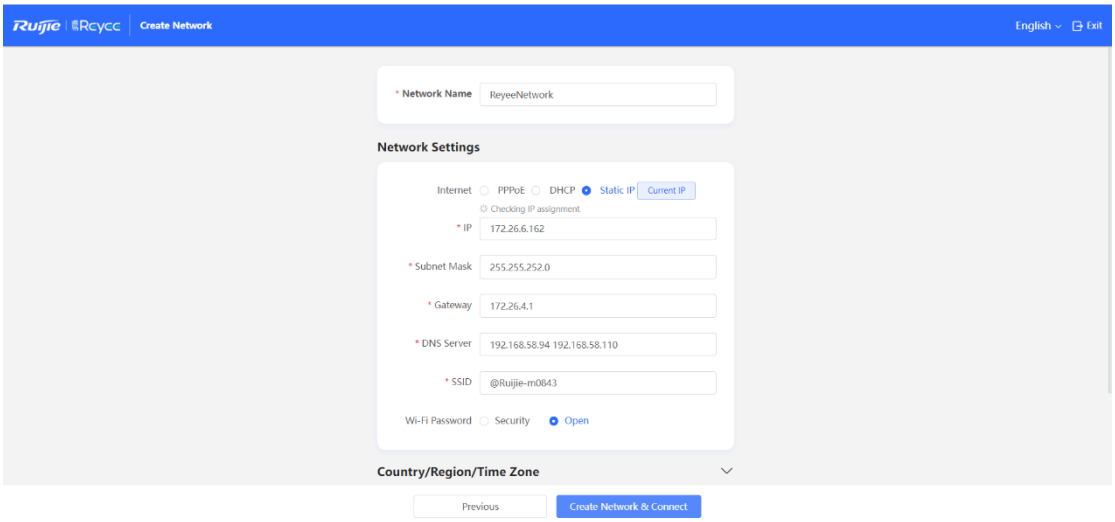


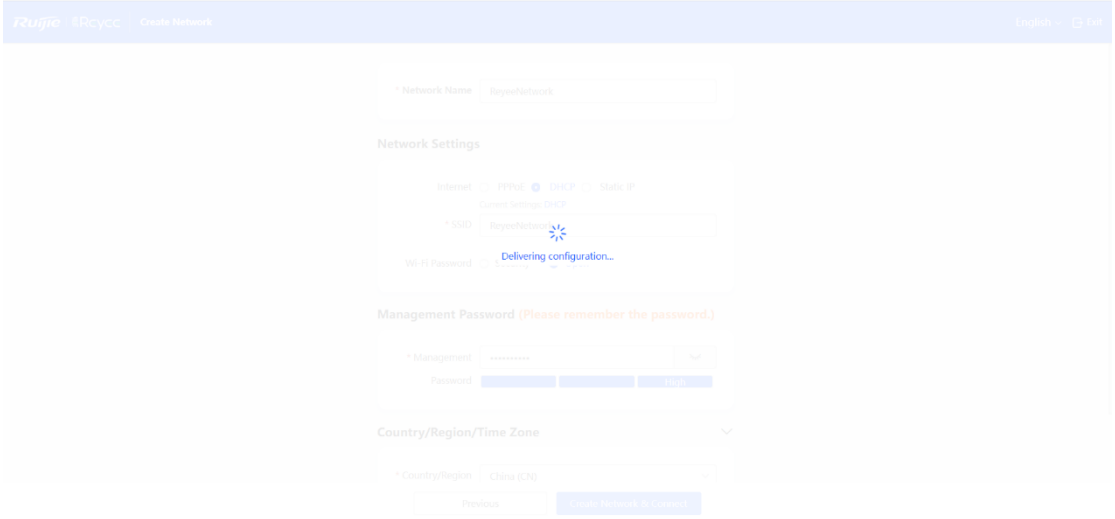


Connect PC to POE switch, set the ip address of PC as static ip address 192.168.110.x, then input 192.168.110.1 on the browser to login the EWEB of EG. All devices in this networks will display in EWEB. Click the Start Setup to perform the quick start of this network.

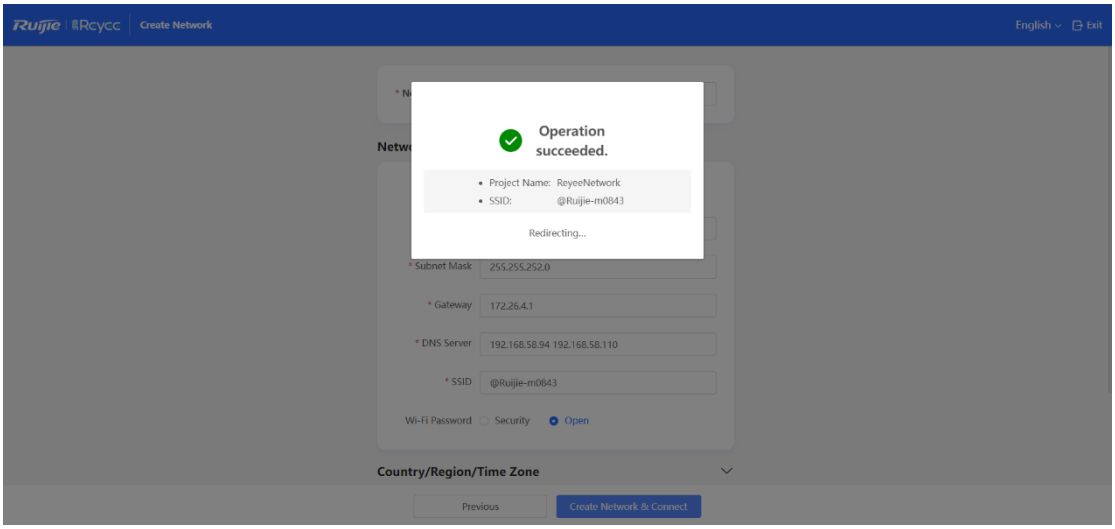


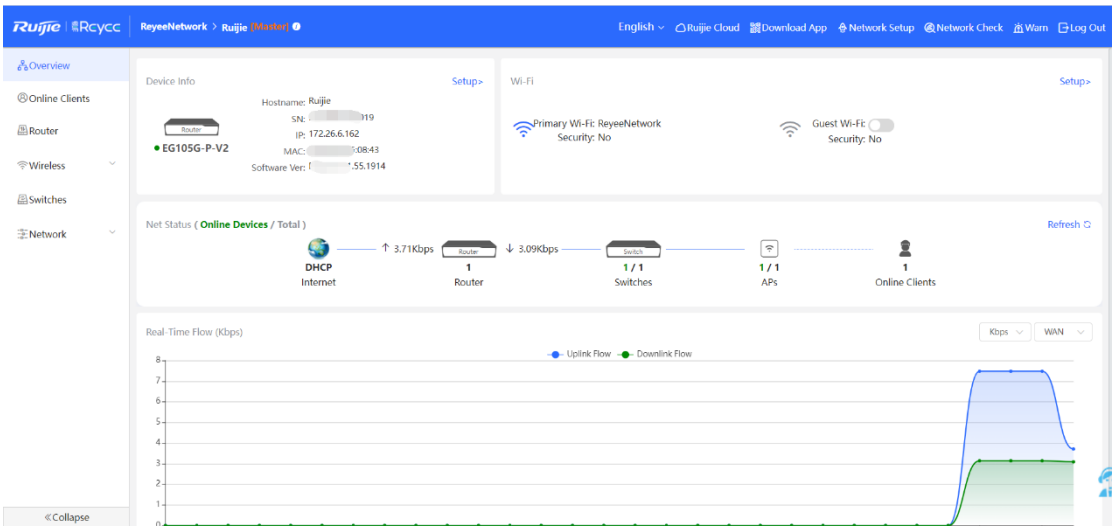
Show in the below picture, to finish the quick start of this network, you need to input the network name, configure the manner to access internet of this network and input the password of SSID or set the SSID as open. After select the Country/Region and click **Create Network & Connect,** the configuration will be delivery and activated, shown as the below two picture.





After the configuration has been delivery and activated, you can enter the overview interface to manage the SON of Reyee devices.



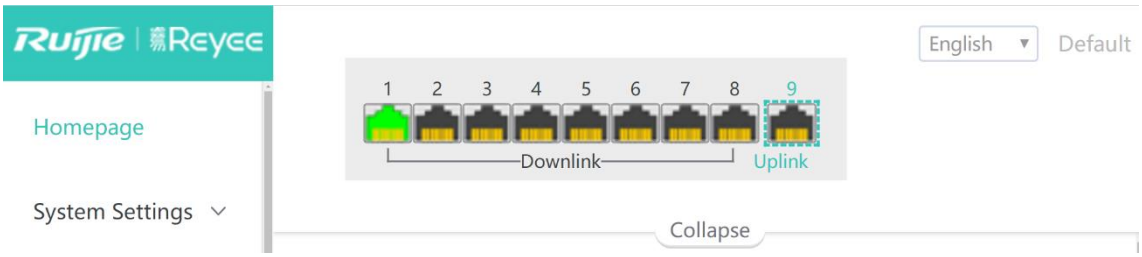

ReyeeNetwork > Ruijie [Master]
English
Ruijie Cloud
Download App
Network Setup
Network Check
Warn
Log Out
Overview
Online Clients
Router
Wireless
Switches
Network
Collapse
Device Info
Setup>
Hostname: Ruijie
SN:
IP: 172.26.6.162
MAC:
Software Ver:
EG105G-P-V2
Wi-Fi
Setup>
Primary Wi-Fi: ReyeeNetwork
Security: No
Guest Wi-Fi:
Security: No
Net Status (Online Devices / Total)
Refresh
3.71Kbps
3.09Kbps
DHCP
Internet
1
Router
1 / 1
Switches
1 / 1
APs
1
Online Clients
Real-Time Flow (Kbps)
Kbps
WAN
Uplink Flow
Downlink Flow

4 ES Series Switches Port Settings

4.1 Managing Port Information

4.1.1 Port Status Bar

The port status bar is at the top of the web page, showing port ID, port attribute (uplink/downlink), and the connection status. Click **Collapse** to hide the port status bar.



Different colors and shapes of the port icons represent different port statuses. See Table 4-1 Port Icons for details. Move the cursor over a port icon and the port status will be displayed, including the connection status, port rate, duplex mode, and flow control status.

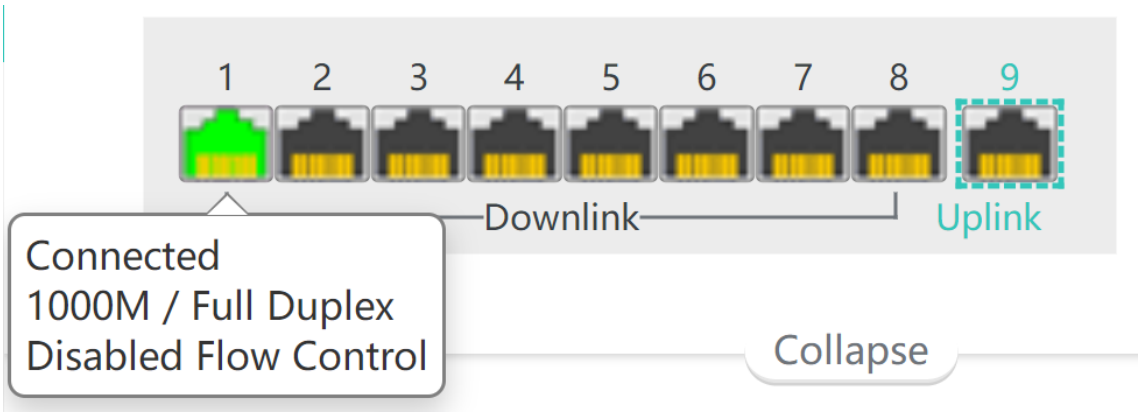
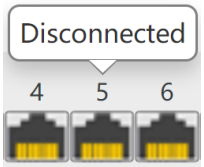
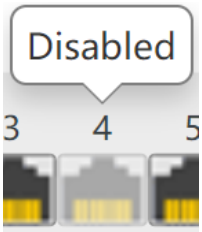
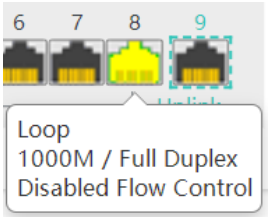
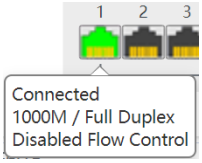
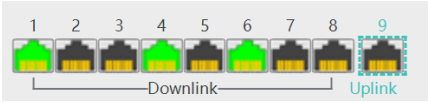


Table 4-1 Port Icons

Port Icon	Description
	The port icon is in the shape of a square, showing the port is a fiber port.
	The port icon is in the shape of an RJ-45 connector, showing the port is a copper port.
	The color of the port icon is black, showing the port is disconnected.

	The color of the port icon is gray, showing the port is disabled and cannot receive or transmit packets.
	The color of the port icon is yellow, showing there is a loop.
	The color of the port icon is green, showing the port is working normally.
	The number above the port icon is the port ID used to identify the device port. With the port ID, users can specify the port they want to configure.
	The device port is classified into the uplink port and the downlink port. The uplink port is used to connect network devices in the upper layer and access the core network. The downlink port is used to connect the endpoints. When port isolation is enabled, the downlink ports of the device are isolated from each another, and they can only communicate with the uplink ports. For details, see Chapter 4.4 Port Isolation.

4.1.2 Port Info Overview

Choose **Homepage**.

The homepage displays the global port information, including the port status, the packet receiving/transmission rate (Rx/Tx rate), port isolation status and loop detection status. Besides, it supports searching for the downlink device.

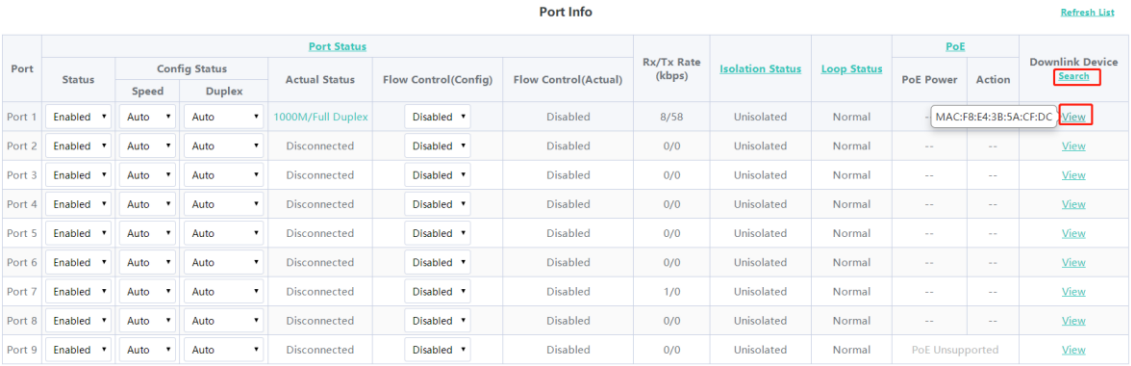
Click **Port Status** to configure the basic port attributes. For details, see Chapter 4.2 Setting and Viewing Port Attributes.

Click **Isolation Status** to configure port isolation so that the downlink ports of the device are isolated from each other. For details, see Chapter4.4 Port Isolation.

Click **Loop Status** to enable loop guard function. After a loop occurs, the port causing the loop will be shut down automatically. For details, see 6.3 Loop Guard.

Click **Search** in the **Downlink Device** column to search for the downlink device of the selected port. After the search is done, click **View** to view the MAC address of the downlink device.

Click **Refresh List** to fetch the latest port information.



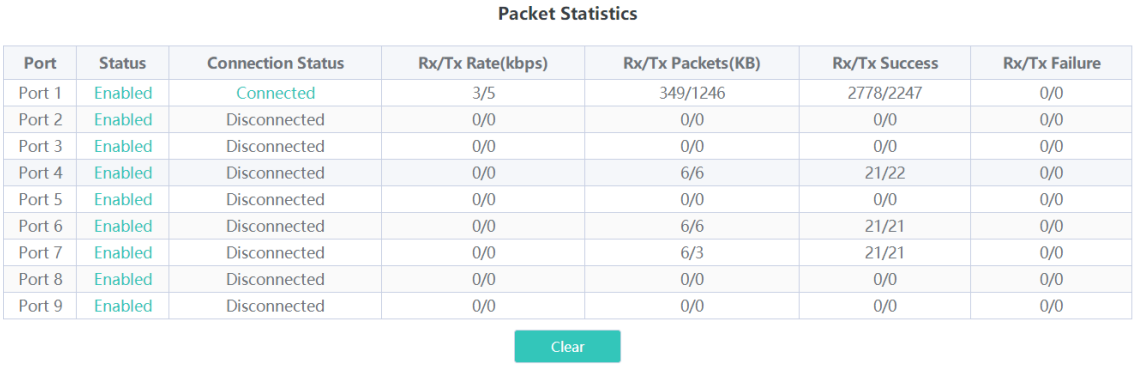
Port	Status	Speed	Duplex	Actual Status	Flow Control(Config)	Flow Control(Actual)	Rx/Tx Rate (kbps)	Isolation Status	Loop Status	PoE Power	Action	Downlink Device
Port 1	Enabled	Auto	Auto	1000M/Full Duplex	Disabled	Disabled	8/58	Unisolated	Normal	-		View
Port 2	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 3	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 4	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 5	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 6	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 7	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	1/0	Unisolated	Normal	--	--	View
Port 8	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	--	--	View
Port 9	Enabled	Auto	Auto	Disconnected	Disabled	Disabled	0/0	Unisolated	Normal	PoE Unsupported		View

4.1.3 Port Packet Statistics

Choose **Monitoring** > **Packet Statistics**.

The **Packet Statistics** page displays the port status, the connection status, Rx/Tx rate (kbps), Rx/Tx packets (KB), Rx/Tx success, and Rx/Tx failure.

Click **Clear** to clear current packet statistics of all ports and reset the statistics.



Port	Status	Connection Status	Rx/Tx Rate(kbps)	Rx/Tx Packets(KB)	Rx/Tx Success	Rx/Tx Failure
Port 1	Enabled	Connected	3/5	349/1246	2778/2247	0/0
Port 2	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 3	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 4	Enabled	Disconnected	0/0	6/6	21/22	0/0
Port 5	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 6	Enabled	Disconnected	0/0	6/6	21/21	0/0
Port 7	Enabled	Disconnected	0/0	6/3	21/21	0/0
Port 8	Enabled	Disconnected	0/0	0/0	0/0	0/0
Port 9	Enabled	Disconnected	0/0	0/0	0/0	0/0

4.2 Setting and Viewing Port Attributes

Choose **Switch Settings** > **Port Settings**.

4.2.1 Port Settings

Users can set the basic attributes of the Ethernet ports in batches.

Click **Select** in the **Port** column to display options of all device ports. Select the ports you want to configure, and then select the port status, port rate, port duplex mode, flow control status, and click **Save**.

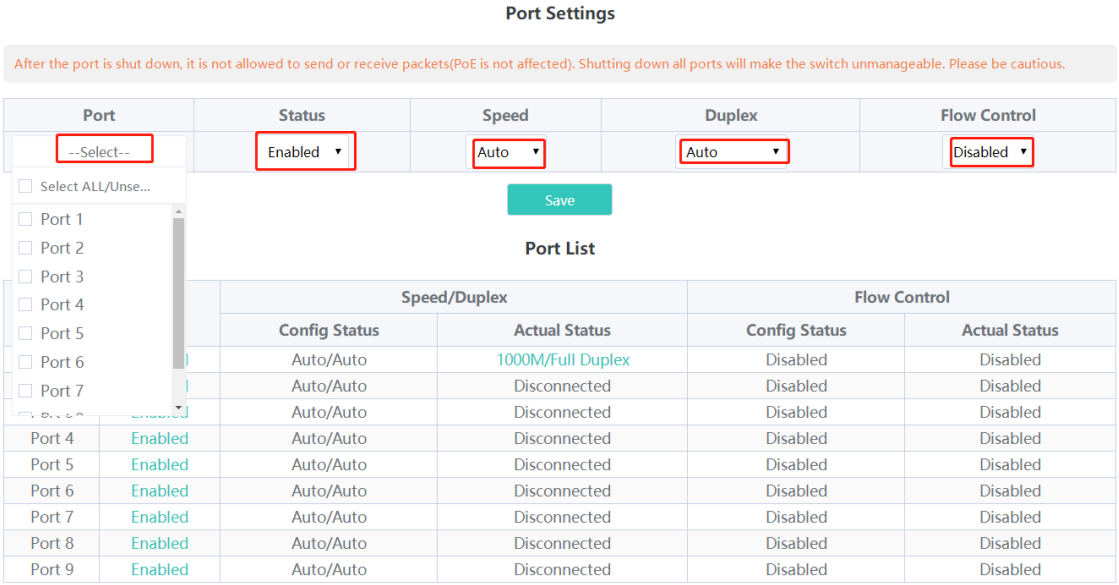


Table 4-2 Basic Port Configuration Parameters

Parameter	Description	Default
Port	Select the ports you want to configure.	NA
Status	When the port is disabled, it cannot receive or transmit packets (PoE is not affected).	Enabled
Speed	Configure the operating speed of the Ethernet physical port. When the speed is set to **Auto**, it means that it is determined by the auto-negotiation between the local port and the peer port. The negotiated speed can be any speed within the port capability.	Auto
Duplex	● Full duplex: The port can receive packets while sending packets. ● Half duplex: The port can receive or send packets at a time. ● Auto-negotiation: The duplex mode of the port is determined by the auto-negotiation between the local port and the peer port.	Auto
Flow Control	After enabling the flow control feature, the port will process the received flow control frames and send flow control frames when flow congestion occurs.	Disabled

Caution

Shutting down all ports will make the switch unmanageable. Exercise caution when performing this operation.

4.2.2 Port Status

Users can view the configuration status of the port attributes and check whether these configurations are active, including the port rate, duplex mode, and flow control status.

Port List

Port	Status	Speed/Duplex		Flow Control	
		Config Status	Actual Status	Config Status	Actual Status
Port 1	Enabled	Auto/Auto	1000M/Full Duplex	Disabled	Disabled
Port 2	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 3	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 4	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 5	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 6	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 7	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 8	Enabled	Auto/Auto	Disconnected	Disabled	Disabled
Port 9	Enabled	Auto/Auto	Disconnected	Disabled	Disabled

4.3 Port Mirroring

4.3.1 Overview

In network monitoring and troubleshooting scenarios, users need to analyze data traffic on suspicious network nodes or device ports. When port mirroring is enabled, packets received and transmitted on the source port will be mirrored to the mirror port (destination port). Users can monitor and analyze the packets on the mirror port through network analyzer without affecting the normal data forwarding of the monitored device.

As Figure 4-1 shows, by configuring port mirroring on Device A, the packets on Port 1 are mirrored to Port 10. Though the network analyzer is not directly connected to Port 1, it can receive all packets on Port 1 and is able to monitor the data traffic on Port 1.

Figure 4-1 Operating Principle of Port Mirroring

4.3.2 Configuration Steps

Choose **Switch Settings** > **Port Mirroring**.

Select the source port, the monitoring direction, and the mirror port, and click **Save**. The device supports configuring one port mirroring rule.

If you want to delete port mirroring configuration, click **Delete**.

Caution

- You can select multiple source ports but only one mirror port. The source ports cannot contain the mirror port.
- For RG-ES205C-P, RG-ES205GC-P, RG-ES209C-P, RG-ES209GC-P switches, the mirror port only supports packet capture and cannot transmit data with switches.

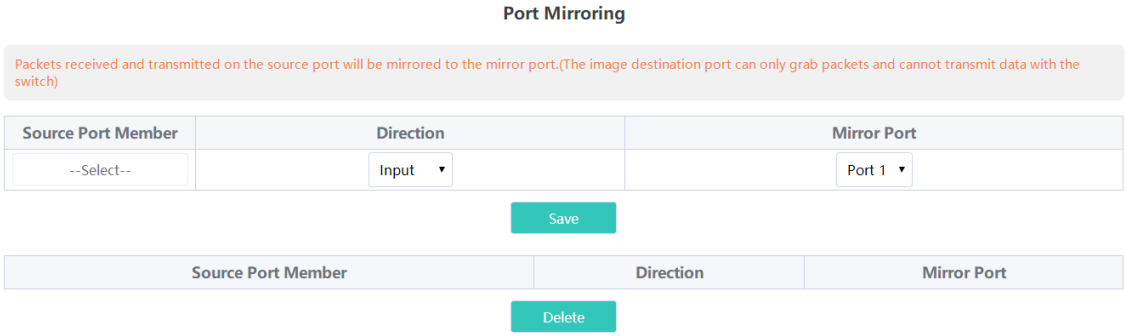


Table 4-3 Port Mirroring Parameters

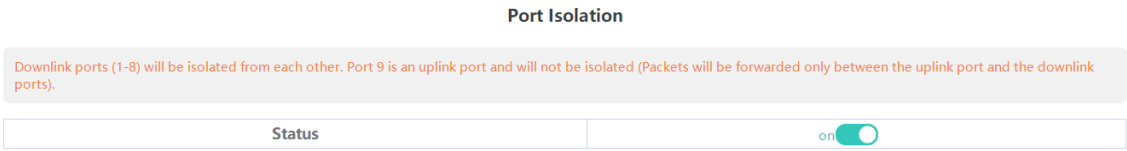
Parameter	Description
Source Port Member	The source port is also called the monitored port. Packets on the source port will be mirrored to the mirror port for network analysis or troubleshooting. Users can select multiple source ports. Packets on these ports will be mirrored to one mirror port.
Direction	Direction of the data traffic monitored on the source port: ● Bi-directions (input & output): All packets on the source port, including the received packets and the transmitted packets, will be mirrored to the mirror port. ● Input: The packets received by the source port will be mirrored to the mirror port. ● Output: The packets transmitted from the sourced port will be mirrored to the mirror port.
Mirror Port	The mirror port is also called the monitoring port. The mirror port is connected with a monitoring device, and it transmits packets on the source port to the monitoring device.

4.4 Port Isolation

Choose **Switch Settings** > **Port Isolation**.

Port isolation is used for isolating layer-2 packets. When port isolation is enabled, the downlink ports are isolated from each other but can communicate with uplink ports.

Port isolation is disabled by default. Toggle the switch to **On** to enable port isolation.



Caution

The number of the uplink/downlink ports and port IDs of different devices vary. Please refer to the actual information of the device.

4.5 Port-based Rate Limiting

Choose **QoS Settings** > **Port Rate**.

Users can configure rate limiting rules for packets in the input direction and the output direction of ports. There is no rate limiting on ports by default.

Select the port you want to configure, then select the rate limiting type and status, and enter the rate limit. Click **Save** to save the configuration. The configuration will be displayed accordingly in the **Port Rate** table right below the **Save** button.

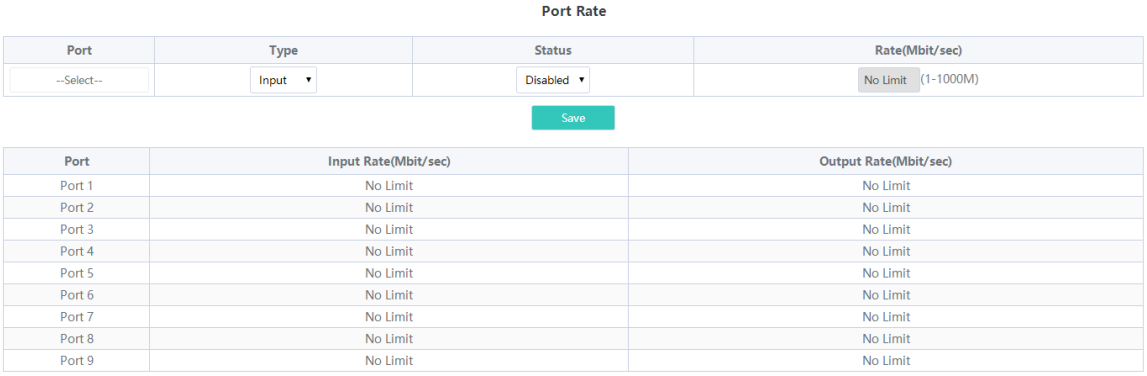


Table 4-4 Rate Limiting Parameters

Parameter	Description	Default
Port	Users can select multiple ports for rate limiting configuration in batches.	NA
Type	The direction of the rate-limited data traffic: ● Input & output: Rate limiting for all packets forwarded over the port, including the received packets and the transmitted packets. ● Input: Rate limiting for packets received by the port. ● Output: Rate limiting for packets transmitted from the port.	NA
Status	Users can decide whether to enable or disable rate limiting.	Disabled
Rate (Mbit/sec)	The maximum rate at which packets are forwarded over the port.	No limit

Note

- The rate limiting range for RG-ES205C-P switch ports is from 1 to 100M.
- The maximum rate supported by port 1 to port 8 of RG-ES209C-P switch is 100M. If the configured rate exceeds 100M, the effective rate will still be 100M. The rate limiting range for port 9 is from 1 to 1000M.
- The rate limiting range for RG-ES226GC-P, RG-ES218GC-P, RG-ES205GC-P, RG-ES209GC-P, RG-FS303AB, RG-FS306-P, RG-FS306-D switches ports is from 1 to 1000M.

4.6 Management IP Address

Choose **System Settings** > **IP Settings**.

Users can configure the management IP address of the device. By accessing the management IP address, users can configure and manage the device.

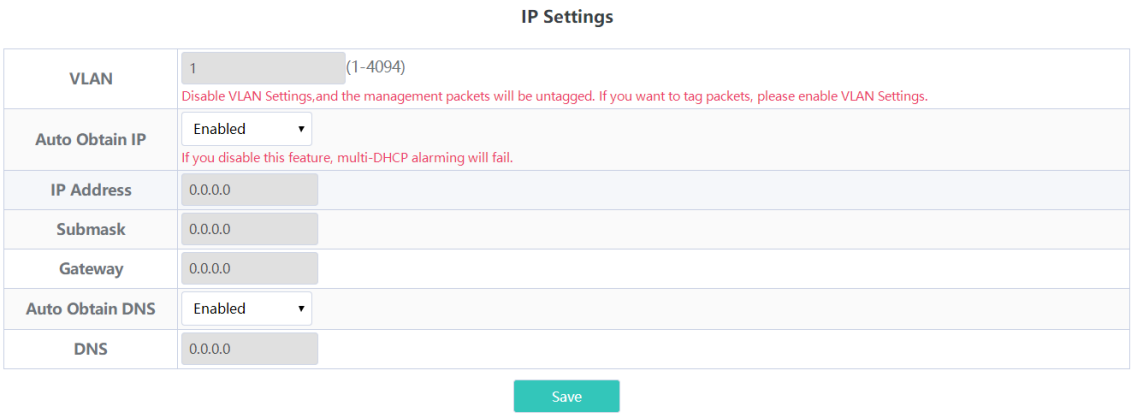
There are two Internet types available:

- Dynamic IP address: Enable **Auto Obtain IP** feature to use the IP address assigned dynamically by the uplink DHCP server.
- Static IP address: Disable **Auto Obtain IP** feature to use the fixed IP address configured manually by the user.

Enable **Auto Obtain IP** feature, and the device will automatically obtain various parameters from the DHCP server. Users can select whether to obtain a DNS address automatically from the DHCP server. If **Auto Obtain DNS** feature is disabled, users need to configure a DNS address manually.

After disabling **Auto Obtain IP** feature, users need to manually configure the IP address, subnet mask, gateway IP address, and DNS address. Click **Save** to enforce the configuration.

VLAN is used for managing VLAN tag of the management packets. Disable VLAN settings, and the management packets will be untagged, and management VLAN configuration is not supported. The management VLAN of the device is VLAN 1 by default.



Note

- Disable VLAN settings, and the management packets will be untagged. If you want to tag packets, please enable VLAN settings. For details, see Chapter5.2.1 Global VLAN Settings .
- The management VLAN must be selected from the existing VLANs. To create a static VLAN, refer to Chapter 5.2.2 Static VLANs Settings.
- You are advised to bind a configured management VLAN to an uplink port. Otherwise, you may fail to access the web management system. For details, see Chapter 5.2.3 Port VLAN Settubgs.
- If you disable **Auto Obtain IP** feature, multi-DHCP alarming will fail. For details about multi-DHCP alarming, see Chapter 9.2 Multi-DHCP Alarming.

4.7 DC Port Reboot

Caution

Only RG-FS306-D switch supports this feature.

Choose **DC Settings**.

Select the DC port you want to reboot, and click **Reboot** to reboot the selected DC port. Click **Reboot all** to reboot all DC ports of the device.

DC Settings

Port	DC Reboot
DC 1	Reboot
DC 2	Reboot
DC 3	Reboot
DC 4	Reboot
Reboot all	

5 ES Series Switches Switch Settings

5.1 Managing MAC Address

5.1.1 Overview

The MAC address table records mappings of MAC addresses and ports to VLANs.

The device queries the MAC address table based on the destination MAC address in a received packet. If the device finds an entry that is consistent with the destination MAC address in the packet, the device forwards the packet through the port specified by the entry in unicast mode. If the device does not find such an entry, it forwards the packet through all ports other than the receiving port in broadcast mode.

MAC address entries are classified into the following types:

- Static MAC address entries: Static MAC address entries are manually configured by the users. Packets whose destination MAC address matches the one in such an entry are forwarded through the corresponding port.
- Dynamic MAC address entries: Dynamic MAC address entries are learned dynamically by the device. They are generated automatically by the device.

5.1.2 Viewing MAC Address Table

Choose **Switch Settings** > **MAC Address Info**.

This page displays the MAC address of the device, including the static MAC address configured manually by the users and the dynamic MAC address learned automatically by the device.

Click **Clear Dynamic MAC** to clear the dynamic MAC address learned by the device. The device will re-learn the MAC address and generate a MAC address table.

MAC Address Info

No.	MAC Address	Type	Port
1	F8:E4:3B:5A:CF:DC	Dynamic	1
2	C8:4B:D6:06:FA:97	Dynamic	3

Clear Dynamic MAC

Note

- If you disable VLAN, the device will forward packets according to only the destination MAC address. VLAN ID is not displayed in the MAC address table.
- Up to 100 MAC addresses are displayed.

5.1.3 Searching for MAC Address

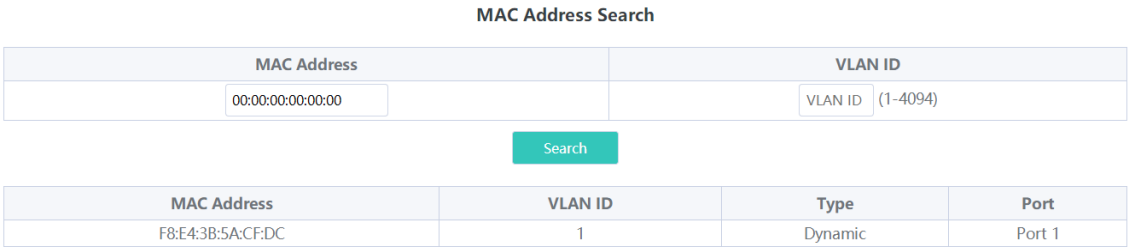
Choose **Switch Settings** > **Search MAC**.

Users can search for MAC address entries according to MAC address and VLAN ID.

Caution

If you disable VLAN, the VLAN ID will not be recorded in the MAC address table.MAC address entries can only be found through MAC address.

Enter MAC address and VLAN ID, and then click **Search**. The MAC address entries that meet the search criteria will be displayed in table right below the **Search** button. Moreover, users can enter partial characters of the MAC address for fuzzy search.



5.1.4 Configuring Static MAC Address

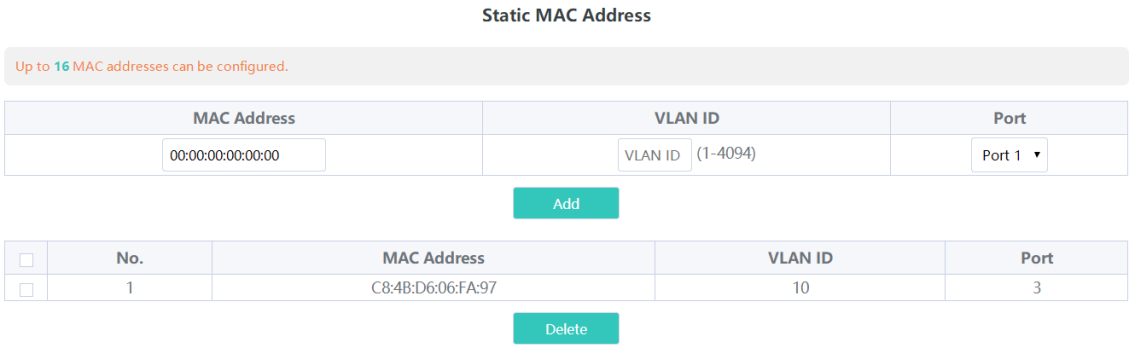
Choose **Switch Settings** > **Static MAC**.

By configuring a static MAC address, users can manually bind the MAC address of a downlink network device with a port of the switch. After you add a static MAC address, when the device receives a packet destined to this address from VLAN, it forwards the packet to the specified port.

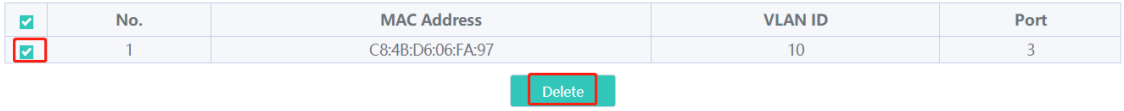
Caution

If you disable VLAN, the VLAN ID will not be recorded in the MAC address table. It is not allowed to configure a VLAN to which the static MAC address belongs.

Enter a MAC address, specify a VLAN ID and select the outbound port. Then click **Add** to add a static MAC address. The MAC address entries will be updated accordingly in the MAC address table.



If you want to delete a static MAC address, select the MAC address entry you want to delete in the table and click **Delete**.



5.2 VLAN Settings

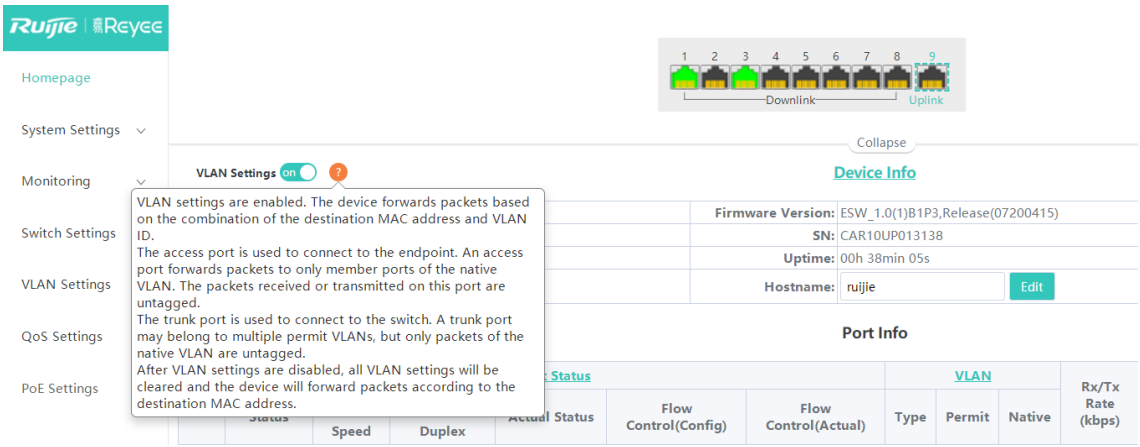
5.2.1 Global VLAN Settings

Choose **Homepage** > **Device Info**.

This page displays the status of VLAN settings. Toggle the **on-off** switch to enable or disable VLAN settings.

When VLAN is disabled, the device operates like an un-managed switch. The device forwards packets according to the destination MAC address, and the VLAN information of the forwarding packets remains unchanged during the forwarding process.

When VLAN is enabled, the device operates like a managed switch. The device forwards packets according to the destination MAC address and VLAN ID. Users can configure the port mode (access or trunk) based on whether a VLAN tag is carried in packets. Besides, all device ports will be initialized to access ports.



5.2.2 Static VLANs Settings

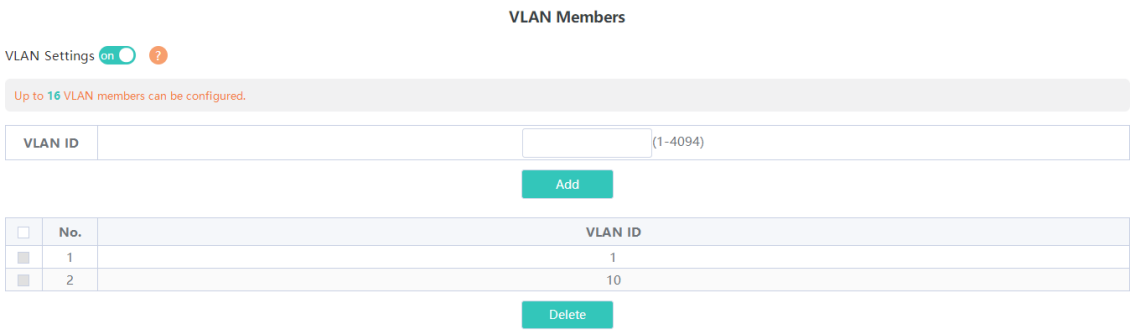
Caution

Static VLANs can be created only when the global VLAN settings feature is enabled. For details, see Chapter 5.2.1 Global VLAN Settings.

Choose **VLAN Settings** > **VLAN Members**.

Enter VLAN ID and click **Add** to create a static VLAN.

The VLAN table contains the existing VLANs. Select the VLANs and click **Delete**, and the corresponding VLANs will be deleted. VLAN 1 cannot be deleted.



Note

- The VLAN ID ranges from 1 to 4094. VLAN 1 is the default VLAN.
- The default VLAN (VLAN 1), Management VLAN, Native VLAN, Permit VLAN, and Access VLAN cannot be deleted.

5.2.3 Port VLAN Settubgs

Caution

Users can configure port VLAN only when the global VLAN settings feature is enabled. For details, see Chapter 5.2.1 Global VLAN Settings.

Choose **VLAN Settings** > **VLAN Settings**.

Configure the port mode and VLAN members of a port, and you will know the allowed VLANs of the port and whether the packets forwarded by the port carry tags.

Note

You are advised to create VLAN members (refer to Chapter 5.2.2 Static VLANs Settings) before configuring the port based on VLANs. Click **VLAN Members** to access **VLAN Members** page where you can add VLAN members.

Select the port you want to configure and the port mode. If you select the access mode, select **Access VLAN** for the port and click **Save**. If you select the trunk mode, select **Native VLAN** for the port and enter the VLAN ID range allowed by the port and click **Save**.

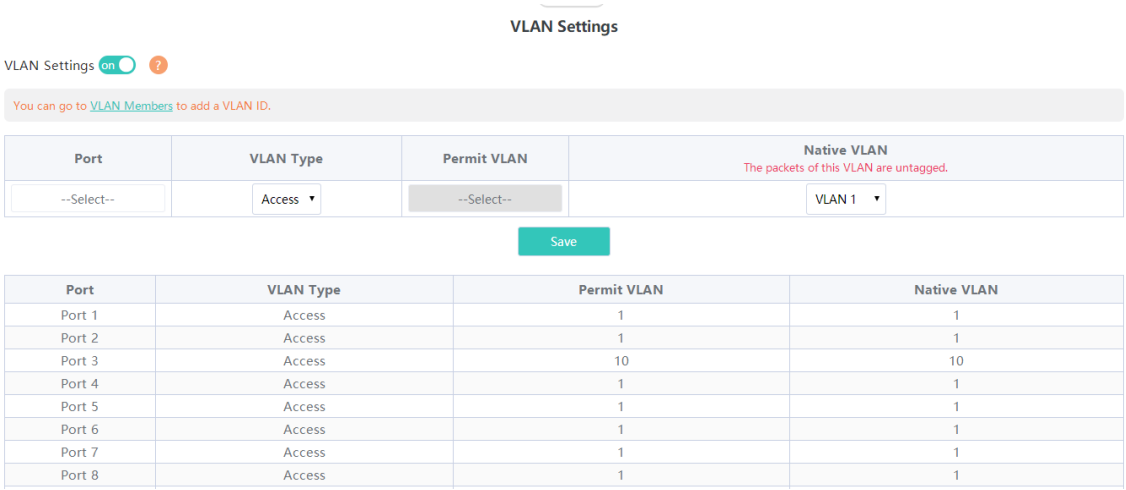


Table 5-1 Port Modes

Port Mode	Description
Access	One access port can belong to only one VLAN and allow frames from this VLAN only to pass through. This VLAN is called an access VLAN. The frames from the access port do not carry VLAN tag. When the access port receives an untagged frame from a peer device, the local device determines that the frame comes from the access VLAN and adds the access VLAN ID to the frame. Access port is connected to the endpoints.

Port Mode	Description
Trunk	One trunk port supports one Native VLAN and several Permit VLANs. Native VLAN frames forwarded by a trunk port do not carry tags while Permit VLAN frames forwarded by the trunk port carry tags. Trunk port is connected to switches. Users can set the Permit VLAN range to limit VLAN frames that can be forwarded. Make sure the trunk ports at the two ends of the link are configured with the same Native VLAN.

Note

Improper configuration of VLANs on a port (especially uplink port) may cause failure to log in to the web management system. Exercise caution when configuring VLANs.

6 ES Series Switches Security

6.1 DHCP Snooping

6.1.1 Overview

The Dynamic Host Configuration Protocol (DHCP) snooping function allows a device to snoop DHCP packets exchanged between clients and a server to record and monitor the IP address usage and filter out invalid DHCP packets, including request packets from the clients and response packets from the server.

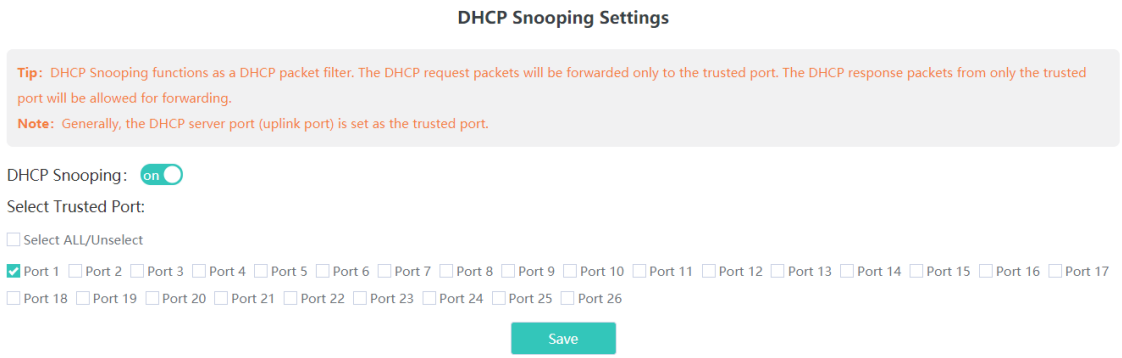
6.1.2 Configuration Steps

Choose **Switch Settings** > **DHCP Snooping Settings**.

Toggle the switch to **On** to enable DHCP snooping, select the trusted ports, and then click **Save**. When DHCP snooping is enabled, request packets from DHCP clients are forwarded only to the trusted ports. For response packets from DHCP servers, only those from the trusted ports are forwarded.

Note

The uplink port connected to the DHCP server is configured as the trusted port generally.



6.2 Storm Control

6.2.1 Overview

When a local area network (LAN) has excess broadcast, multicast, or unknown unicast data flows, the network speed will slow down and packet transmission will have an increased timeout probability. This situation is called a LAN storm, which may be caused by topology protocol execution errors or incorrect network configuration.

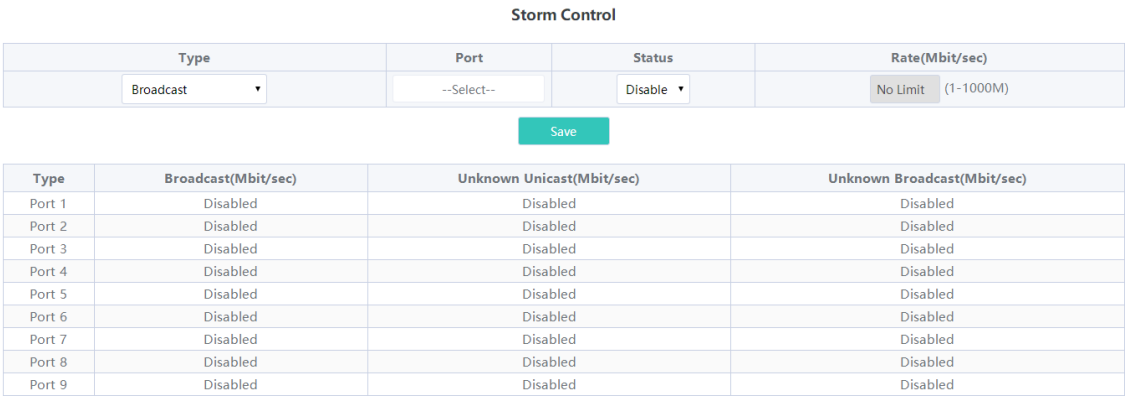
Users can perform storm control separately for the broadcast, unknown multicast, and unknown unicast data flows. When the rate of broadcast, unknown multicast, or unknown unicast data flows received over a device port exceeds the specified range, the device transmits only packets in the specified range and discards packets beyond the range until the packet rate falls within the range. This prevents flooded data from entering the LAN and causing a storm.

6.2.2 Configuration Steps

Choose **QoS Settings** > **Storm Control**.

Select the storm control type, port, status, and enter the rate limit, and then click **Save**.

The storm control type and corresponding rate are displayed in the table right below the **Save** button. When storm control is disabled, the rate of broadcast, unknown multicast, and unknown unicast data flows is not limited. The corresponding status is displayed **Disabled**. When storm control is enabled, the corresponding rate limits will be displayed.



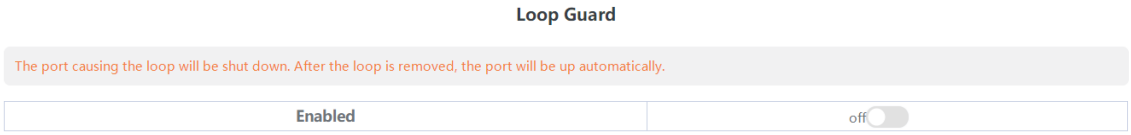
Note

- The rate limit for the ports of RG-ES205C-P switch ranges from 1Mpbs to 100Mbps.
- The maximum rate supported by ports 1 to 8 of RG-ES209C-P switch is 100Mbps. If the configured rate exceeds 100Mbps, the effective rate will still be 100Mbps. The rate limit for port 9 ranges from 1Mbps to 1000Mbps.
- The rate limit for the ports of RG-ES226GC-P, RG-ES218GC-P, RG-ES205GC-P, RG-ES209GC-P, RG-FS303AB, RG-FS306-P, RG-FS306-D switches ranges from 1Mbps to 1000Mbps.

6.3 Loop Guard

Choose **Monitoring** > **Loop Guard**.

When loop guard feature is enabled, the port causing the loop will be shut down automatically. After the loop is removed, the port will be up automatically. Loop guard function is disabled by default.



7 ES Series Switches PoE Settings

Caution

Only RG-ES226GC-P, RG-ES218GC-P, RG-ES209GC-P, RG-ES209C-P, RG-ES205GC-P, RG-ES205C-P, and RG-FS306-P switches support the PoE function.

Choose **PoE Settings**.

The device supports PoE power supply. Users can view and configure the current power status.

Device status: The total power, used power, remaining power, and current work status of the PoE system are displayed.

PoE Info

Total Power	Used	Remaining	Work Status
120w	0w	120w	Normal

Port status: The voltage, current, output power, and current power status of the device ports are displayed. Users can enable or disable PoE function through the **on-off** toggle switch. When PoE is disabled, the port will not supply power to external devices.

If a PD device fails, please power on the port connected to the PD device again to reboot it.

PoE Settings

PoE Status When off, PoE will not work on this port	Port	Power(W)	Current(mA)	Voltage(V)	Power Status	Action
on	Port 1	0	0	0	Powered Off	--
on	Port 2	0	0	0	Powered Off	--
on	Port 3	0	0	0	Powered Off	--
on	Port 4	0	0	0	Powered Off	--
on	Port 5	0	0	0	Powered Off	--
on	Port 6	0	0	0	Powered Off	--
on	Port 7	0	0	0	Powered Off	--
on	Port 8	0	0	0	Powered Off	--
Port 9 Unsupported						

Note

The fiber ports of RG-ES226GC-P, RG-ES218GC-P, and RG-FS306-P switches do not support the PoE function.

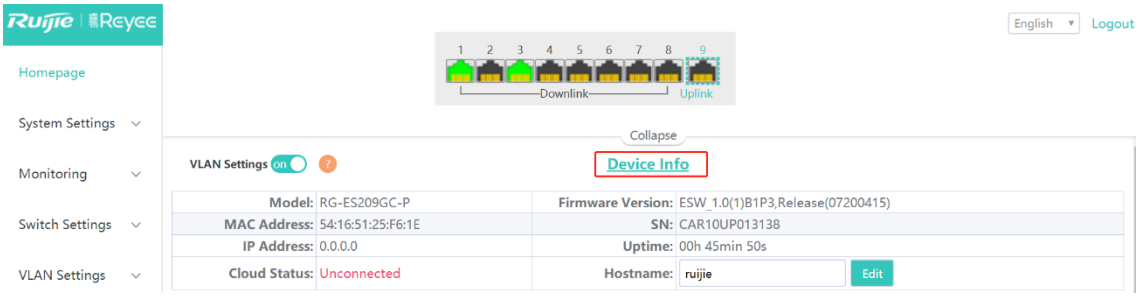
8 ES Series Switches System Settings

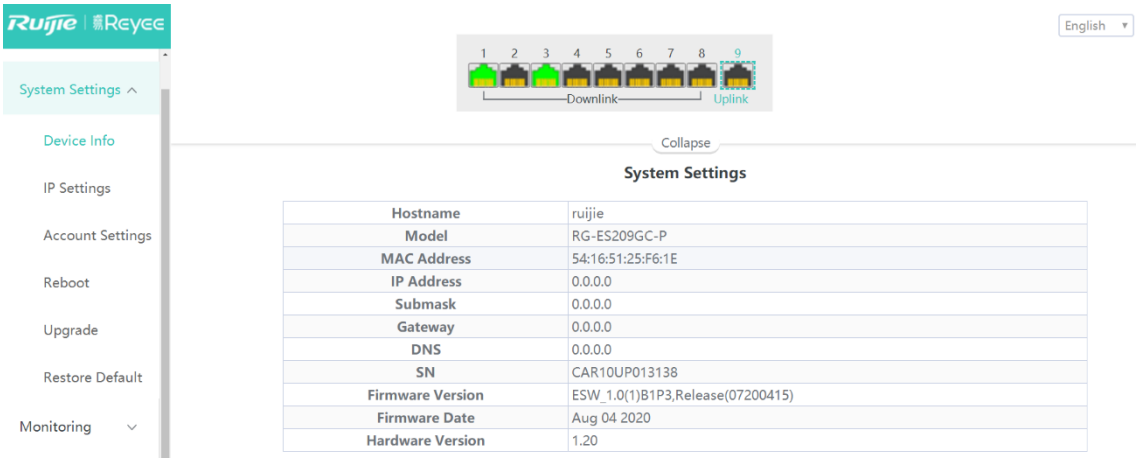
8.1 Managing Device Information

8.1.1 Viewing Device Information

Choose **Homepage** > **Device Info**.

The device information is displayed on the homepage, including hostname, device model, serial number, firmware version, IP address, MAC address, cloud status, and uptime. Click **Device Info** to access the **Device Info** page (**System Settings** > **Device Info**) to view more detailed information.

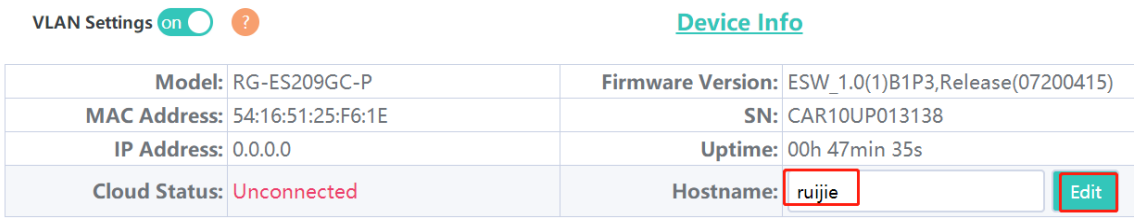




8.1.2 Editing the Hostname

Choose **Homepage** > **Device Info**.

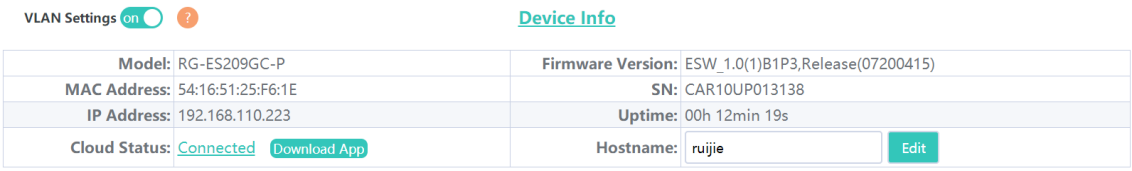
Enter the hostname and click **Edit** to edit the hostname in order to distinguish different devices.



8.1.3 Cloud Management

Choose **Homepage** > **Device Info**.

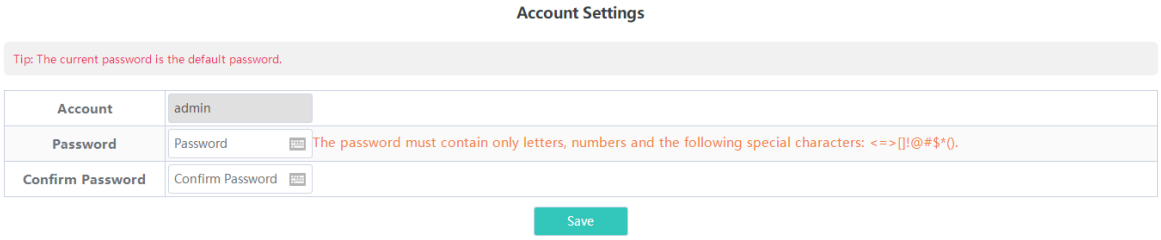
Cloud status displays whether the device is connected to the cloud. After the device is bound to a cloud management account, the Cloud Status will display **Connected**, and users can manage the device remotely through Ruijie Cloud webpage or APP. Click **Connected** to access the homepage of Ruijie Cloud (https://cloud-as.ruijienetworks.com). Click **Download APP** to download Ruijie Cloud APP.



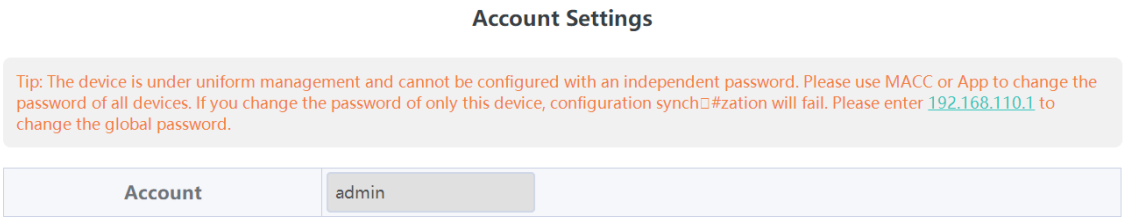
8.2 Password Settings

When the device password is the default password, users will be prompted to reset the password when they log into the Eweb management system. Click **Yes** to access the **Account Settings** page (or choose **System Settings** > **Account Settings** to access the page).

Set a new password according to the tip, and then click **Save** to save the configuration.



If the device is under uniform management, it cannot be configured with an independent password. Users need to follow the tip to log in to the master device for global password configuration.



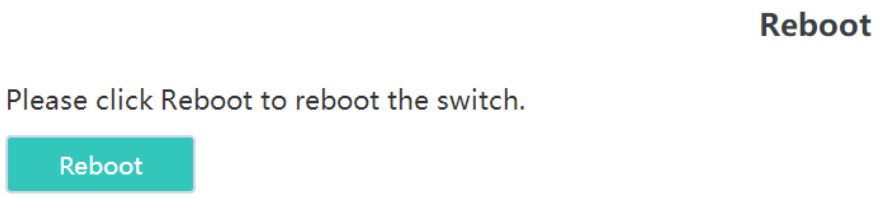
Caution

- Upon your initial login to the Eweb management system, you must set the device management password first before you configuring other features.
- Please remember the device management password (default username/password: admin/admin). You may need to log in again after changing the password.
- If the device has been under uniform management, please use MACC or APP to change the network-wide password. Changing the password of this device will cause failure to synchronize network-wide settings to this device.

8.3 Device Reboot

Choose **System Settings** > **Reboot**.

Click **Reboot** to reboot the switch.



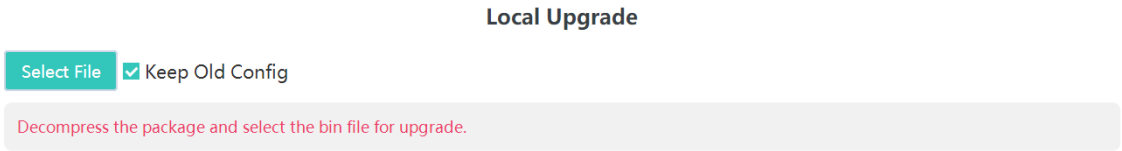
8.4 System Upgrade

8.4.1 Local Upgrade

Choose **System Settings** > **Upgrade**.

Click **Select File** to select the upgrade package from the local files (the upgrade package is a bin file. If it is a tar.gz file, users need to decompress the package and select the bin file for upgrade).

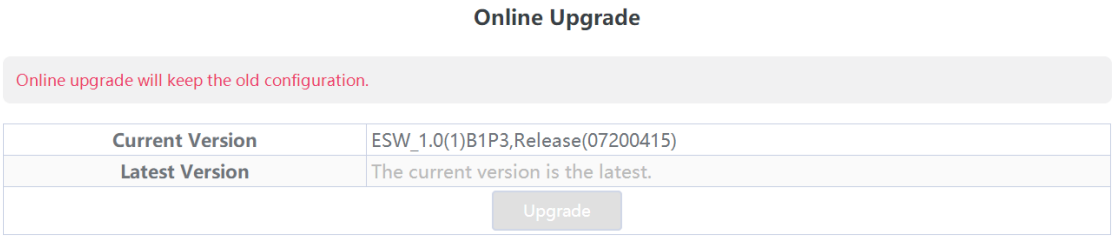
Keep Old Config is selected by default. That means the current configuration will be saved after device upgrade. If there is a huge difference between the current version and the upgrade version, you are advised not to select **Keep Old Config**.



8.4.2 Online Upgrade

Choose **System Settings** > **Upgrade**.

When there is a new version in the cloud, the version number of the latest version will be displayed on this page, and the **Upgrade** button will become available. The device will download the installation package of the recommended version from the cloud and it will be updated to the latest version. Online upgrade will keep the old configuration by default.



Note

The time that online upgrade takes depends on the current network speed. It may take some time. Please be patient.

8.5 Restoring Factory Configuration

Choose **System Settings** > **Restore Default**.

Click **Restore** to restore factory configuration and reboot the device.

Restoring

Restore factory configuration and reboot the device.

Restore

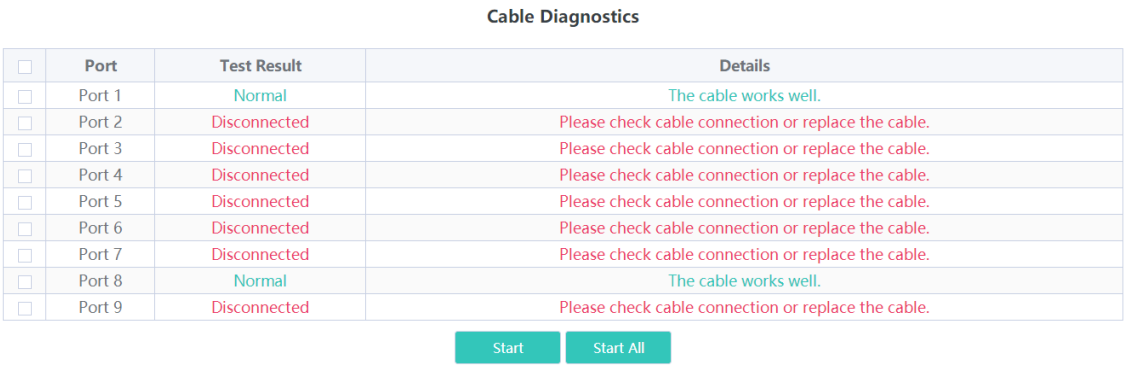
9 ES Series Switches Monitoring

9.1 Cable Diagnostics

Choose **Monitoring** > **Cable Diagnostics**.

Cable diagnostics allows users to check the status of Ethernet cables. For example, users can check whether the cables are short-circuited or disconnected.

Select the ports you want to detect, and then click **Start** to start cable diagnostics. The test result will be displayed accordingly. Click **Start All** to perform one-click cable diagnostics on all ports.



Caution

If you select an uplink port for diagnostics, the network may be intermittenly disconnected. Exercise caution when performing this operation.

9.2 Multi-DHCP Alarming

Caution

- Only RG-ES226GC-P, RG-ES218GC-P, RG-ES224GC, RG-ES216GC switches support multi-DHCP alarming.
- Multi-DHCP alarming will fail when the device IP address is not obtained dynamically. For relevant IP address configuration, see Chapter 4.6 Management IP Address.

Choose **Homepage**.

When there are multiple DHCP servers in a LAN, the system will send a conflicting alarm. An alarming message will be displayed in the **Device Info** column.

Move the cursor to ? to view the alarm details, including the VLAN where the conflicts occur, port, IP address of DHCP server, and MAC address.

9.3 Viewing Switch Information

Choose **Monitoring** > **Switches**.

If the switch is under uniform management, some features cannot be configured independently (such as password settings). To facilitate configuration, information of the master device in the VLAN will be displayed in this page. Click the **IP Address** of the master device to access **Master Device** page for global configuration.

Primary Device

The current device has been managed by the master device. Please click the IP address to manage the master device.

IP Address	SN	Model
192.168.110.1	H1RP4HH076624	EG105GW-E

The device is able to automatically discover other switches in the same management VLAN. Information of these switches will be displayed in **Switch List**.

The first row of **Switch List** displays information of the current device, and the following rows display information of other devices. Click **IP Address** of a device to access the Eweb management system of the device (login required).

Switch List

Up to **16** switches of the same management VLAN can be discovered.

No.	IP Address	SN	Hostname	Model
1	192.168.110.209(Local)	CARL542000171	ruijie	RG-ES205C-P
2	192.168.110.39	MACCLLES226GC	ruijie	RG-ES226GC-P
3	192.168.110.102	CAQB1AW047292	ruijie	New Model

Note

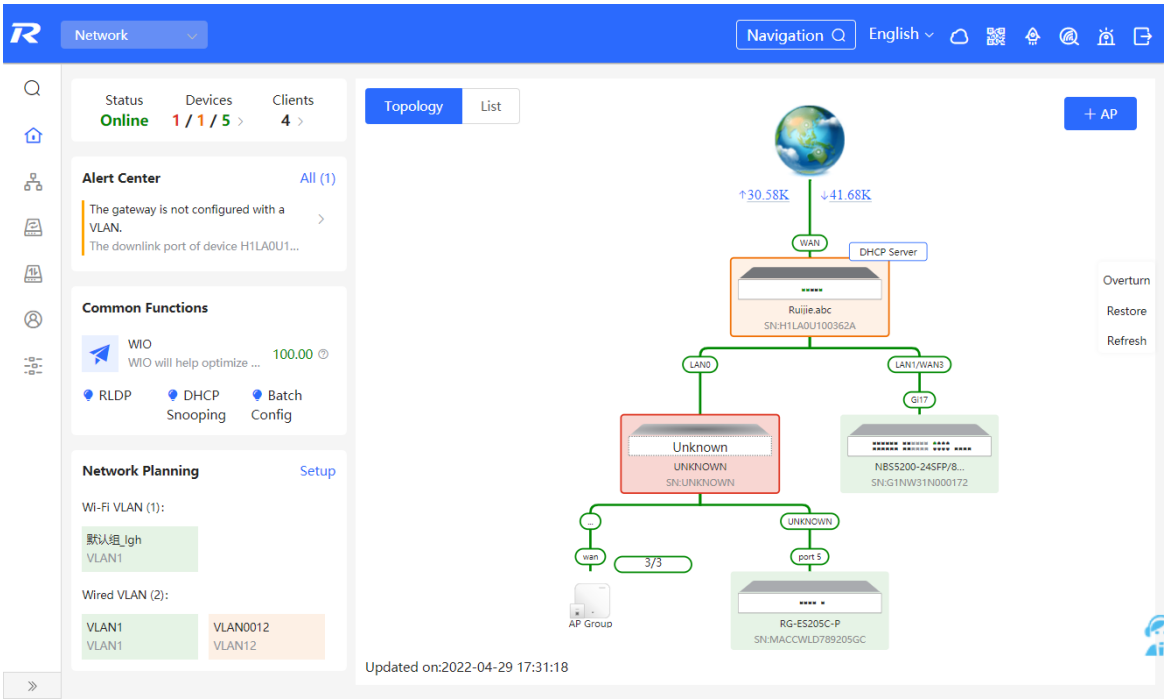
The number of switches that can be discovered varies with product modes:

- RG-ES226GC-P, RG-ES218GC-P and RG-FS303-AB can discover 32 switches.
- RG-ES205C-P, RG-ES205GC-P, RG-ES209C-P, RG-ES209GC-P, RG-FS306-P and RG-FS306-D can discover 16 switches.

10 NBS and NIS Series Switches Network management

10.1 Overviewing Network Information

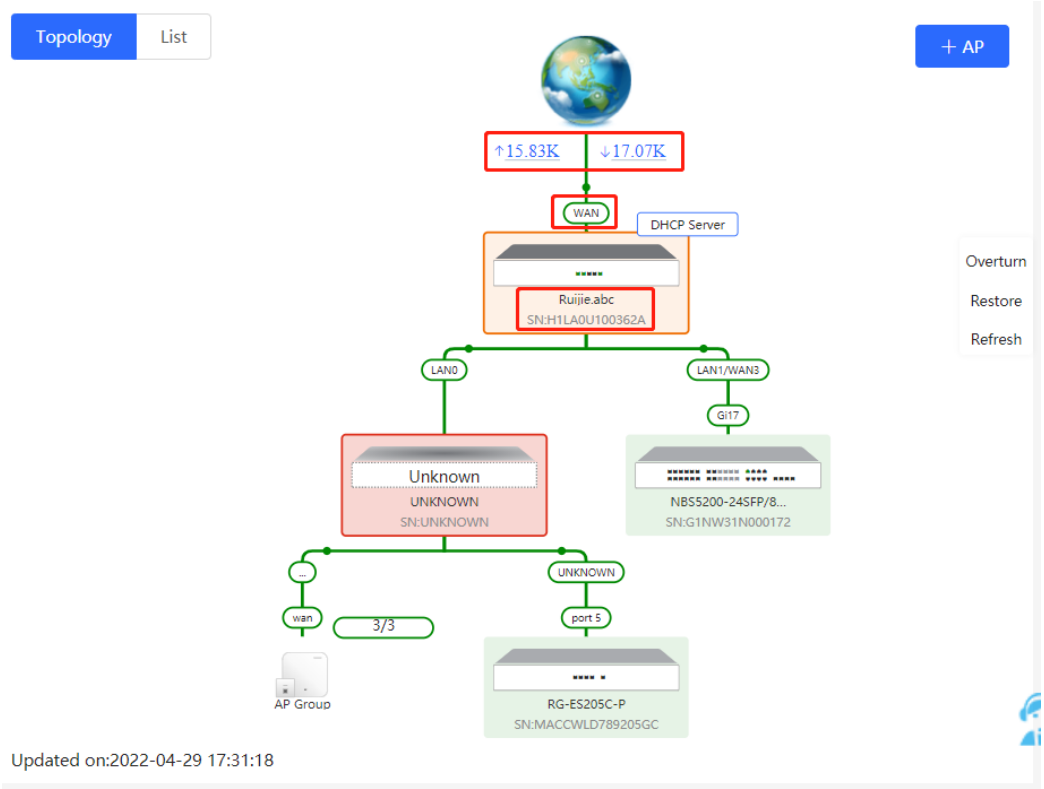
In network mode, the **Overview** page displays the current network topology, uplink and downlink real-time traffic, network connection status, and number of users and provides short-cut entries for configuring the network and devices. Users can monitor and manage the network status of the entire network on the page.



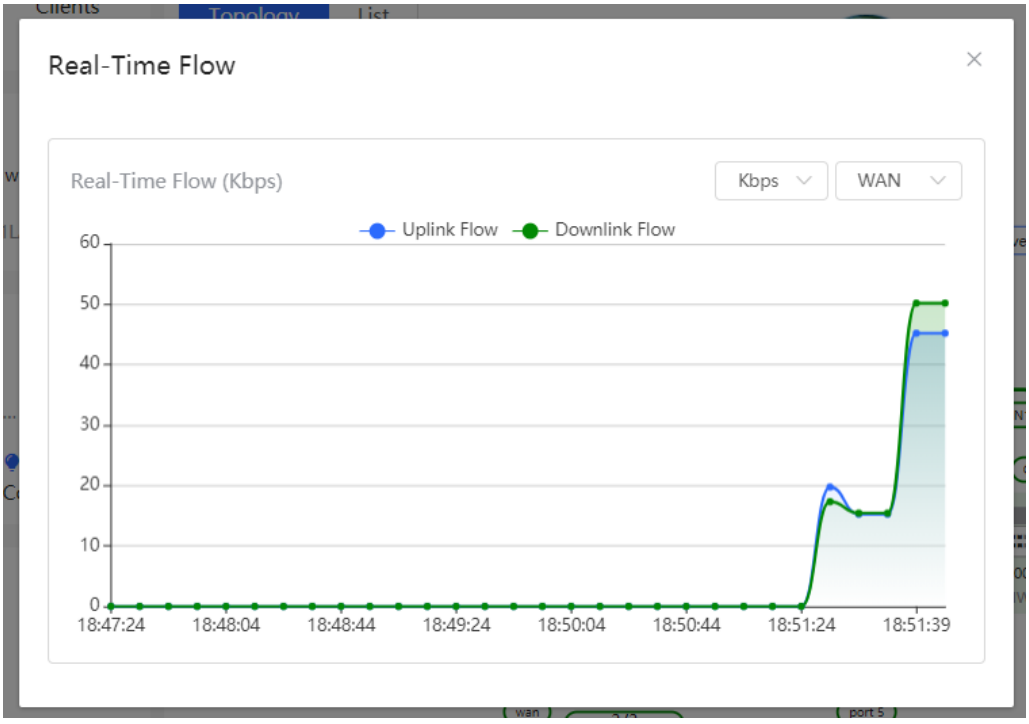
10.2 Viewing Networking Information

Choose **Network** > **Overview**.

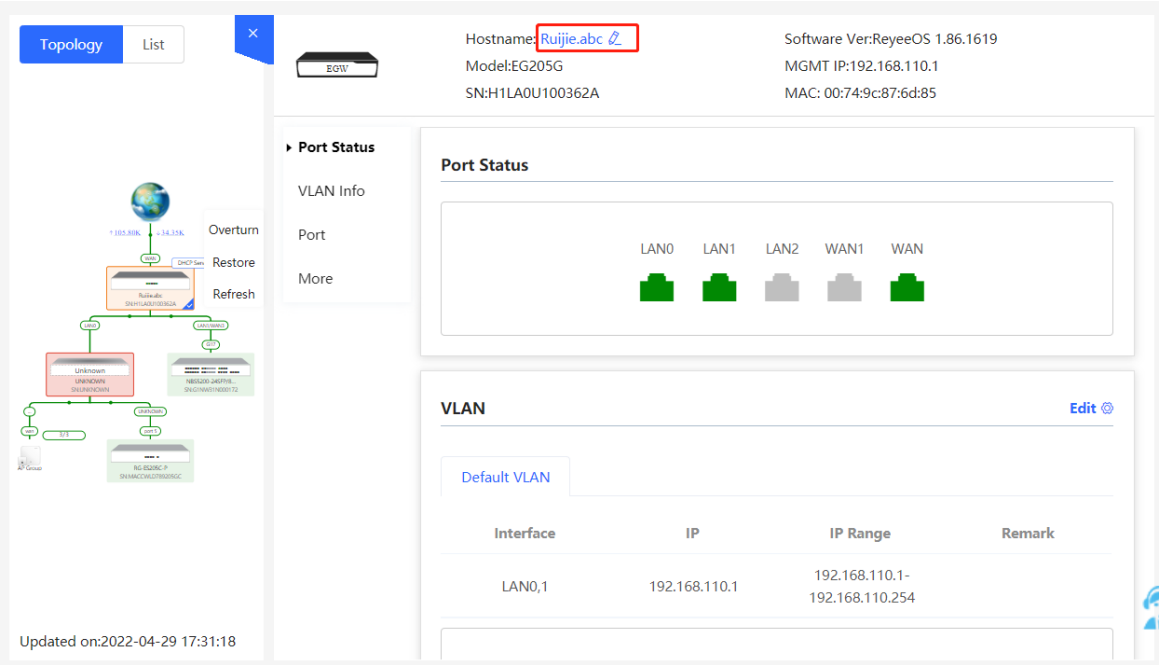
The networking topology contains information about online devices, connected port numbers, device SNs, and uplink and downlink real-time traffic.



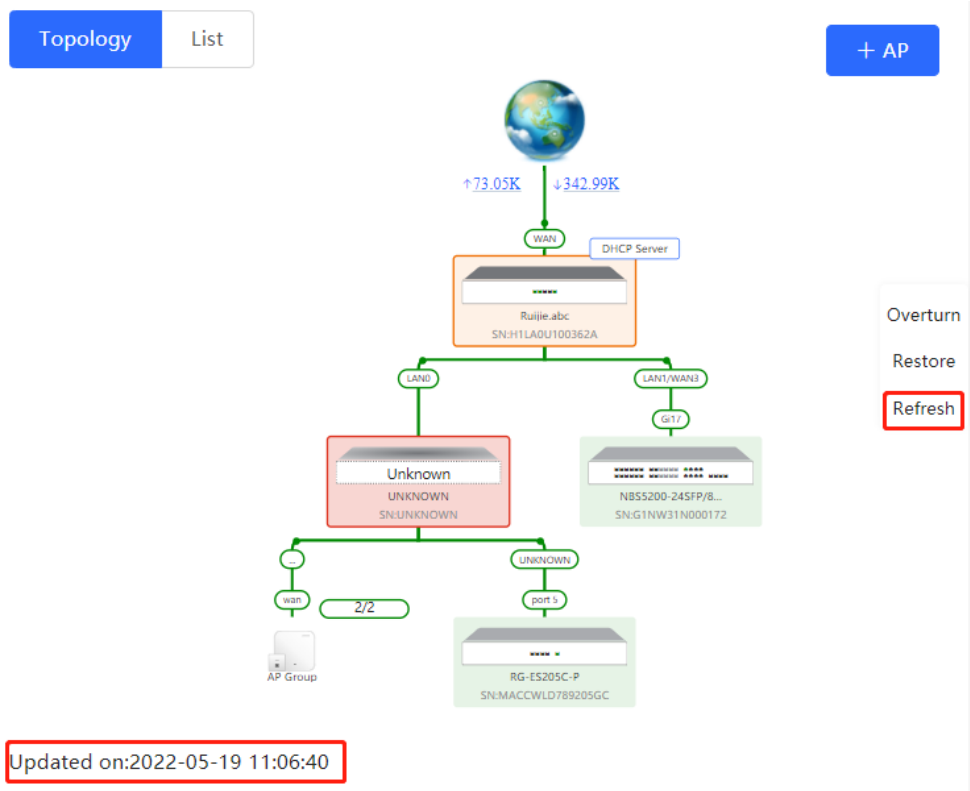
- Click a traffic data item to view the real-time total traffic information.



- Click a device in the topology to view the running status and configuration of the device and configure device functions. By default, the product model is used as the device name. Click to modify the device name so that the description can distinguish devices from one another.



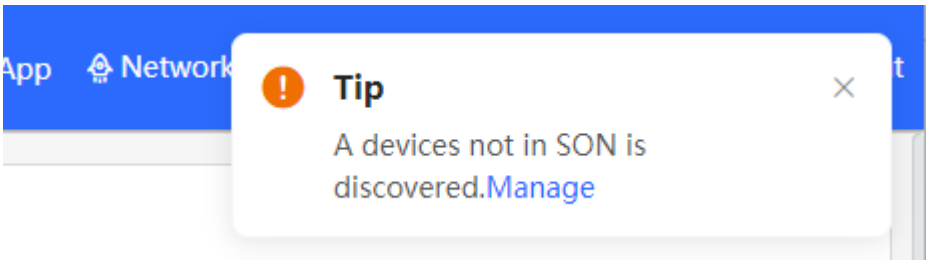
- The update time is displayed in the lower-left corner of the topology view. Click **Refresh** to update the topology to the latest state. It takes some time to update the topology data. Please wait patiently.

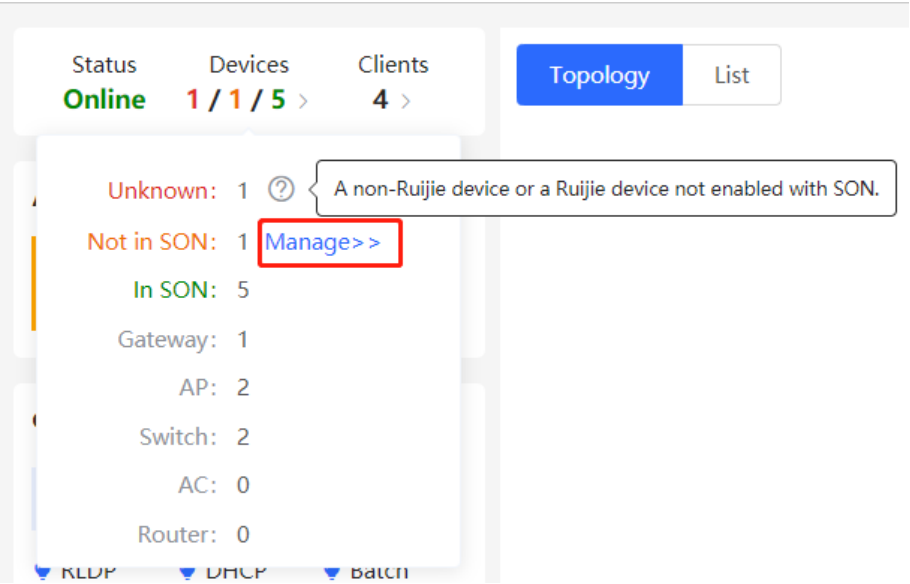


10.3 Adding Networking Devices

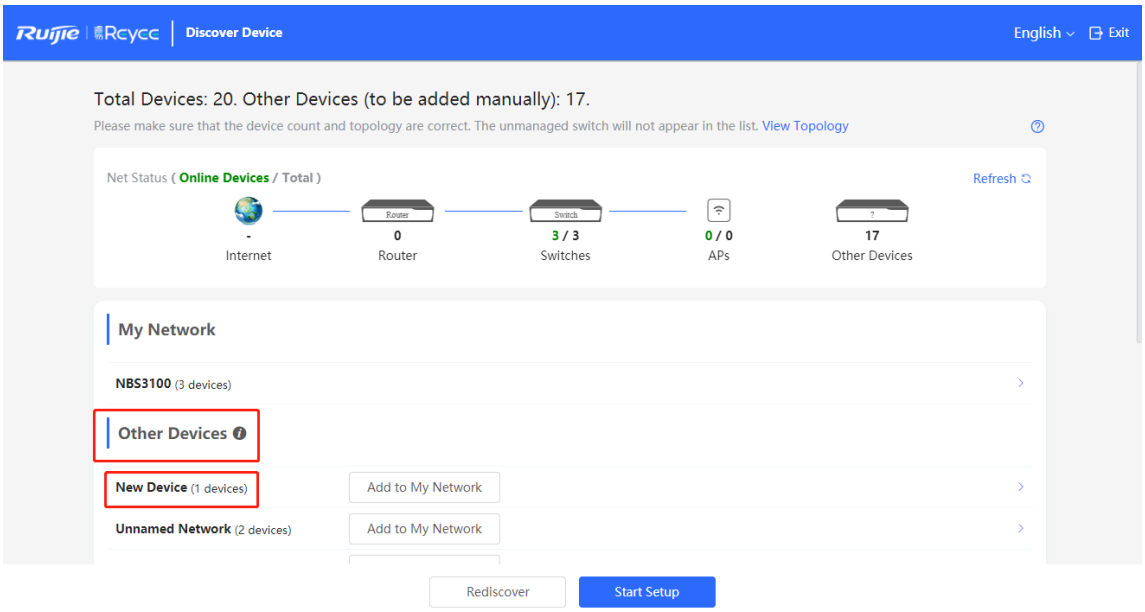
10.3.1 Wired Connection

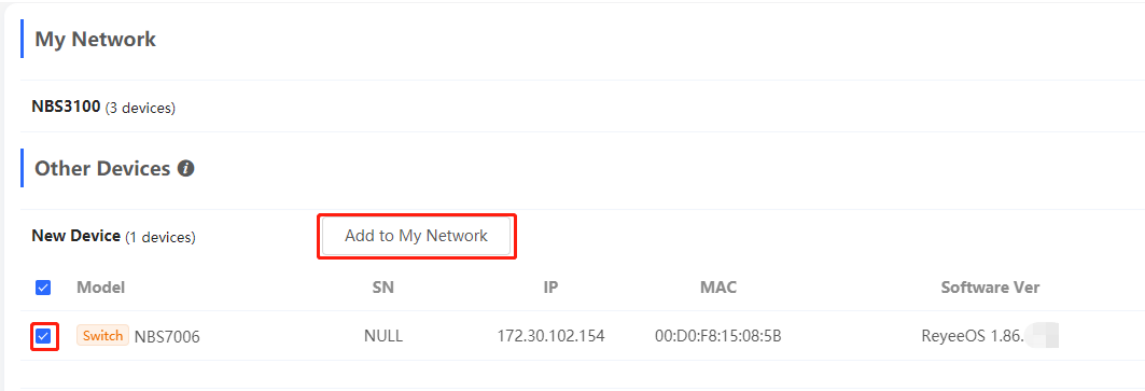
(1) When a new device connects to an existing device on the network, the system displays the message “A device not in SON is discovered.” and the number of such devices in orange under “Devices” on the upper-left corner of the [Overview] page. You can click **Manage** to add this device to the current network.



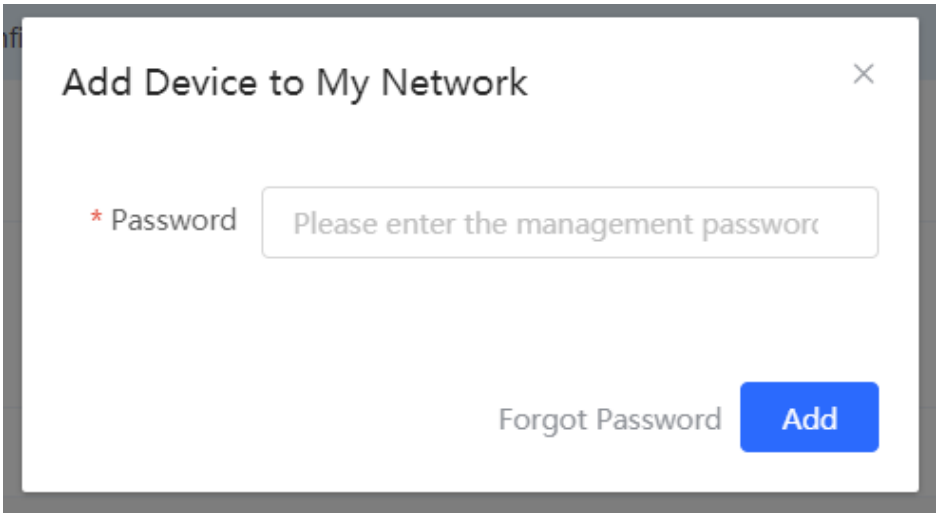


(2) After the system switches to the **Network List** page, click **Other Network**. In the **Other Network** section, select the device to be added to the network and click **Add to My Network**.





(3) You do not need to enter the password if the device to add is newly delivered from factory. If the device has a password, enter the configuring password of the device. Device addition fails if the password is incorrect.



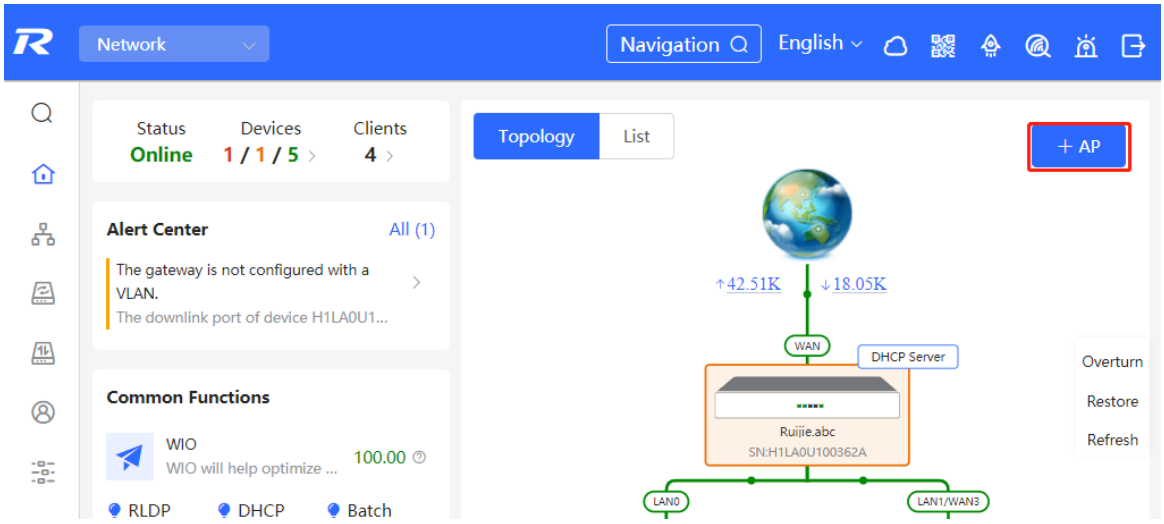
10.3.2 AP Mesh

If the AP supports the AP Mesh (Reyee Mesh) function, you do not need to connect cables after powering on the AP. The AP can be added to the current network in Reyee Mesh mode, establish a mesh networking with other wireless devices, and automatically synchronize Wi-Fi configuration.

Caution

To scan the AP, the Reyee Mesh function must be enabled on the current network. (For details, see 21.9 Enabling the Reyee Mesh Function.) The AP should be powered on nearby. It may fail to be scanned in case of long distance or obstacle blocking.

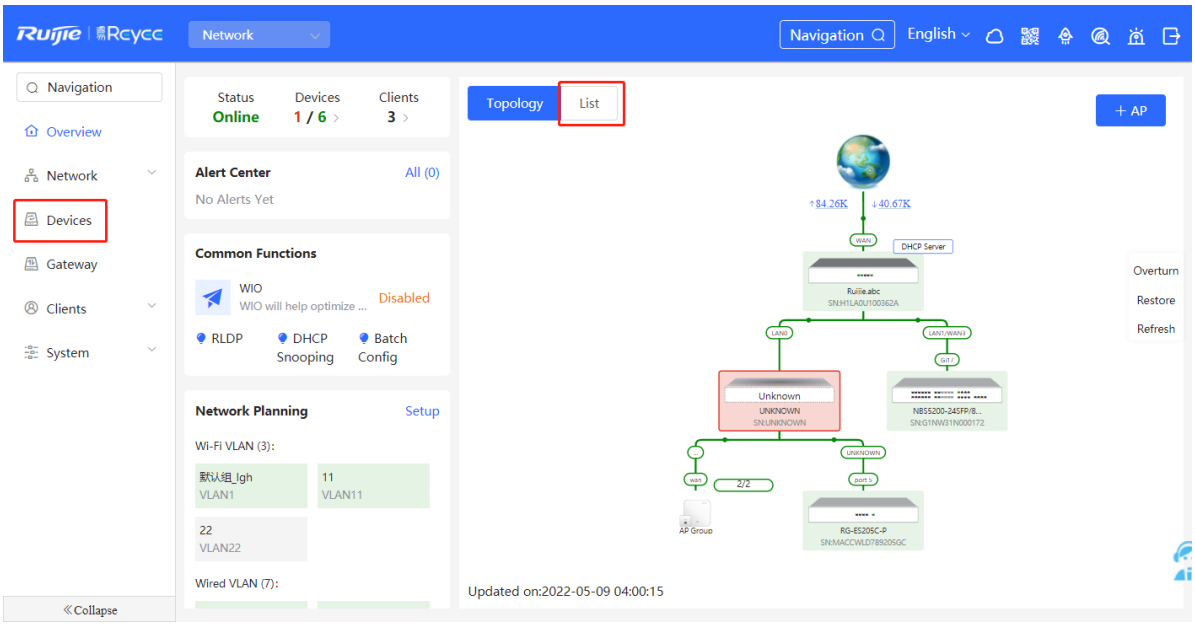
(1) Place the powered new AP near an existing AP, where the new AP can receive Wi-Fi signals from the existing AP. Log in to a device in the network. On the **Overview** page, click **+AP** in the upper-right corner of the topology to scan nearby APs that do not belong to the current network and are not connected to a network cable.

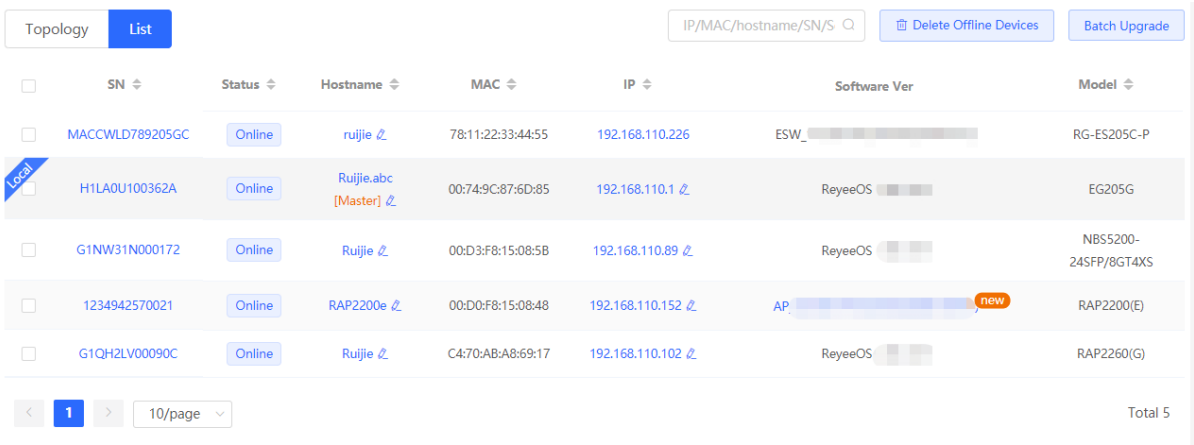


(2) Select the target AP to add it to the current network. You do not need to enter the password if the device to add is new. If the device has a password, enter the management password of the device.

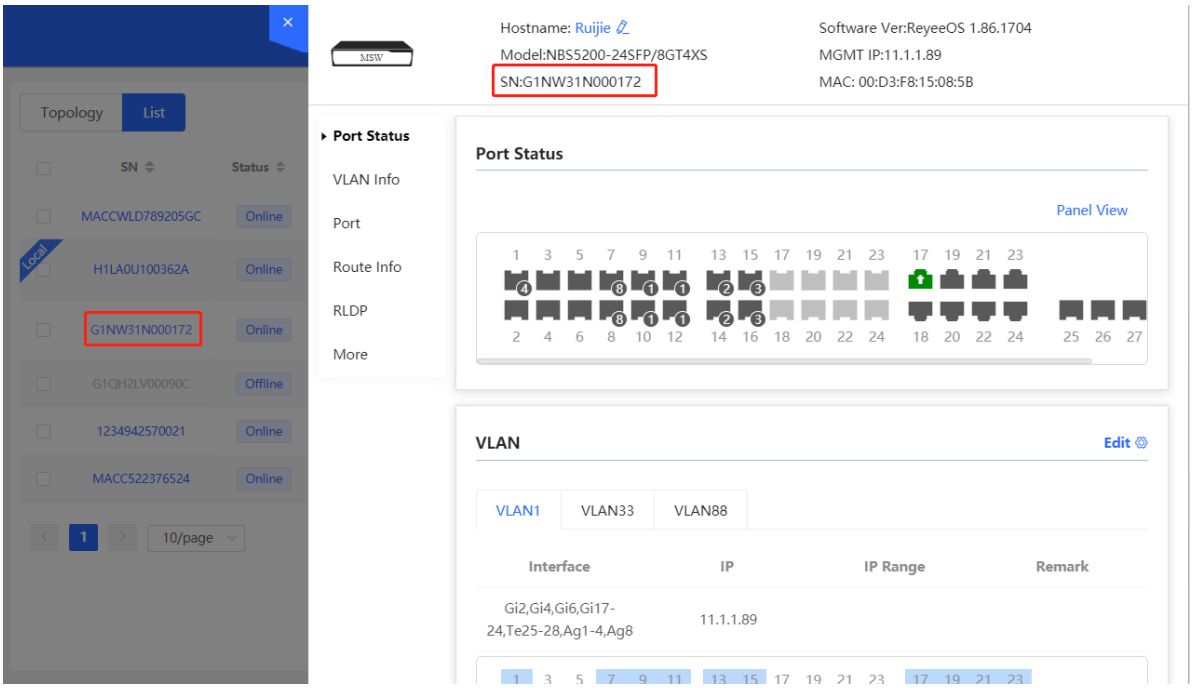
10.4 Managing Networking Devices

On the **Overview** page, click **List** in the upper-left corner of the topology or click **Devices** in the menu bar to switch to the device list view. Then, you can view all the device information in the current networking. Users only need to log in to one device in the network to configure and manage devices in the entire network.

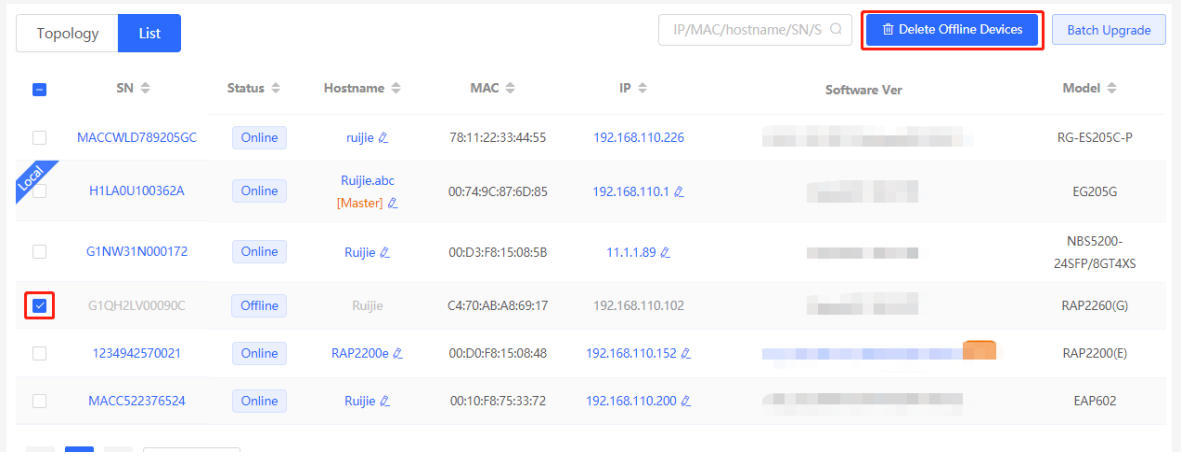




- Click the device **SN** to configure the specified device separately.

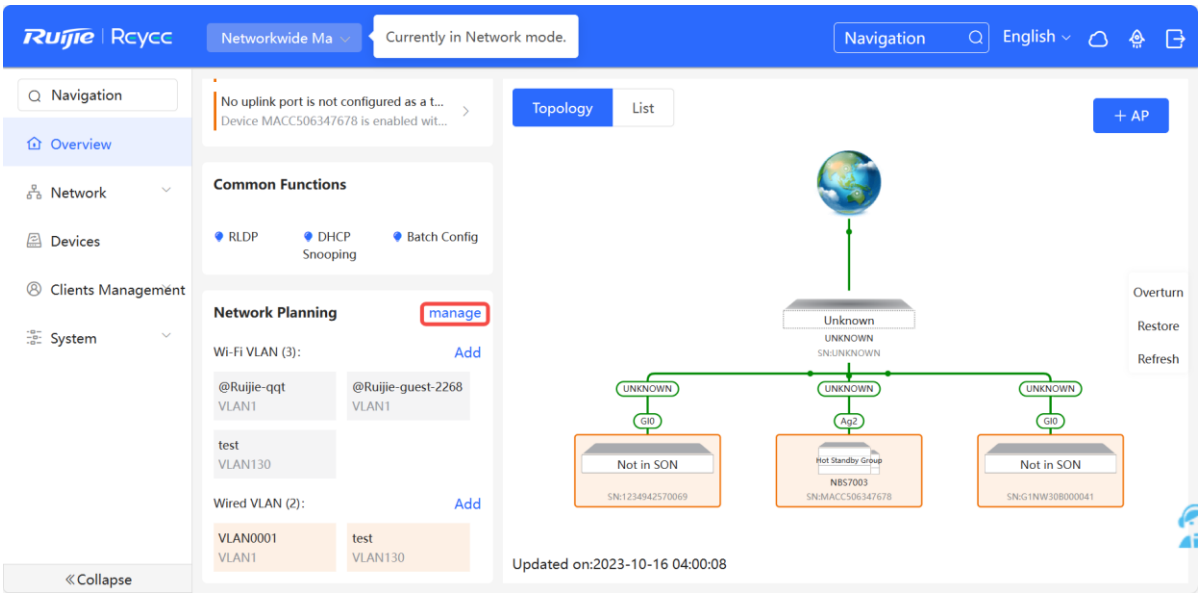


- Check offline devices and click **Delete Offline Devices** to remove them from the list and networking topology.



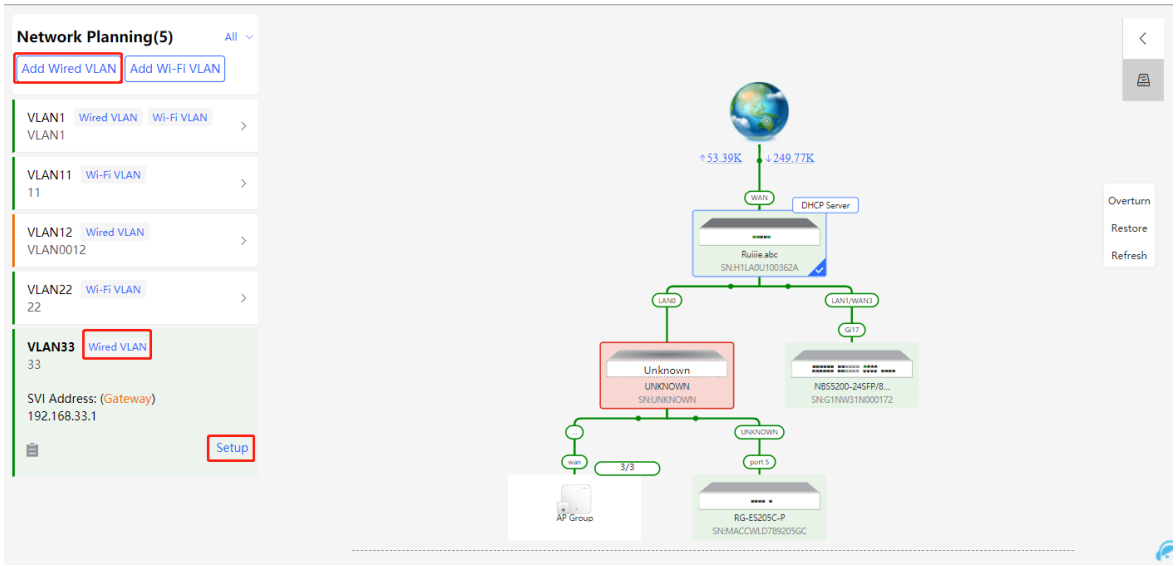
10.5 Configuring the Service Network

The wireless and wired network configurations of the current network are displayed in the lower-left of the **Overview** page. Click **manage** to switch to the service network configuration page (or click **Network** > **Network Planning**).

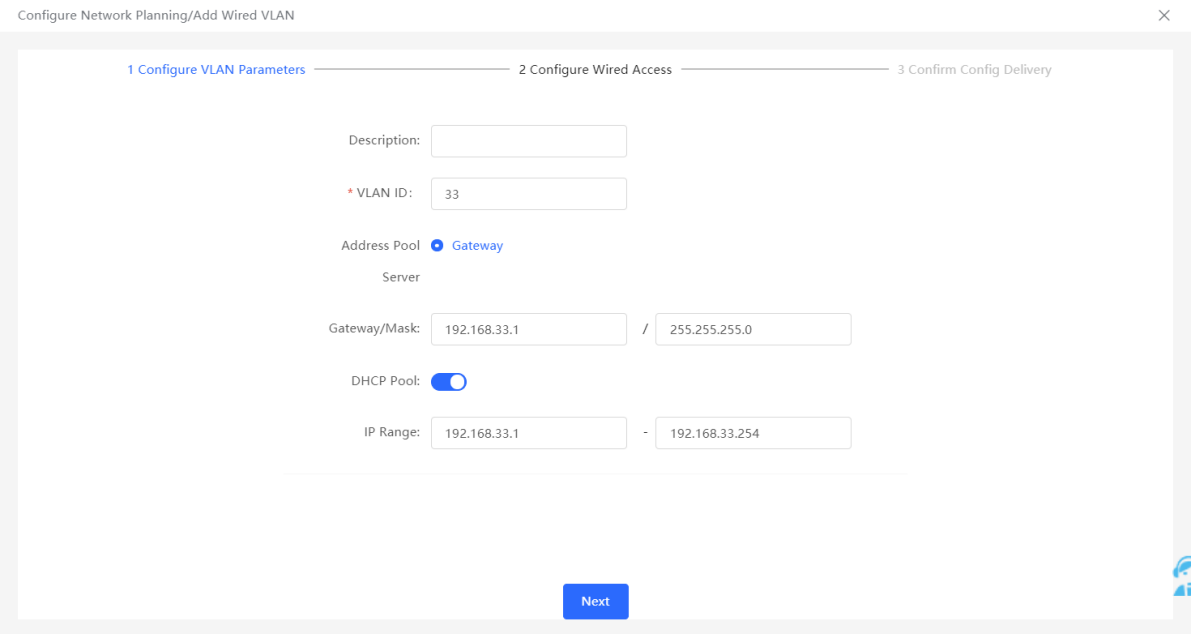


10.5.1 Configuring the Wired Network

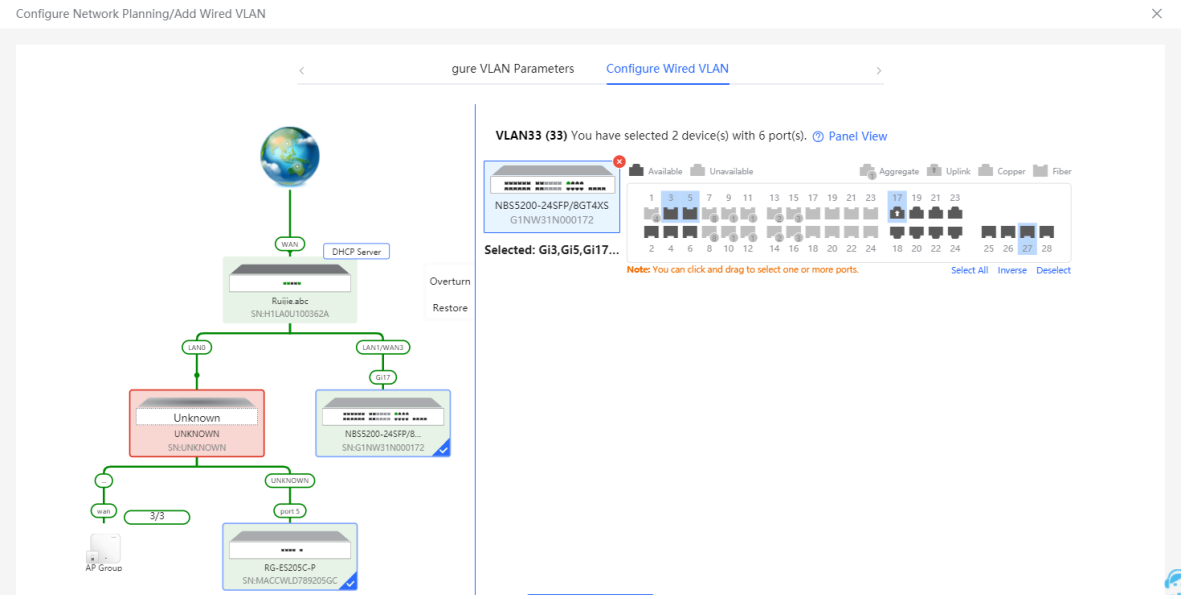
(1) Click **Add Wired VLAN** to add wired network configuration, or select an existing wired VLAN and click **Setup** to modify its configuration.



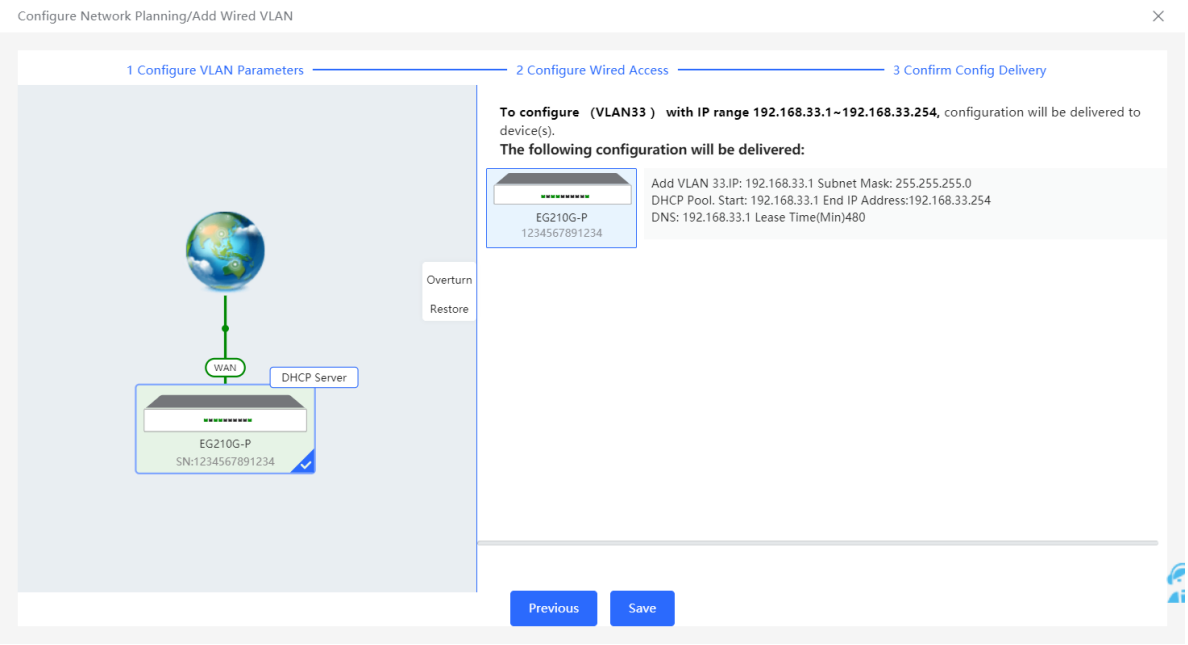
(2) Configure a VLAN for wired access, specify the address pool server for access clients in this VLAN, and determine whether to create a new DHCP address pool. A switch or gateway device can be selected as the address pool server. After setting the service parameters, click **Next**.



(3) Select the switch to configure in the topology, select the switch ports added to this VLAN, and click **Next**.

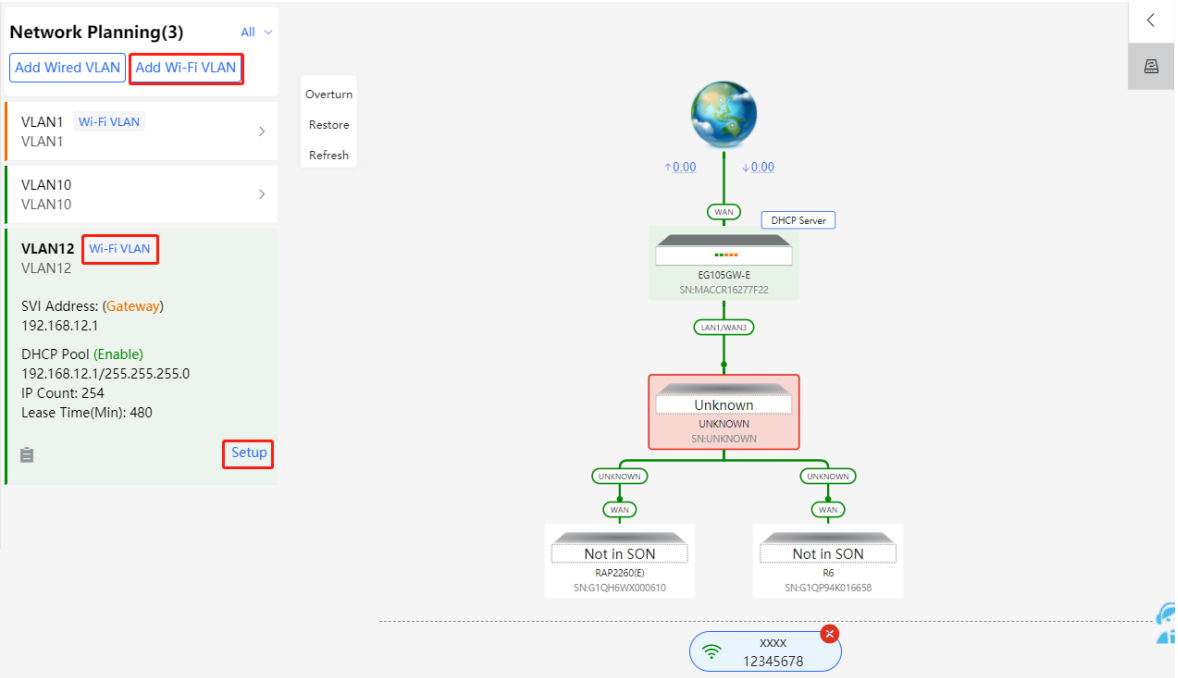


(4) Confirm that the configuration items to be delivered are correct and then click **Save**. Wait a moment for the configuration to take effect.

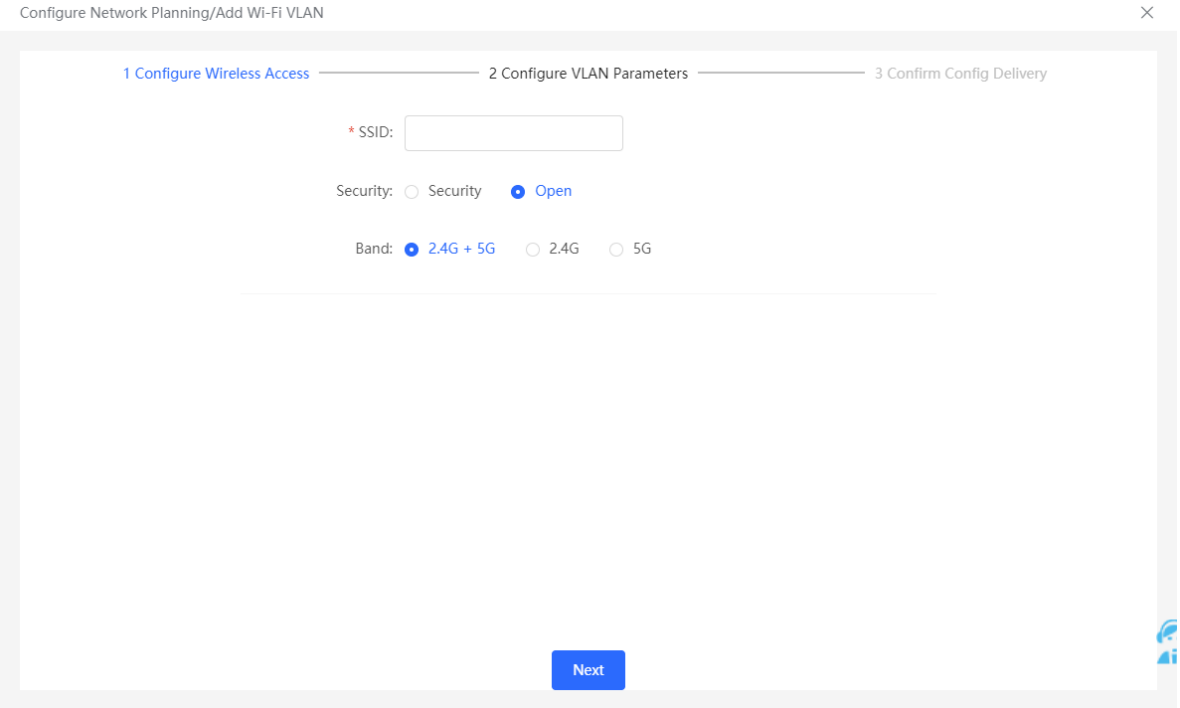


10.5.2 Configuring the Wireless Network

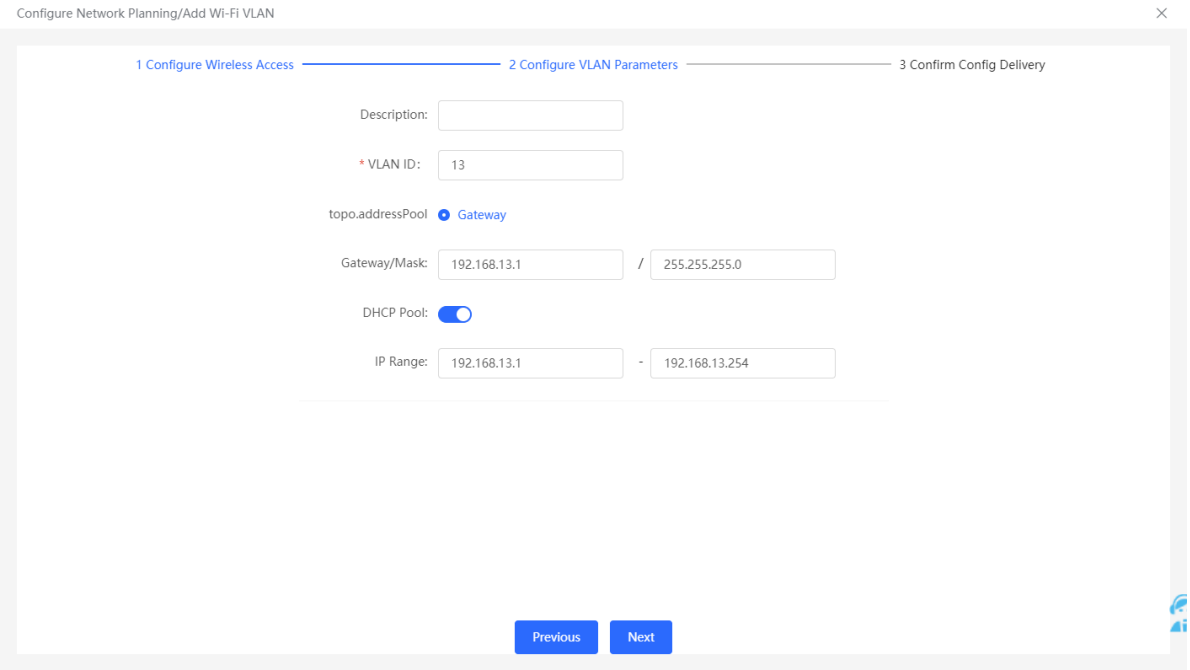
(1) Click **Add Wi-Fi VLAN** to add wireless network configuration, or select an existing Wi-Fi VLAN and click **Setup** to modify its configuration.



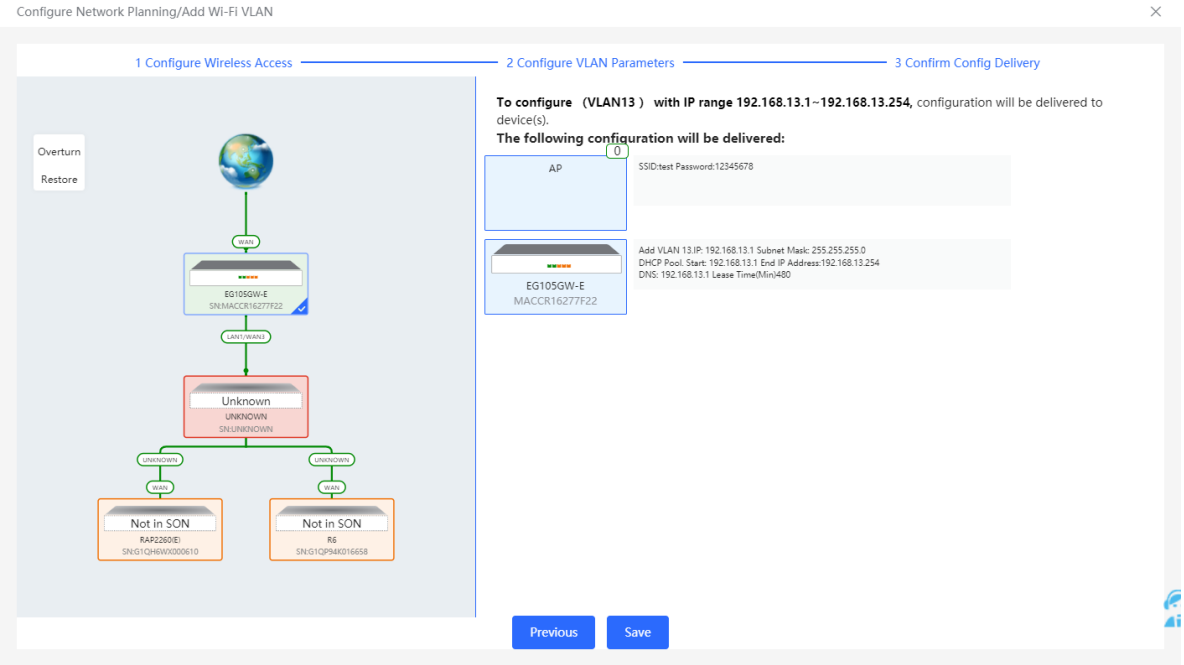
(2) Set the Wi-Fi name, Wi-Fi password, and applicable bands. Click **Next**.



(3) Configure a VLAN for wireless access, specify the address pool server for access clients in this VLAN, and determine whether to create a new DHCP address pool. A switch or gateway device can be selected as the address pool server. After setting the service parameters, click **Next**.



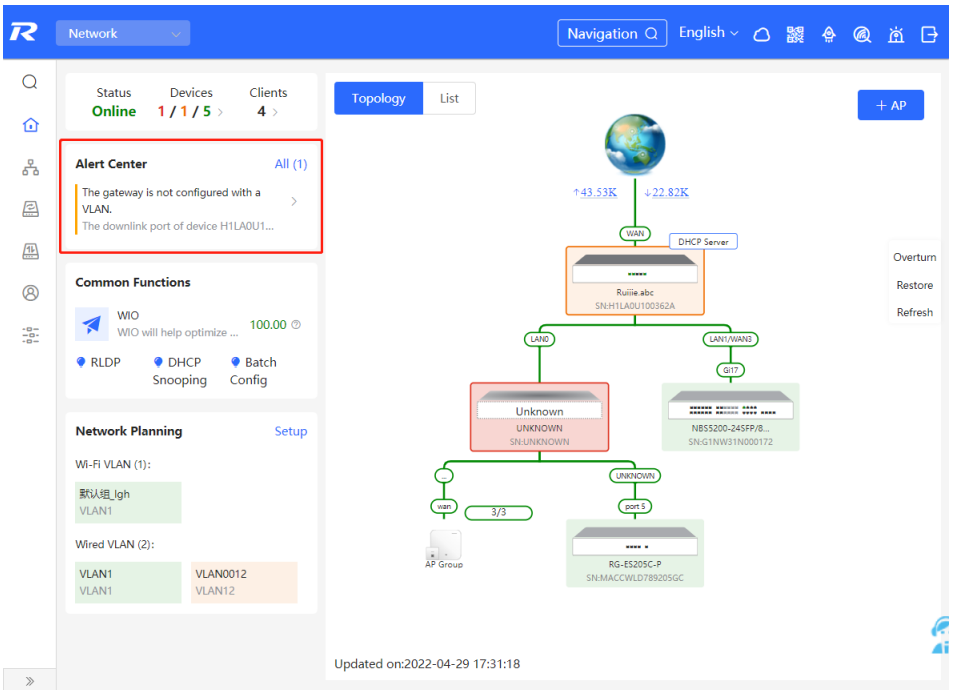
(4) Confirm that the configuration items to be delivered are correct and then click **Save**. Wait a moment for the configuration to take effect.

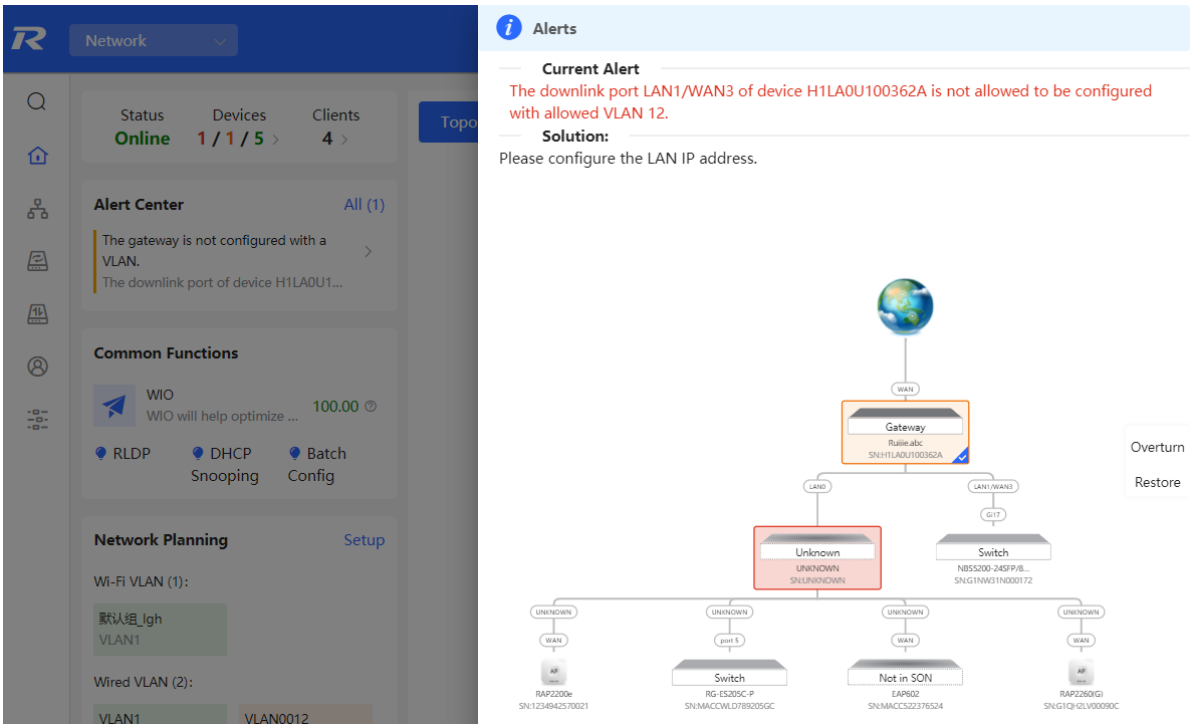


10.6 Processing Alerts

Choose **Network** > **Overview**.

If a network exception occurs, alert message on this exception and the corresponding solution are displayed on the **Overview** page. Click the alert message in the **Alert Center** section to view the faulty device, problem details, and its solution. Troubleshoot and process the alert according to the solution.

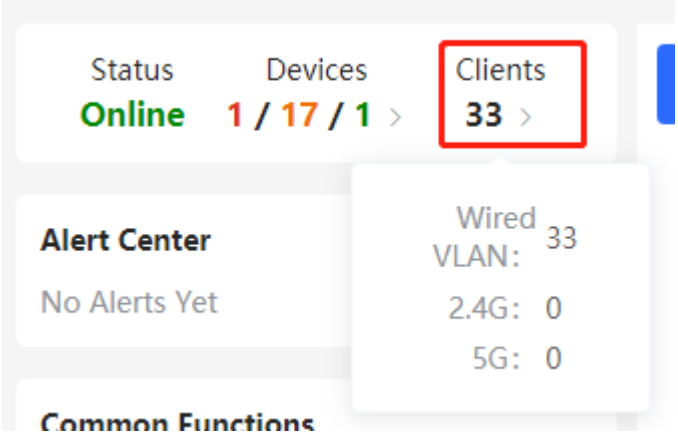




10.7 Viewing Online Clients

The **Clients** in the upper-left corner of the **Overview** page displays the total number of online clients in the current network; moving the cursor to the number of users will display the number of current wired users, wireless users in the 2.4GHz band, and wireless users in the 5GHz band.

Click to switch to the online clients page (or click **Clients** > **Online Clients**).



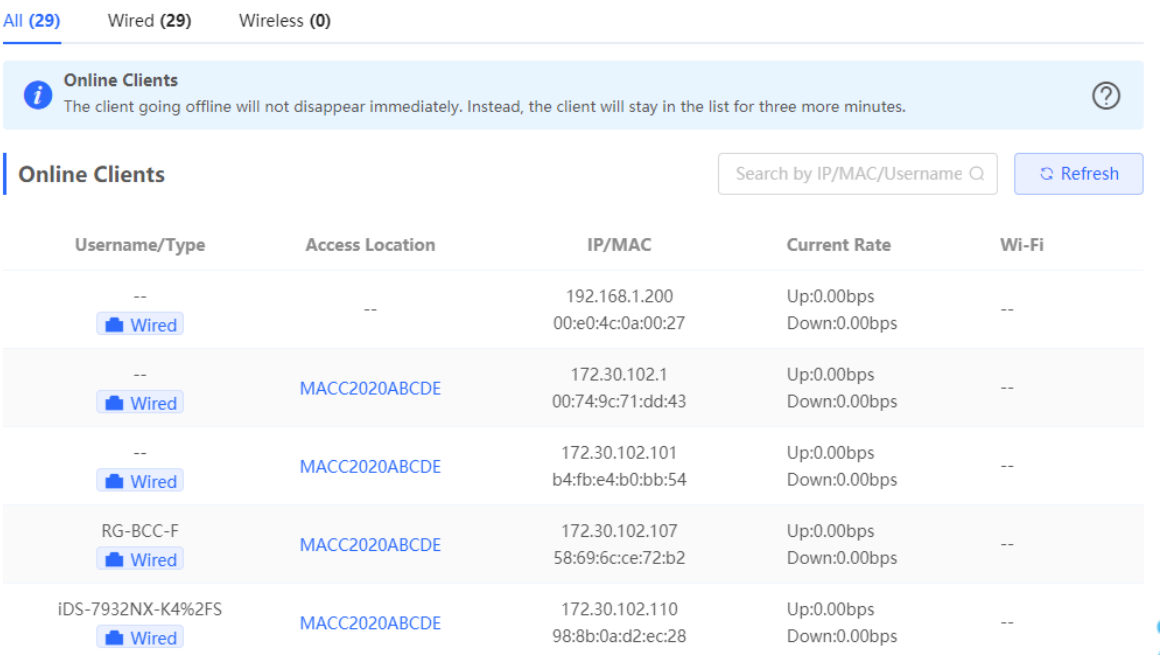


Table 10-1 Description of Online Client Information

Field	Description
Username/Type	Indicate the name and access type of the client. The access type can be wireless or wired.
Access Location	Indicate the SN of the device that the user accesses to. You can click it to view the access port during wired access.
IP/MAC	The IP address and the MAC address of the client.
Current Rate	Indicate the uplink and downlink data transmission rates of the client.
Wi-Fi	Wireless network information associated with wireless clients, including channel, signal strength, online time, negotiation rate, etc.

10.8 Smart Device Network

Caution

Currently, the function is supported by RG-NBS6002 Series, RG-NBS7003 Series and RG-NBS7006 Series devices.

10.8.1 Overview

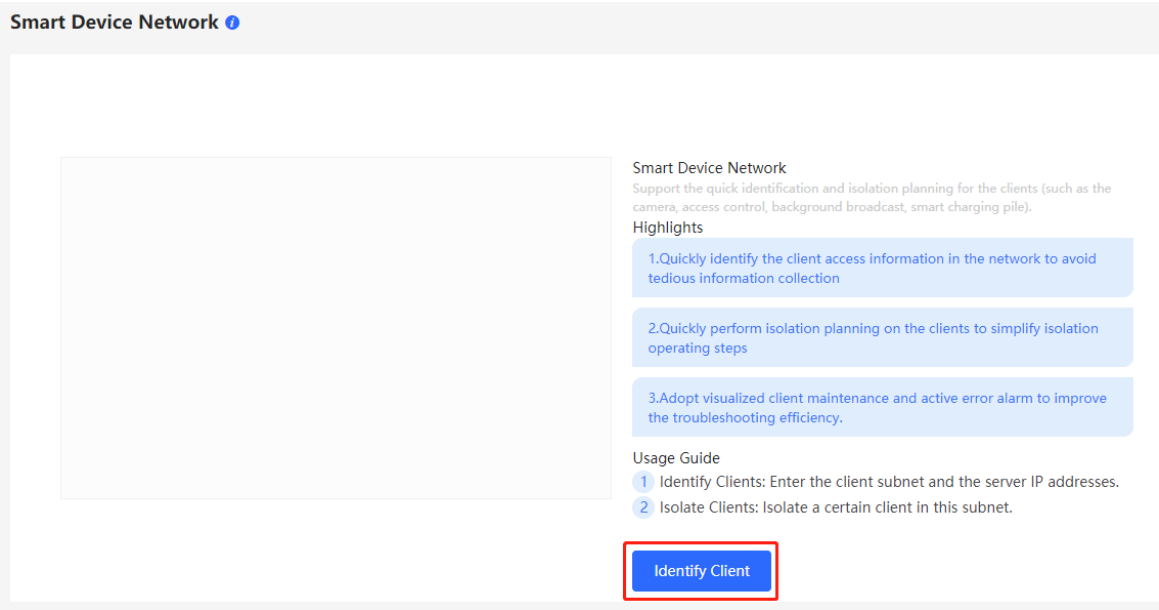
The smart device network is used to quickly plan and set up an isolation network for smart clients, so as to isolate the client network from the normal service network and other types of clients, and improve the stability of the network. The smart device network supports rapid identification of various types of clients (such as cameras, access control, background broadcasting, smart charging piles, etc.) and batch execution of isolation planning on clients. Compared with traditional client network planning and deployment steps, it eliminates the tedious process, collects information and simplifies the steps to set up client isolation.

After setting up the smart device network, the page visually displays client information, and actively alerts abnormality, which can effectively improve the efficiency of troubleshooting.

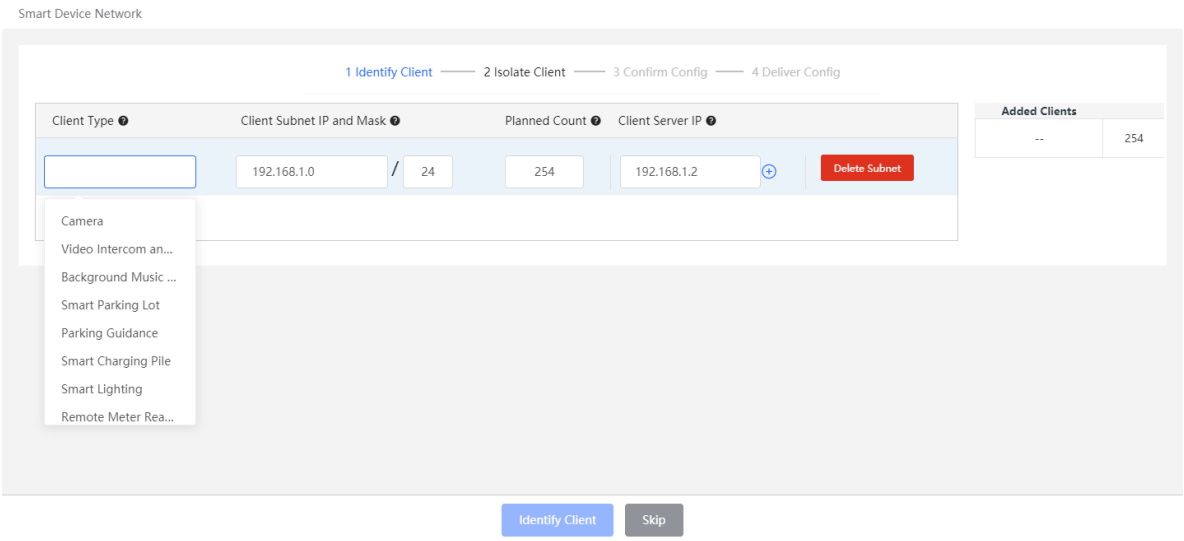
10.8.2 Procedure

Choose **Network** > **Clients** > **Smart Device Network**.

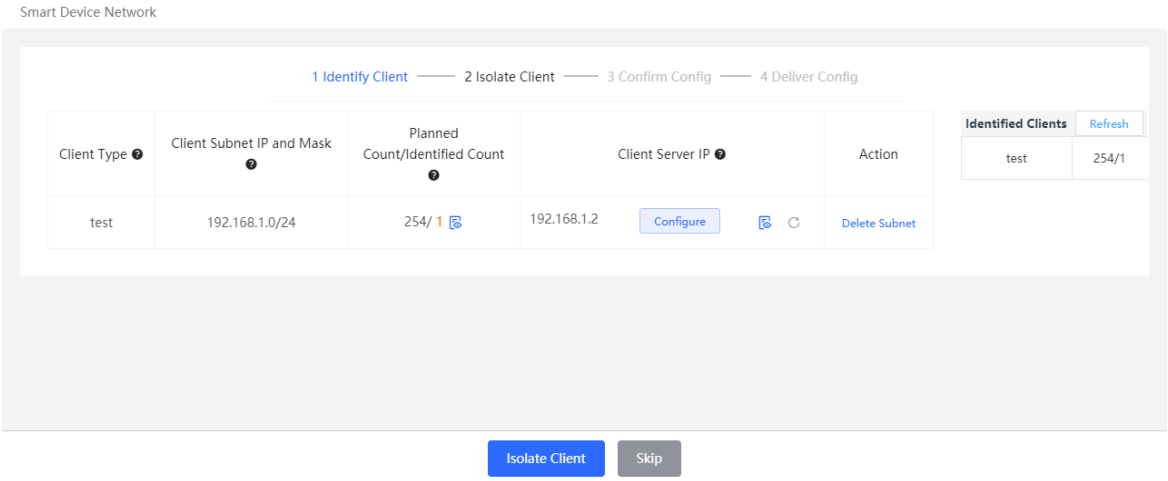
(1) Click **Identify Client**.

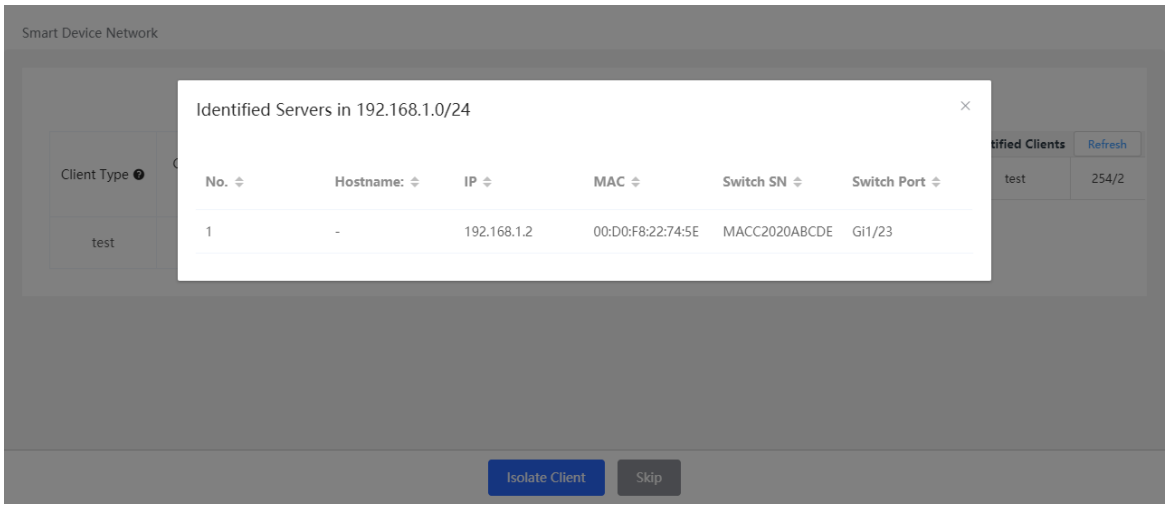


(2) Click **+Client Subnet**, enter the client type (which can be selected or customized in the drop-down box), the network segment of the client, the planned number and the corresponding server IP address to identify the client. Multi-type client network segments can be set. Click **Identify Client** after filling in.

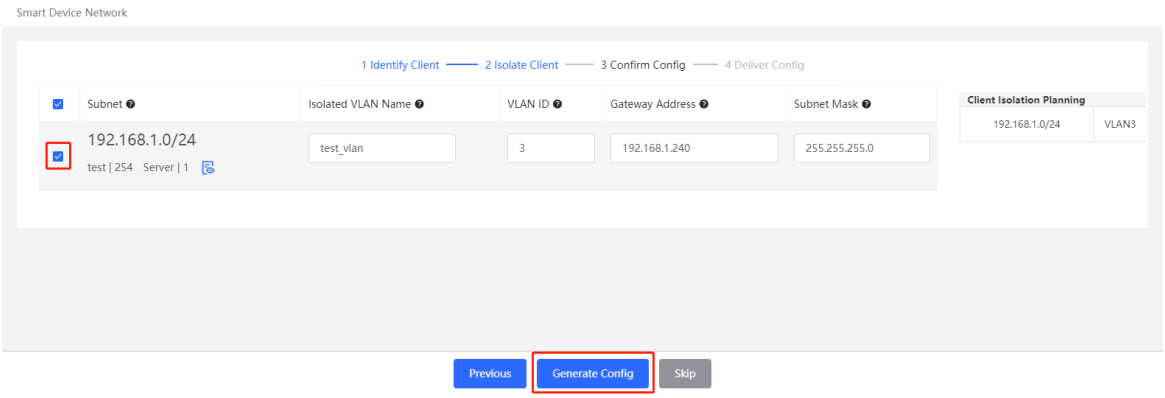


(3) Display the identified client and client server information, including IP address, MAC address, SN number of the connected switch and connection port. Click to view the detailed information. If the connection information to the client server is not identified, you need to click **Configure** and fill in the relevant information manually. After confirming that the client device information is correct, click **Isolate Client**.

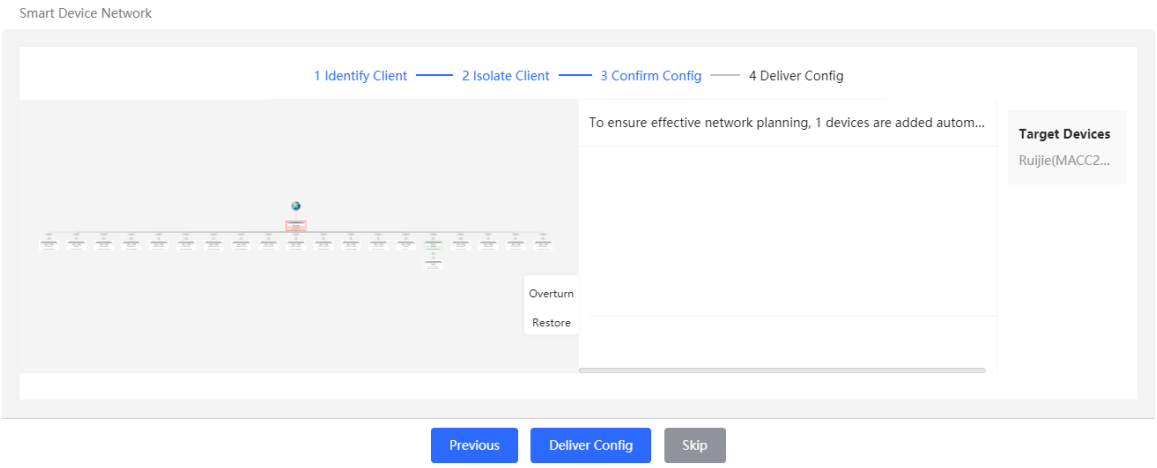




(4) Input the name of the VLAN, VLAN ID, gateway address, and subnet mask of the isolated client. Check the target network segment and click **Generate Config**.

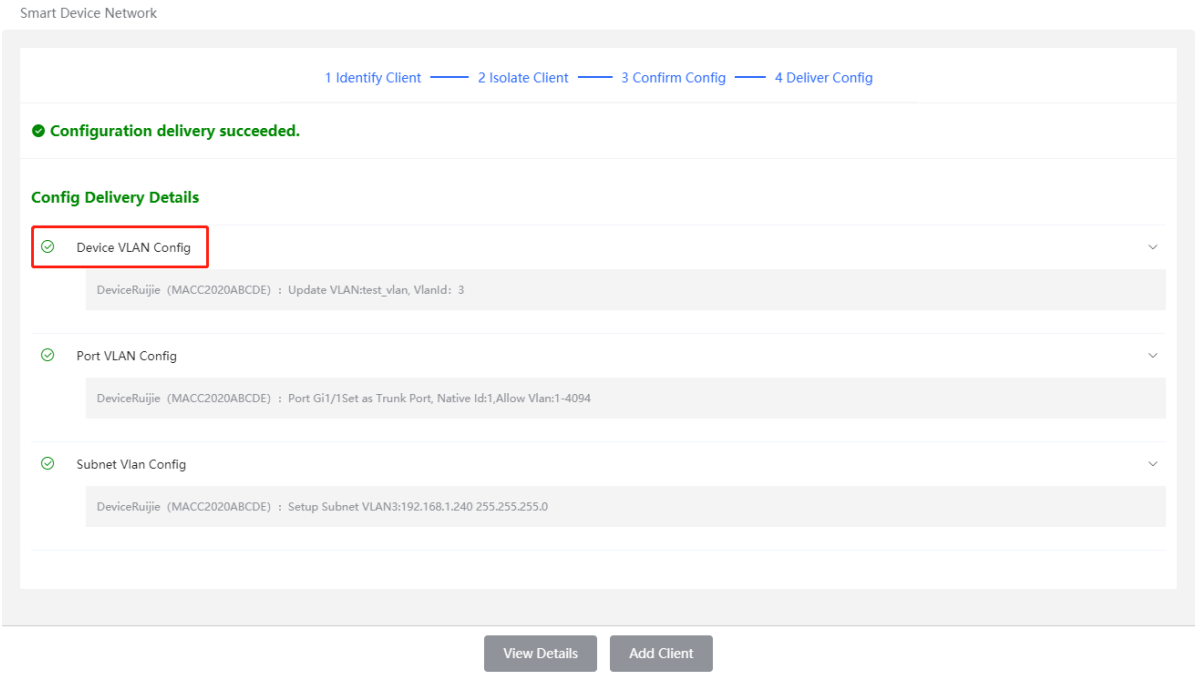


(5) After confirming the configuration, click **Deliver Config**. If you need to modify it, you can click **Previous** to return to the setting page.



(6) The page displays that the configuration has been delivered successfully, indicating that the settings have been completed. Click the configuration item to view the configuration delivery details. After the configuration

is delivered, click **View Details** to switch to the page that displays monitoring information of the smart device network; click **Add Client** to continue setting the client network segment.



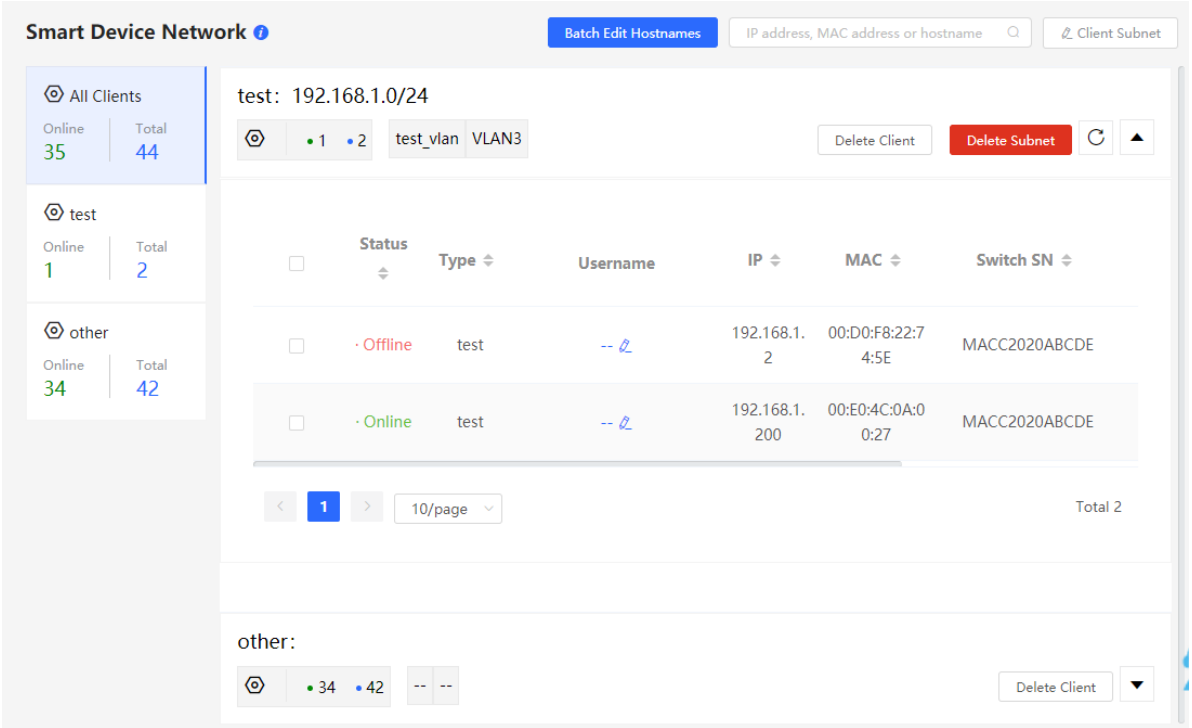
(7) After completing the smart device network settings, you can view the client monitoring information on the page, including client online status, connection information, device information, and online and offline time.

Select the client entry and click **Delete Client** to remove the specified client from the current network.

Click **Batch Edit Hostnames** to import a txt file containing client IP and client name (one line for each client, each line contains an IP and a name, and the IP and the name are separated by the Tab key), and modify the client names in batches.

Click **Client Subnet** to modify servers and isolate VLAN information, or add a new client network segment.

Click **Delete Subnet** to delete the corresponding smart device network configuration.


Smart Device Network
Batch Edit Hostnames
IP address, MAC address or hostname
Client Subnet
All Clients
Online 35
Total 44
test
Online 1
Total 2
other
Online 34
Total 42
test: 192.168.1.0/24
1
2
test_vlan
VLAN3
Delete Client
Delete Subnet
Status
Type
Username
IP
MAC
Switch SN
Offline
test
--
192.168.1.2
00:D0:F8:22:74:5E
MACC2020ABCDE
Online
test
--
192.168.1.200
00:E0:4C:0A:00:27
MACC2020ABCDE
1
10/page
Total 2
other:
34
42
-- --
Delete Client

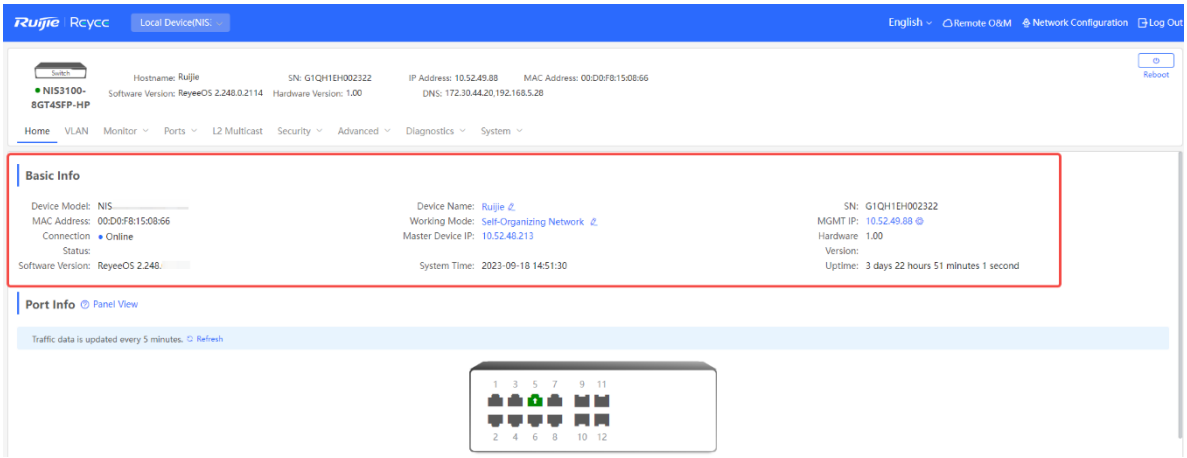
11 NBS and NIS Series Switches Basic Management

11.1 Overviewing Switch Information

11.1.1 Basic information about the Device

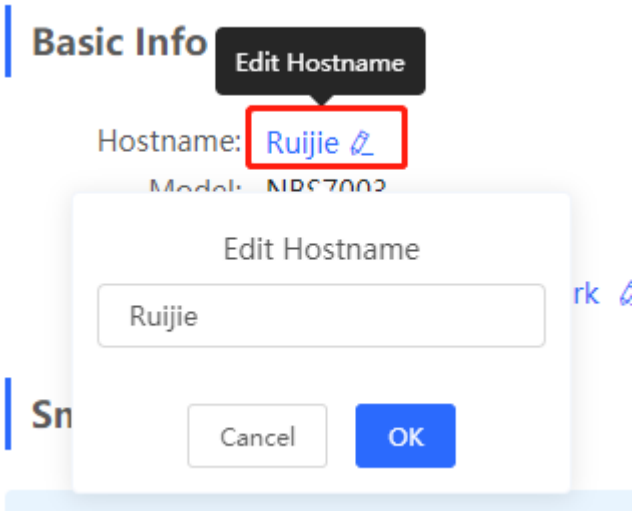
Choose **Local Device** > **Home** > **Basic Info**.

Basic information includes device name, device model, SN number, software version, management IP, MAC address, networking status, system time, working mode, power supply status, etc.



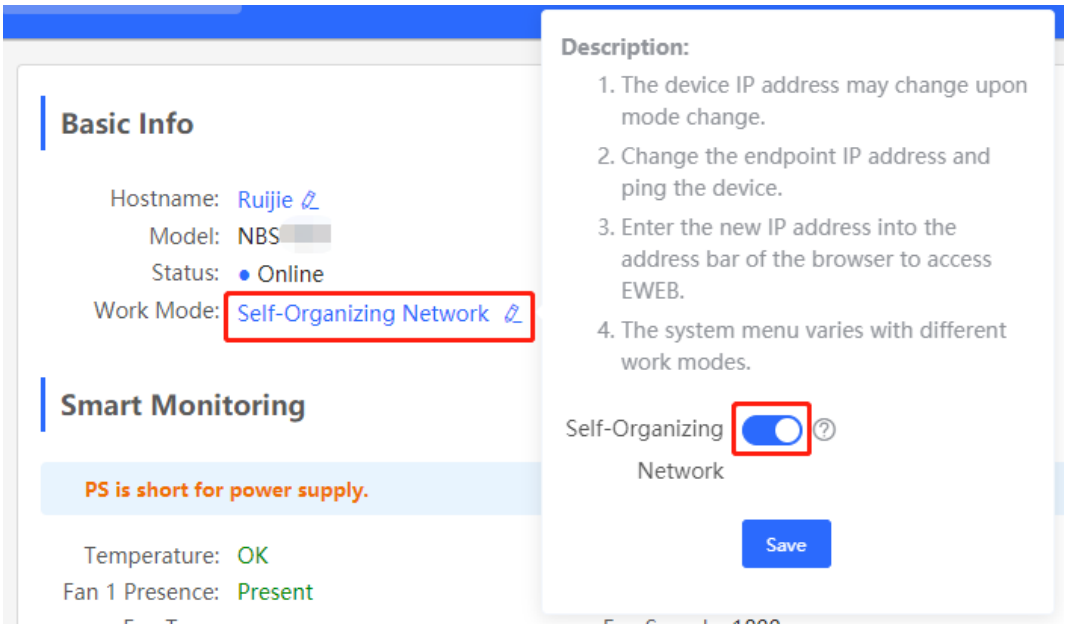
1. Setting the device name

Click the device name to modify the device name in order to distinguish between different devices.



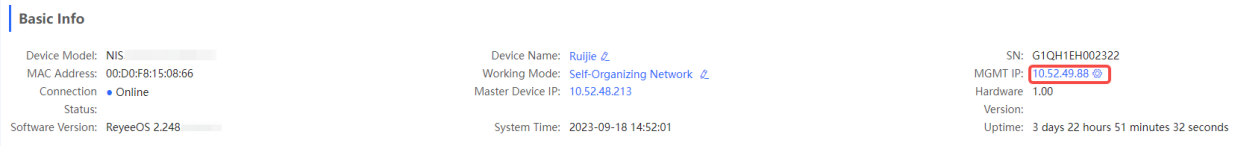
2. Switching the Work Mode

Click the current work mode to change the work mode.



3. Setting MGMT IP

Click current management IP address to jump to the management IP configuration page. For more information, see 12.6 MGMT IP Configuration.



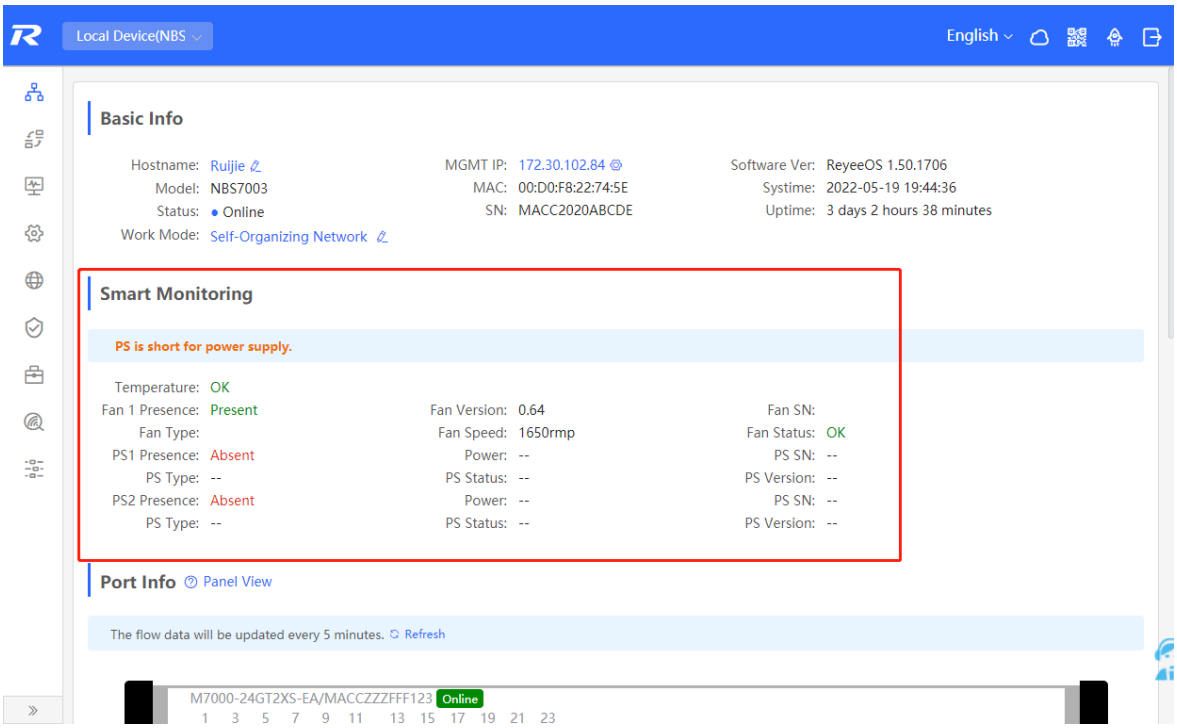
11.1.2 Hardware Monitor Information

Caution

Only RG-NBS6002 Series, RG-NBS7003 Series and RG-NBS7006 Series devices support displaying this type of information.

Choose **Local Device** > **Home** > **Smart Monitoring**.

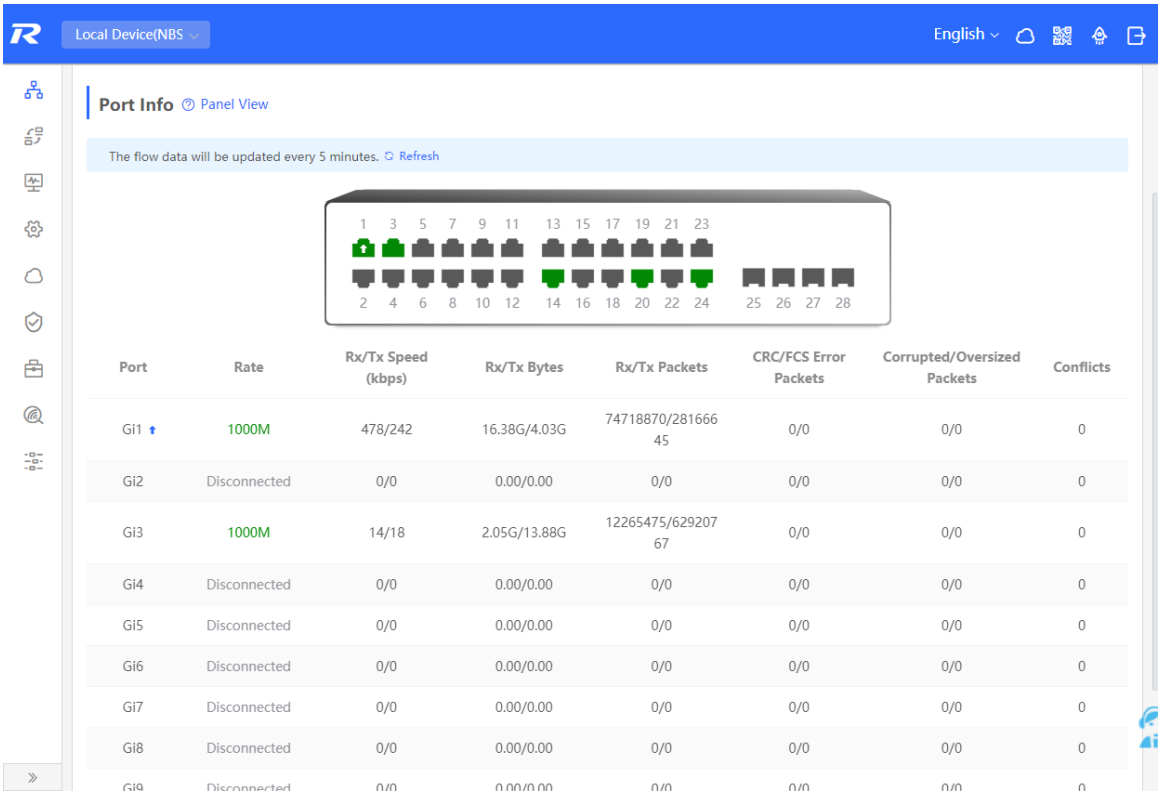
Display the current hardware operating status of the device, such as the device temperature and power supply status, etc.



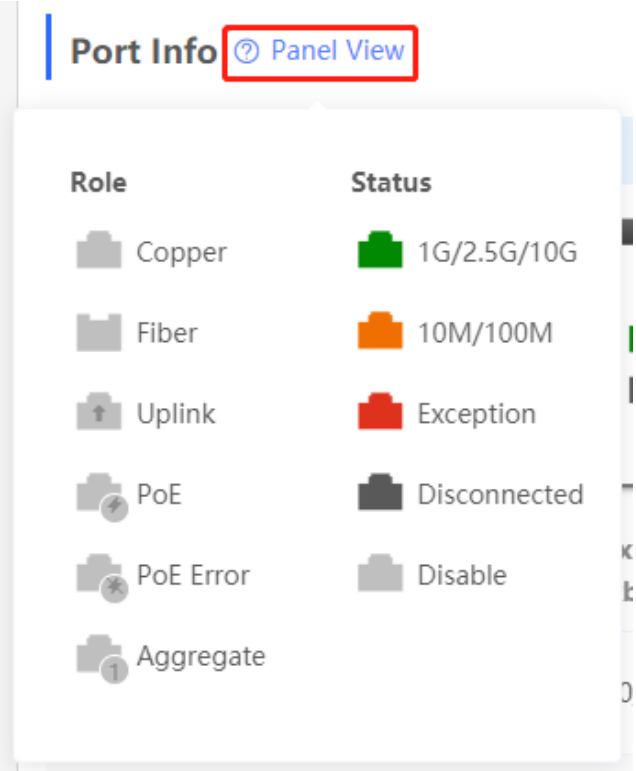
11.1.3 Port Info

Choose **Local Device** > **Home** > **Port Info**.

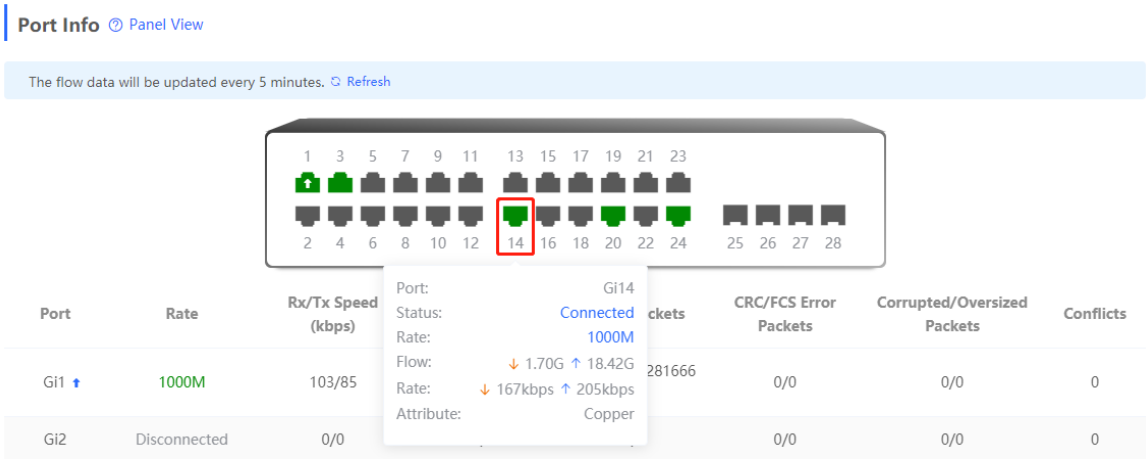
- The port info page displays the details of all ports currently on the switch. Click **Panel View** to view the port roles and statuses corresponding to port icons of different colors or shapes.



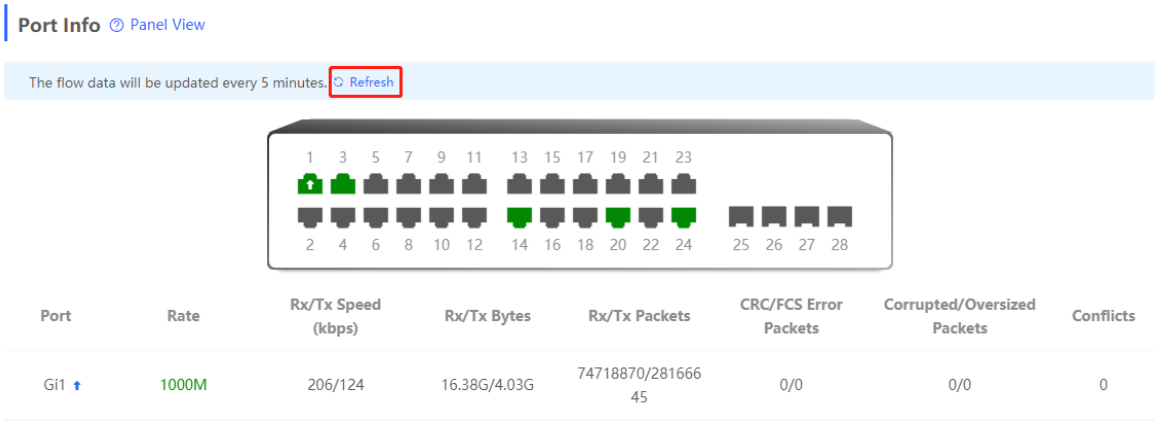
Port	Rate	Rx/Tx Speed (kbps)	Rx/Tx Bytes	Rx/Tx Packets	CRC/FCS Error Packets	Corrupted/Oversized Packets	Conflicts
Gi1	1000M	478/242	16.38G/4.03G	74718870/28166645	0/0	0/0	0
Gi2	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi3	1000M	14/18	2.05G/13.88G	12265475/62920767	0/0	0/0	0
Gi4	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi5	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi6	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi7	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi8	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0
Gi9	Disconnected	0/0	0.00/0.00	0/0	0/0	0/0	0



- Move the cursor to the icon of a port (for example, Gi14) on the port panel, and more information about the port will be displayed, including the port ID, port status, port rate, uplink and downlink traffic, transmission rate, and optical/electrical attribute of the port.



- Traffic data is automatically updated every five minutes. You can click **Refresh** above the port panel to obtain the latest port traffic and status information simultaneously.



11.2 Port Flow Statistics

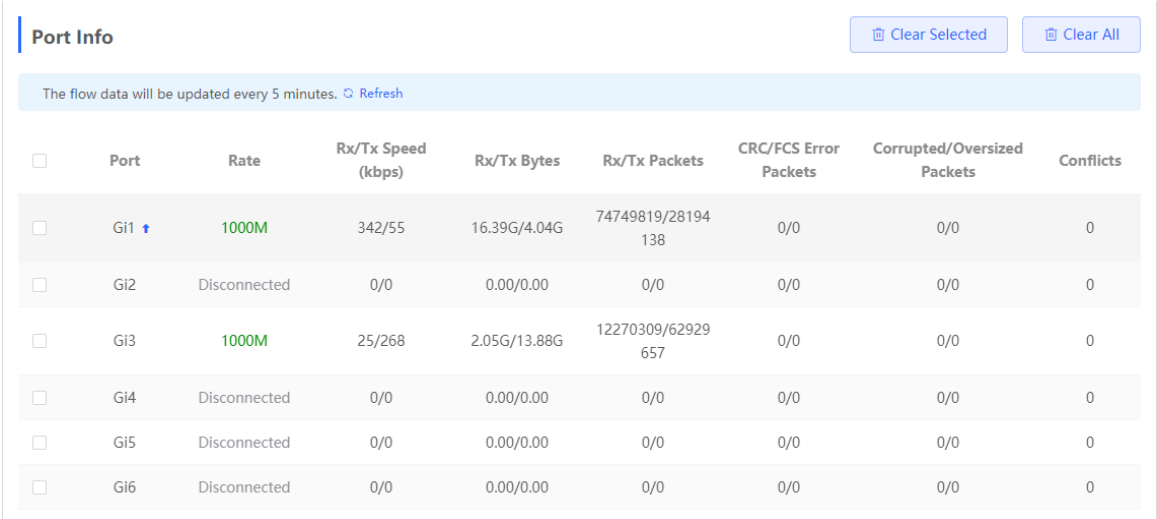
Choose **Local Device** > **Monitor** > **Port Flow**.

Display traffic statistics such as the rate of the device port, the number of sent and received packets, and the number of error packets. The rate of the port is updated every five seconds. Other traffic statistics are updated every five minutes.

Select a port and click **Clear Selected**, or click **Clear All** to clear statistics such as current port traffic and start statistics collection again.

Note

Aggregate ports can be configured. Traffic of an aggregate port is the sum of traffic of all member ports.



11.3 MAC Address Management

11.3.1 Overview

A MAC address table records mappings of MAC addresses and interfaces to virtual local area networks (VLANs).

A device queries the MAC address table based on the destination MAC address in a received packet. If the device finds an entry that is consistent with the destination MAC Address in the packet, the device forwards the packet through the interface corresponding to the entry in unicast mode. If the device does not find such an entry, it forwards the packet through all interfaces other than the receiving interface in broadcast mode.

MAC address entries are classified into the following types:

- Static MAC address entries: Manually configured by the user. Packets whose destination MAC address matches the one in such an entry are forwarded through the correct interface. This type of entries does not age.
- Dynamic MAC address entries: Automatically generated by devices. Packets whose destination MAC address matches the one in such an entry are forwarded through the correct interface. This type of entries ages.
- Filtering MAC address entries: Manually configured by the user. Packets whose source or destination MAC address matches the one in such an entry are discarded. This type of entries does not age.

Note

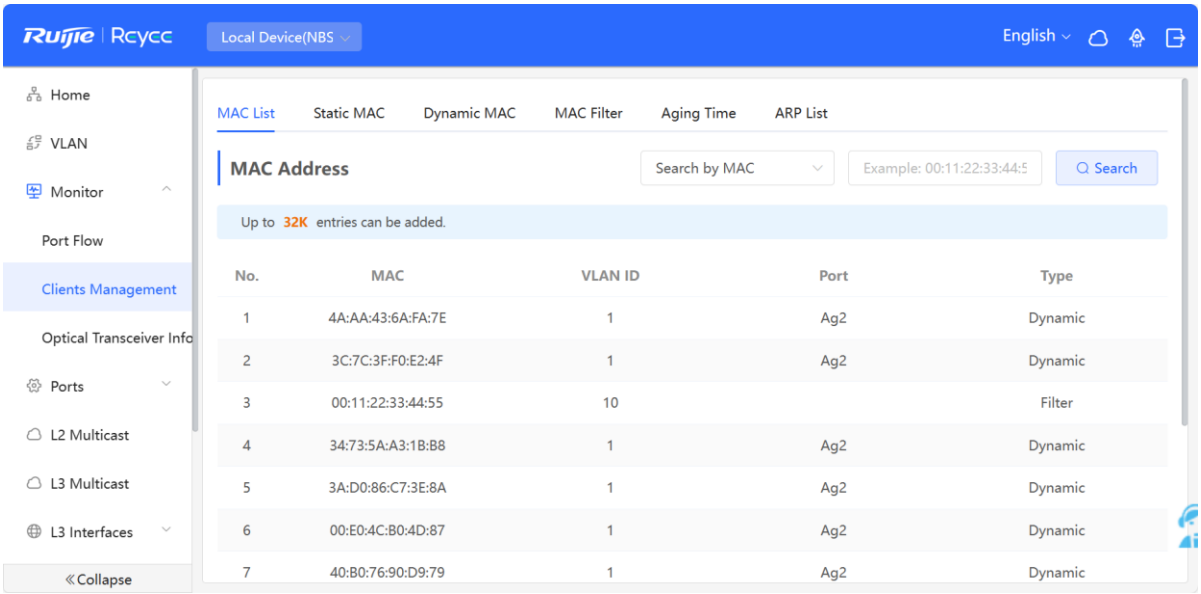
This section describes the management of static, dynamic, and filtering MAC address entries, without involving multicast MAC address entries.

11.3.2 Displaying the MAC Address Table

Choose **Local Device** > **Monitor** > **Clients Management** > **MAC List**.

Displays the MAC address information of the device, including the static MAC address manually set by the user, the filtering MAC address, and the dynamic MAC address automatically learned by the device.

Querying MAC address entries: Support querying MAC address entries based on MAC address, VLAN ID or port. Select the search type, enter the search string, and click **Search**. MAC entries that meet the search criteria are displayed in the list. Support fuzzy search.



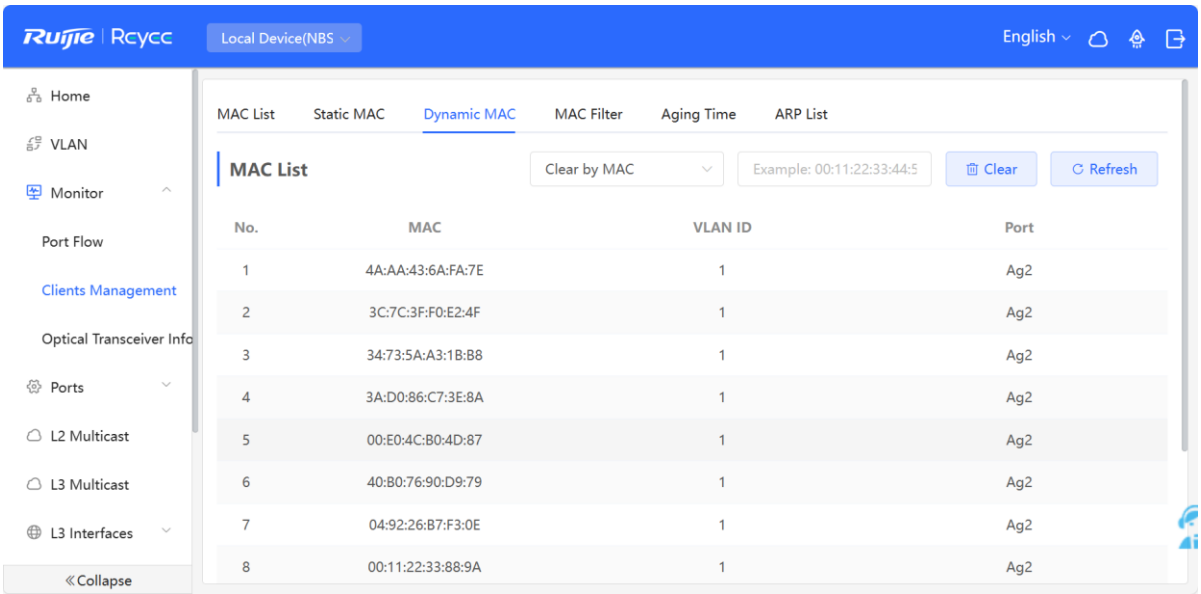
Note

The MAC address entry capacity depends on the product. For example, the MAC address entry capacity of the device shown in the figure above is 32K.

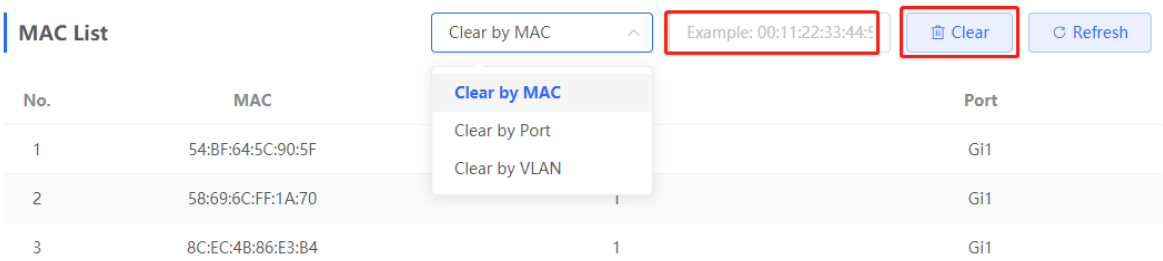
11.3.3 Displaying Dynamic MAC Address

Choose **Local Device** > **Monitor** > **Clients Management** > **Dynamic MAC**.

After receiving the packet, the device will automatically generate dynamic MAC address entries based on the source MAC address of the packet. The current page displays the dynamic MAC address entries learned by the device. Click **Refresh** to obtain the latest dynamic MAC address entries.



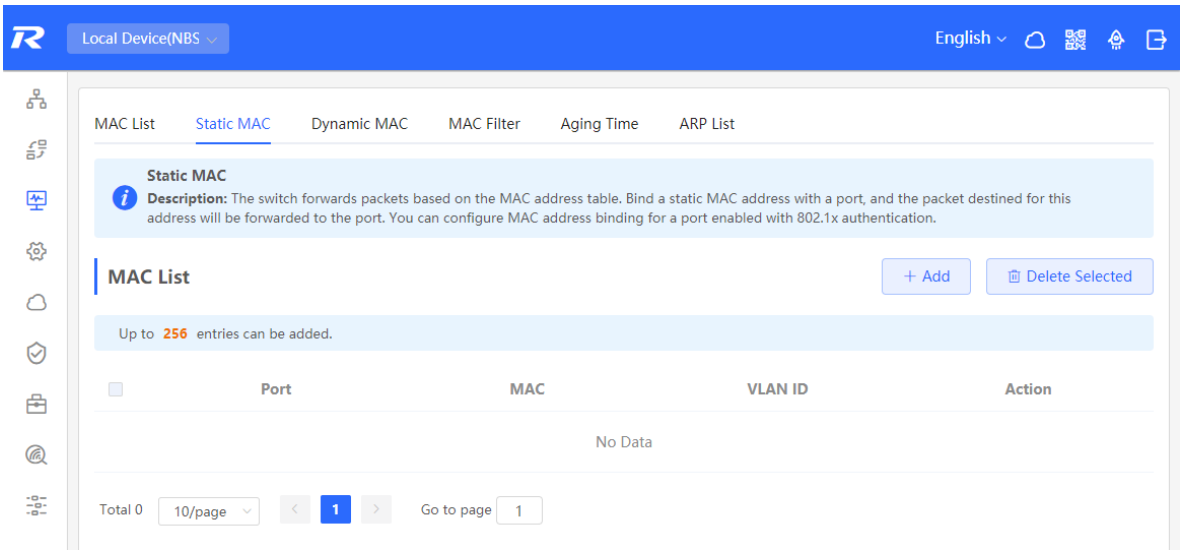
Delete dynamic MAC address: Select the clear type (by MAC address, by VLAN, or by port), enter a string for matching the dynamic MAC address entry, and click **Clear**. The device will clear MAC address entries that meet the conditions.



11.3.4 Configuring Static MAC Binding

The switch forwards data based on the MAC address table. You can set a static MAC address entry to manually bind the MAC address of a downlink network device with the port of the device. After a static address entry is configured, when the device receives a packet destined to this address from the VLAN, it will forward the packet

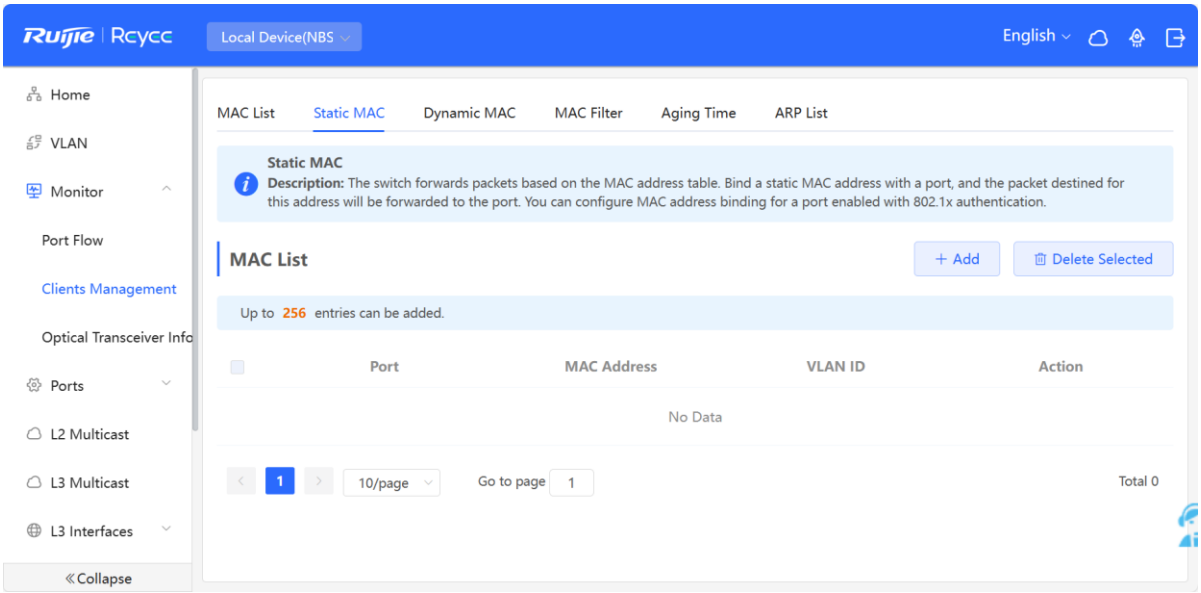
to the specified port. For example, when 802.1x authentication is enabled on the port, you can configure static MAC address binding to implement authentication exemption.

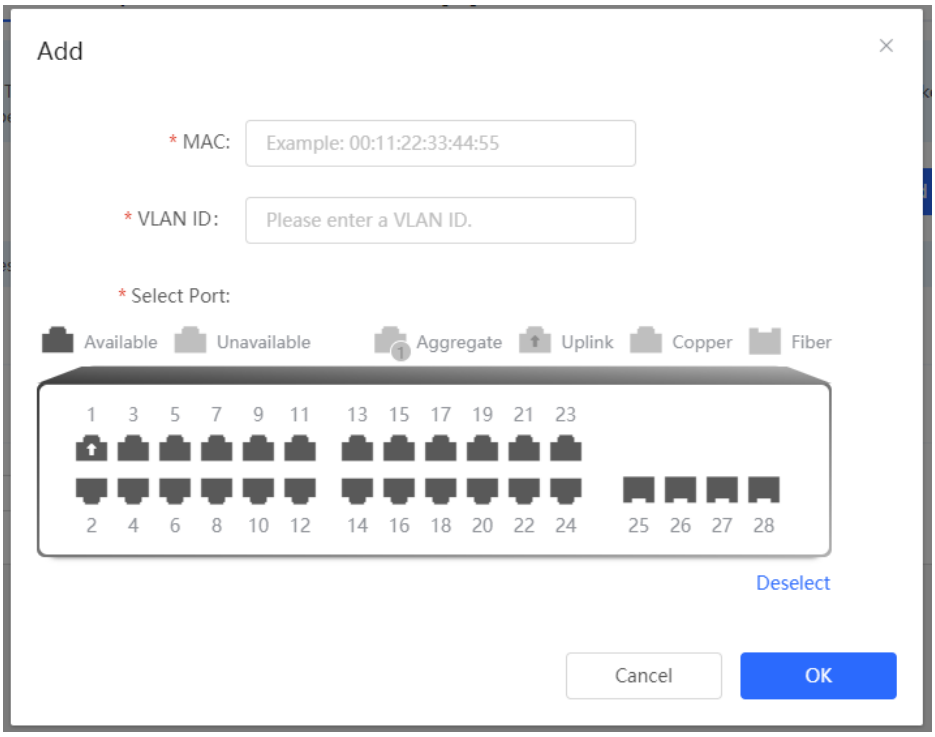


1. Adding Static MAC Address Entries

Choose **Local Device** > **Monitor** > **Clients Management** > **Static MAC**.

Click **Add**, enter the MAC address and VLAN ID, select the port for packet forwarding, and click **OK**. After the addition is successful, the MAC address table will update the entry data.



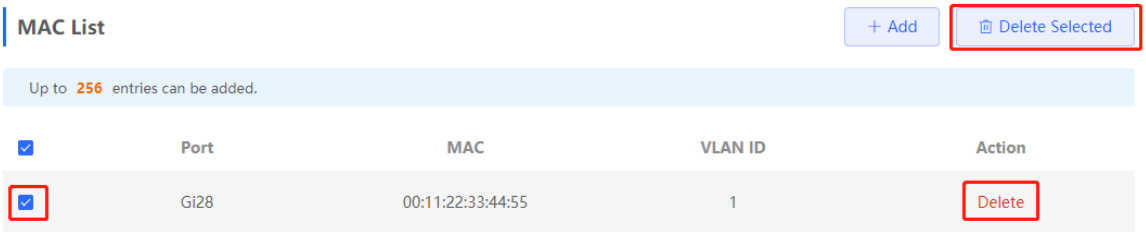


2. Deleting Static MAC Address Entries

Choose **Local Device** > **Monitor** > **Clients Management** > **Static MAC**.

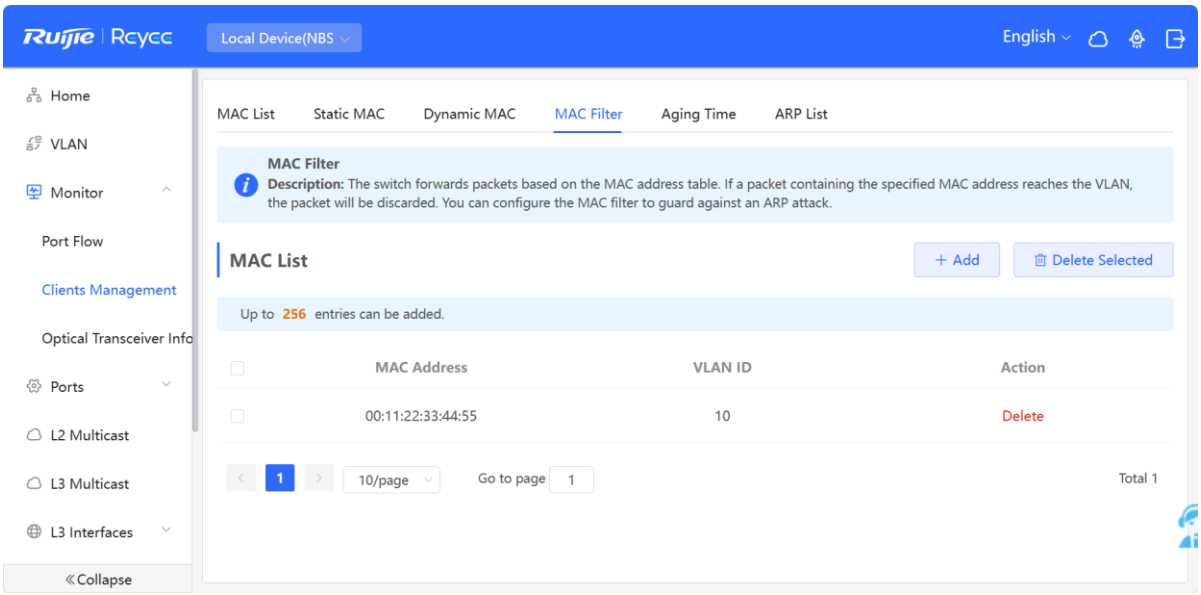
Batch delete: In **MAC List**, select the MAC address entries to be deleted and click **Delete Selected**. In the displayed dialog box, click **OK**.

Delete an entry: In **MAC List**, find the entry to be deleted, click **Delete** in the last **Action** column. In the displayed dialog box, click **OK**.



11.3.5 Configuring MAC Address Filtering

To prohibit a user from sending and receiving packets in certain scenarios, you can add the MAC address of the user to a filtering MAC address entry. After the entry is configured, packets whose source or destination MAC address matches the MAC address in the filtering MAC address entry are directly discarded. For example, if a user initiates ARP attacks, the MAC address of the user can be configured as a to-be-filtered address to prevent attacks.



1. Adding Filtering MAC Address

Choose **Local Device** > **Monitor** > **Clients Management** > **MAC Filter**.

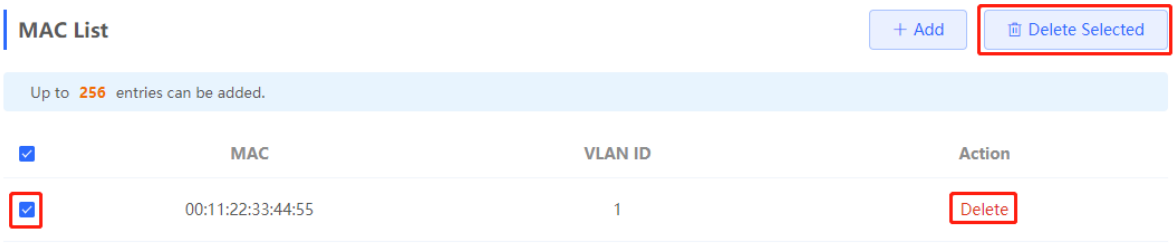
Click **Add**. In the dialog box that appears, enter the MAC addresses and VLAN ID, and then click **OK**.

2. MAC Filter

Choose **Local Device** > **Monitor** > **Clients Management** > **MAC Filter**.

Batch delete: In **MAC List**, select the MAC address entries to be deleted and click **Delete Selected**. In the displayed dialog box, click **OK**.

Delete an entry: In **MAC List**, find the entry to be deleted, click **Delete** in the last **Action** column. In the displayed dialog box, click **OK**.



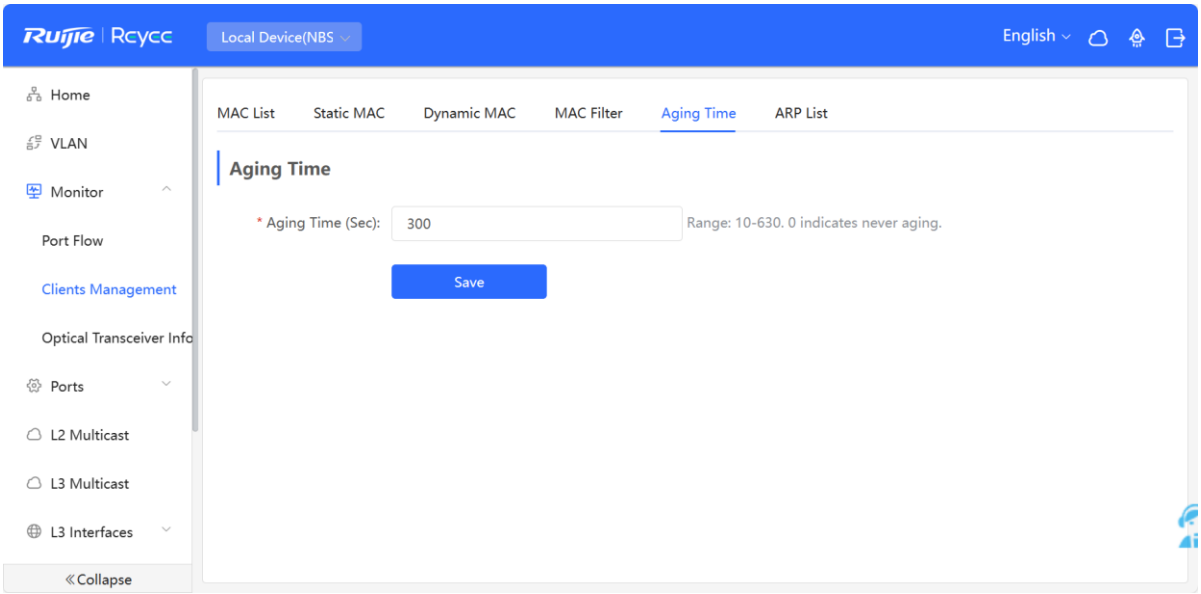
11.3.6 Configuring MAC Address Aging Time

Set the aging time of dynamic MAC address entries learned by the device. Static MAC address entries and filtering MAC address entries do not age.

The device deletes useless dynamic MAC address entries based on the aging time to save entry resources on the device. An overly long aging time may lead to untimely deletion of useless entries, whereas an overly short aging time may lead to deletion of some valid entries and repeated learning of MAC addresses by the device, which increases the packet broadcast frequency. Therefore, you are advised to configure a proper aging time of dynamic MAC address entries as required to save device resources without affecting network stability.

Choose **Local Device** > **Monitor** > **Clients Management** > **Aging Time**.

Enter valid aging time and click **Save**. The value range of the aging time is from 10 to 630, in seconds. The value 0 specifies no aging.



11.4 Displaying ARP Information

Choose **Local Device** > **Monitor** > **Clients Management** > **ARP List**.

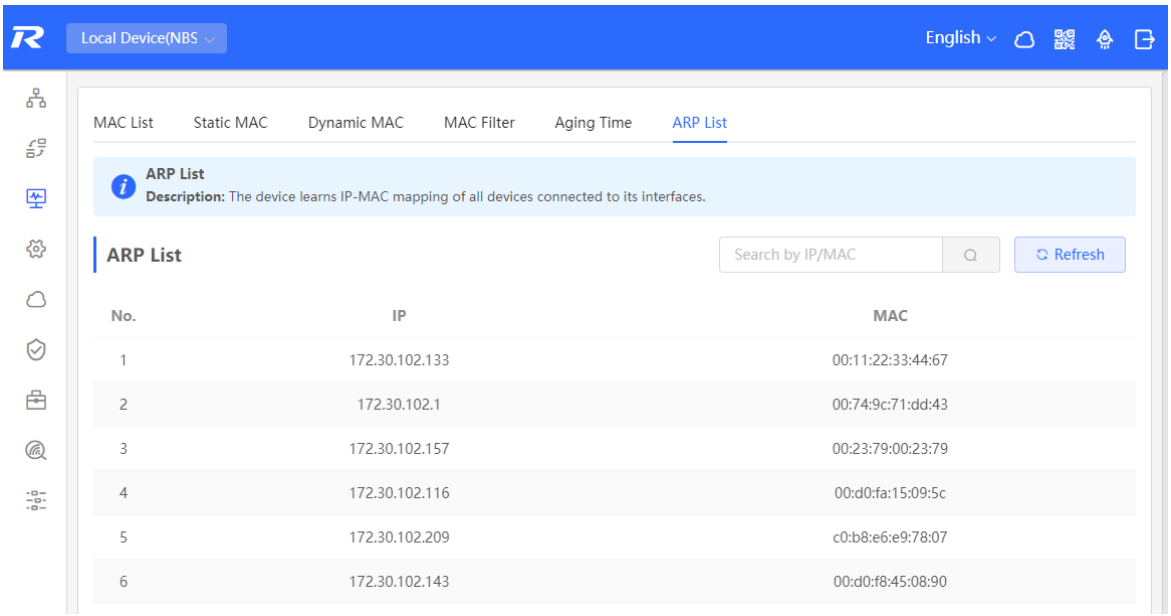
When two IP-based devices need to communicate with each other, the sender must know the IP address and MAC address of the peer. With MAC addresses, an IP-based device can encapsulate link-layer frames and then send data frames to the physical network. The process of obtaining MAC addresses based on IP addresses is called address resolution.

The Address Resolution Protocol (ARP) is used to resolve IP addresses into MAC addresses. ARP can obtain the MAC Address associated with an IP address. ARP stores the mappings between IP addresses and MAC addresses in the ARP cache of the device.

The device learns the IP address and MAC address of the network devices connected to its interfaces and generates the corresponding ARP entries. The **ARP List** page displays ARP entries learned by the device. The ARP list allows you search for specified ARP entries by IP or MAC address. Click **Refresh** to obtain the latest ARP entries.

Note

For more ARP entry function introduction, see 15.6 Configuring a Static ARP Entry.



11.5 IPv6 Neighbor List

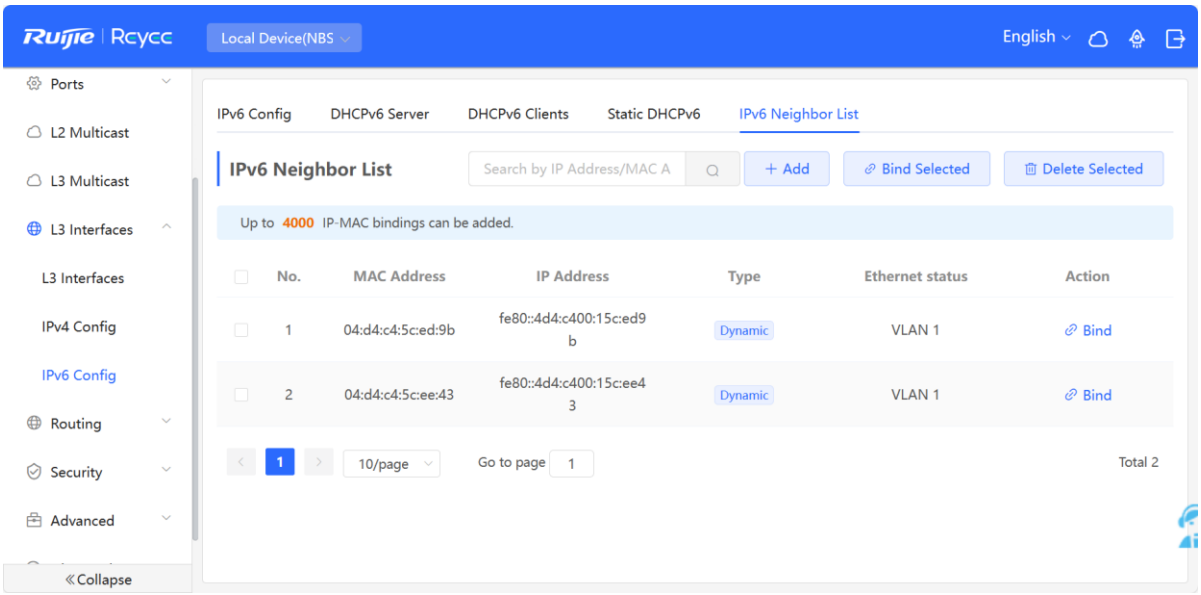
In the IPv6 protocol system, the Neighbor Discovery Protocol (NDP) is an essential foundational protocol. NDP replaces the ARP and ICMP router discovery protocols used in IPv4 and supports various functions such as address resolution, neighbor state tracking, duplicate address detection, router discovery, and redirection.

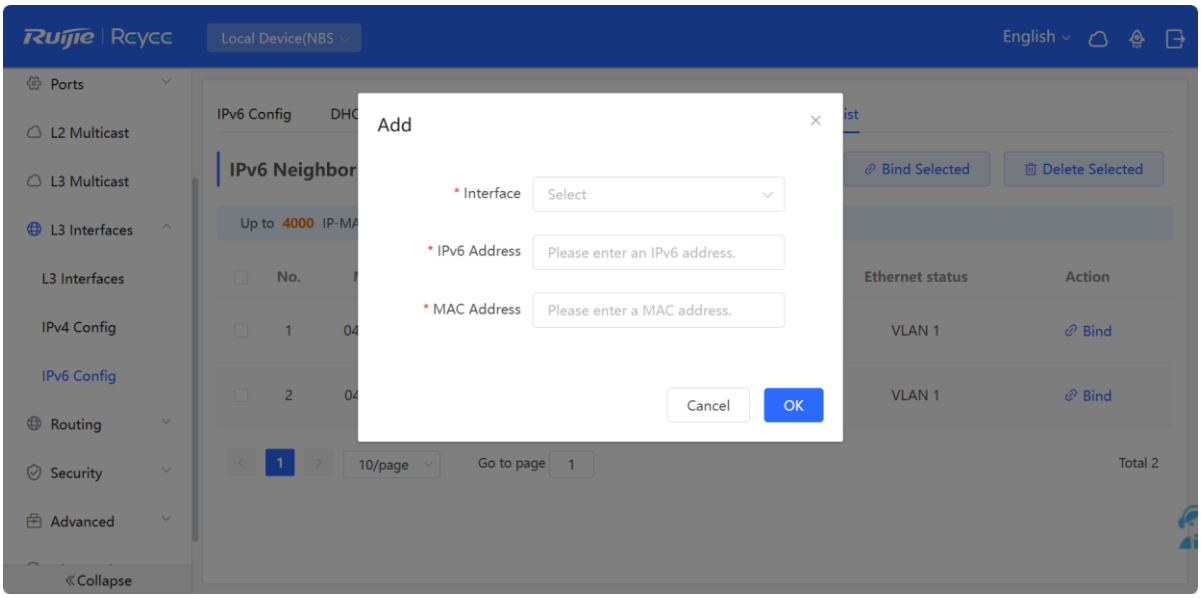
Choose **Local Device** > **L3 Interfaces** > **IPv6 Config** > **IPv6 Neighbor List**.

Click **Add** to manually add the interface, IPv6 address, and MAC address of the neighbor.

Click **Bind Selected** to bind IPv6 and MAC addresses in the list to prevent ND attacks.

You can also edit, delete, batch delete and search a neighbor by its IP address or MAC address.





11.6 VLAN

11.6.1 VLAN Overview

A virtual local area network (VLAN) is a logical network created on a physical network. A VLAN has the same properties as a normal physical network except that it is not limited by its physical location. Each VLAN has an independent broadcast domain. Different VLANs are L2-isolated. L2 unicast, broadcast, and multicast frames are forwarded and spread within one VLAN and will not be transmitted to other VLANs.

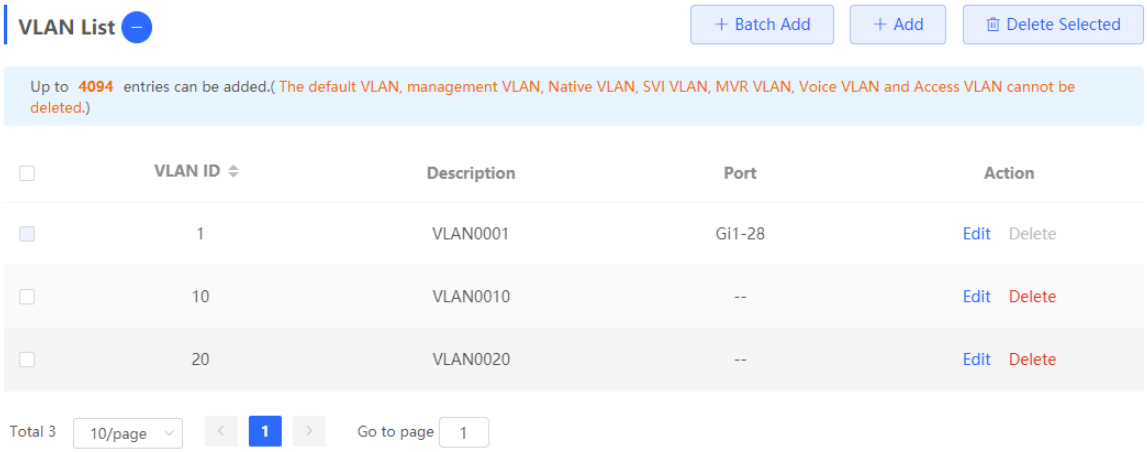
When a port is defined as a member of a VLAN, all clients connected to the port are a part of the VLAN. A network supports multiple VLANs. VLANs can make L3 communication with each other through L3 devices or L3 interfaces.

VLAN division includes two functions: creating VLANs and setting port VLANs.

11.6.2 Creating a VLAN

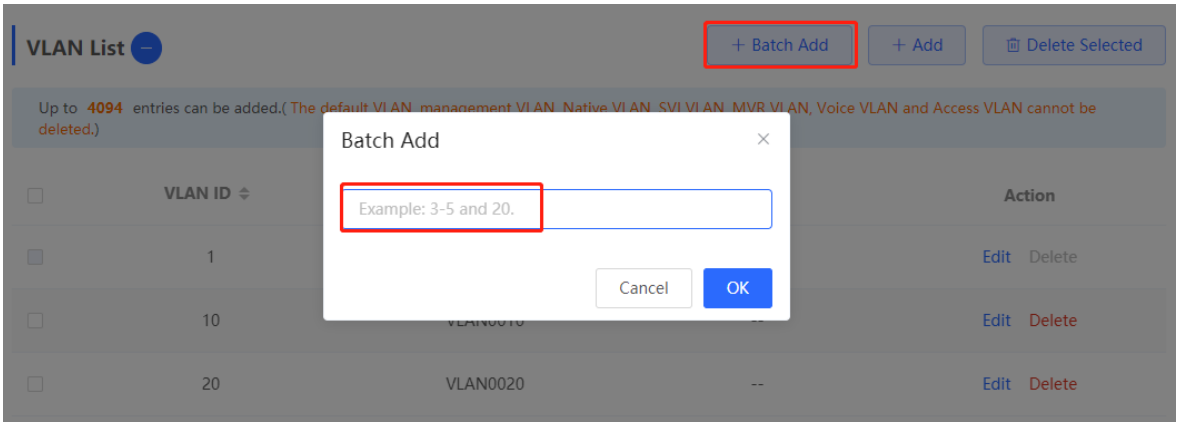
Choose **Local Device** > **VLAN** > **VLAN List**.

The VLAN list contains all the existing VLAN information. You can modify or delete the existing VLAN, or create a new VLAN.

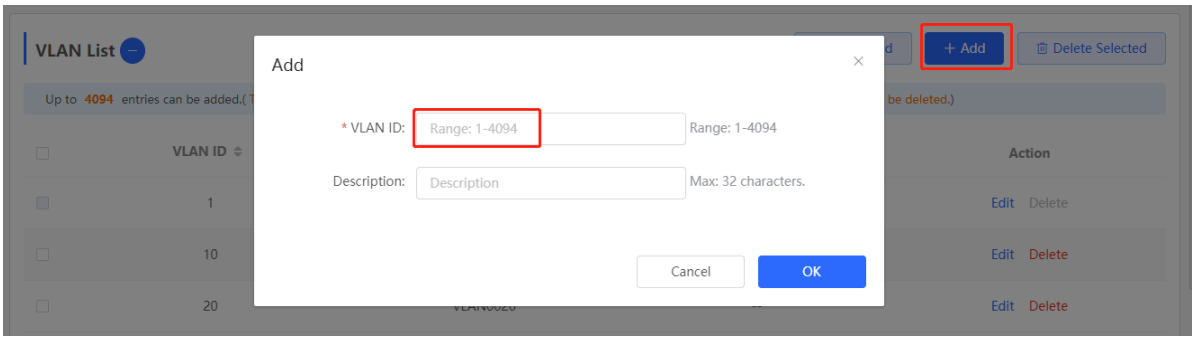


1. Adding a VLAN

Create multiple VLANs: Click **Batch Add**. In the displayed dialog box, enter VLAN ID range (separate multiple VLAN ID ranges with commas (,)), and click **OK**. The VLANs added will be displayed in **VLAN List**.



Create a VLAN: Click **Add**. Enter the VLAN ID and description for the VLAN, and click **OK**. The VLAN added will be displayed in **VLAN List**.

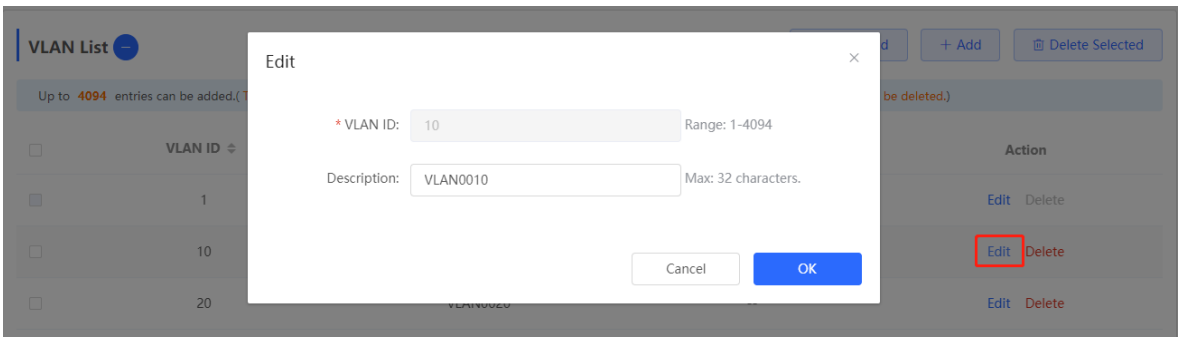


Note

- The range of a VLAN ID is from 1 to 4094.
- You can separate multiple VLANs to be added in batches with commas (,), and separate the start and end VLAN IDs of a VLAN range with a hyphen (-).
- If no VLAN description is configured when the VLAN is added, the system automatically creates a VLAN description in the specified format, for example, VLAN000XX. The VLAN descriptions of different VLANs must be unique.
- If the device supports L3 functions, VLANs, routed ports, and L3 aggregate ports (L3APs) share limited hardware resources. If resources are insufficient, a message indicating resource insufficiency for VLAN will be displayed.

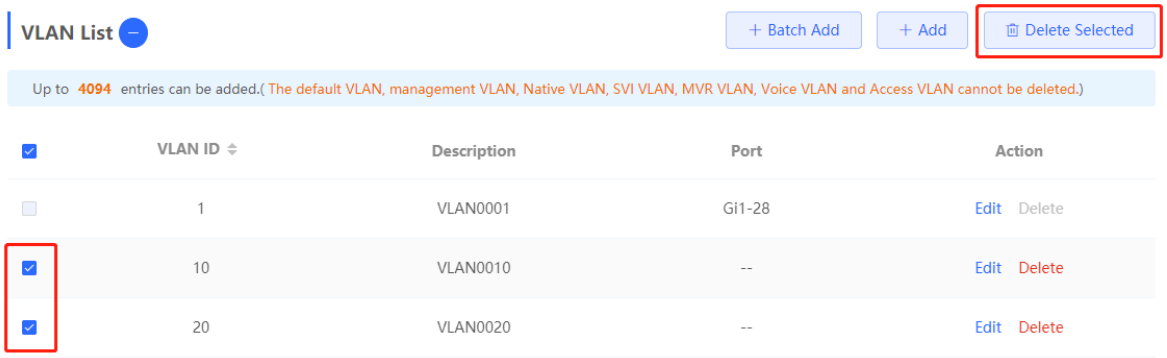
2. VLAN Description Modifying

In **VLAN List**, Click **Edit** in the last **Action** column to modify the description information of the specified VLAN.



3. Deleting a VLAN

Batch delete VLANs: In **VLAN List**, select the VLAN entries to be deleted and click **Delete Selected** to delete VLANs in a batch.



Delete a VLAN: In **VLAN List**, click **Delete** in the last **Action** column to delete the specified **VLAN**.

Note

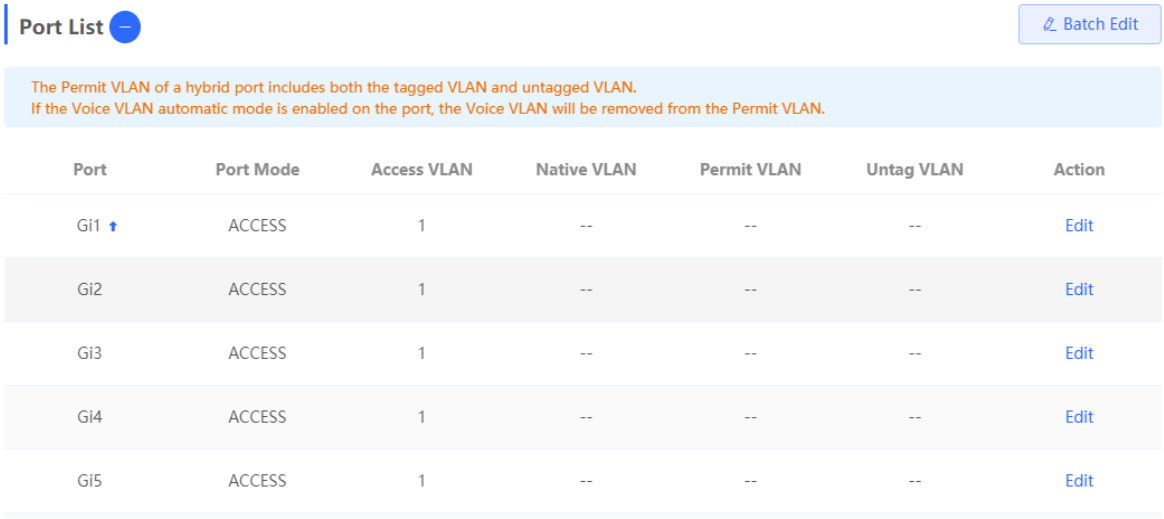
The default VLAN (VLAN 1), management VLAN, native VLAN, and access VLAN cannot be deleted. For these VLANs, the **Delete** button is unavailable in gray.

11.6.3 Configuring Port VLAN

1. Overview

Choose **Local Device** > **VLAN** > **Port List**.

Port List displays the VLAN division of the current port. Create VLANs in **VLAN List** page (see 11.6.2 Creating a VLAN) and then configure the port based on the VLANs.



You can configure the port mode and VLAN members for a port to determine VLANs that are allowed to pass through the port and whether packets to be forwarded by the port carry the tag field.

Table 11-1 Port Modes Description

Port mode	Function
Access port	One access port can belong to only one VLAN and allow only frames from this VLAN to pass through. This VLAN is called an access VLAN. Access VLAN has attributes of both Native VLAN and Permitted VLAN The frames sent from the Access port do not carry tags. When the access port receives an untagged frame from a peer device, the local device determines that the frame comes from the Access VLAN and adds the access VLAN ID to the frame.
Trunk port	One trunk port supports one native VLAN and several allowed VLANs. Native VLAN frames forwarded by a trunk port do not carry tags while allowed VLAN frames forwarded by the trunk port carry tags. A trunk port belongs to all VLANs of the device by default, and can forward frames of all VLANs. You can set the allowed VLAN range to limit VLAN frames that can be forwarded. Note that the trunk ports on both ends of the link must be configured with the same Native VLAN.
Hybrid port	A hybrid port supports one native VLAN and several allowed VLANs. The allowed VLANs are divided into Tag VLAN and Untagged VLAN. The frames forwarded by the hybrid port from a Tag VLAN carry tags, and the frames forwarded by the hybrid port from an Untagged VLAN do not carry tags. The frames forwarded by the hybrid port from Native VLAN must not carry tags, therefore Native VLAN can only belong to Untagged VLAN List.

Note

Whether the hybrid mode function is supported depends on the product version.

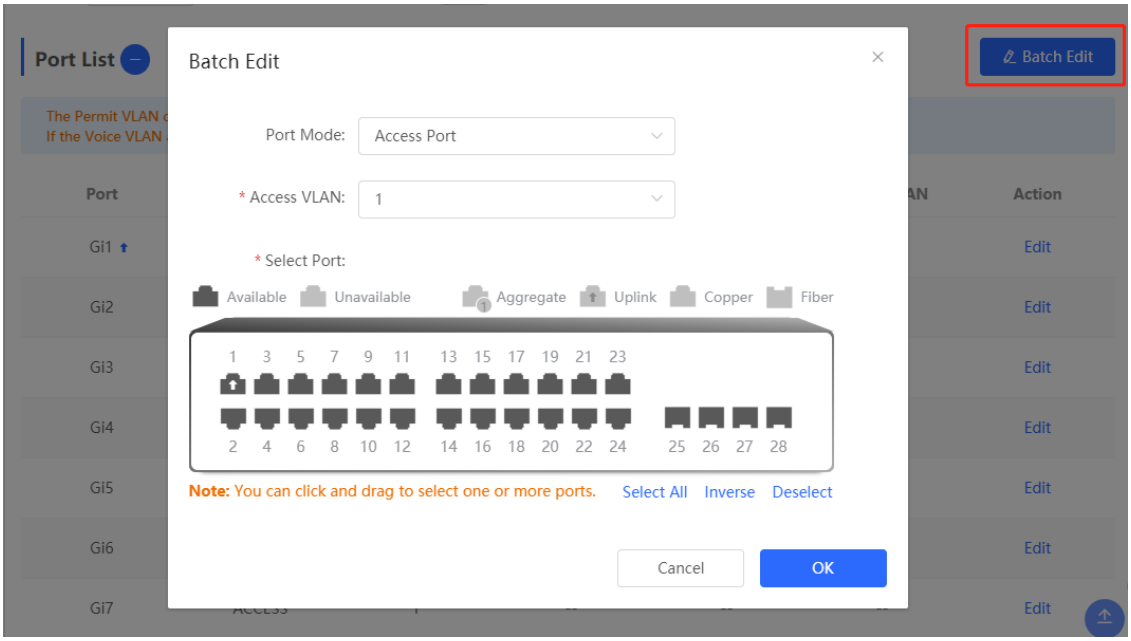
2. Procedure

Choose **Local Device** > **VLAN** > **Port List**.

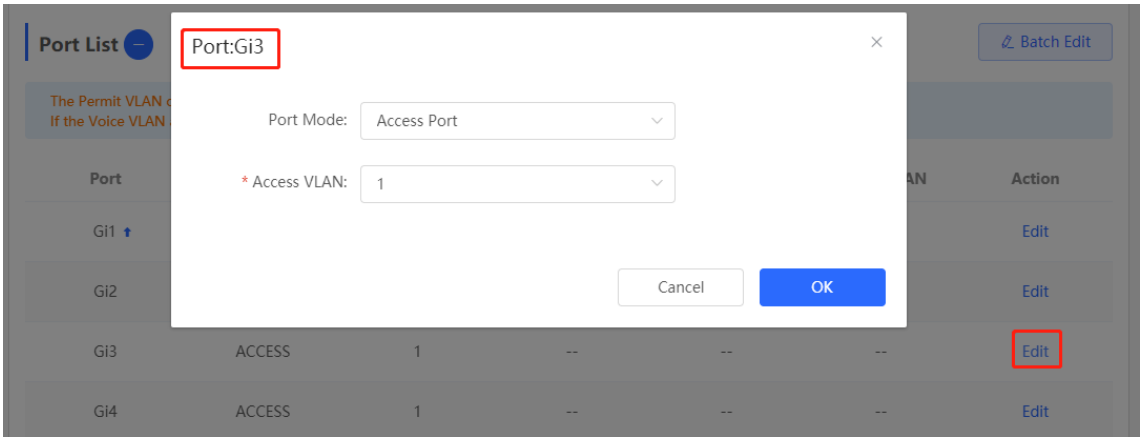
Configure port VLANs in a batch: Click **Batch Edit**, select the port to be configured on the port panel, and select the port mode. If the port mode is Access port, you need to select Access VLAN; if the port mode is Trunk port, you need to select Native VLAN and enter the allowed VLAN ID range; if the port mode is Hybrid port, you need to select Native VLAN and enter the allowed VLAN range and Untagged VLAN range. Click **OK** to complete the batch configuration.

Note

In Hybrid mode, the allowed VLANs include Tag VLAN and Untagged VLAN, and the Untagged VLAN range must include Native VLAN.



Configure one port: In **Port List**, click **Edit** in the last **Action** column of a specified port, configure the port mode and corresponding VLAN, and click **OK**.



Note

- VLAN ID range is from 1 to 4094, among which VLAN 1 is the default VLAN that cannot be deleted.
- When hardware resources are insufficient, the system displays a VLAN creation failure message.
- Improper configuration of VLANs on a port (especially uplink port) may cause the failure to log in to the Eweb management system. Therefore, exercise caution when configuring VLANs.

11.6.4 Batch Switch Configuration

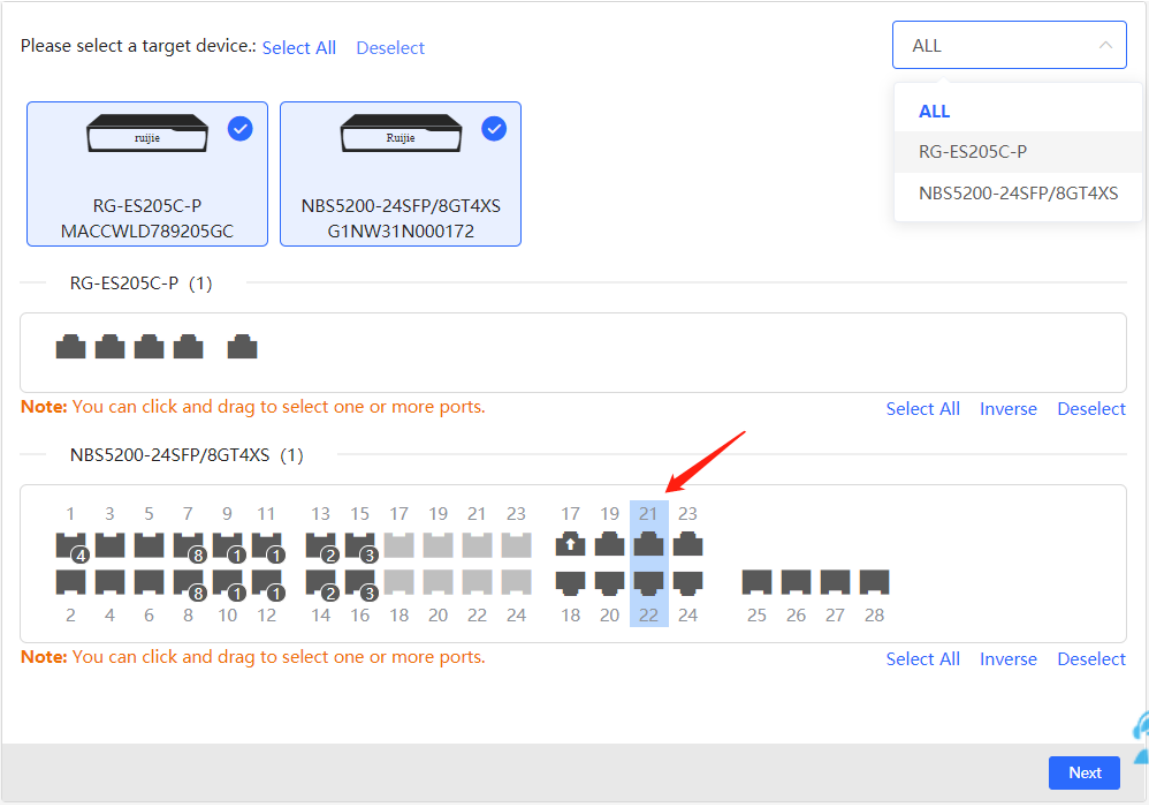
1. Overview

You can batch create VLANs, configure port attributes, and divide port VLANs for switches in the network.

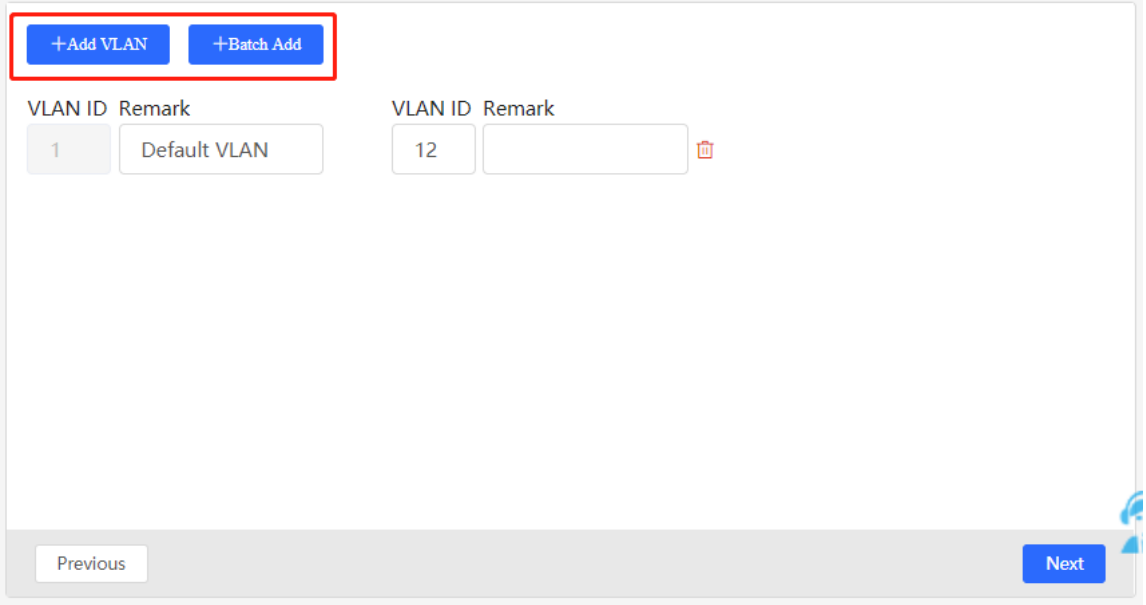
2. Procedure

Choose **Network** > **Batch Config**.

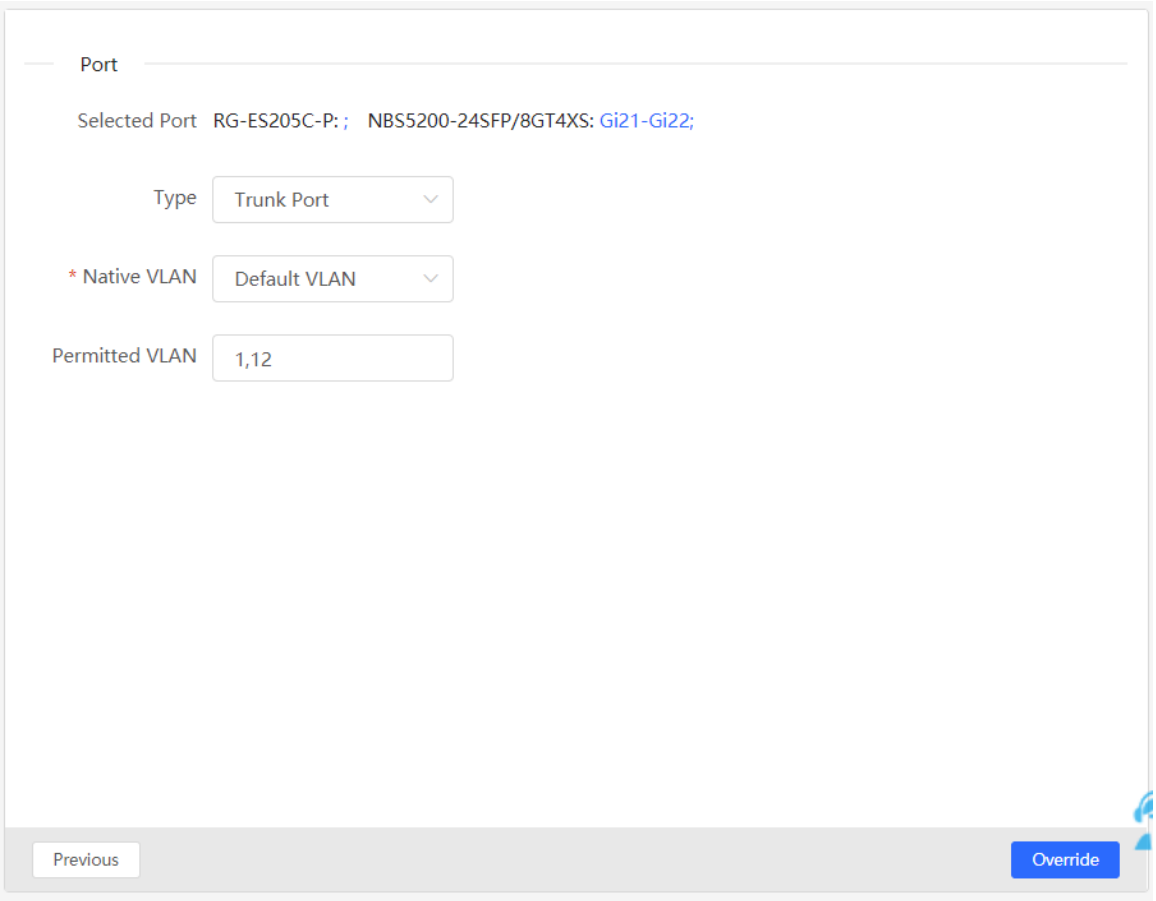
(1) The page displays all switches in the current network. Select the switches to configure, and then select the desired ports in the device port view that appears below. If there are a large number of devices in the current network, select a product model from the drop-down list box to filter the devices. After the desired devices and ports are selected, click **Next**.



(2) Click **Add VLAN** to create a VLAN for the selected devices in a batch. If you want to create multiple VLANs, click **Batch Add** and enter the VLAN ID range, such as 3-5,100. After setting the VLANs, click **Next**.

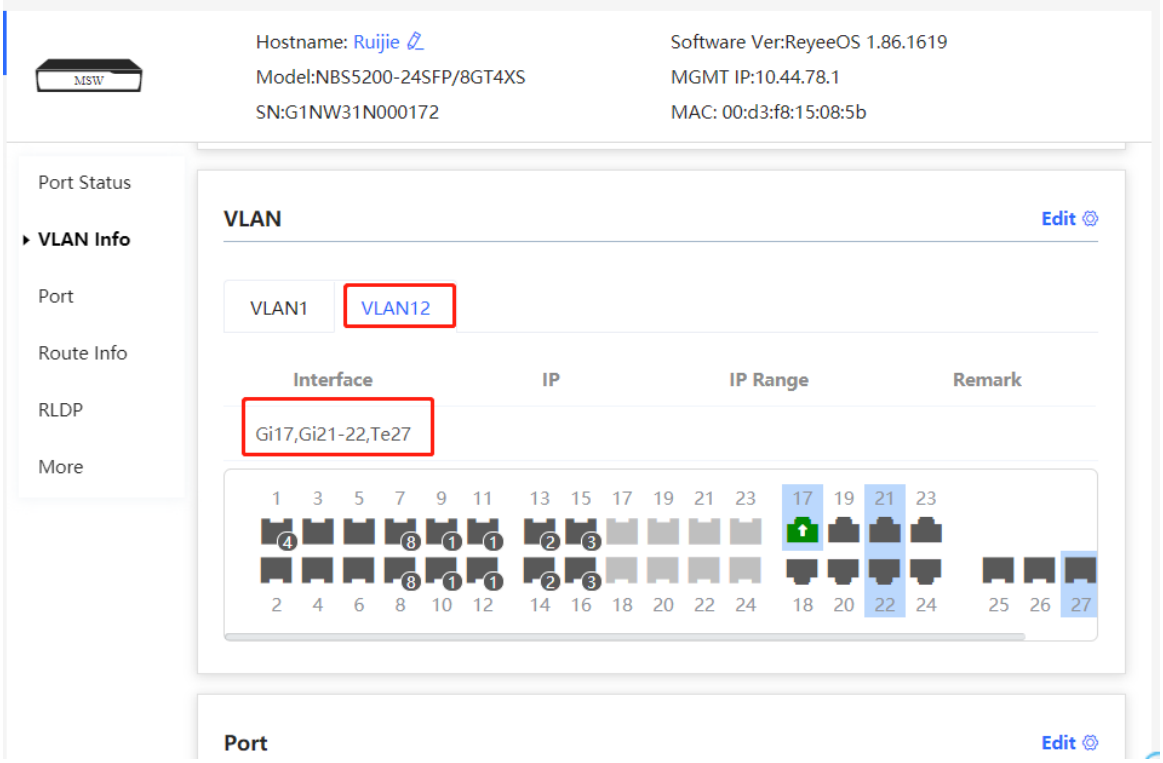


(3) Configure port attributes for the ports selected in Step 1 in a batch. Select a port type. If you set **Type** to **Access Port**, you need to configure **VLAN ID**. If you set **Type** to **Trunk Port**, you need to configure **Native VLAN** and **Permitted VLAN**. After setting the port attributes, click **Override** to deliver the batch configurations to the target devices.



11.6.5 Verifying Configuration

View the VLAN and port information of switches to check whether the batch configurations are successfully delivered.



11.7 Viewing Optical Transceiver Info

Choose **Local Device** > **Monitoring** > **Optical Transceiver Info**.

The **Optical Transceiver Info** page displays the basic information of an optical transceiver, including the port to which it is connected, DDM, temperature, voltage, current, Tx power, local Rx power, and so on.

You can query the information of an optical transceiver by entering the port to which it is connected in the search box.

The data on this page is automatically updated every 5 seconds. You can also click **Refresh** to refresh the optical transceiver information.

12 NBS and NIS Series Switches Port Management

12.1 Overview

Ports are important components for data exchange on network devices. The port management module allows you to configure basic settings for ports, and configure port aggregation, switched port analyzer (SPAN), port rate limiting, management IP address, etc.

Table 12-1 Description of Port Type

Port Type	Note	Remarks
Switch Port	A switch port consists of a single physical port on the device and provides only the L2 switching function. Switch ports are used to manage physical port and their associated L2 protocols.	Described in this section
L2 aggregate port	An Interface binds multiple physical members to form a logical link. For L2 switching, an aggregate port is like a high-bandwidth switch port. It can combine the bandwidths of multiple ports to expand link bandwidth. In addition, for frames sent through an L2 aggregate port, load balancing is performed on member ports of the L2 aggregate port. If one member link of the aggregate port fails, the L2 aggregate port automatically transfers traffic on this link to other available member links, improving connection reliability.	Described in this section
SVI Port	A switch virtual interface (SVI) serves as the management interface of the device, through which the device can be managed. You can also create an SVI as a gateway interface, which is equivalent to the virtual interface of corresponding VLAN and can be used for inter-VLAN routing on L3 devices.	For related configuration, see 15.1 Setting an L3 Interface
Routed Port	On L3 devices, you can configure a single physical port as a routed port and use it as the gateway interface of L3 switching. Route interfaces do not have L2 switching functions and have no corresponding relationship with VLANs, but only serve as access interfaces.	For related configuration, see 15.1 Setting an L3 Interface

Port Type	Note	Remarks
L3 Aggregate Port	An L3 aggregate port is a logical aggregate port group composed of multiple physical member ports, just like an L2 aggregate port. The ports to be aggregated must be L3 ports of the same type. An aggregate port serves as the gateway interface of L3 switching. It treats multiple physical links in the same aggregate group as one logical link. It is an important way to expand link bandwidth. Multiple physical links are combined into one logical link, expanding the bandwidth of a link. Frames sent over the L3 AP are balanced among the L3 AP member ports. If one member link fails, the L3 AP automatically transfers the traffic on the faulty link to other member links, improving reliability of connections. L3 aggregate ports do not support the L2 switching function.	For related configuration, see 15.1 Setting an L3 Interface

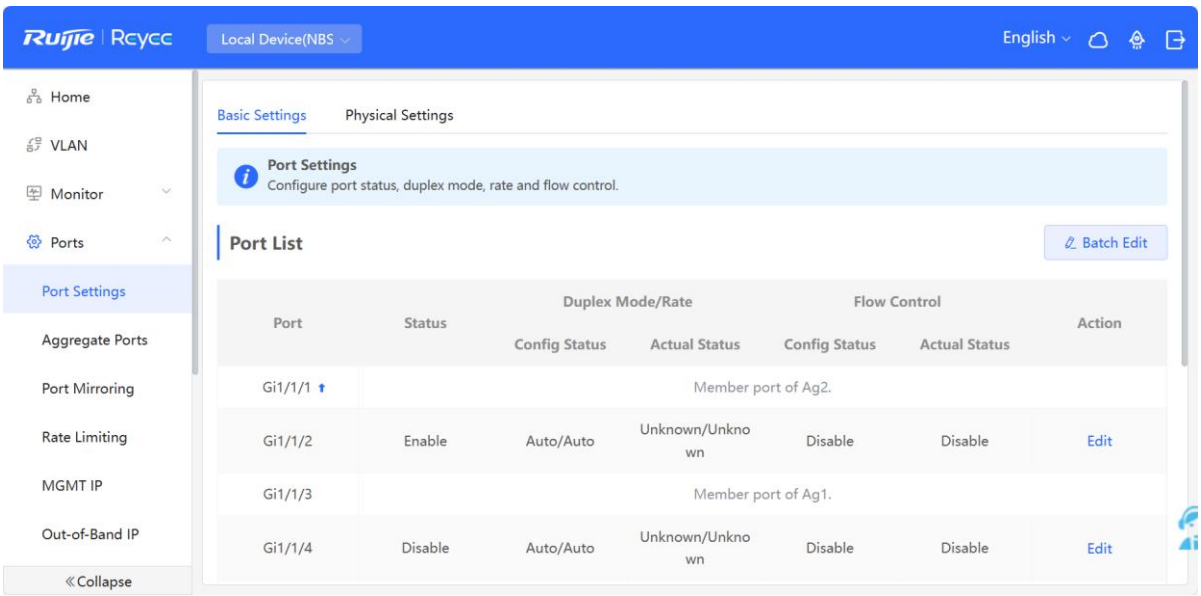
12.2 Port Configuration

Port configuration includes common attributes such as basic settings and physical settings of the port. Users can adjust the port rate, set port switch, duplex mode, flow control mode, energy efficient Ethernet switch, port media type and MTU, etc.

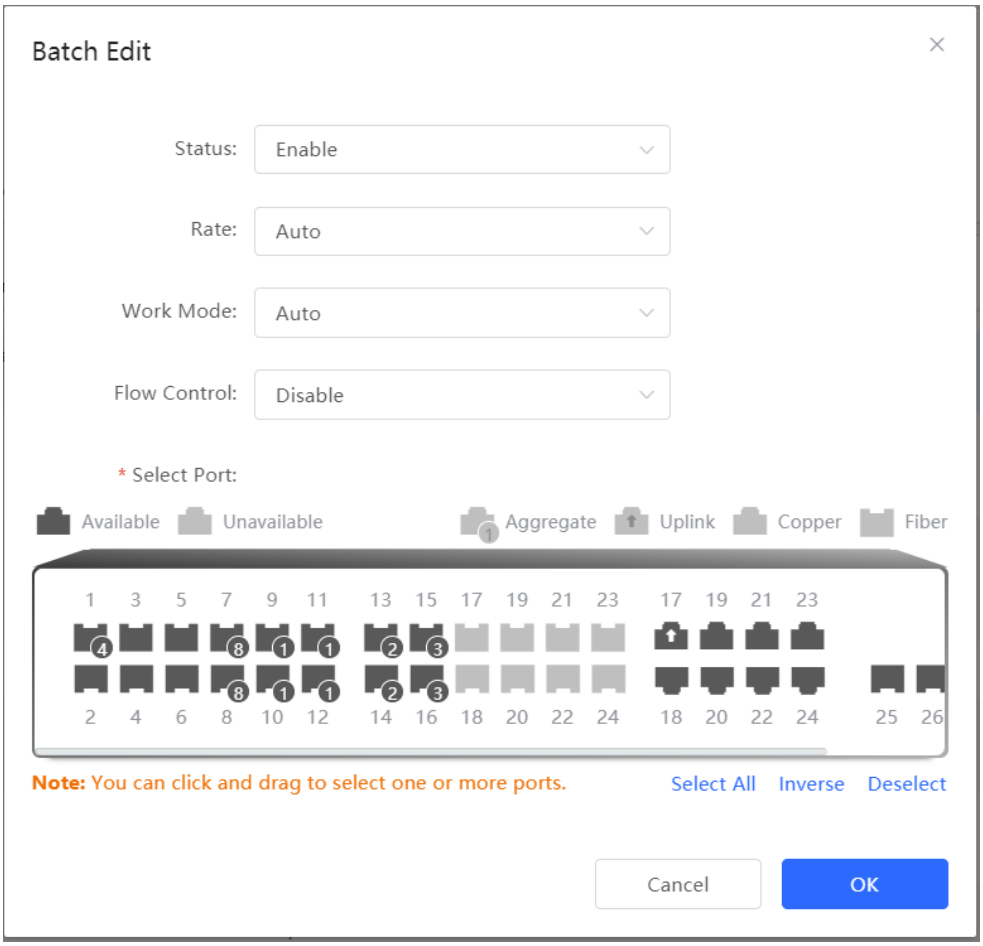
12.2.1 Basic Settings

Choose **Local Device** > **Ports** > **Port Settings** > **Basic Settings**.

Support setting whether to enable the port, the speed and duplex mode of the port, and the flow control mode, and display the current actual status of each port.



Batch configure: Click **Batch Edit**, select the port to be configured In the displayed dialog box, select the port switch, rate, work mode, and flow control mode, and click **OK** to deliver the configuration. In batch configuration, optional configuration items are a common collection of selected ports (that is, attributes supported the selected ports).



Configure one port: In **Port List**, select a port entry and click **Edit** in the **Action** column. In the displayed dialog box, select port status, rate, work mode, and flow control mode, and click **OK**.

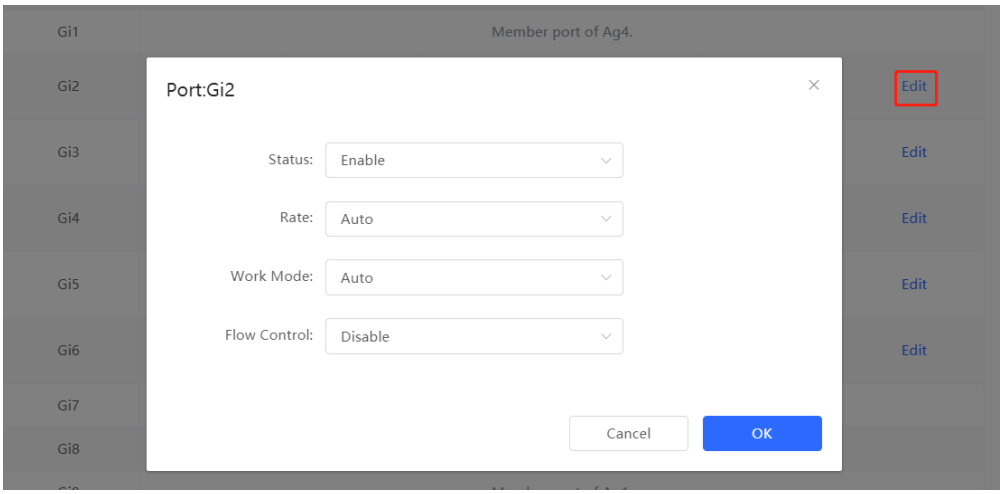


Table 4-2 Description of Basic Port Configuration Parameters

Parameter	Description	Default Value
Status	If a port is closed, no frame will be received and sent on this port, and the corresponding data processing function will be lost, but the PoE power supply function of the port will not be affected.	Enable
Rate	Set the rate at which the Ethernet physical interface works. Set to Auto means that the port rate is determined by the auto-negotiation between the local and peer devices. The negotiated rate can be any rate within the port capability.	Auto
Work Mode	● Full duplex: realize that the port can receive packets while sending. ● Half duplex: control that the port can receive or send packets at a time. ● Auto: the duplex mode of the port is determined through auto negotiation between the local port and peer port	Auto
Flow Control	After flow control is enabled, the port will process the received flow control frames, and send the flow control frames when congestion occurs on the port.	Disable

Note

The rate of a GE port can be set to 1000M, 100M, or auto. The rate of a 10G port can be set to 10G, 1000M, or auto.

12.2.2 Physical Settings

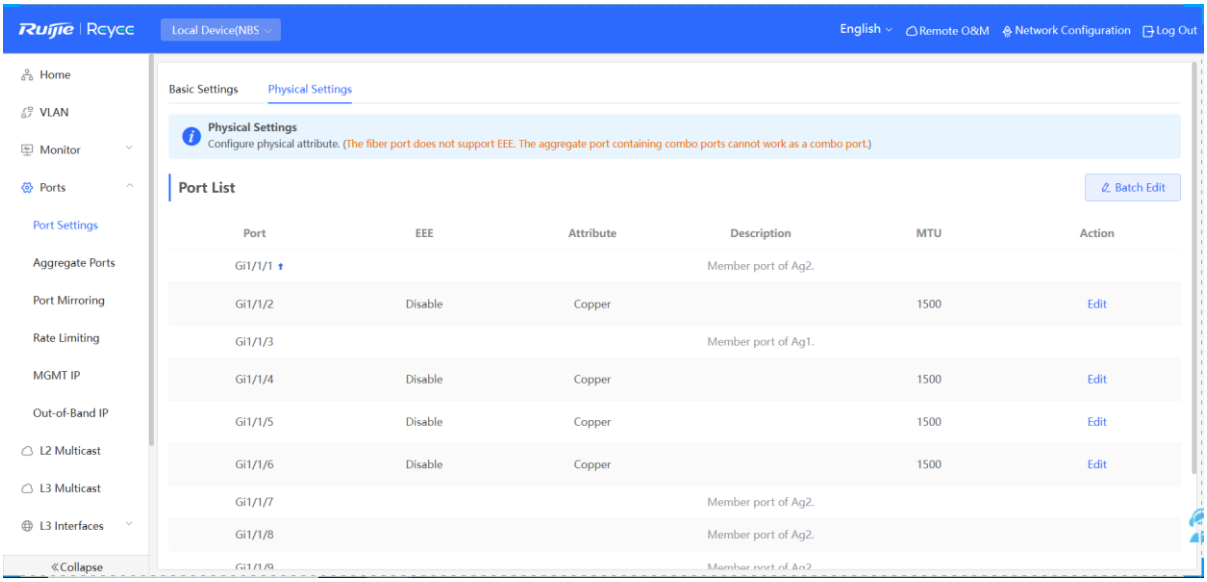
Choose **Local Device** > **Ports** > **Port Settings** > **Physical Settings**.

On this page, you can enable the energy-efficient Ethernet (EEE) function, and set the media type and MTU on the port.

Note

- Maximum Transmission Unit (MTU) is used to notify the peer of the acceptable maximum size of a data service unit. It indicates the size of the payload acceptable to the sender. You can configure the MTU of a port to limit the length of a frame that can be received or forwarded through this port. The default value for MTU is 1500 bytes.

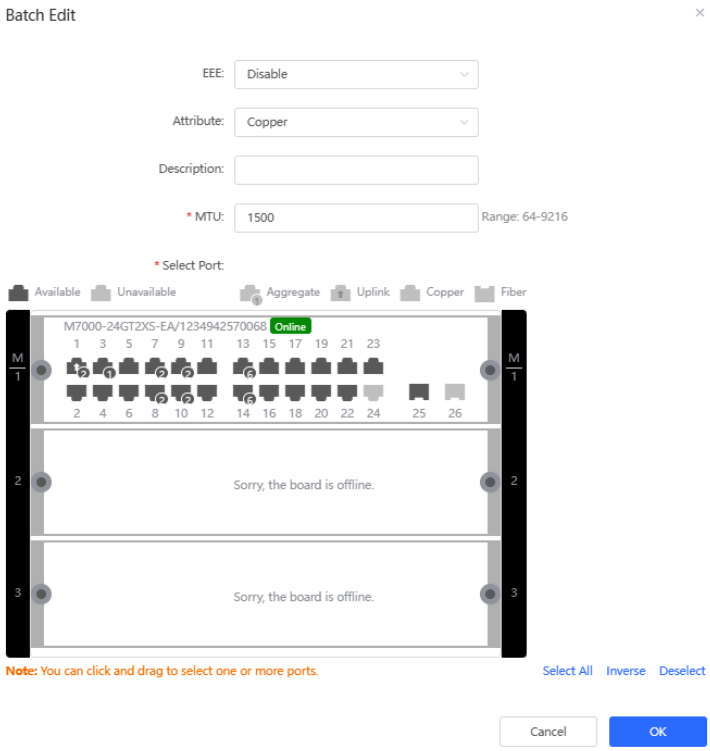
- MTU is configured globally.



Batch configure: Click **Batch Edit**. In the displayed dialog box, select the port to be configured, configure the EEE switch, MTU, enter the port description, and click **OK**.

Note

Copper ports and SFP ports cannot be both configured during batch configuration.



Configure one port: Click **Edit** in the **Action** column of the list. In the displayed configuration box, configure the EEE switch, port mode, enter the port description, and click **OK**.

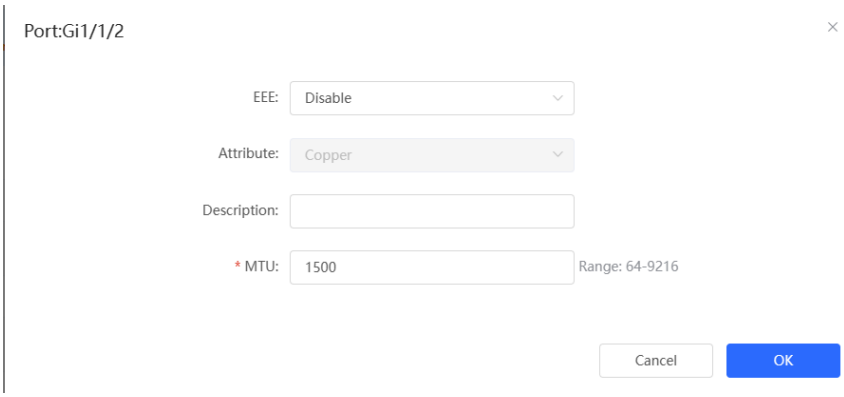


Table 4-3 Description of Physical Configuration Parameters

Parameter	Description	Default Value
EEE	It is short for energy-efficient Ethernet, which is based on the standard IEEE 802.3az protocol. When enabled, EEE saves energy by making the interface enter LPI (Low Power Idle) mode when the Ethernet connection is idle. Value: Disable/Enable	Disable
Attribute	The port attribute indicates whether the port is a copper port or an SFP port. Coper port: copper mode (cannot be changed); SFP port: fiber mode (cannot be changed); Only combo ports support mode change.	Depending on the port attribute
Description	You can add a description to label the functions of a port.	NA

Note

- Different ports support different attributes and configuration items.
- Only the SFP combo ports support port mode switching.
- SFP ports do not support enabling EEE.

12.3 Aggregate Ports

12.3.1 Aggregate Port Overview

An aggregate port (AP) is a logical link formed by binding multiple physical links. It is used to expand link bandwidth, thereby improving connection reliability.

The AP function supports load balancing and therefore, evenly distributes traffic to member links. The AP implements link backup. When a member link of an AP is disconnected, the system automatically distributes traffic of this link to other available member links. Broadcast or multicast packets received by one member link of an AP are not forwarded to other member links.

- If a single interface that connects two devices supports the maximum rate of 1000 Mbps (assume that interfaces of both devices support the rate of 1000 Mbps), when the service traffic on the link exceeds 1000 Mbps, the excess traffic will be discarded. Link aggregation can solve this problem. For example, use *n* network cables to connect the two devices and bind the interfaces together. In this way, the interfaces are logically bound to support the maximum traffic of 1000 Mbps × *n*.
- If two devices are connected through a single cable, when the link between the two interfaces is disconnected, services carried on this link are interrupted. After multiple interconnected interfaces are bound, as long as there is one link available, services carried on these interfaces will not be interrupted.

12.3.2 Overview

1. Static AP Address

In static AP mode, you can manually add a physical interface to an aggregate port. An aggregate port in static AP mode is called a static aggregate port and the member ports are called member ports of the static aggregate port. Static AP can be easily implemented. You can aggregate multiple physical links by running commands to add specified physical interfaces to an AP. Once a member interface is added to an AP, it can send and receive data and balance traffic in the AP.

2. Dynamic Aggregation

Dynamic aggregation mode is a special port aggregation function developed for the WAN port of RG-MR series gateway devices. The maximum bandwidth of the WAN port of the MR device can support 2000M, but after the intranet port is connected to the switch, a single port can only support a maximum bandwidth of 1000M. In order to prevent the downlink bandwidth from being wasted, it is necessary to find a way to increase the maximum bandwidth of the port between the MR device and the switch, and the dynamic aggregation function emerged to meet the need.

After connecting the two fixed AG (aggregation) member ports on the MR gateway device to any two ports on the switch, through packet exchange, the two ports on the switch can be automatically aggregated, thereby doubling the bandwidth. The aggregate port automatically generated in this way on the switch is called a dynamic aggregate port, and the corresponding two ports are the member ports of the aggregate port.

Note

Dynamic aggregate ports do not support manual creation and can be deleted after they are automatically generated by the device, but member ports cannot be modified.

3. Load Balancing

An AP, based on packet characteristics such as the source MAC address, destination MAC address, source IP address, destination IP address, L4 source port ID, and L4 destination port ID of packets received by an inbound interface, differentiates packet flows according to one or several combined algorithms. It sends the same packet flow through the same member link, and evenly distributes different packet flows among member links. For example, in load balancing mode based on source MAC addresses, packets are distributed to different member

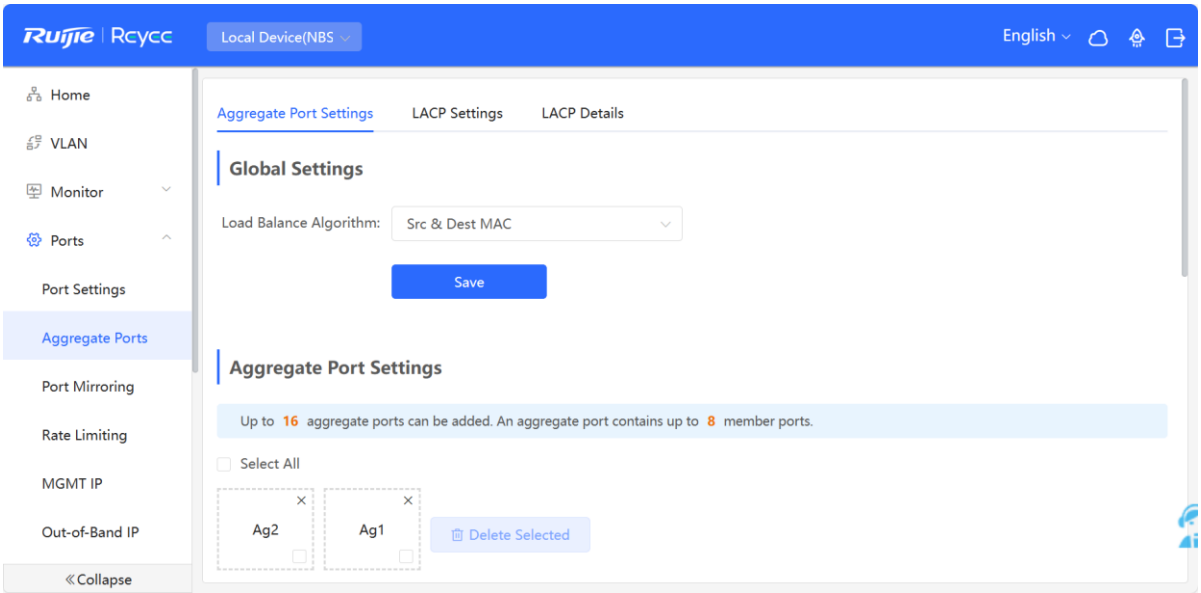
links of an AP based on their source MAC addresses. Packets with different source MAC addresses are distributed to different member links; packets with a same source MAC address are forwarded along a same member link.

Currently, the AP supports the traffic balancing modes based on the following:

- Source MAC address or destination MAC address
- Source MAC address + destination MAC address
- Source IP address or destination IP address
- Source IP address + destination IP address
- Source port
- L4 source port or L4 destination port
- L4 source port + L4 destination port

12.3.3 Aggregate Port Configuration

Choose **Local Device** > **Ports** > **Aggregate Ports** > **Aggregate Port Settings**.

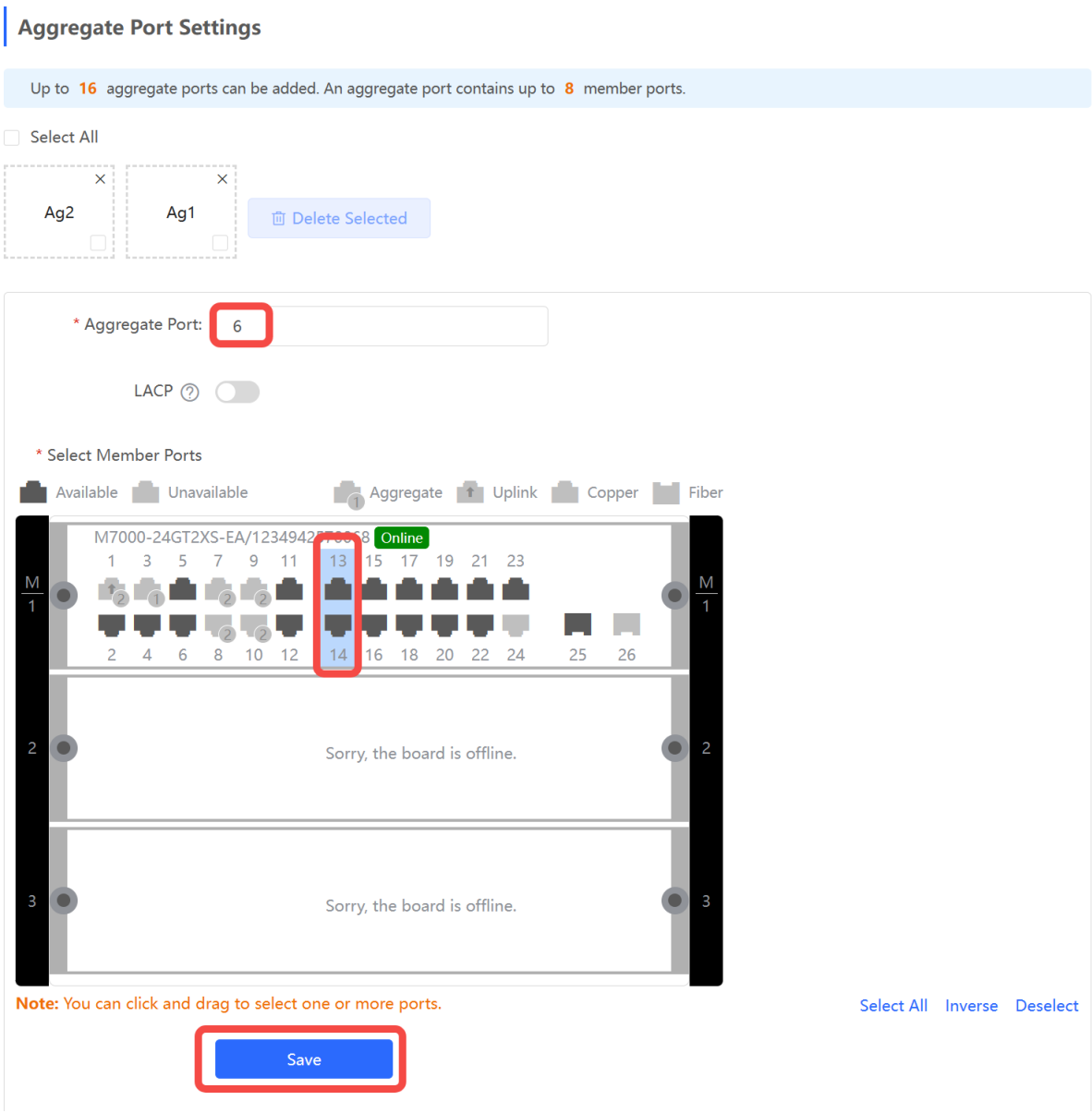


1. Adding a Static Aggregate Port

Enter an aggregate port ID, select member ports (ports that have been added to an aggregate port cannot be selected), and click **Save**. The port panel displays a successfully added aggregate port.

Note

- An aggregate port contains a maximum of eight member ports.
- The attributes of aggregate ports must be the same, and copper ports and SFP ports cannot be aggregated.
- Dynamic aggregate ports do not support manual creation.

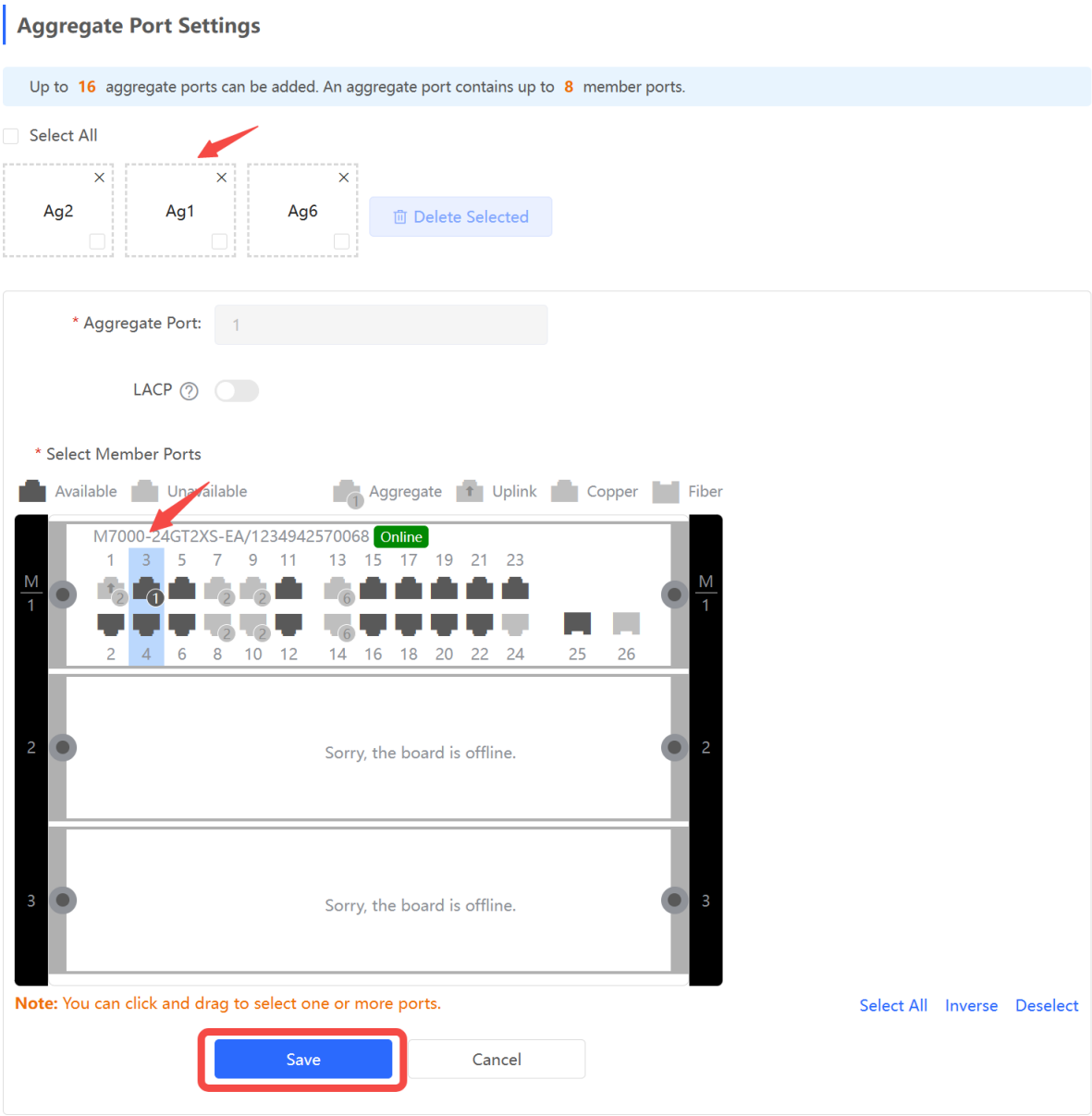


2. Modifying Member Ports of a Static Aggregate Port

Click an added static aggregate port. Member ports of the aggregate port will become selected. Click a port to deselect it; or select other ports to join the current aggregate port. Click **Save** to modify the member ports of the aggregate port.

Note

Dynamic aggregation ports do not support to modify member ports.

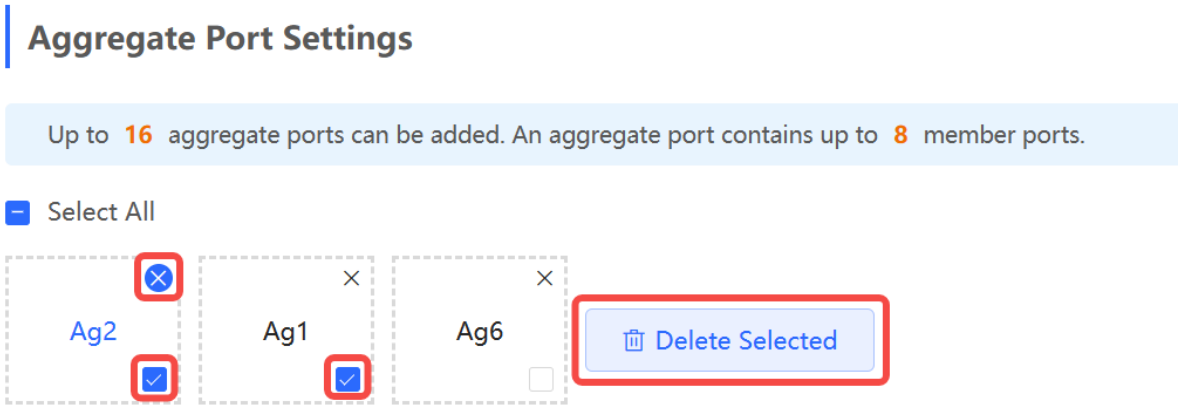


3. Deleting an Aggregate Port

Move the cursor over an aggregate port icon and click upper-right, or select the aggregate port to be deleted, and click **Delete Selected** to delete the selected aggregate port. After deleted, the corresponding ports become **available** on the port panel to set a new aggregate port.

Caution

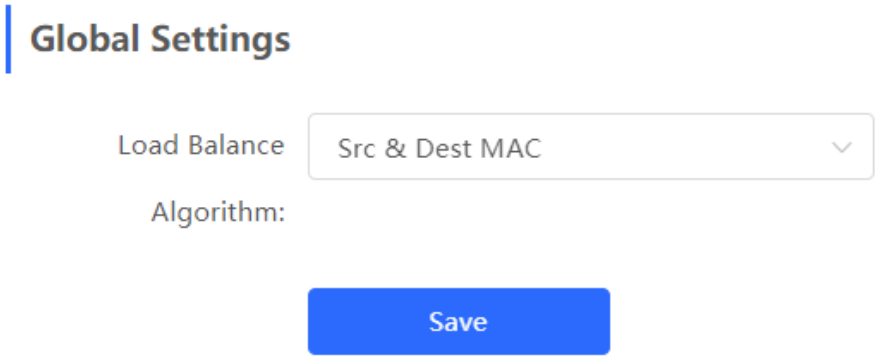
After an aggregate port is deleted, its member ports are restored to the default settings and are disabled.



12.3.4 Configuring a Load Balancing Mode

Choose **Local Device** > **Ports** > **Aggregate Port** > **Global Settings**.

Select **Load Balance Algorithm** and click **Save**. The Device distributes incoming packets among member links by using the specified load balancing algorithm. The packet flow with the consistent feature is transmitted by one member link, whereas different packet flows are evenly distributed to various links.



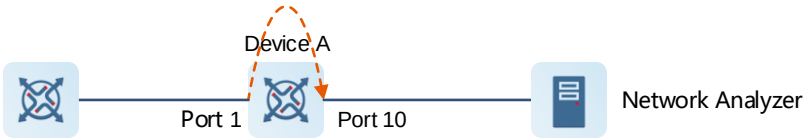
12.4 Port Mirroring

12.4.1 Overview

The switched port analyzer (SPAN) function is a function that copies packets of a specified port to another port that is connected to a network monitoring device, After port mirroring is set, the packets on the source port will be copied and forwarded to the destination port, and a packet analyzer is usually connected to the destination port to analyze the packet status of the source port, so as to monitor all incoming and outgoing packets on source ports.

As shown, by configuring port mirroring on Device A, the device copies the packets on Port 1 to Port 10. Although the network analysis device connected to Port 10 is not directly connected to Port 1, it can receive packets through Port 1. Therefore, the aim to monitor the data flow transmitted by Port 1 is realized.

Figure 12-1 Port Mirroring Principles Figure



The SPAN function not only realizes the data traffic analysis of suspicious network nodes or device ports, but also does not affect the data forwarding of the monitored device. It is mainly used in network monitoring and troubleshooting scenarios.

12.4.2 Procedure

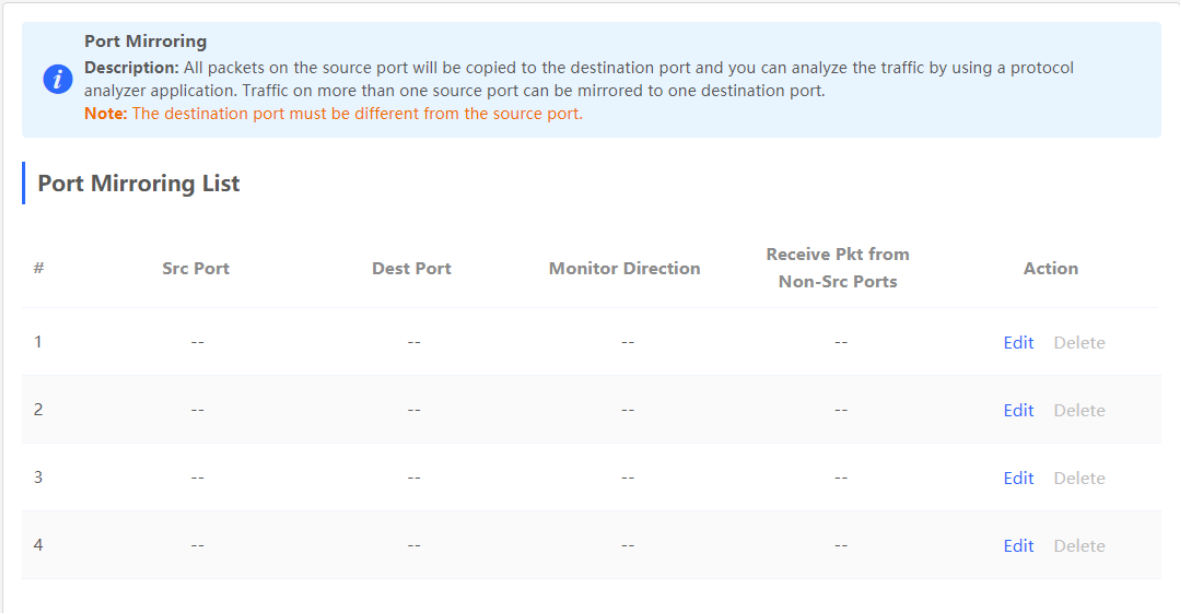
Choose **Local Device** > **Ports** > **Port Mirroring**.

Click **Edit**, select the source port, destination port, monitor direction, and whether to receive packets from non-Src ports, and click **OK**. A maximum of four SPAN entries can be configured.

To delete the port mirroring configuration, click **Delete** in the corresponding **Action** column.

Caution

- You can select multiple source traffic monitoring ports but only one destination port. Moreover, the source traffic monitoring ports cannot contain the destination port.
- An aggregate port cannot be used as the destination port.
- A maximum of four SPAN entries can be configured. SPAN cannot be configured for ports that have been used for SPAN.



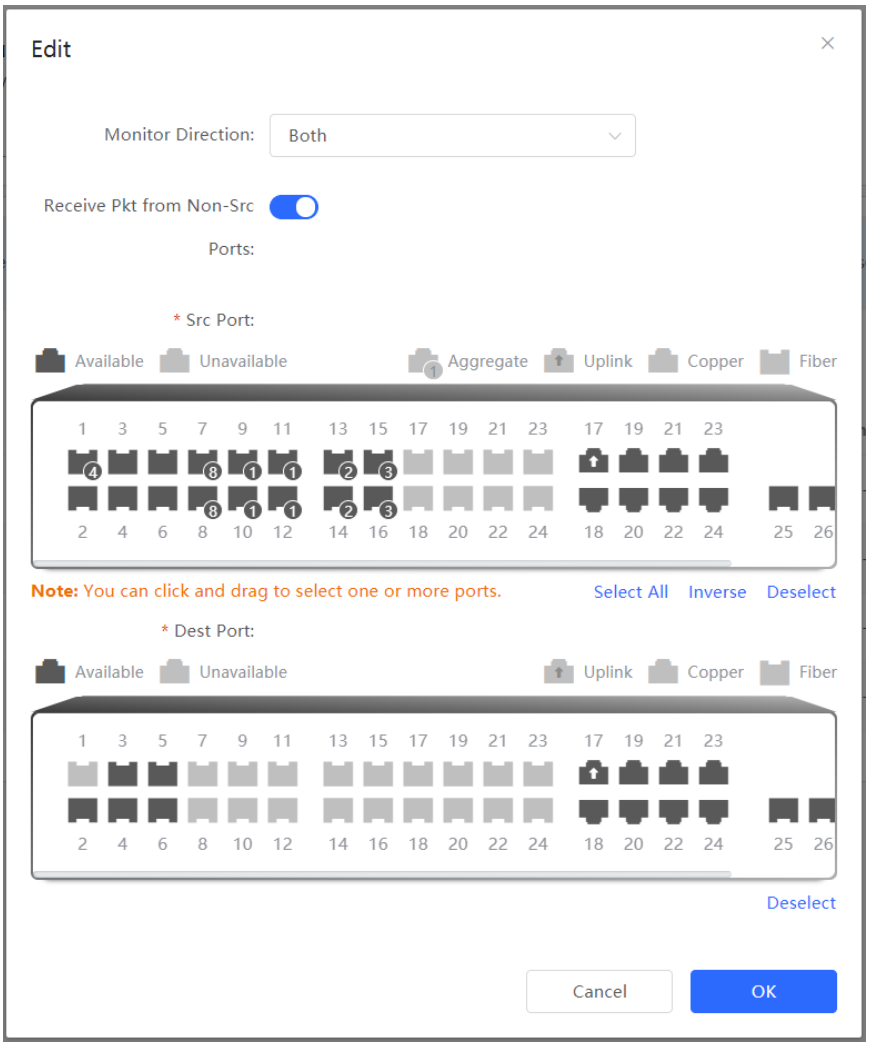


Table 4-4 Description of Port Mirroring Parameters

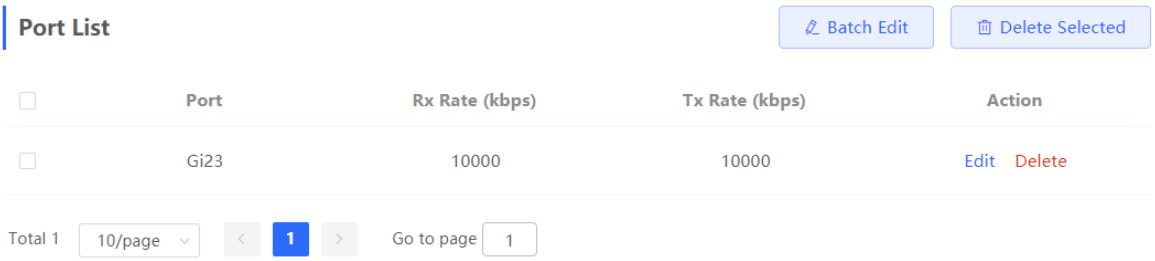
Parameter	Description	Default Value
Src Port	A source port is also called a monitored port. Data flows on the source port are monitored for network analysis or troubleshooting. Support selecting multiple source ports and mirroring multiple ports to one destination port	N/A
Dest Port	The destination port is also called the monitoring port, that is, the port connected to the monitoring device, and forwards the received packets from the source port to the monitoring device.	N/A

Parameter	Description	Default Value
Monitor Direction	The type of packets (data flow direction) to be monitored by a source port. ● Both: All packets passing through the port, including incoming and outgoing packets ● Incoming: All packets received by a source port are copied to the destination port ● Outcoming: All packets transmitted by a source port are copied to the destination port	Both
Receive Pkt from Non-Src Ports	It is applied to the destination port and indicates whether a destination port forwards other packets while monitoring packets. ● Enabled: While monitoring the packets of the source port, the packets of other non-Src ports are normally forwarded ● Disabled: Only monitor source port packets	Enable

12.5 Rate Limiting

Choose **Local Device** > **Ports** > **Rate Limiting**.

The **Rate Limiting** module allows you to configure traffic limits for ports, including rate limits for inbound and outbound direction of ports.



1. Rate Limiting Configuration

Click **Batch Edit**. In the displayed dialog box, select ports and enter the rate limits, and click **OK**. You must configure at least the ingress rate or egress rate. After the configuration is completed, it will be displayed in the list of port rate limiting rules.

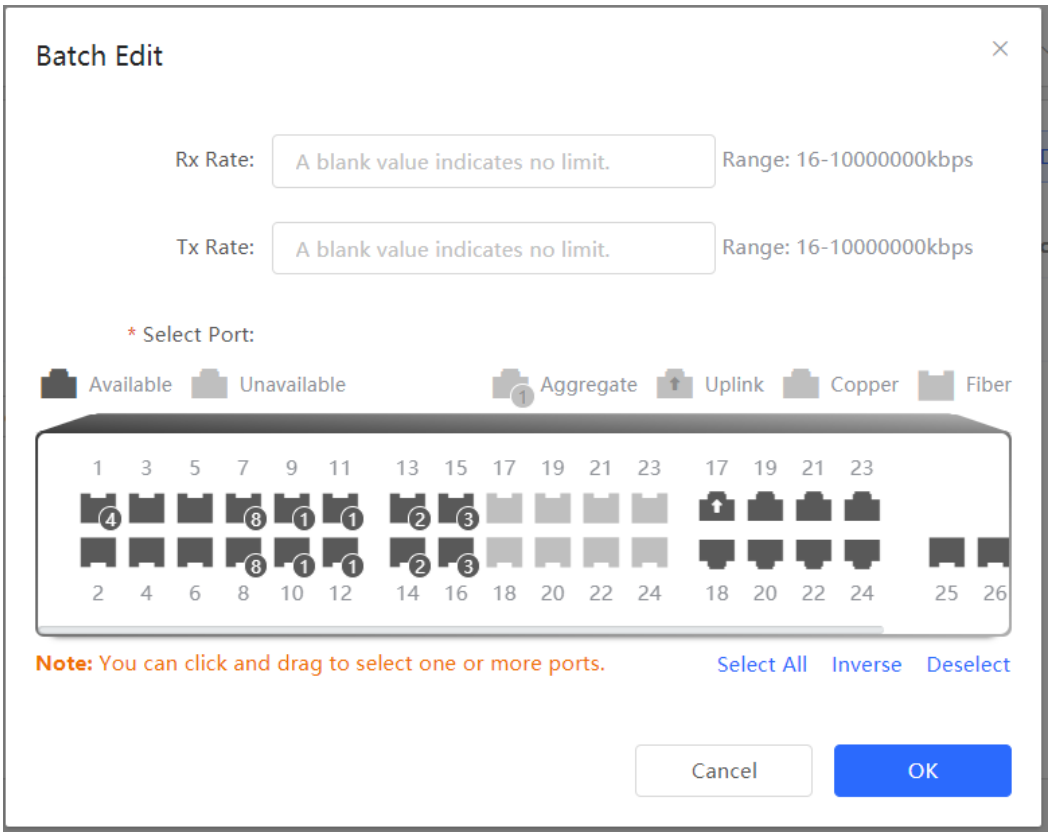
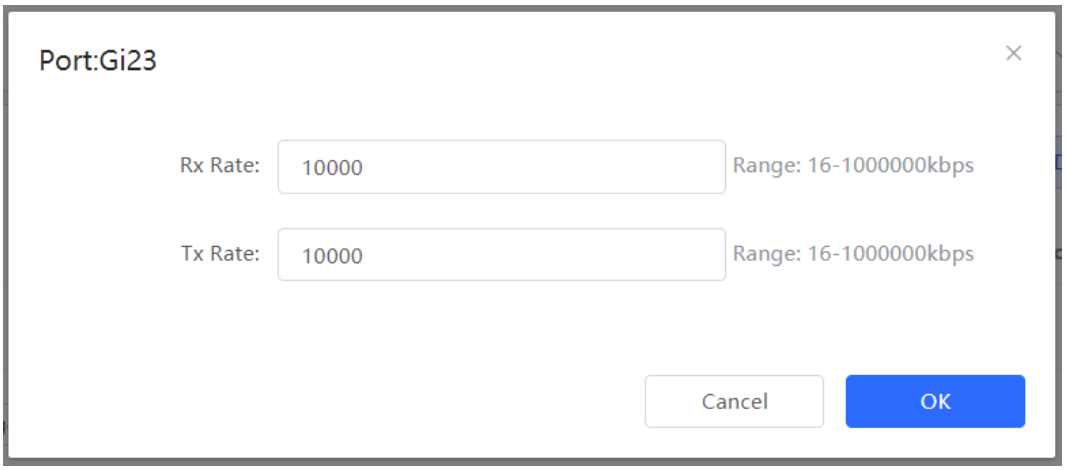


Table 4-5 Description of Rate Limiting Parameters

Parameter	Description	Default Value
Rx Rate	Max Rate at which packets are sent from a port to a switch, in kbps.	Not limited
Tx Rate	Max Rate at which packets are sent out of a switch through a port, in kbps.	Not limited

2. Changing Rate Limits of a Single Port

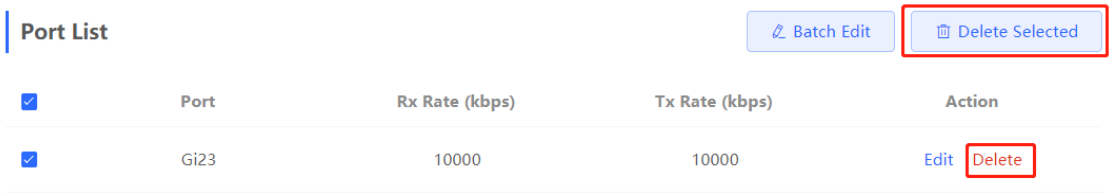
In the port list for which the rate limit has been set, click **Edit** on the corresponding port entry, enter the ingress rate and egress rate in the displayed dialog box, and click **OK**.



3. Deleting Rate Limiting

Batch configure: Select multiple records in **Port List**, click **Delete Selected** and click **OK** in the confirmation dialog box**.**

Configure one port: In **Port List**, click **Delete** on the corresponding port entry, and click **OK** in the confirmation dialog box.



Note

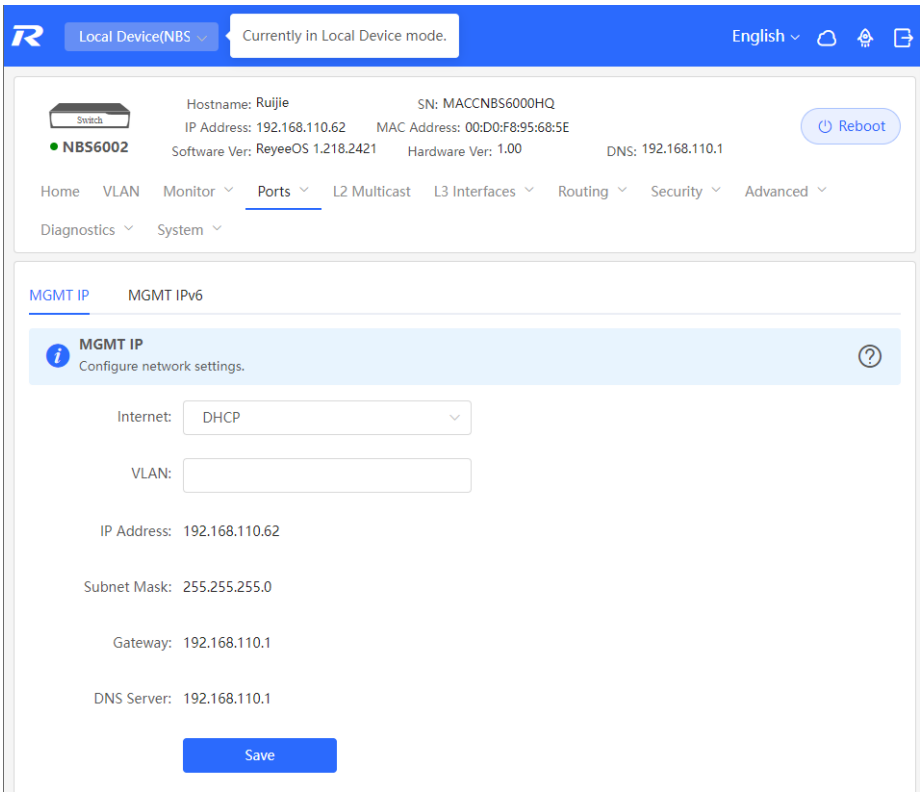
- When configuring rate limits for a port, you must configure at least the ingress rate or egress rate.
- When the ingress rate or egress rate is not set, the port rate is not limited.

12.6 MGMT IP Configuration

12.6.1 Configuring the Management IPv4 Address

Choose **Local Device** > **Ports** > **MGMT IP>**.

The **MGMT IP** page allows you to configure the management IP address for the device. Users can configure and manage the device by accessing the management IP.



The device can be networked in two modes:

- DHCP: Uses a temporary IP address dynamically assigned by the upstream DHCP server for Internet access.
- Static IP: Uses a static IP address manually configured by users for Internet access.

If you select DHCP, the device obtains parameters from the DHCP Server. If Static IP is selected, you need to enter the management VLAN, IP address, subnet mask, default gateway IP address, and address of a DNS server. Click **Save** to make the configuration take effect.

Note

- If the management VLAN is null or not specified, VLAN 1 takes effect by default.
- The management VLAN must be selected from existing VLANs. If no VLAN is created, go to the VLAN list to add a VLAN (for details, see 11.6.2 Creating a VLAN).
- You are advised to bind a configured management VLAN to an uplink port. Otherwise, you may fail to access the Eweb management system.

12.6.2 Configuring the Management IPv6 Address

Configure the IPv6 address used to log in to the device management page.

Choose **Local Device** > **Ports** > **MGMT IPv6**.

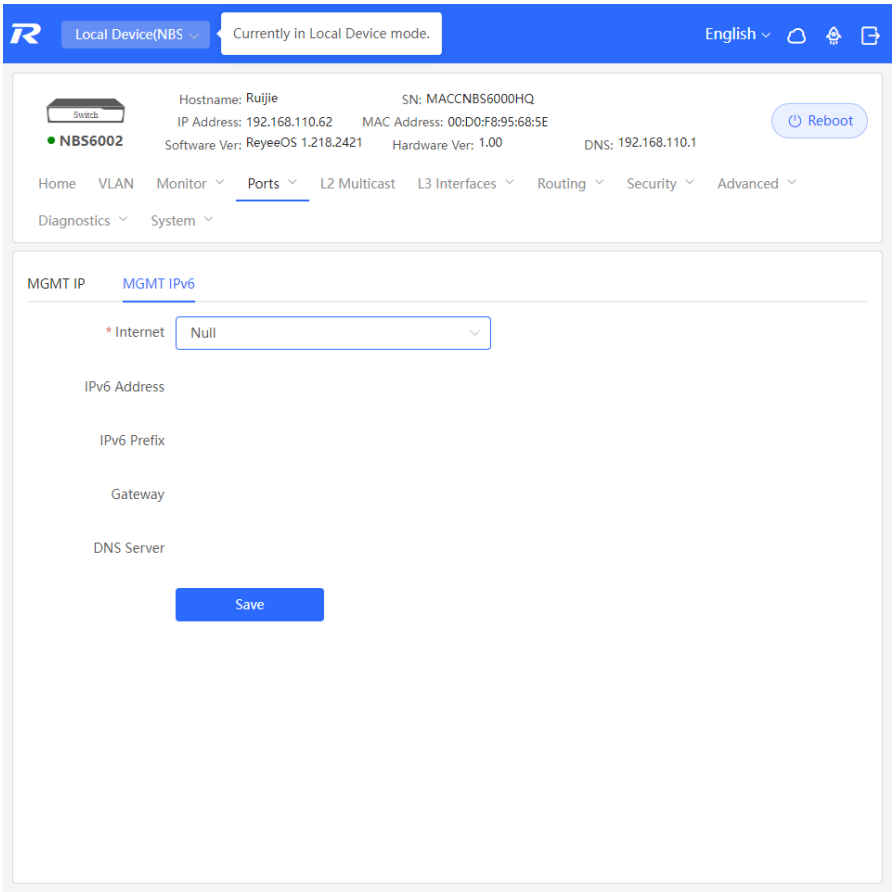
Configure the management IPv6 address so that you can log in to the device management page using the IPv6 address of the device.

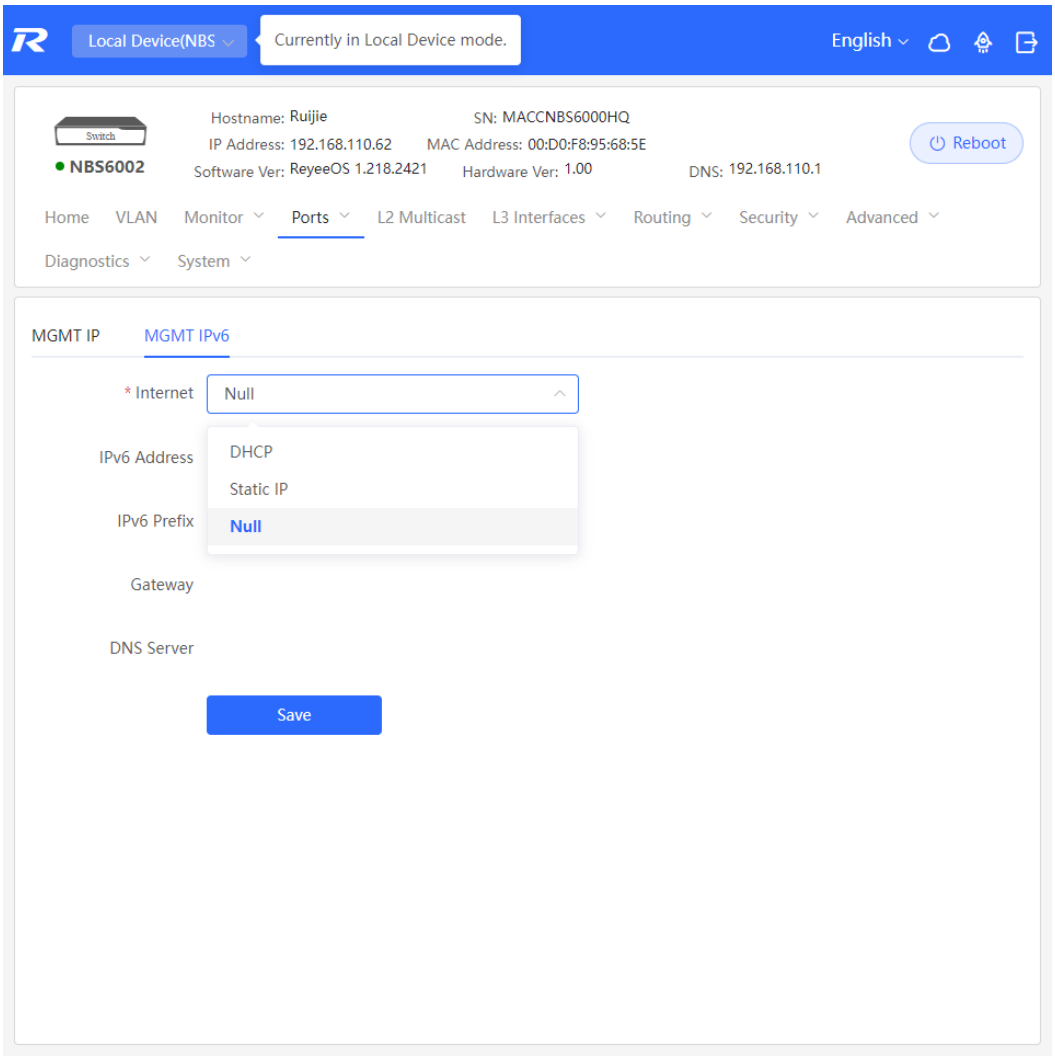
The device supports the following Internet connection types:

- **Null**: The IPv6 function is disabled on the current port.
- **DHCP**: The device dynamically obtains an IPv6 address from the upstream device.

- **Static IP**: You need to manually configure the IPv6 address, length, gateway address, and DNS server.

Click **Save**.





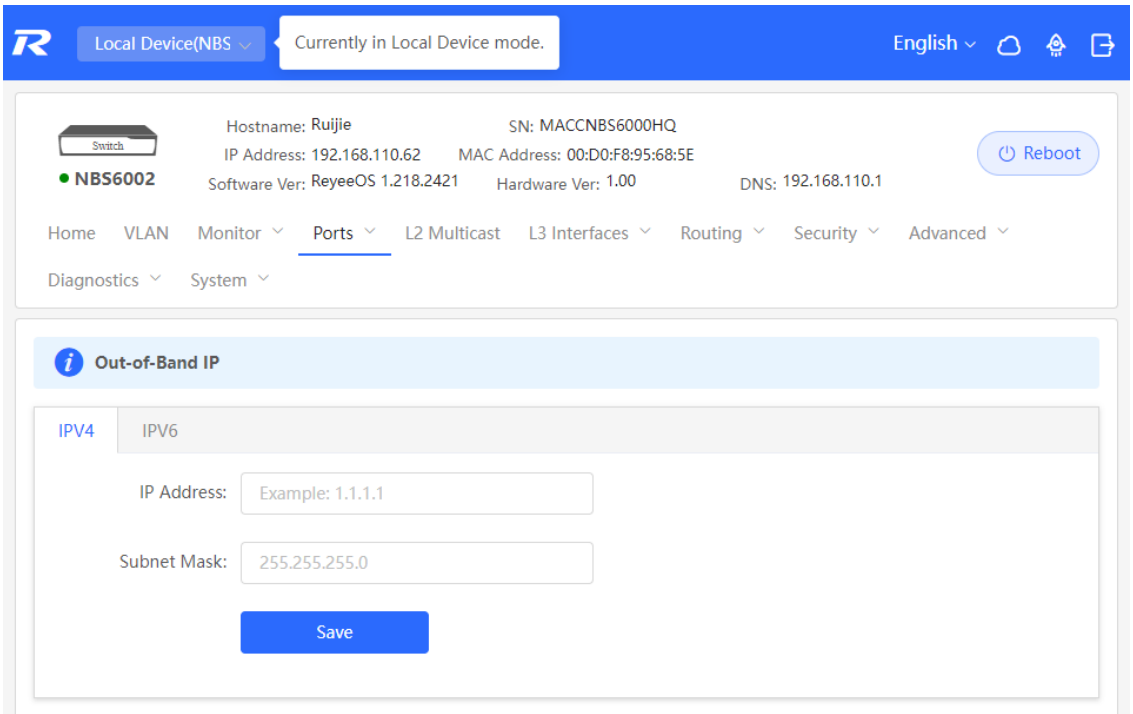
12.7 Out-of-Band IP Configuration

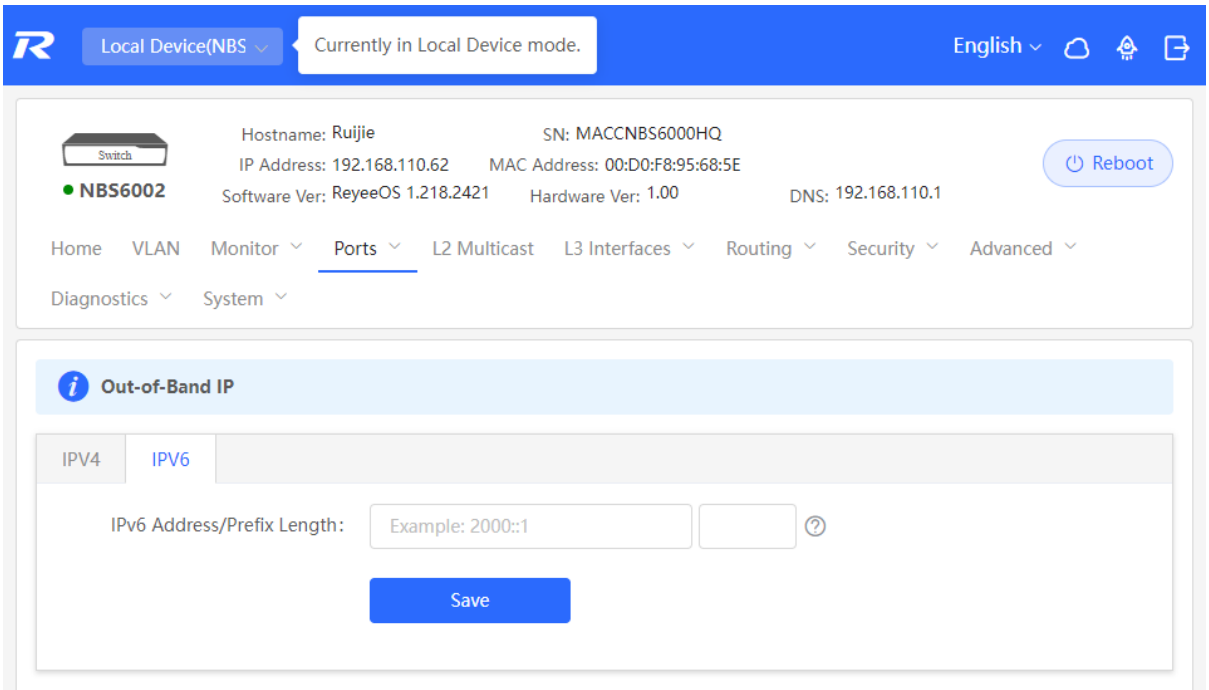
Caution

Only the RG-NBS6002 Series, RG-NBS7003 Series and RG-NBS7006 Series support this function.

Choose **Local Device** > **Ports** > **Out-of-Band IP**.

Set the MGMT management port IP of the chassis to centrally manage the modules in multiple slots of the device.





Note

No IP address is configured for the MGMT port by default. Currently, only a static IP address can be configured for the MGMT port but DHCP is not supported.

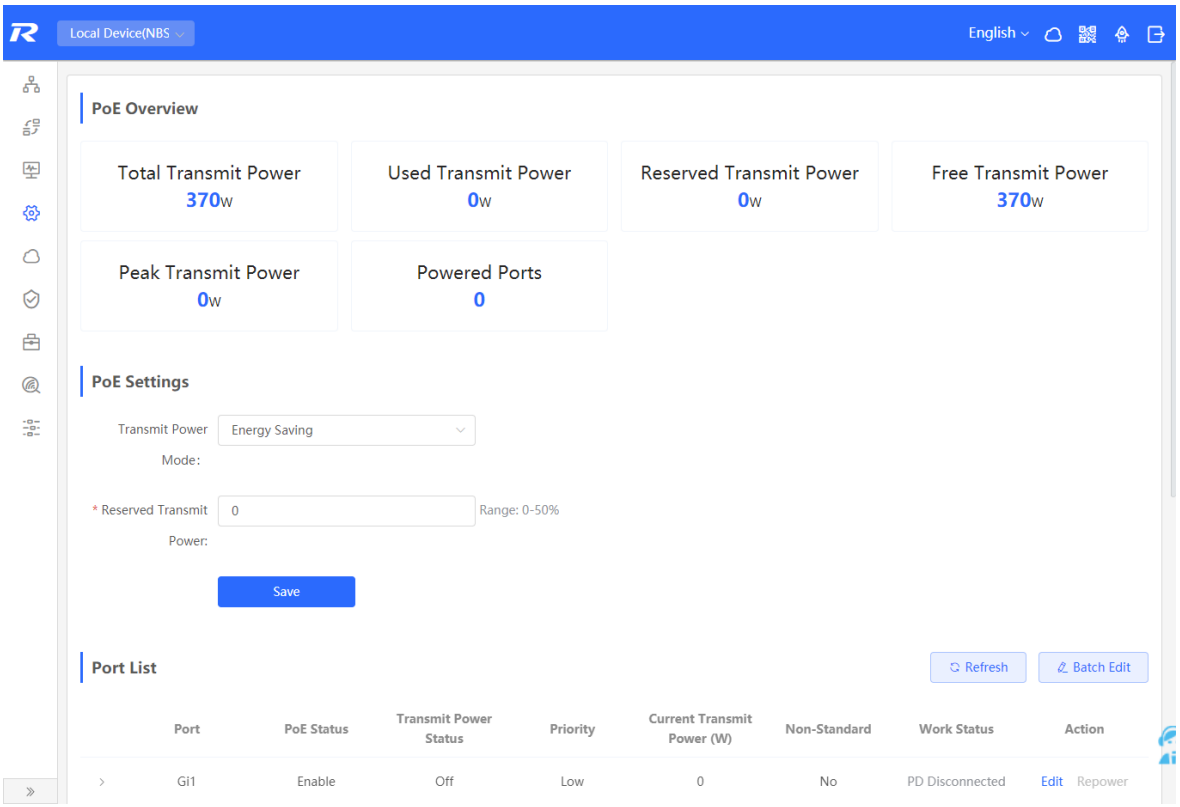
12.8 PoE Configuration

Caution

Only PoE switches (The device models are marked with **-P**) support this function.

Choose **Local Device** > **Ports** > **PoE**.

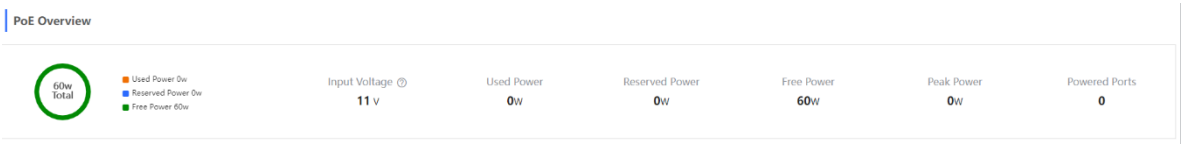
The device supplies power to PoE powered devices through ports. Users can view the current power supply status, and set the system power supply and port power supply policies respectively to achieve flexible power distribution.



12.8.1 Viewing Global PoE Info

Choose **Local Device** > **Ports** > **PoE** > **PoE Overview**.

The **PoE Overview** page displays global PoE power supply, including total power, used power, reserved power, free power, peak power, and powered ports.



12.8.2 PoE Global Settings

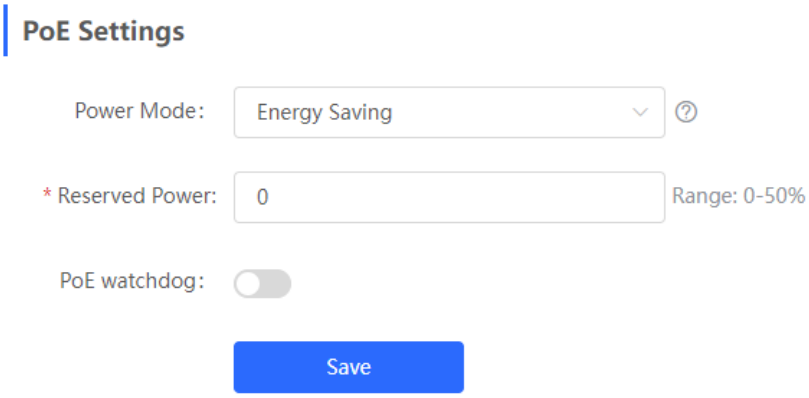
Choose **Local Device** > **Ports** > **PoE** > **PoE Settings**.

PoE Transmit Power Mode refers to the way that a device allocates power to a connected PD (Powered Device). It supports Auto mode and Energy-saving mode.

In Auto mode, the system allocates power based on the classes of PDs detected on ports. The device allocates power to PD devices of Class 0~4 based on a fixed value: Class 0 is 15.4W, Class 1 is 4W, Class 2 is 7W, Class 3 is 15.4W, Class 4 Type 1 is 15.4W, and Class 4 Type 2 is 30W. In this mode, if the port is connected to a device of Class 3, even if the actual power consumption is only 11W, the PoE power supply device will allocate power to the port based on the power of 15.4W.

In energy-saving mode, the PoE device dynamically adjusts allocated power based on actual consumption of PDs. In this mode, in order to prevent the power supply of the port from fluctuating due to the fluctuation of the actual power consumption of the PD when the power is fully loaded, you can set the Reserved Transmit Power, and the reserved power will not be used for power supply, so as to ensure that the total power consumed by the current system does not exceed the limit of the PoE device. The size of the reserved power is expressed as a percentage of the total PoE power. The value ranges from 0 to 50.

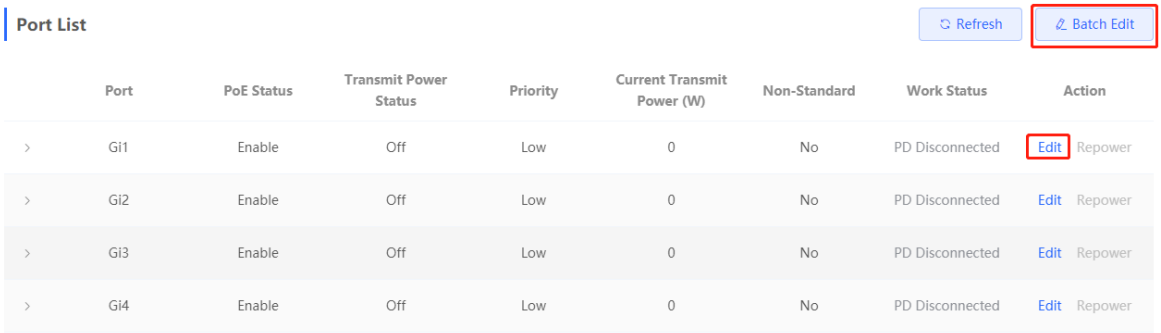
PoE watchdog: By enabling **PoE watchdog**, you can monitor the status of connected PDs. When the Powered Device (PD) does not respond or ceases to function properly, the PoE watchdog feature automatically restarts the PoE function of the port to restore the PD's operation.



12.8.3 Power Supply Configuration of Ports

Choose **Local Device** > **Ports** > **PoE** > **Port List**.

Click **Edit** in the port entry or click **Batch Edit** to set the PoE power supply function of the port.



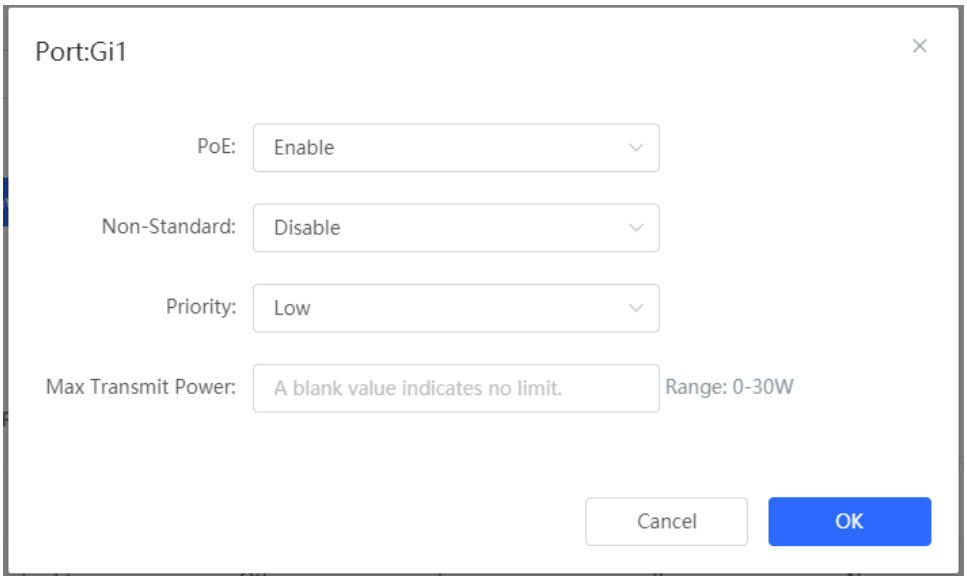


Table 4-6 Description of Parameters for Power Supply Configuration of Ports

Parameter	Description	Default Value
PoE	Whether to enable the power supply function on the ports	Enable
Non-Standard	By default, the device only supplies power to PDs that comply with the standard IEEE 802.3af and 802.3at protocols. In practical applications, there may be PDs that do not conform to the standard. After the non-standard mode is enabled, the device port can supply power to some non-standard PD devices.	Disable
Priority	The power supply priority of the port is divided into three levels: High, Medium, and Low In auto and energy-saving modes, ports with high priorities are powered first. When the system power of the PoE device is insufficient, ports with low priorities are powered off first. Ports with the same priority are sorted by the port number. A smaller port number indicates a higher priority.	Low

Parameter	Description	Default Value
Max Transmit Power	The maximum power that the port can transmit, ranging from 0 to 30, in watts (W). A blank value indicates no limit	Not limit

12.8.4 Displaying the Port PoE Information

Choose **Local Device** > **PoE** > **Port List**.

The **Port List** displays the PoE configuration and status information of each port. Click to expand the detailed information.

When the PD device connected to the port needs to be restarted, for example, when the AP connected to the port is abnormal, you can click **Repower** to make the port power off briefly and then power on again to restart the device connected to the power supply port.

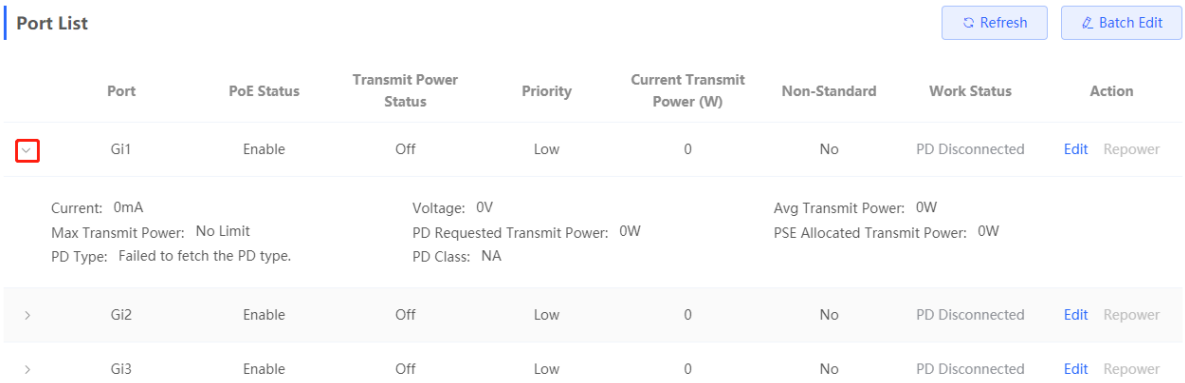


Table 4-7 Description of Port Power Supply Info

Field	Description
Port	Device Port ID
PoE Status	Whether to enable the PoE function on the ports.
Transmit Power Status	Whether the port supplies power for Pds currently.
Priority	The power supply priority of the port is divided into three levels: High, Medium, and Low.

Field	Description
Current Transmit Power	Indicates the power output by the current port, in watts (W).
Non-Standard	Indicates whether the non-standard compatibility mode is enabled.
Work Status	Current work status of PoE ports.
Current	Indicates the present current of the port in milliamps (mA).
Voltage	Indicates the present current of the port in volts (V).
Avg Transmit Power	Indicates the current average power of the port, namely, the sampling average of current power after the port is powered on, in watts (W).
Max Transmit Power	The maximum output power of the port in watts (W).
PD Requested Transmit Power	The power requested by the PD to the PSE (Power Sourcing Equipment, power supply equipment), in watts (W).
PSE Allocated Transmit Power	Indicates the power allocated to a PD by PSE in watts (W).
PD Type	Information of PD type obtained through LLDP classification are divided into Type 1 and Type 2.
PD Class	The classification level of the PD connected to the port is divided into Class 0~4, based on the IEEE 802.3af/802.3at standard.

13 NBS and NIS Series Switches L2 Multicast

13.1 Multicast Overview

IP transmission methods are categorized into unicast, multicast, and broadcast. In IP multicast, an IP packet is sent from a source and forwarded to a specific group of receivers. Compared with unicast and broadcast, IP multicast saves bandwidth and reduces network loads. Therefore, IP multicast is applied to different network services that have high requirements for real timeliness, for example, Internet TV, distance education, live broadcast and multimedia conference.

13.2 Multicast Global Settings

Choose **Local Device** > **L2 Multicast** > **Global Settings**.

Global Settings allow you to specify the version of the IGMP protocol, whether to enable report packet suppression, and the behavior for processing unknown multicast packets.

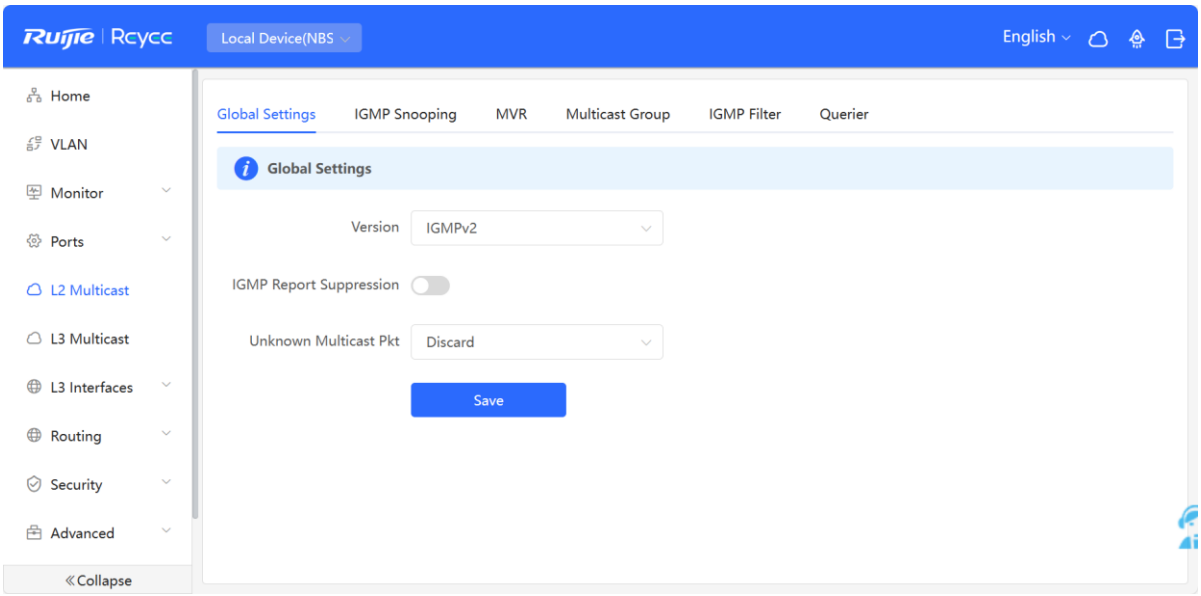


Table 5-1 Description of Configuration Parameters of Global Multicast

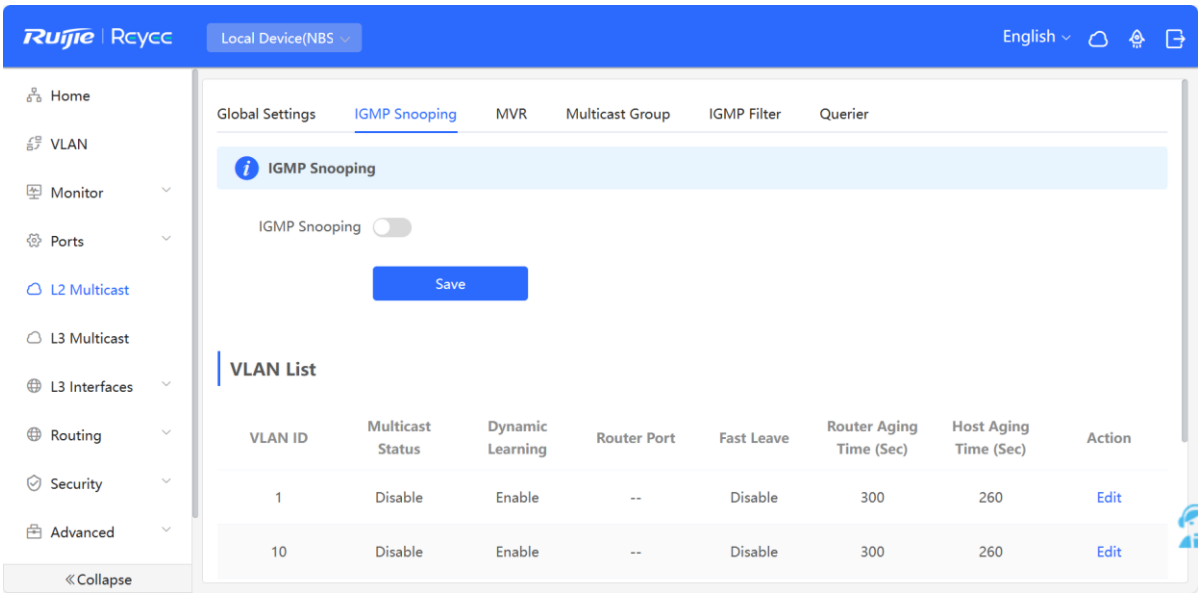
Parameter	Description	Default Value
Version	The Internet Group Management Protocol (IGMP) is a TCP/IP protocol that manages members in an IPv4 multicast group and runs on the multicast devices and hosts residing on the stub of the multicast network, creating and maintaining membership of the multicast group between the hosts and connected multicast devices. There are three versions of IGMP: IGMPv1, IGMPv2, IGMPv3. This parameter is used to set the highest version of IGMP packets that can be processed by Layer 2 multicast, and can be set to IGMPv2 or IGMPv3.	IGMPv2
IGMP Report Suppression	After this function is enabled, to reduce the number of packets in the network, save network bandwidth and ensure the performance of the IGMP multicast device, the switch forwards only one report packet to the multicast router if multiple downlink clients connected to the switch simultaneously send the report packet to demand the same multicast group.	Disable
Unknown Multicast Pkt	When both the global and VLAN multicast functions are enabled, the processing method for receiving unknown multicast packets can be set to **Discard** or **Flood**.	Discard

13.3 IGMP Snooping

13.3.1 Overview

The Internet Group Management Protocol (IGMP) snooping is an IP multicast snooping mechanism running on a VLAN to manage and control the forwarding of IP multicast traffic within the VLAN. It implements the L2 multicast function.

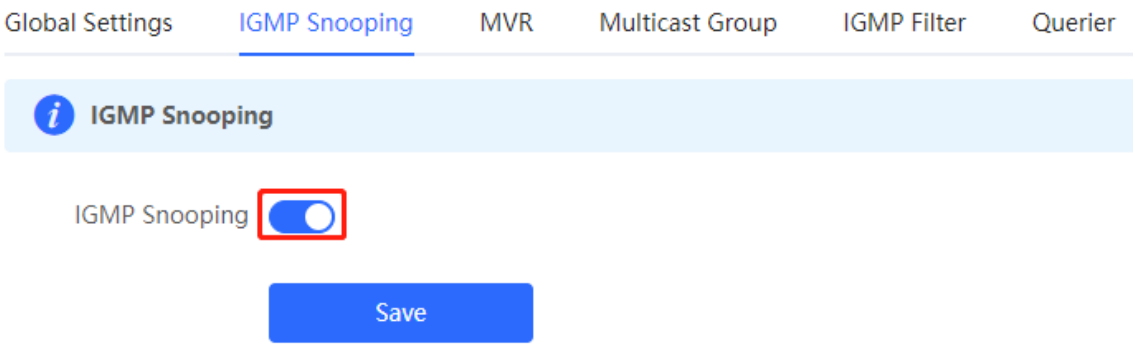
Generally, multicast packets need to pass through L2 switches, especially in some local area networks (LANs). When the Layer 2 switching device does not run IGMP Snooping, the IP multicast packets are broadcast in the VLAN; when the Layer 2 switching device runs IGMP Snooping, the Layer 2 device can snoop the IGMP protocol packets of the user host and the upstream PIM multicast device. In this way, an Layer 2 multicast entry is established, and IP multicast packets are controlled to be sent only to group member receivers, preventing multicast data from being broadcast on the Layer 2 network.



13.3.2 Enabling Global IGMP Snooping

Choose **Local Device** > **L2 Multicast** > **IGMP Snooping**.

Turn on **IGMP Snooping** and click **Save**.



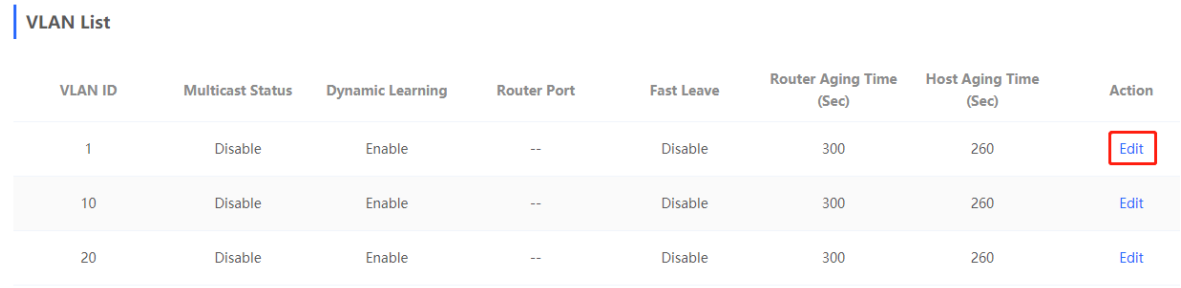
13.3.3 Configuring Protocol Packet Processing Parameters

By controlling protocol packet processing, an L2 multicast device can establish static or dynamic multicast forwarding entries. In addition, the device can adjust parameters to refresh dynamic multicast forwarding entries and IGMP snooping membership quickly.

Choose **Local Device** > **L2 Multicast** > **IGMP Snooping**.

The IGMP Snooping function is implemented based on VLANs. Therefore, each VLAN corresponds to an IGMP Snooping setting entry. There are as many IGMP Snooping entries as VLANs on the device.

Click **Edit** in the VLAN entry. In the displayed dialog box enable/disable the VLAN multicast function, dynamic learning function, fast leave function and static route connection port, and set the router aging time and the host aging time, and click **OK**.



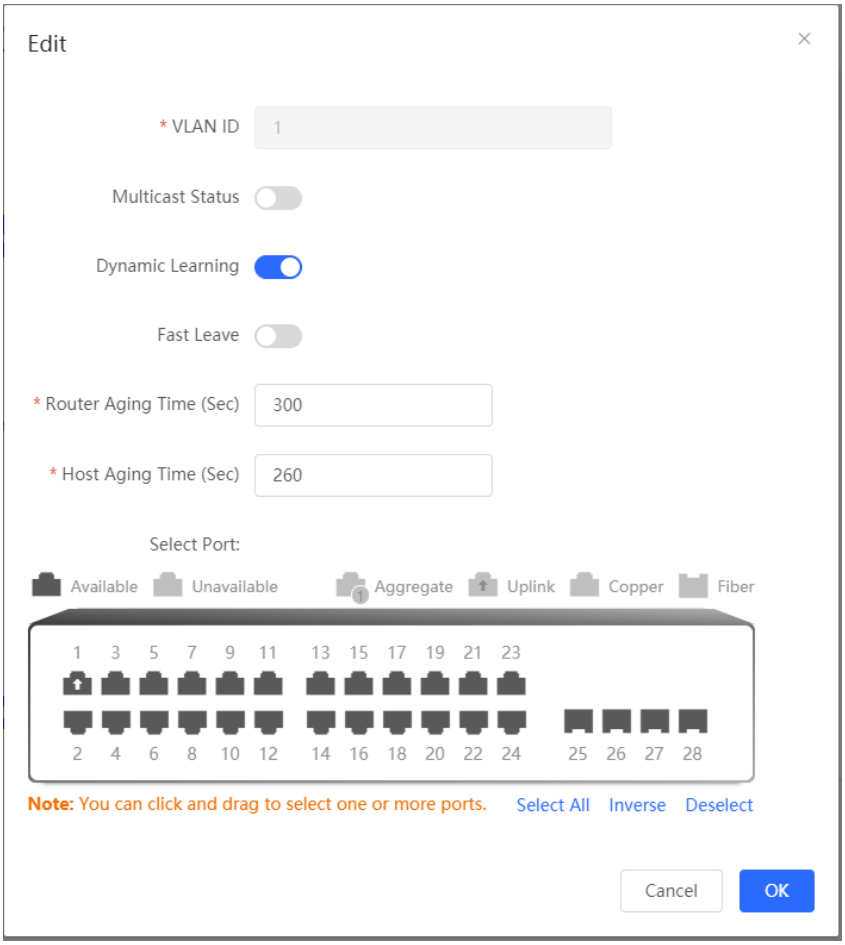


Table 5-2 Description of VLAN Configuration Parameters of IGMP Snooping

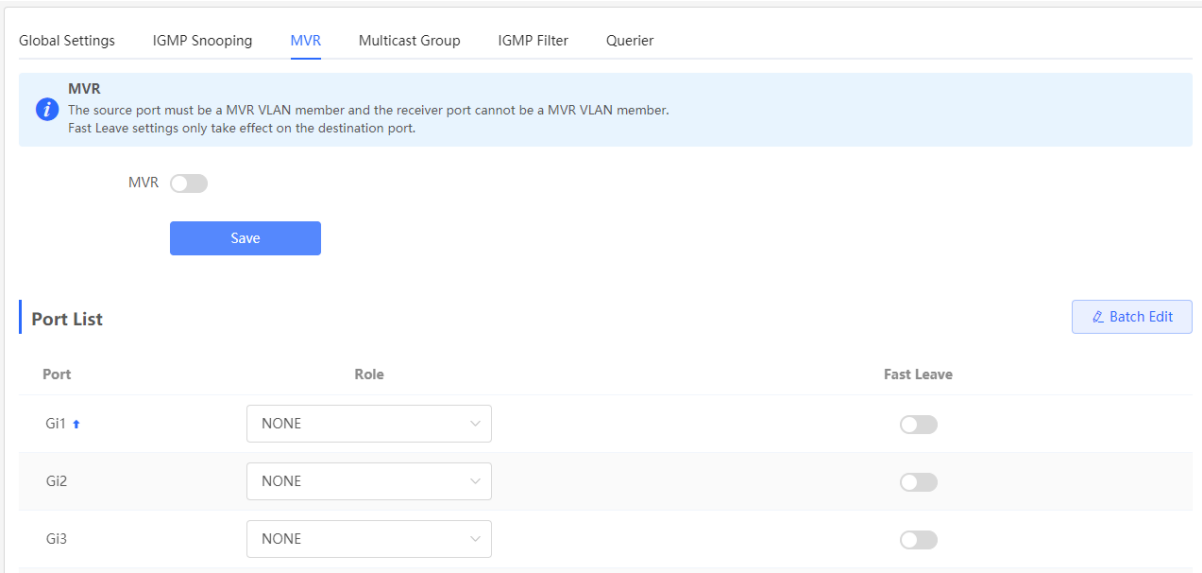
Parameter	Description	Default Value
Multicast Status	Whether to enable or disable the VLAN multicast function. The multicast function of a VLAN takes effect only when both the global IGMP snooping and VLAN multicast functions are enabled.	Disable

Parameter	Description	Default Value
Dynamic Learning	The device running IGMP Snooping identifies the ports in the VLAN as router ports or member ports. The router port is the port on the Layer 2 multicast device that is connected to the Layer 3 multicast device, and the member port is the host port connected to the group on the Layer 2 multicast device. By snooping IGMP packets, the L2 multicast device can automatically discover and maintain dynamic multicast router ports.	Enable
Router Port	List of current multicast router ports includes dynamically learned routed ports (if Dynamic Learning function is enabled) and statically configured routed ports.	NA
Fast Leave	After it is enabled, when the port receives the Leave packets, it will immediately delete the port from the multicast group without waiting for the aging timeout. After that, when the device receives the corresponding specific group query packets and multicast data packets, the device will no longer forward it to the port. This function is applicable when only one host is connected to one port of the device, and is generally enabled on the access switch directly connected to the endpoint.	Disable
Router Aging Time (Sec)	Aging time of dynamically learned multicast router ports ranges from 30 to 3600, in seconds.	300 seconds
Host Aging Time (Sec)	Aging time of dynamically learned member ports of a multicast group, in seconds.	260 seconds
Select Port	In the displayed dialog box, select a port and set it as the static router port. When a port is configured as a static router port, the port will not age out	NA

13.4 Configuring MVR

13.4.1 Overview

IGMP snooping can forward multicast traffic only in the same VLAN. If multicast traffic needs to be forwarded to different VLANs, the multicast source must send multicast traffic to different VLANs. In order to save upstream bandwidth and reduce the burden of multicast sources, multicast VLAN register (MVR) comes into being. MVR can copy multicast traffic received from an MVR VLAN to the VLAN to which the user belongs and forward the traffic.



13.4.2 Configuring Global MVR Parameters

Choose **Local Device** > **L2 Multicast** > **MVR**.

Click to enable the MVR, select the MVR VLAN, set the multicast group supported by the VLAN, and click **Save**. Multiple multicast groups can be specified by entering the start and end multicast IP addresses.

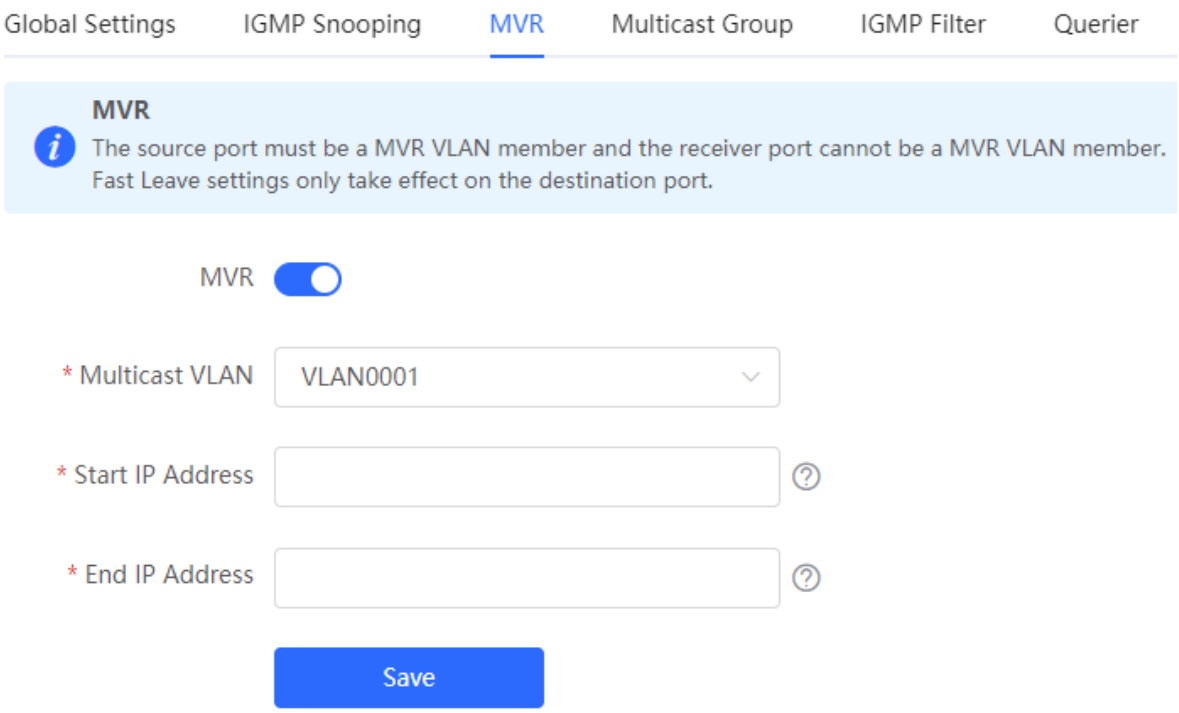


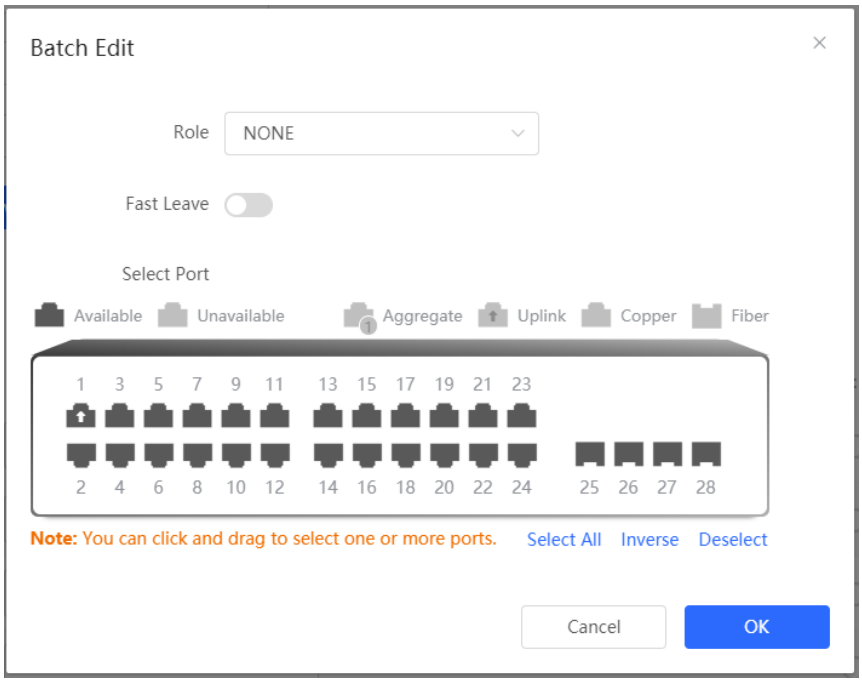
Table 5-3 Description of Configuring Global MVR Parameters

Parameter	Description	Default Value
MVR	Enables/Disables MVR globally	Disable
Multicast VLAN	VLAN of a multicast source	1
Start IP Address	Learned or configured start multicast IP address of an MVR multicast group.	NA
End IP Address	Learned or configured end multicast IP address of an MVR multicast group.	NA

13.4.3 Configuring the MVR Ports

Choose **Local Device** > **L2 Multicast** > **MVR**.

Batch configure: Click **Batch Edit**, select the port role, the port to be set, and whether to enable the Fast Leave function on the port, and click **OK**.



Configure one port: Click the drop-down list box to select the MVR role type of the port. Click the switch in the **Fast Leave** column to set whether the port enables the fast leave function.

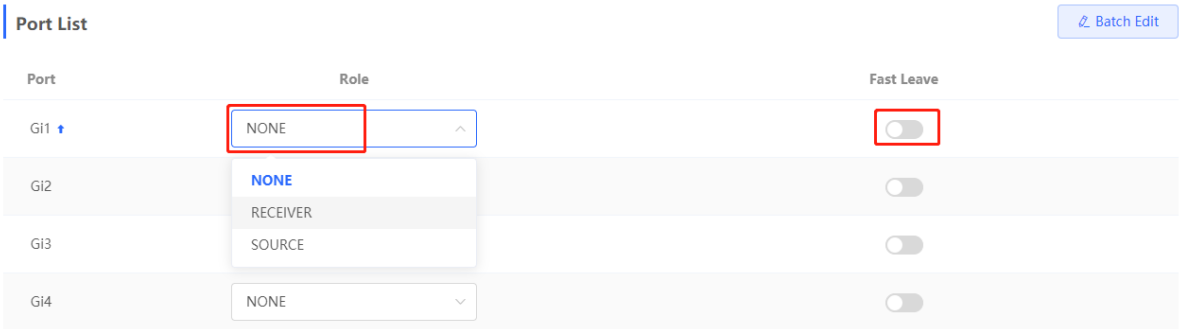


Table 5-4 Description of MVR Configuration Parameters of Ports

Parameter	Description	Default Value
Role	**NONE**: Indicates that the MVR function is disabled. **SOURCE**: Indicates the source port that receives multicast data streams. **RECEIVER**: Indicates the receiver port connected to a client.	NONE

Parameter	Description	Default Value
Fast Leave	Configures the fast leave function for a port. After the function is enabled, if the port receives the leave packet, it is directly deleted from the multicast group.	Disable

Note

- If a source port or a receiver port is configured, the source port must belong to the MVR VLAN and the receiver port must not belong to the MVR VLAN.
- The fast leave function takes effect only on the receiver port.

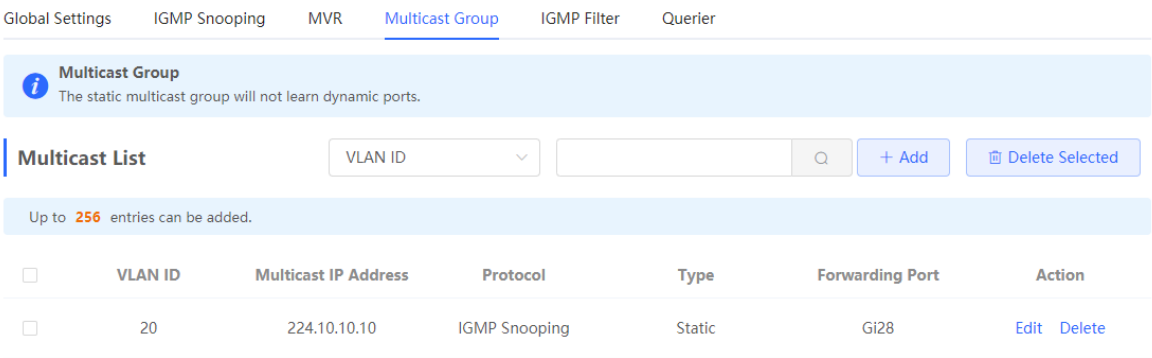
13.5 Configuring Multicast Group

Choose **Local Device** > **L2 Multicast** > **Multicast Group**.

A multicast group consists of the destination ports, to which multicast packets are to be sent. Multicast packets are sent to all ports in the multicast group.

You can view the **Multicast List** on the current page. The search box in the upper-right corner supports searching for multicast group entries based on VLAN IDs or multicast addresses.

Click **Add** to create a multicast group.



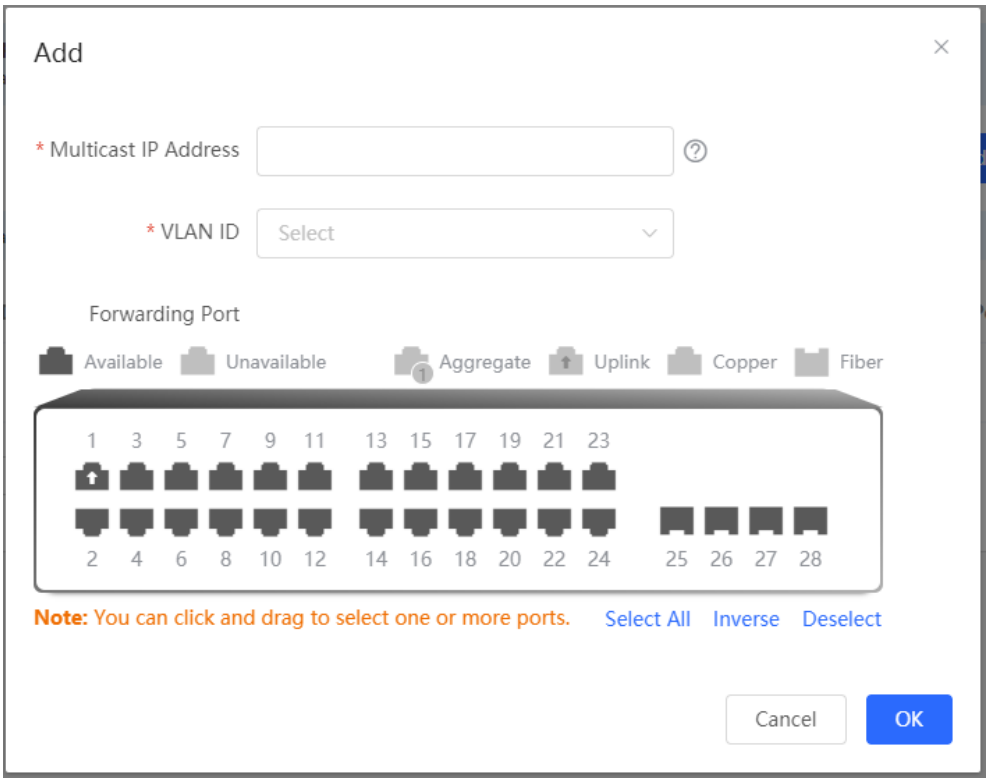


Table 5-5 Description of Multicast Group Configuration Parameters

Parameter	Description	Default Value
VLAN ID	VLAN, to which received multicast traffic belongs	NA
Multicast IP Address	On-demand multicast IP address	NA
Protocol	If the VLAN ID is a multicast VLAN and the multicast address is within the multicast IP address range of the MVR, the protocol is MVR. In other cases, the protocol is IGMP snooping.	NA
Type	Multicast group generation mode can be statically configured or dynamically learned. In normal cases, a port can join a multicast group only after the port receives an IGMP Report packet from the multicast, that is, dynamically learned mode. If you manually add a port to a group, the port can be statically added to the group and exchanges multicast group information with the PIM router without IGMP packet exchange.	NA

Parameter	Description	Default Value
Forwarding Port	List of ports that forward multicast traffic	NA

Note

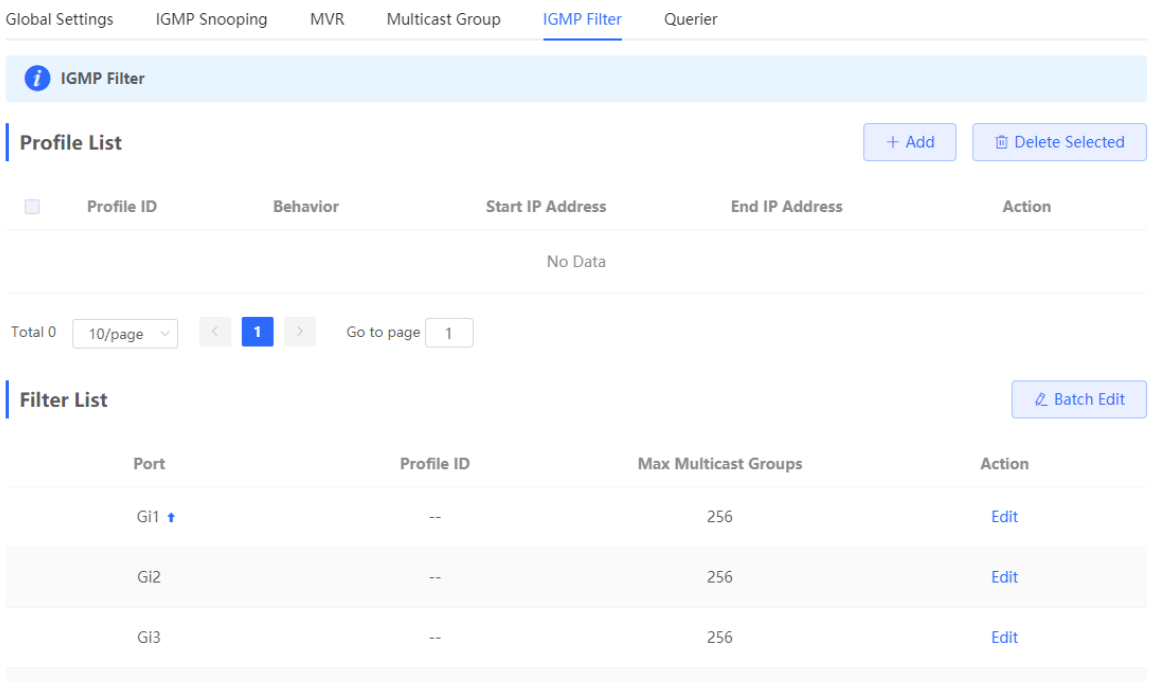
Static multicast groups cannot learn other dynamic forwarding ports.

13.6 Configuring a Port Filter

Choose **Local Device** > **L2 Multicast** > **IGMP Filter**.

Generally, the device running ports can join any multicast group. A port filter can configure a range of multicast groups that permit or deny user access, you can customize the multicast service scope for users to guarantee the interest of operators and prevent invalid multicast traffic.

There are 2 steps to configure the port filter: configure the profile and set a limit to the range of the port group address.



13.6.1 Configuring Profile

Choose **Local Device** > **L2 Multicast** > **IGMP Filter** > **Profile List**.

Click **Add** to create a **Profile**. A profile is used to define a range of multicast groups that permit or deny user access for reference by other functions.

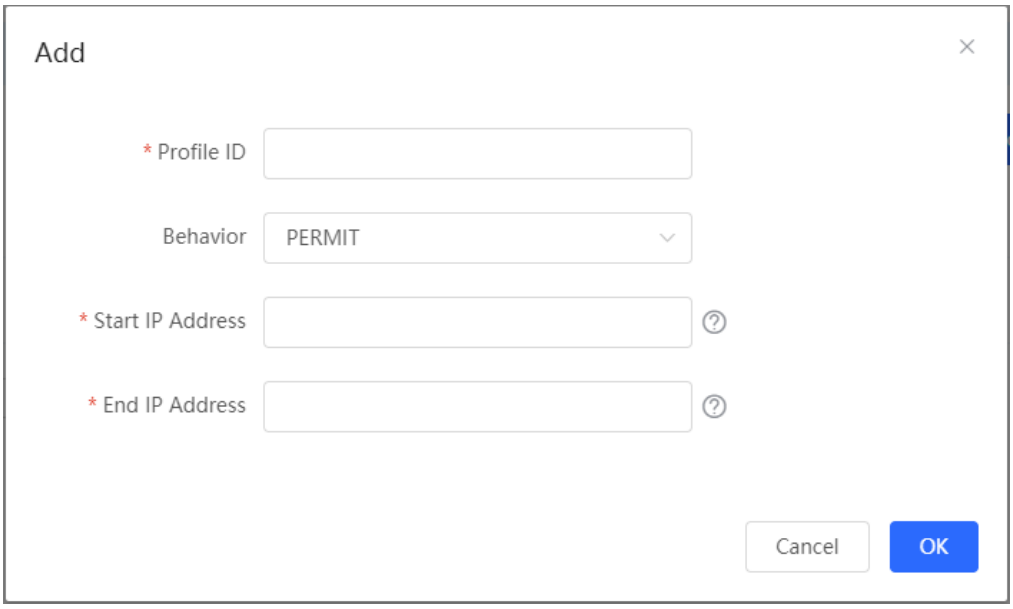


Table 5-6 Description of Profile Configuration Parameters

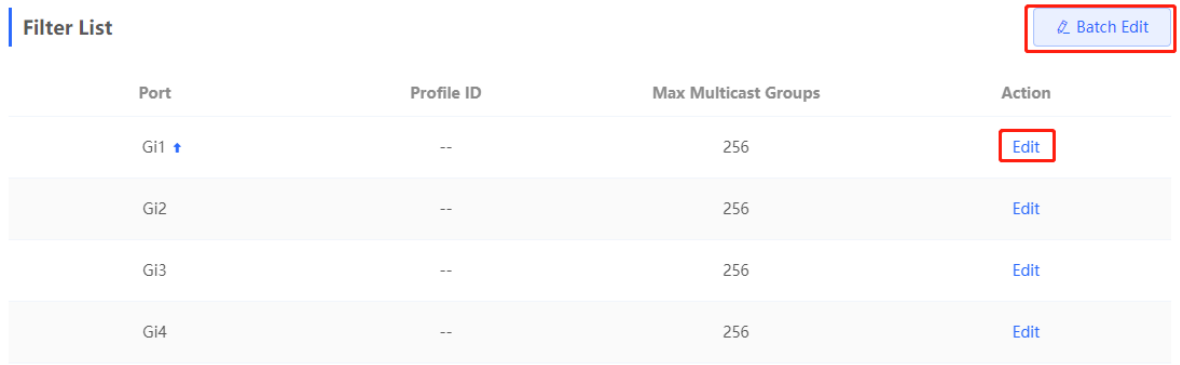
Parameter	Description	Default Value
Profile ID	Profile ID	NA
Behavior	**DENY**: Forbids demanding multicast IP addresses in a specified range. **PERMIT**: Only allows demanding multicast IP addresses in a specified range.	NA
Start IP Address	Start Multicast IP address of the range of multicast group addresses	NA
End IP Address	End Multicast IP address of the range of multicast group addresses	NA

13.6.2 Configuring a Range of Multicast Groups for a Profile

Choose **Local Device** > **L2 Multicast** > **IGMP Filter** > **Filter List**.

The port filter can cite a profile to define the range of multicast group addresses that can be or cannot be demanded by users on a port.

Click **Batch Edit**, or click **Edit** of a single port entry. In the displayed dialog box, select profile ID and enter the maximum number of multicast groups allowed by a port and click **OK**.



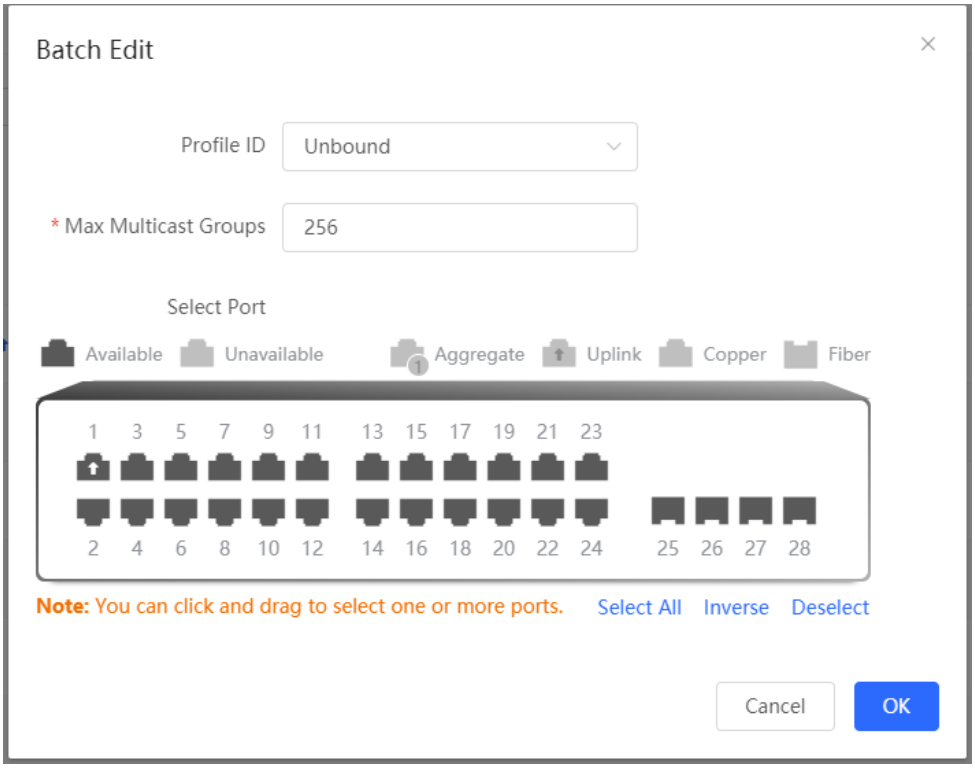


Table 5-7 Description of Port Filter Configuration Parameters

Parameter	Description	Default Value
Profile ID	Profile that takes effect on a port. If it is not set, no profile rule is bound to the port.	NA

Parameter	Description	Default Value
Max Multicast Groups	Maximum number of multicast groups that a port can join. If too much multicast traffic is requested concurrently, the multicast device will be severely burdened. Therefore, configuring the maximum number of multicast groups allowed for the port can guarantee the bandwidth.	256

13.7 Setting an IGMP Querier

13.7.1 Overview

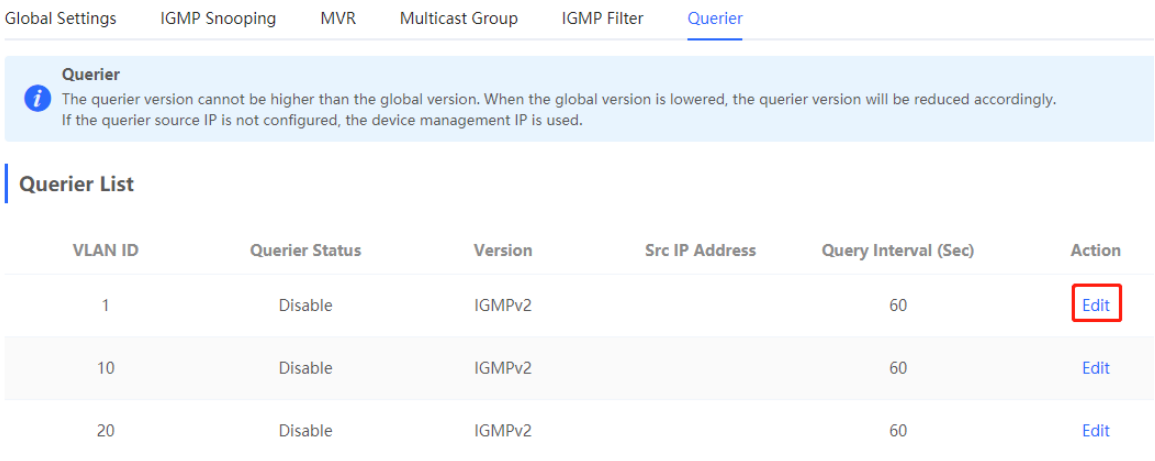
In a three-layer multicast network, the L3 multicast device serves as the querier and runs IGMP to maintain group membership. L2 multicast devices only need to listen to IGMP packets to establish and maintain forwarding entries and implement L2 multicasting. When a multicast source and user host are in the same L2 network, the query function is unavailable because the L2 device does not support IGMP. To resolve this problem, you can configure the IGMP snooping querier function on the L2 device so that the L2 device sends IGMP Query packets to user hosts on behalf of the L3 multicast device, and listens to and maintains IGMP Report packets responded by user hosts to establish L2 multicast forwarding entries.

13.7.2 Procedure

Choose **Local Device** > **L2 Multicast** > **Querier**.

One querier is set for each VLAN. The number of queriers is the same as that of device VLANs.

In **Querier List**, click **Edit** in the last **Action** column. In the displayed dialog box, select whether to enable the querier, set the querier version, querier source IP address, and packet query interval, and click **OK**.



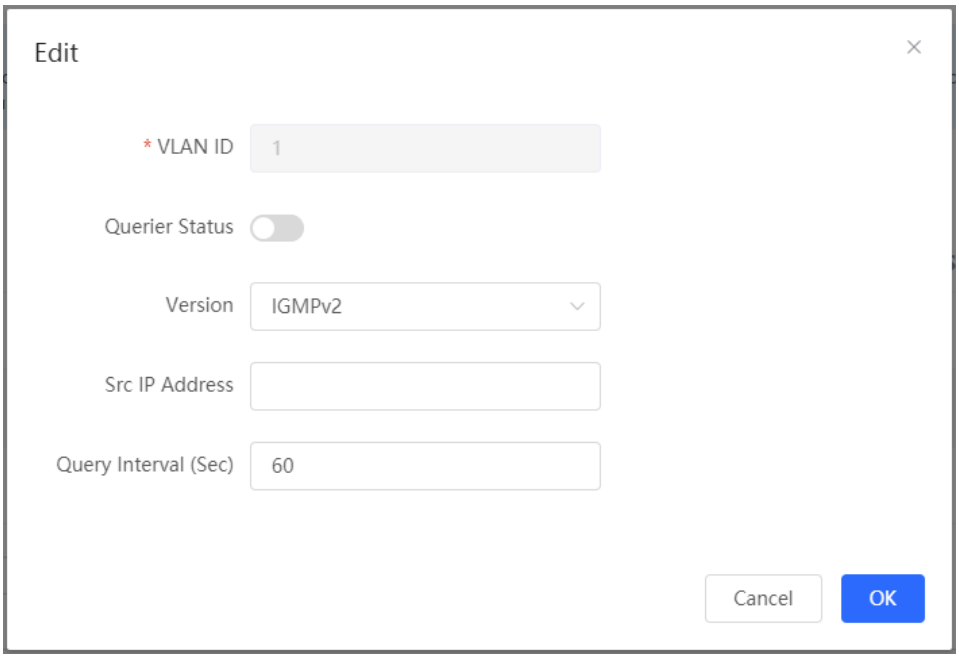


Table 5-8 Description of Querier Configuration Parameters

Parameter	Description	Default Value
Querier Status	Whether to enable or disable the VLAN querier function.	Disable
Version	IGMP Protocol version of query packets sent by the querier. It can be set to IGMPv2 or IGMPv3.	IGMPv2
Src IP Address	Source IP address carried in query packets sent by the querier.	NA
Query Interval (Sec)	Packet transmission interval, of which the value range is from 30 to 18000, in seconds.	60 seconds

Note

- The querier version cannot be higher than the global IGMP version. When the global IGMP version is lowered, the querier version is lowered accordingly.
- If no querier source IP is configured, the device management IP is used as the source IP address of the querier.

14 NBS and NIS Series Switches L3 Multicast

14.1 Overview

Layer 3 multicast is a communication method that uses multicast addressing at the network layer for sending data. Multicast enables a sender to send packets to a group of receivers simultaneously, which reduces the network bandwidth consumption and lowers the network load. Layer 3 multicast is extensively used in applications such as video conferencing, streaming media, VoIP, and others.

In Layer 3 multicast, each multicast group address corresponds to a specific multicast group, and the members of a multicast group share the same multicast group address. The sender sends data packets to the multicast group address, and routers on the network forward the packets to all members of the multicast group based on the multicast group address and the routing protocols used.

14.2 Multicast Routing Table

Choose **Local Device** > **L3 Multicast** > **Multicast Routing Table**.

The **Multicast Routing Table** page displays the information of the Layer 3 multicast routing table, including the source IP address, multicast group address, incoming interface, outgoing interface, and time to live (TTL). You can search the routing information based on either the source IP address or the multicast group address. You can click **Refresh** to view the up-to-date multicast routing table information.

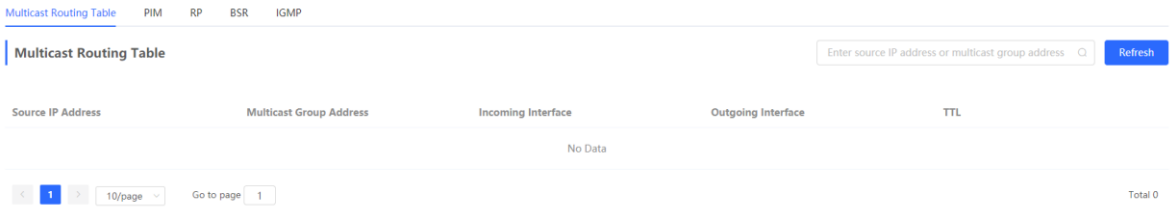


Table 14-1 Description of Multicast Routing Table Parameters

Parameter	Description	Default Value
Source IP Address	IP address of the source device sending the multicast packet.	N/A
Multicast Group Address	A special IP address that identifies a multicast group. In the routing table, the multicast group address is the IP address of the destination multicast group.	N/A
Incoming Interface	Interface receiving the multicast packets	N/A
Outgoing Interface	When the router receives a multicast packet, it forwards the multicast packet to the appropriate outgoing interface according to the value in the Outgoing Interface field in the routing table.	N/A

Parameter	Description	Default Value
TTL	The TTL value is the duration for which a routing table entry remains valid. Once this time expires, the routing table entry is considered expired and is no longer utilized.	N/A

14.3 Configuring PIM

14.3.1 Overview

Protocol Independent Multicast (PIM) is a protocol-independent intra-domain multicast routing protocol. PIM allows multicast communication to be implemented using various unicast routing protocols, including static routing, RIP, OSPF, and others. Through the implementation of the PIM protocol, routers can exchange multicast routing information, which enables the establishment and maintenance of multicast trees, thus efficiently delivering multicast data packets from the source to the receivers within the multicast group.

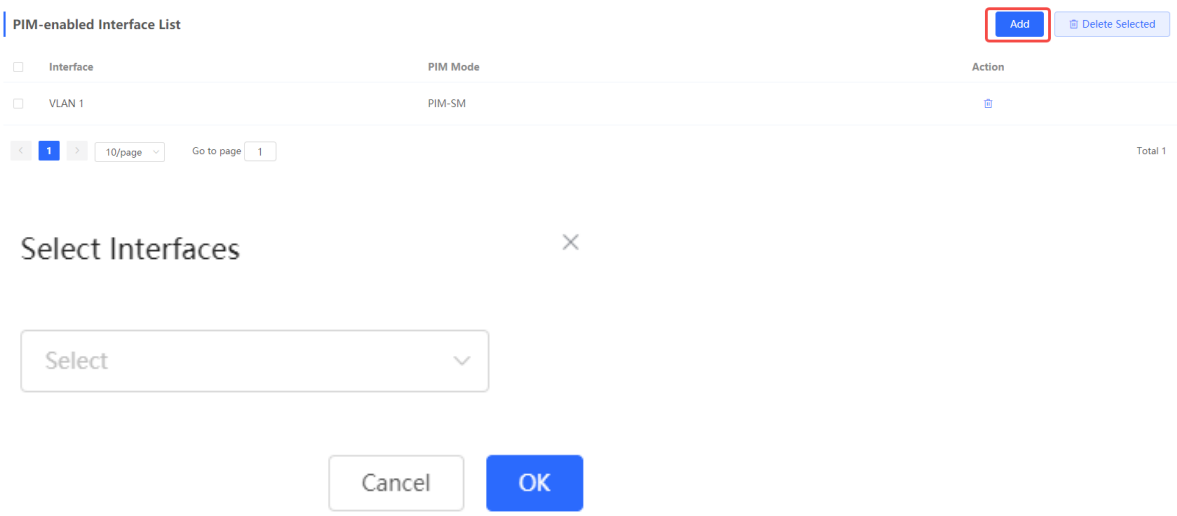
The PIM protocol features two widely used modes:

- PIM Dense Mode (PIM-DM)
  This mode is applicable to small-scale networks or scenarios with dense multicast traffic. In PIM-DM, multicast packets are transmitted along all available paths, which results in higher network bandwidth and resource consumption.
- PIM Sparse Mode (PIM-SM)
  This mode is applicable to large-scale networks or scenarios with sparse multicast traffic. In PIM-SM, routers only forward multicast packets along the required paths, effectively reducing the utilization of network bandwidth.

14.3.2 Enabling PIM

Choose **Local Device** > **L3 Multicast** > **PIM** > **PIM-enabled Interface List**.

Click **Add**. A pop-up window is displayed. On the pop-up window, select the interface on which PIM is to be enabled, and click **OK**. Multicast packet forwarding can be implemented on the selected interface. The PMI mode is PIM-SM by default.



14.3.3 Viewing PIM Neighbor Table

In the PIM protocol, routers discover neighboring routers and establish neighbor relationships through the exchange of Hello messages. Once a neighbor relationship is established between two PIM-enabled routers, they can exchange multicast information, including multicast group memberships and multicast forwarding states. By continuously updating and maintaining the PIM neighbor table, PIM-enabled routers are able to efficiently forward and process multicast packets based on the neighbor information, thereby achieving effective multicast communication.

Choose **Local Device** > **L3 Multicast** > **PIM** > **PIM Neighbor Table**.

The **PIM Neighbor Table** page displays information about PIM neighbors, such as interface, PIM neighbor, TTL, and aging time. You can search for PIM neighbor table information by entering either the interface or the PIM neighbor in the search box. You can click **Refresh** to view the up-to-date PIM neighbor table information.

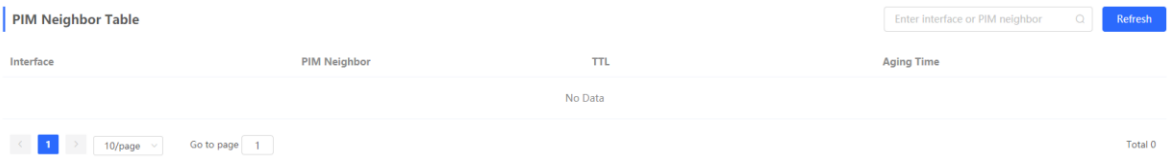


Table 14-2 Description of PIM Neighbor Table Parameters

Parameter	Description	Default Value
Interface	Interface connecting the neighbor router to the local router.	N/A
PIM Neighbor	IP address of the neighbor router.	N/A
TTL	The TTL value indicates the duration in which Hello messages sent by neighboring routers remain valid. If the local router does not receive any new Hello messages from a neighbor within the TTL time, it will consider the neighboring router as inactive or expired.	N/A
Aging Time	If a neighboring router becomes inactive or ceases to send Hello messages, the respective entry in the PIM Neighbor Table will be deleted after the specified aging time is exceeded.	105 seconds

14.4 Configuring RP

14.4.1 Overview

The Rendezvous Point (RP) is a crucial concept in the PIM protocol. In multicast communication, when a sender sends a multicast data packet, it needs to identify a specific point as the rendezvous point, from which multiple receivers can receive the multicast packet. The RP is the rendezvous point router in the multicast tree. An RP can be manually configured or dynamically elected through the BSR (Bootstrap Router) mechanism.

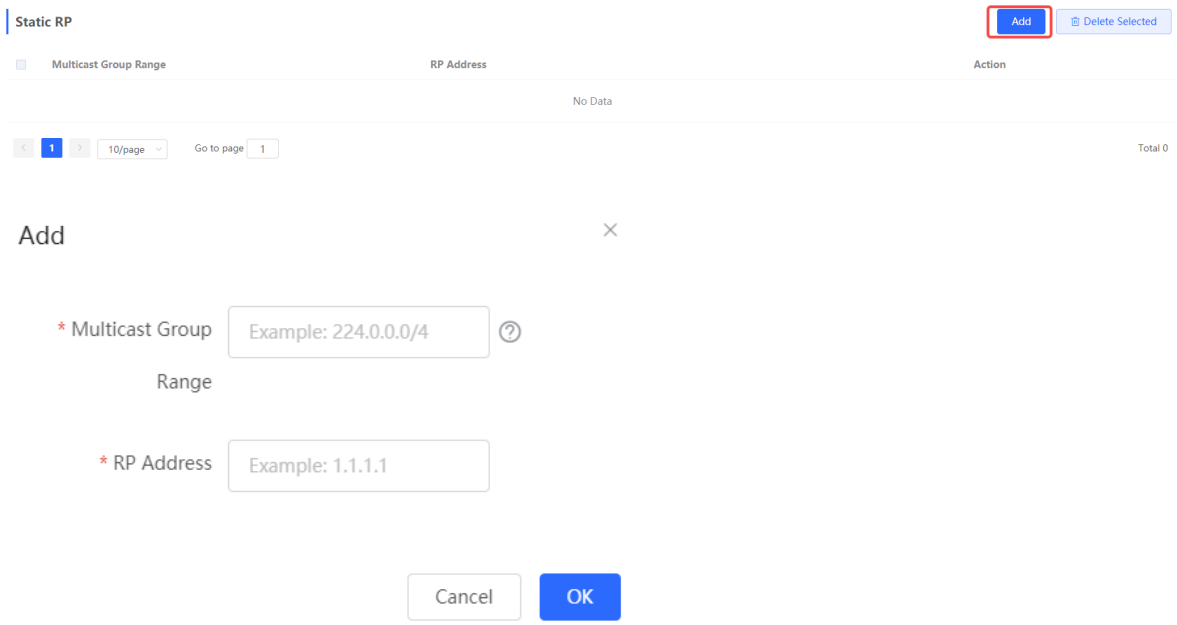
Note

An RP can provide services for multiple or all multicast groups. However, only one RP can forward multicast traffic for a multicast group at a time.

14.4.2 Configuring a Static RP

Choose **Local Device** > **L3 Multicast** > **RP** > **Static RP**.

Click **Add**. On the pop-up window that is displayed, enter the multicast group range covered by the RP and the RP address, then click **OK**.



14.4.3 Configuring a Candidate RP

On a PIM network, a Candidate RP refers to a router that is eligible to become an RP. You can configure several PIM-enabled routers in the PIM domain as Candidate RPs, so that a suitable RP is eventually elected. This process aims to enhance the efficiency and reliability of multicast communication.

Choose **Local Device** > **L3 Multicast** > **RP** > **Candidate RP**.

Toggle on **Local routing device as candidate RP:** to designate the local device as the candidate RP. Enter the priority, advertisement interval, source IP address, and the designated multicast group. Then, click **Save**.

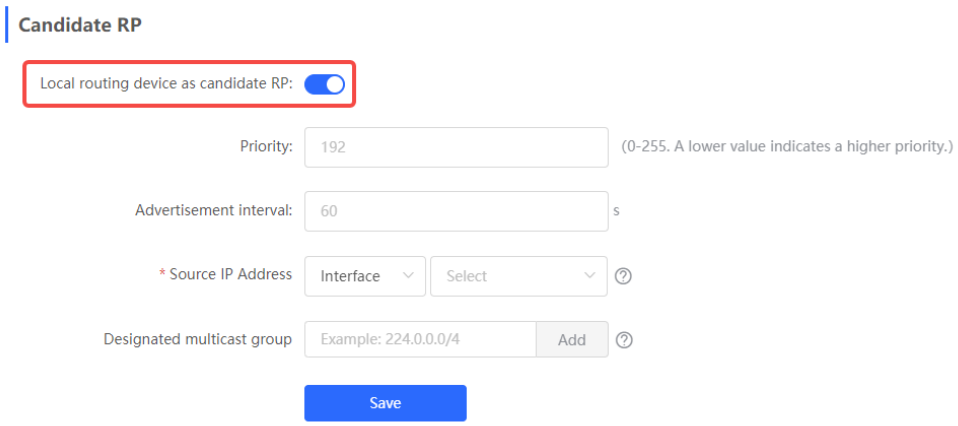


Table 4-1 **Description of Candidate RP Configuration Parameters**

Parameter	Description	Default Value
Priority	The priority determines which candidate RP will become the RP during the election process. The priority value ranges from 0 to 255, where a smaller value indicates a higher priority. A candidate RP with a higher priority has a greater chance of being elected as the RP.	192
Advertisement Interval	A candidate RP announces its presence and availability by sending PIM messages. The advertisement interval determines the frequency at which a candidate RP sends these messages. A shorter advertisement interval can notify other routers about the presence of candidate RP more quickly, but it will also increase the network load.	60 seconds
Source IP Address	The source IP address of the PIM messages sent by the candidate RP, which can be either an interface or an IP address.	N/A
Designated multicast group	The PIM messages sent by the candidate RP must contain a multicast group address, which falls within the range of 224.0.0.0/4 to 239.255.255.255/32. Candidate RPs typically send multiple messages, each specifying a different multicast group address, in order to notify other routers that they can become the RP for these multicast groups. You can click Add to configure multiple multicast group addresses.	N/A

14.5 Configuring BSR

14.5.1 Overview

In PIM-SM mode, RP needs to be manually configured, which is a tedious task for large-scale networks. The BSR (Bootstrap Router) mechanism can automatically select the RP, simplifying the RP configuration process. BSR serves as the management core of the PIM-SM domain, responsible for collecting and advertising RP information within the domain. BSR is elected by candidate BSRs.

Note

A PIM-SM domain can have only one BSR, but can have multiple candidate BSRs.

14.5.2 Configuring BSR

Choose **Local Device** > **L3 Multicast** > **BSR** > **Local Routing Device as Candidate BSR**.

Toggle on **Local routing device as candidate BSR:** to designate the local device as the candidate BSR. Enter the priority and the source IP address. Then, click **Save**.

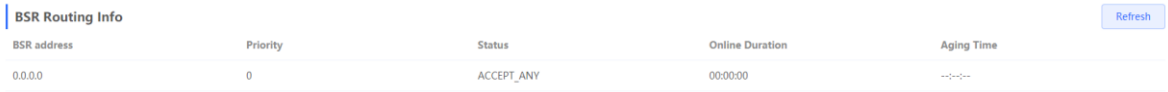
Table 4-2 **Description of Candidate BSR Configuration Parameters**

Parameter	Description	Default Value
Priority	Higher-priority candidate BSRs have a greater chance of being elected as the BSR. The priority value ranges from 0 to 255, where a smaller value indicates a higher priority.	192
Source IP Address	The source IP address of the PIM messages sent by the candidate BSR, which can be either an interface or an IP address.	N/A

14.5.3 Viewing BSR Routing Info

Choose **Local Device** > **L3 Multicast** > **BSR** > **BSR Routing Info**.

The **BSR Routing Info** page displays BSR routing information, including BSR address, priority, status, online duration and aging time. You can click **Refresh** to view the up-to-date BSR routing information.



14.6 Configuring IGMP

14.6.1 Overview

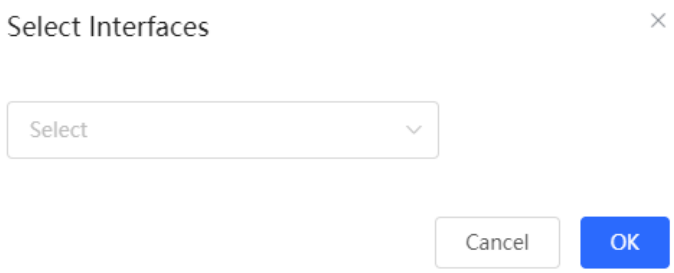
Internet Group Management Protocol (IGMP) is used to enable multicast communication on IPv4 networks. IGMP is responsible for managing the membership of multicast groups and facilitating communication between hosts and multicast routers. With IGMP, hosts can join or leave a specific multicast group and advertise its membership to multicast routers. Multicast routers use IGMP to determine which hosts are members of a multicast group, enabling efficient forwarding of multicast traffic.

14.6.2 Enabling IGMP

Choose **Local Device** > **L3 Multicast** > **IGMP** > **IGMP-enabled Interface List**.

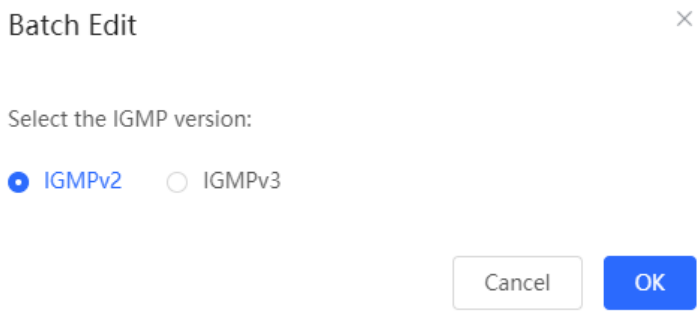
The **IGMP-enabled Interface List** page displays basic information of IGMP-enabled interfaces, including the interface and the IGMP version.

Add: Click **Add**. The **Select Interfaces** pop-up window is displayed. On the pop-up window, select an interface on which IGMP will be enabled. Then, Click **OK**. IGMP is enabled on the corresponding VLAN.



Batch edit: Select the interfaces, and click **Batch Edit**. On the pop-up window that is displayed, select the IGMP version, then click **OK**.

IGMPv3 has improved functionality and flexibility compared to IGMPv2. It supports more multicast group management features, provides finer control over membership and query methods, and introduces security mechanisms. With these enhancements, IGMPv3 can be applied in scenarios that require a higher level of multicast management and security.



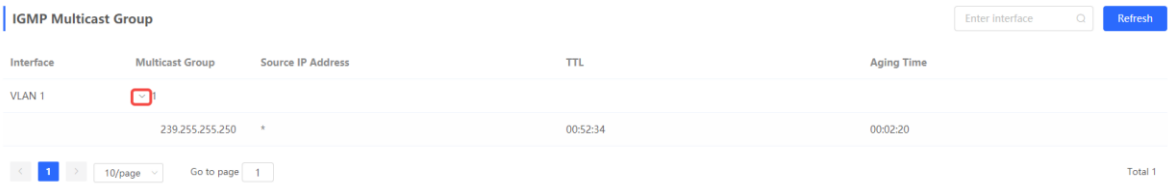
Batch delete: Select the interfaces, and click **Batch Delete**. IGMP is disabled on the selected interfaces.

14.6.3 Viewing IGMP Multicast Group

Choose **Local Device** > **L3 Multicast** > **IGMP** > **IGMP Multicast Group**.

The **IGMP Multicast Group** page displays information about IGMP multicast groups, including the number of multicast groups, source IP addresses, TTL, and aging time. You can click to expand a multicast group to view the detailed IP addresses associated with the multicast group on that interface.

You can search IGMP multicast group information by entering the interface in the search box. You can click **Refresh** to view the up-to-date IGMP multicast group information.



15 NBS and NIS Series Switches L3 Management

Caution

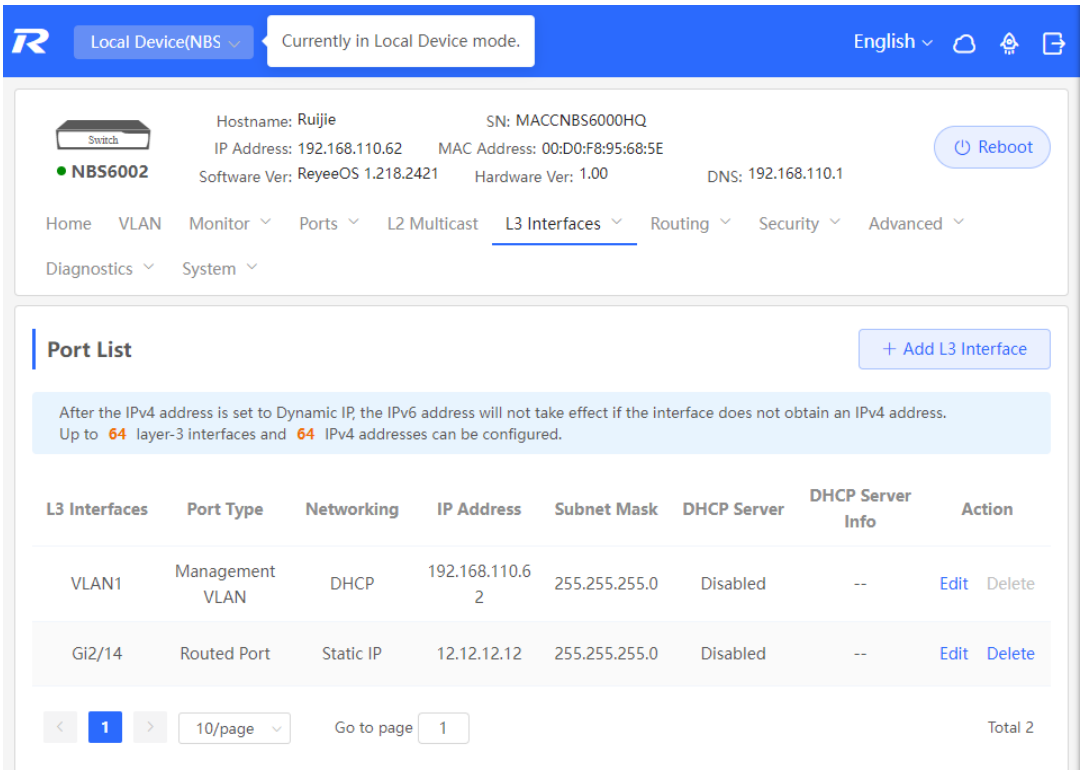
This section is applicable only to NBS Series Switches that support L3 functions. Products that do not support L3 functions such as RG-NBS3100 Series Switches, RG-NBS3200 Series Switches, do not support the functions mentioned in this section.

15.1 Setting an L3 Interface

Choose **Local Device** > **L3 Interfaces** > **L3 Interfaces**.

The port list displays various types of L3 interfaces on the device, including SVIs, Routed Ports, and L3 Aggregate Ports.

Click **Add L3 Interfaces** to set a new L3 Interface**.**



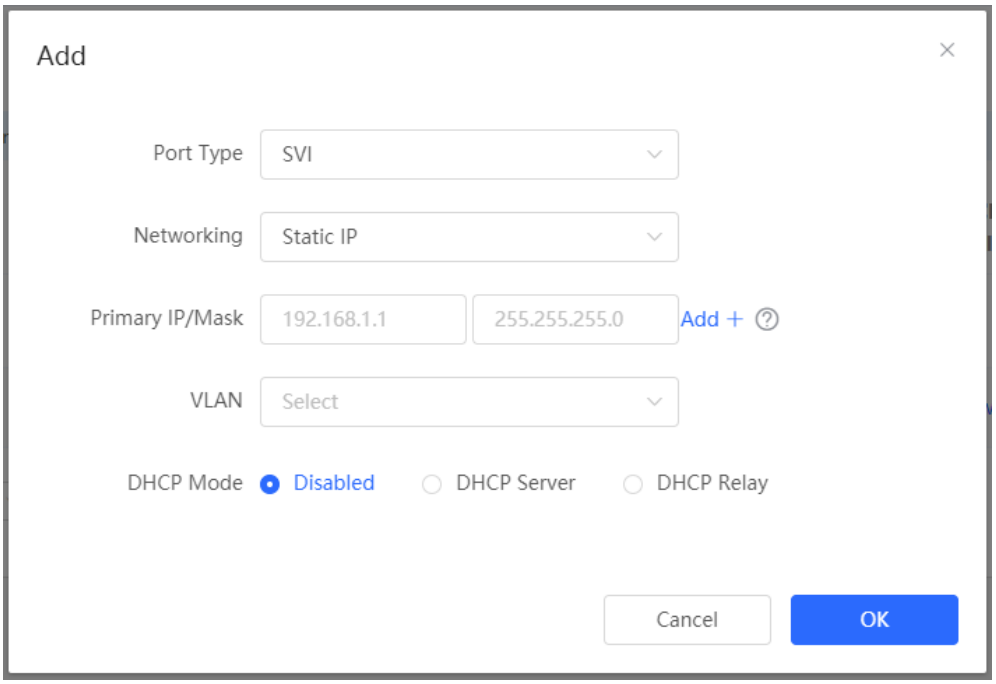


Table 6-1 Description of Configuration Parameters of L3 Interfaces

Parameter	Description
Port Type	The type of a created L3 interface. It can be an SVI, routed port, or L3 aggregate port. For details, see Table 12-1
Networking	Specifies DHCP or static mode for a port to obtain the IP address.
VLAN	Specifies the VLAN, to which an SVI belongs.
IP/Mask	When **Networking** is set to **Static IP**, you need to manually enter the IP address and subnet mask.
Select Port	Select the device port to be configured.
Aggregate	Specifies the aggregate port ID, for example, Ag1, when an L3 aggregate port is created.
DHCP Mode	Select whether to enable the DHCP service on the L3 interface. **Disabled**: Indicates that the DHCP service is disabled. No IP address can be assigned to clients connected to the interface. **DHCP Server**: Indicates that the device functions as the DHCP server to assign IP addresses to downlink devices connected to the interface. You need to set the start IP address of an address pool, number of IP addresses that can be assigned, and address lease; for more information, see 15.2 Configuring the IPv6 Address for the L3 Interface. **DHCP Relay**: Indicates that the device serves as a DHCP relay, obtains IP addresses from an external server, and assigns the IP addresses to downlink devices. The interface IP address and DHCP server IP address need to be configured. The interface IP address must be in the same network segment as the address pool of the DHCP server.

Parameter	Description
Excluded IP Address (Range)	When the device acts as a DHCP server, set the IP address in the address pool that is not used for assignment

Note

- VLAN 1 is the default SVI of the device. It can be neither modified nor deleted.
- The management VLAN is only displayed on the L3 Interfaces page but cannot be modified. To modify it, choose Ports > MGMT IP. For details, see 12.6 MGMT IP Configuration.
- The DHCP relay and DHCP server functions of an L3 interface are mutually exclusive and cannot be configured at the same time.
- Member ports of an L3 interface must be routed ports.

15.2 Configuring the IPv6 Address for the L3 Interface

IPv6 is a suite of standard protocols for the network layer of the Internet. IPv6 solves the following problems of IPv4:

- Address depletion:

NAT must be enabled on the gateway to convert multiple private network addresses into a public network address. This results in an extra delay caused by address translation, and may interrupt the connection between devices inside and outside the gateway. In addition, you need to add a mapping to enable access to the intranet devices from the Internet.

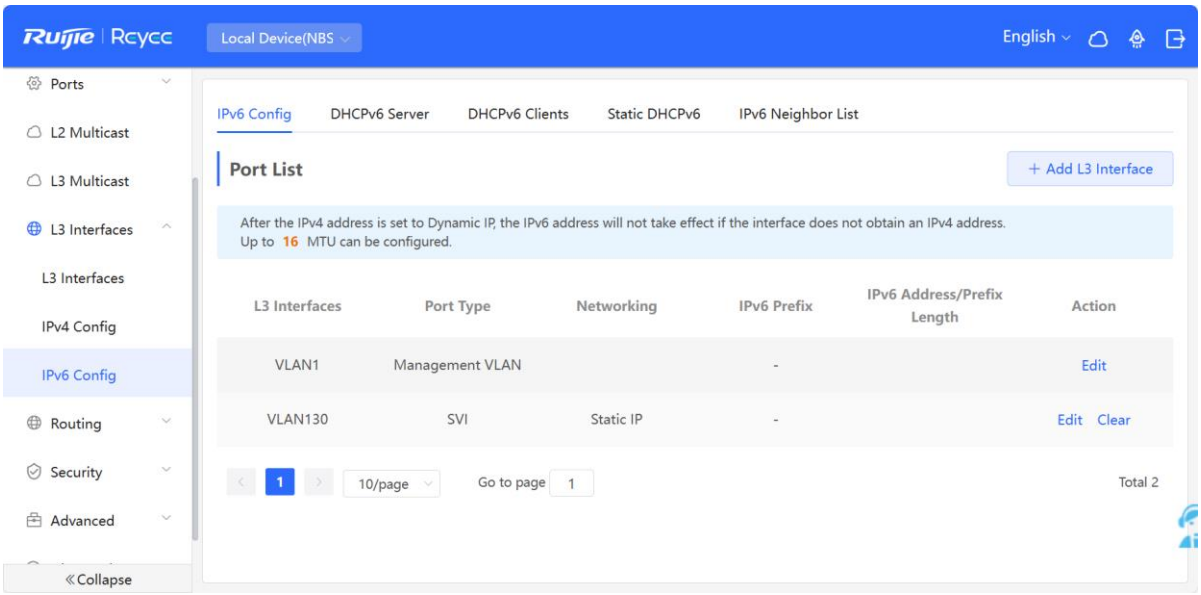
- Design defect:

IP addresses cannot be formed using network topology mapping, and a large-scale routing table is needed.

- Lack of built-in authentication and confidentiality:

IPv4 itself does not require encryption. It is difficult to trace the source after address translation. As the number of addresses in a network segment is limited, it is easy for attackers to scan all hosts in the LAN. IPv6 integrates IPSec by default. End-to-end connections can be established without address translation, and it is easy to trace the source. IPv6 has a huge address space. A 64-bit prefix address supports 64 host bits, which increases the difficulty and cost of scanning and therefore prevents attacks.

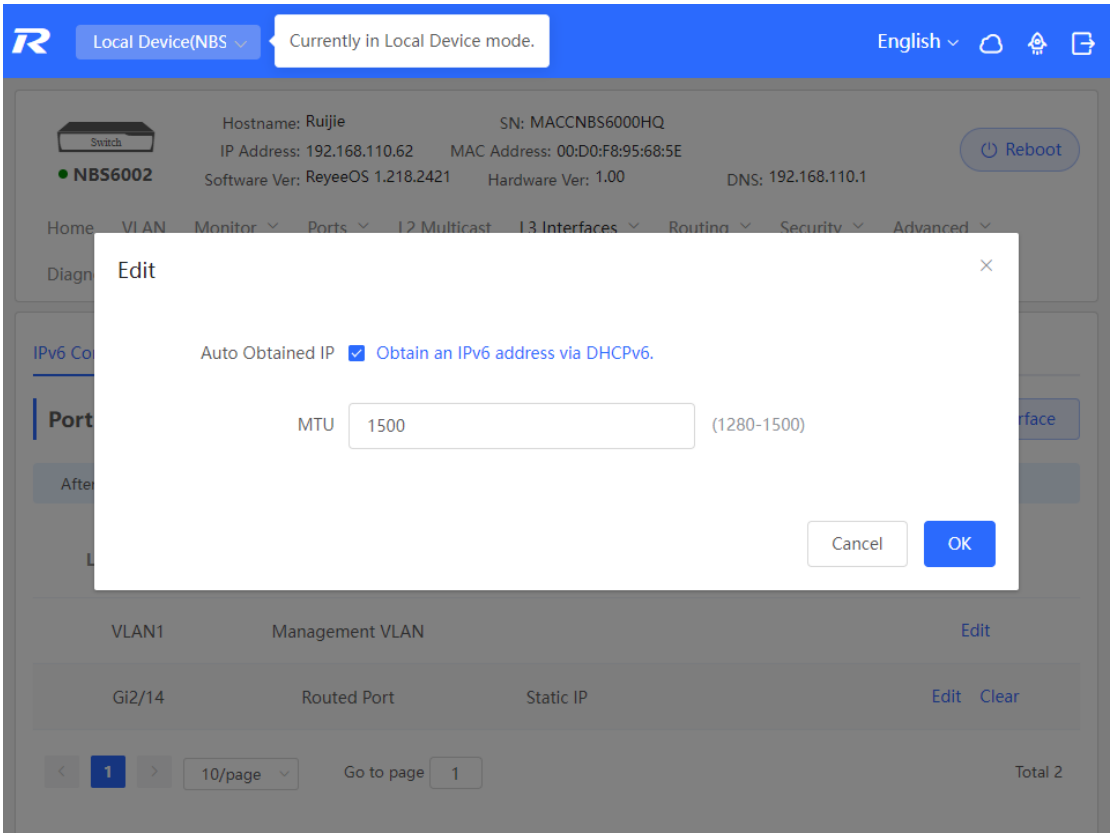
Choose **Local Device** > **L3 Interfaces** > **IPv6 Config**.



Caution

- Add an IPv4 L3 interface first. Then, select the interface on the IPv6 L3 interface configuration page, and click **Edit**.
- If the IPv4 address of an interface is set to **DHCP** and no IPv4 address is obtained, the IPv6 address of this interface will not take effect.

- If an upstream DHCPv6 server is available, select **Auto Obtained IP** and specify the MTU. The default MTU is **1500**. You are advised to retain the default value. Then, click **OK**.



- If no upstream DHCPv6 server is available to assign the IP address, configure the IPv6 information as follows:

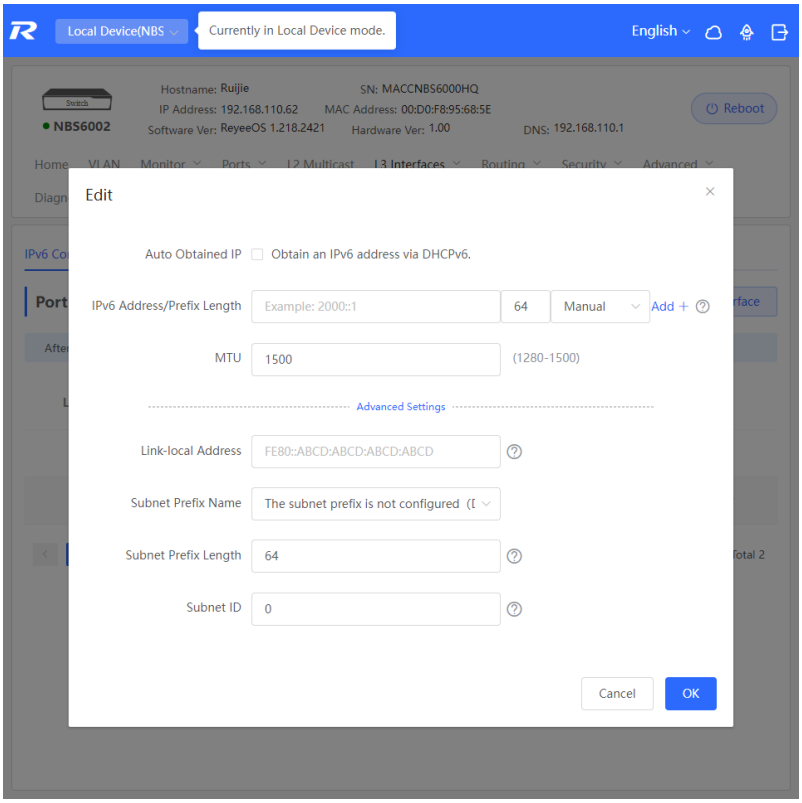


Table 6-2 **IPv6 Address Configuration Parameters of the L3 Interface**

Parameter	Description
Obtain an IPv6 address via DHCPv6	If no upstream DHCPv6 server is available, do not select **Auto Obtained IP**. Instead, manually add the IPv6 address.
IPv6 Address/Prefix Length	Configure the IPv6 address and prefix length. You can click **Add** to add multiple IPv6 addresses. If the primary IP address is empty, the configured secondary IP address is invalid. For manual configuration, the prefix length ranges from 1 to 128. For auto configuration, the prefix length ranges from 1 to 64. If the IPv6 prefix length of the L3 interface is between 48 and 64, this address can be assigned.
MTU	Configure the MTU. The default MTU is **1500**.

Parameter	Description
Advanced Settings	Click **Advanced Settings** to configure the link local address, subnet prefix name, subnet prefix length, and subnet ID.
Link-local Address	The link local address is used to number hosts on a single network link. The first 10 bits of link address in binary notation must be '1111111010'.
Subnet Prefix Name	It identifies a specified link (subnet).
Subnet Prefix Length	It indicates the length (in bits) of the subnet prefix in the address. The value ranges from 48 to 64 (The subnet prefix length must be greater than the length of the prefix assigned by the server).
Subnet ID	Configure the subnet ID of the interface in hexadecimal notation. The number of available subnet IDs is (2^N - 1), where **N** is equal to (Subnet prefix length of the interface - Length of the prefix assigned by the server).

15.3 Configuring the DHCP Service

After the DHCP server function is enabled on the L3 interface, the device can assign IP addresses to downlink devices connected to the port.

15.3.1 Enable DHCP Services

Choose **Local Device** > **L3 Interfaces** > **L3 Interfaces**.

Click **Edit** on the designated port, or click **Add L3 Interface** to add a Layer 3 interface, select DHCP mode for local allocation, and enter the starting IP of the address pool, the number of allocated IPs, the excluded IP address range, and the address lease time.

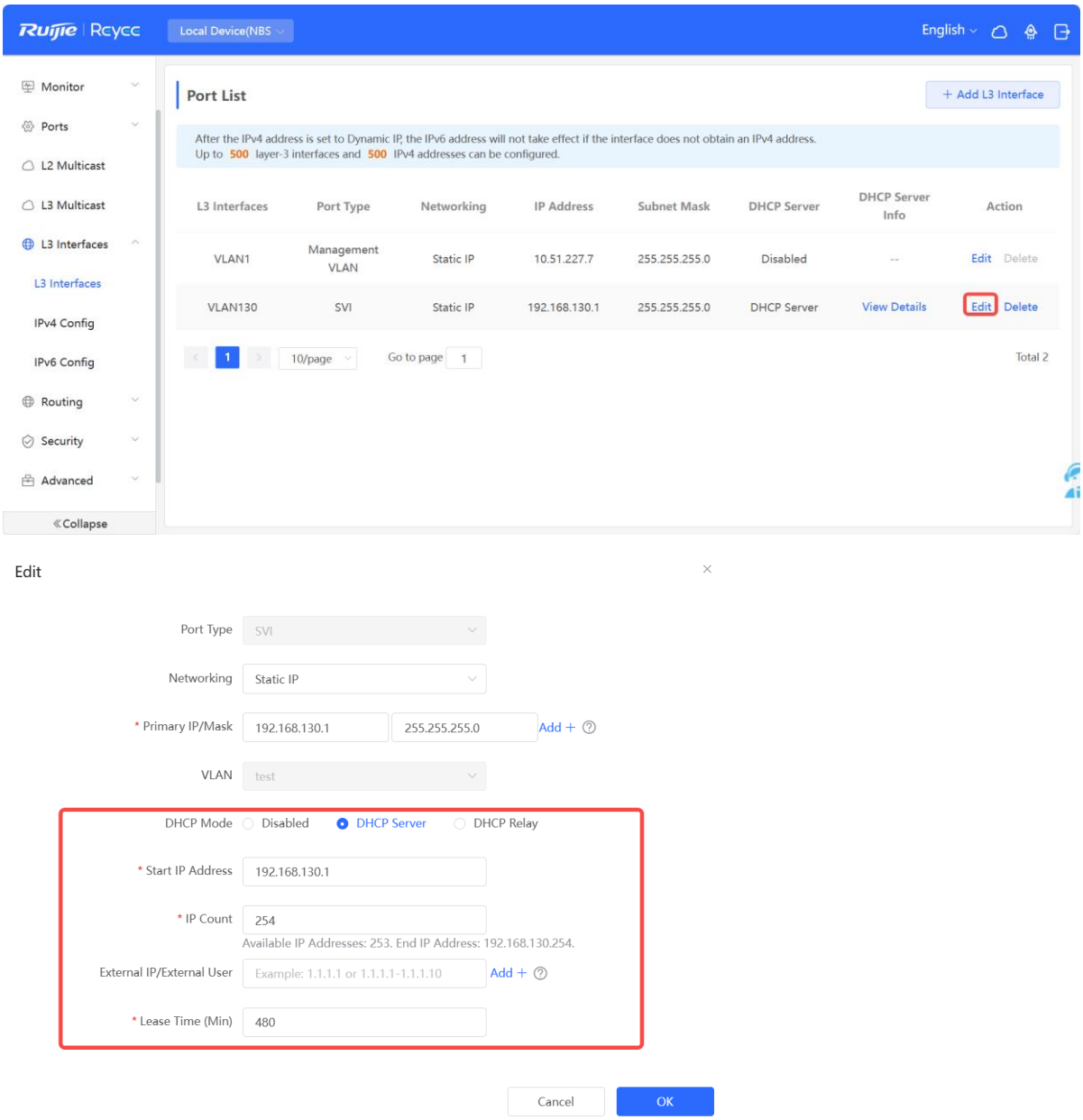


Table 6-3 Description of DHCP Server Configuration Parameters

Parameter	Description
DHCP Server	To choose DHCP server
Start IP Address	The DHCP server assigns the Start IP address automatically, which is the Start IP address of the DHCP address pool. A client obtains an IP address from the address pool. If all the addresses in the address pool are used up, no IP address can be obtained from the address pool.

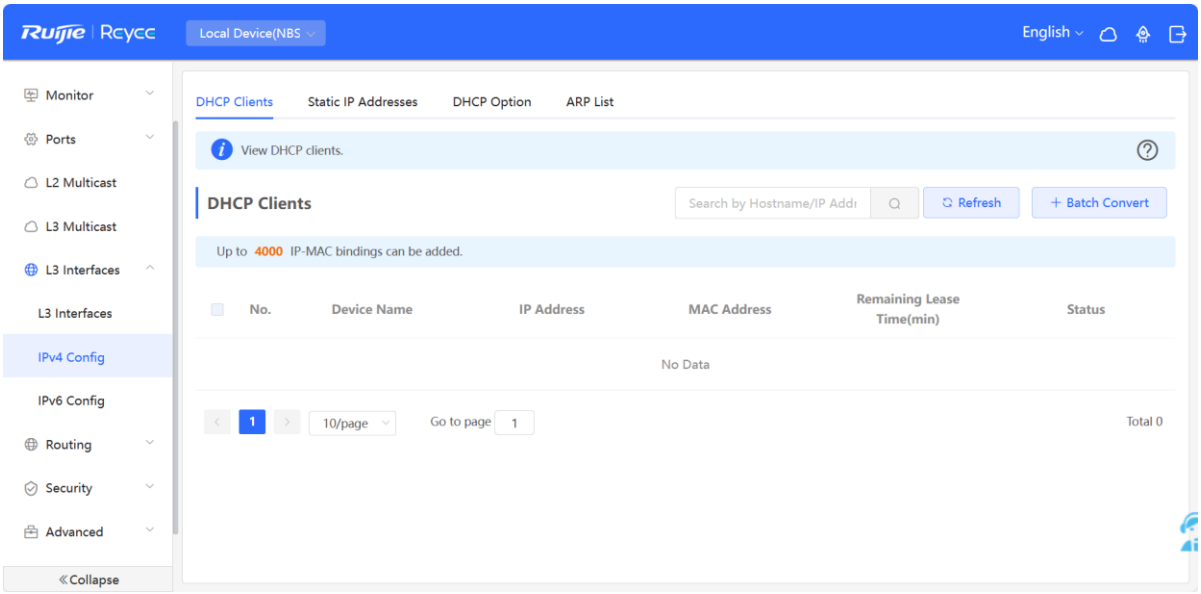
Parameter	Description
IP Count	The number of IP addresses in the address pool
External IP/External User	IP addresses in the address pool that are not used for allocation, support inputting a single IP address or IP network segment, and add up to 20 address segments.
Lease Time(Min)	The lease of the address, in minutes. **Lease Time(Min)**: When a downlink client is connected, the leased IP address is automatically renewed. If a leased IP address is not renewed due to client disconnection or network instability, the IP address will be reclaimed after the lease term expires. After the downlink client connection is restored, the client can request an IP address again

15.3.2 Viewing the DHCP Client

Choose **Local Device** > **L3 Interfaces** > **IPv4 Config** > **DHCP Clients**.

View the addresses automatically allocated to downlink clients after the L3 Interfaces enable DHCP services. You can find the client information based on the MAC address, IP address, or username.

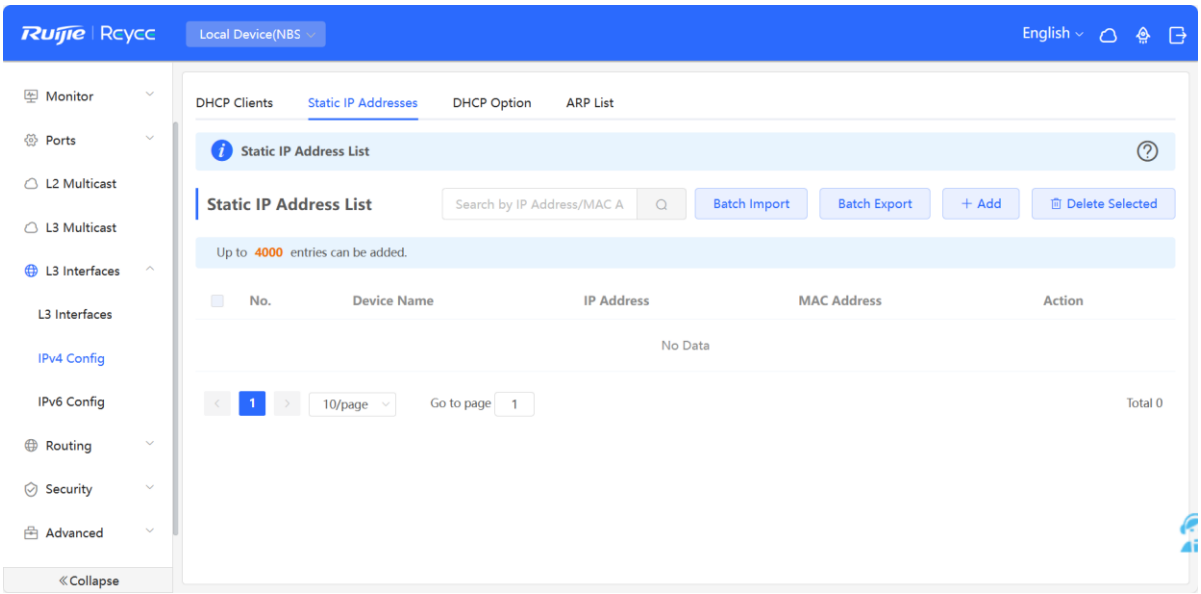
Find the target client and click **Convert to Static IP** in the **Status** column, or select desired clients and click **Batch Convert**. The dynamic address allocation relationship is added to the static address allocation list, so that the host can obtain the bound IP address for each connection. For details on how to view the static address allocation list, see 15.3.3 Configuring Static IP Addresses Allocation.



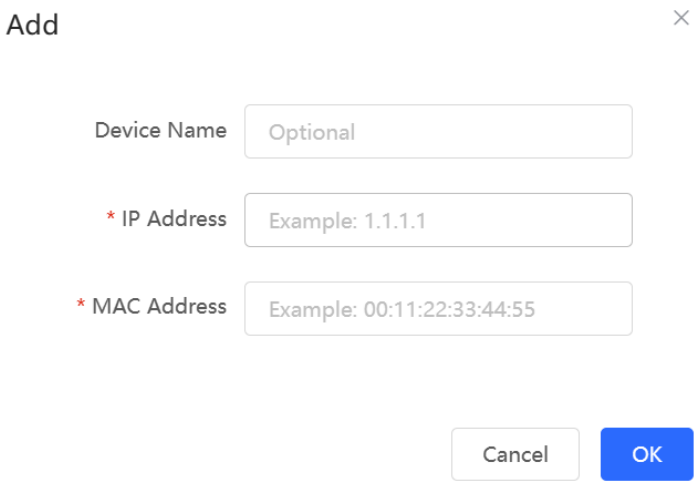
15.3.3 Configuring Static IP Addresses Allocation

Choose **Local Device** > **L3 Interfaces** > **IPv4 Config** > **Static IP Addresses**.

Displays the client entries which are converted into static addresses in the client list as well as manually added static address entries. The upper-right search box supports searching for corresponding entries based on the assigned IP address or the Device MAC Address



Click **Add**. In the displayed static IP address binding dialog box, enter the MAC address and IP address of the client to be bound, and click **OK**. After a static IP address is bound, the bound IP address will be obtained each time the corresponding downlink client connects to the network.



To delete a static address, select the static entry to be deleted in **Static IP Address List**, and click **Delete Selected**; or click **Delete** in the last **Action** column of the corresponding entry.

15.3.4 Configuring the DHCP Server Options

Choose **Local Device** > **L3 Interfaces** > **IPv4 Config** > **DHCP Option**.

The configuration delivered to the downlink devices is optional and takes effect globally when the L3 interface serves as the DHCP server.

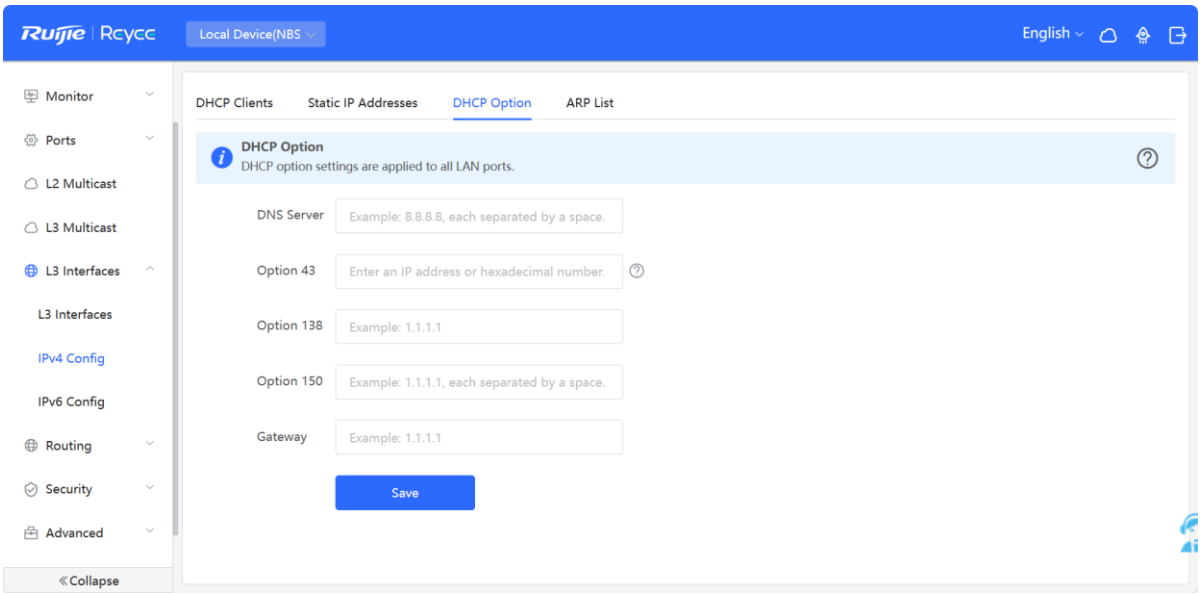


Table 6-4 Description of the DHCP Server Options Configuration Parameters

Parameter	Description
DNS Server	DNS server address provided by an ISP. Multiple IP addresses can be entered and separated by spaces.
Option 43	When the AC (wireless controller) and the AP are not in the same LAN, the AP cannot discover the AC through broadcast after obtaining an IP address from the DHCP server. To enable the AP to discover the AC, you need to configure Option 43 carried in the DHCP response packet on the DHCP server.
Option 138	Enter the IP address of the AC. Similar to Option 43, when the AC and AP are not in the same LAN, you can configure Option 138 to enable the AP to obtain the IPv4 address of the AC.
Option 150	Enter the IP address of the TFTP server. Enter the IP address of the TFTP server to specify the TFTP server address assigned to the client. Multiple IP addresses can be entered and separated by spaces.
Gateway	Specifies the default gateway address that client devices use to access networks outside of their local subnet, typically the IP address of a router or other networking device that connects to other networks or the internet.

Note

DHCP options are optional configuration when the device functions as an L3 DHCP server. The configuration takes effect globally and does not need to be configured by default. If no DNS server address is specified, the DNS address assigned to a downlink port is the gateway IP address by default.

15.4 Configuring the DHCPv6 Server

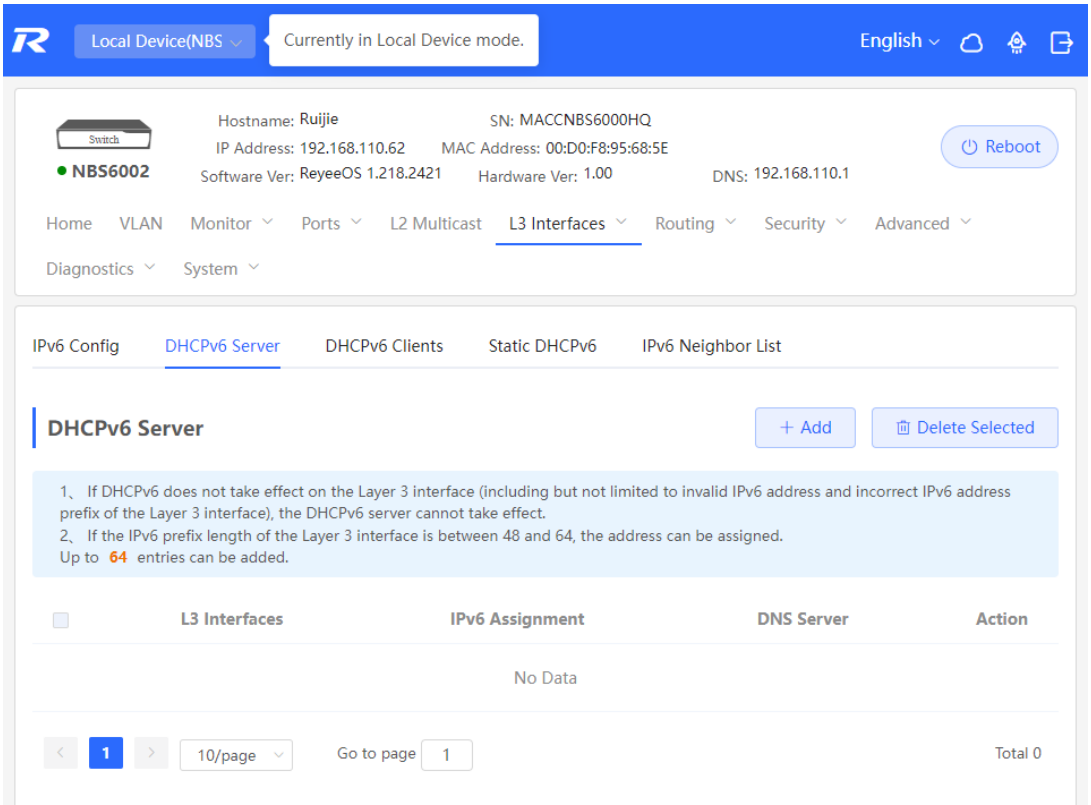
Dynamic Host Configuration Protocol for IPv6 (DHCPv6) is a protocol that allows the DHCP server to pass configuration information (such as the IPv6 network address) to IPv6 nodes.

Compared with other IPv6 address assignment methods (such as manual configuration and stateless address autoconfiguration), DHCPv6 provides the functions of address assignment, Prefix Delegation (PD), and configuration parameter assignment.

- DHCPv6 is both a stateful address autoconfiguration protocol and a stateless address configuration protocol. It supports flexible addition and reuse of network addresses, and can record the assigned addresses, thus enhancing network management.
- The configuration parameter assignment function of DHCPv6 can solve the problem that parameters cannot be obtained under the stateless address autoconfiguration protocol, and provide the host with configuration information, such as the DNS server address and domain name.

Choose **Local Device** > **L3 Interfaces** > **IPv6 Config**.

(1) Click **Add**, select a L3 interface and IP address assignment method, and enter the address lease term and DNS server address. The address lease term is 30 minutes by default. You are advised to retain the default value. Then, click **OK**.



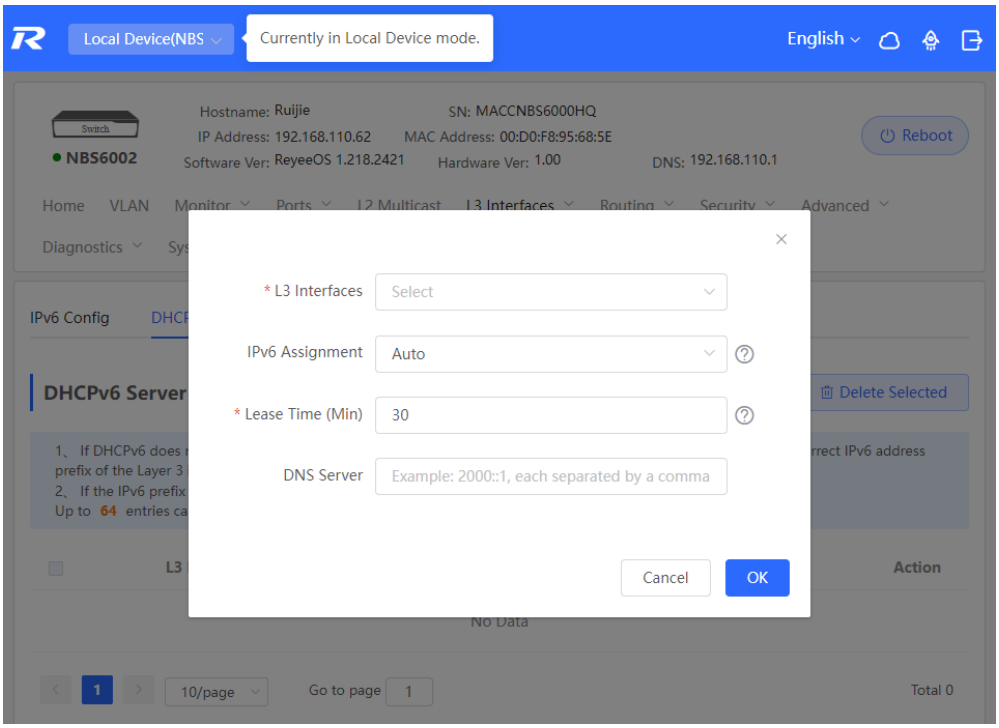


Table 6-5 **IPv6 Address Configuration Parameters of the L3 Interface**

Parameter	Description
L3 Interfaces	Select the L3 interface for which the DHCPv6 server needs to be added.
IPv6 Assignment	If this parameter is set to **Auto**, both DHCPv6 and SLAAC are used to assign IPv6 addresses.
Lease Time	The default value is **30** minutes. The value ranges from 30 to 2880 minutes. When the device stays online and the network is normal, this parameter is periodically updated (reset to 0).
DNS Server	Enter the DNS server address.

15.4.1 Viewing DHCPv6 Clients

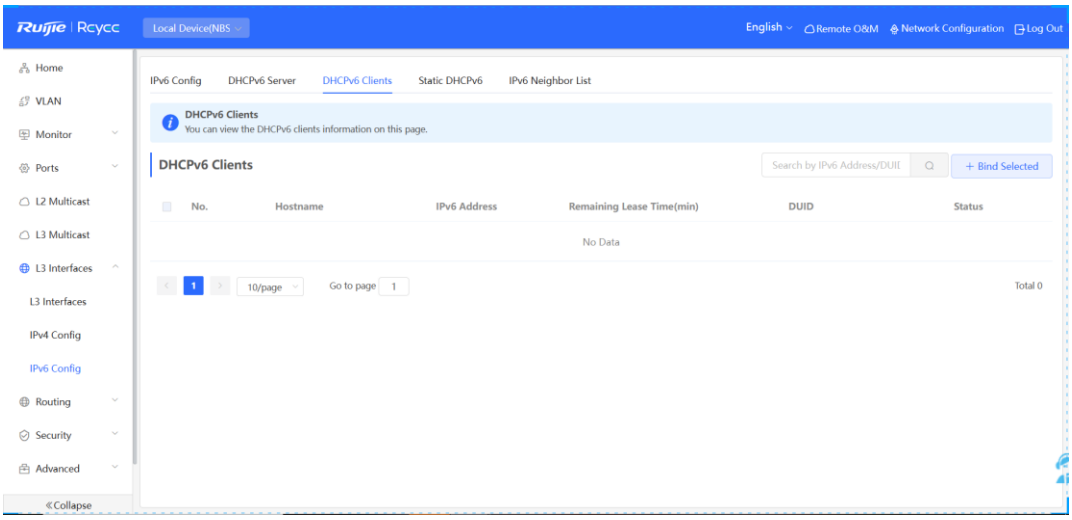
Choose **Local Device** > **L3 Interfaces** > **IPv6 Config**.> DHCPv6 Clients

View the information of the client that obtains the IPv6 address from the device, including the host name, IPv6 address, remaining lease term, DHCPv6 Unique Identifier (DUID), and status. Click + Bind Selected to bind the IP

addresses and hosts in batches, so that the IP addresses obtained by the hosts from the switch remain unchanged.

Note

Each server or client has only one DUID for identification.

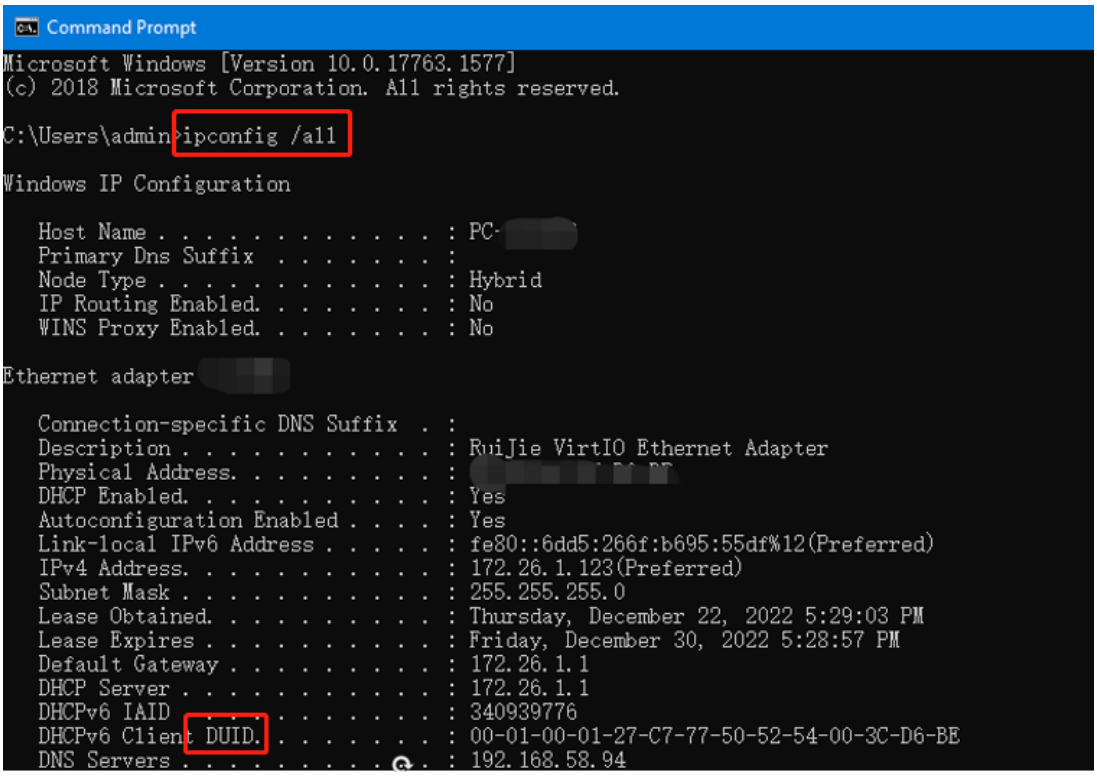


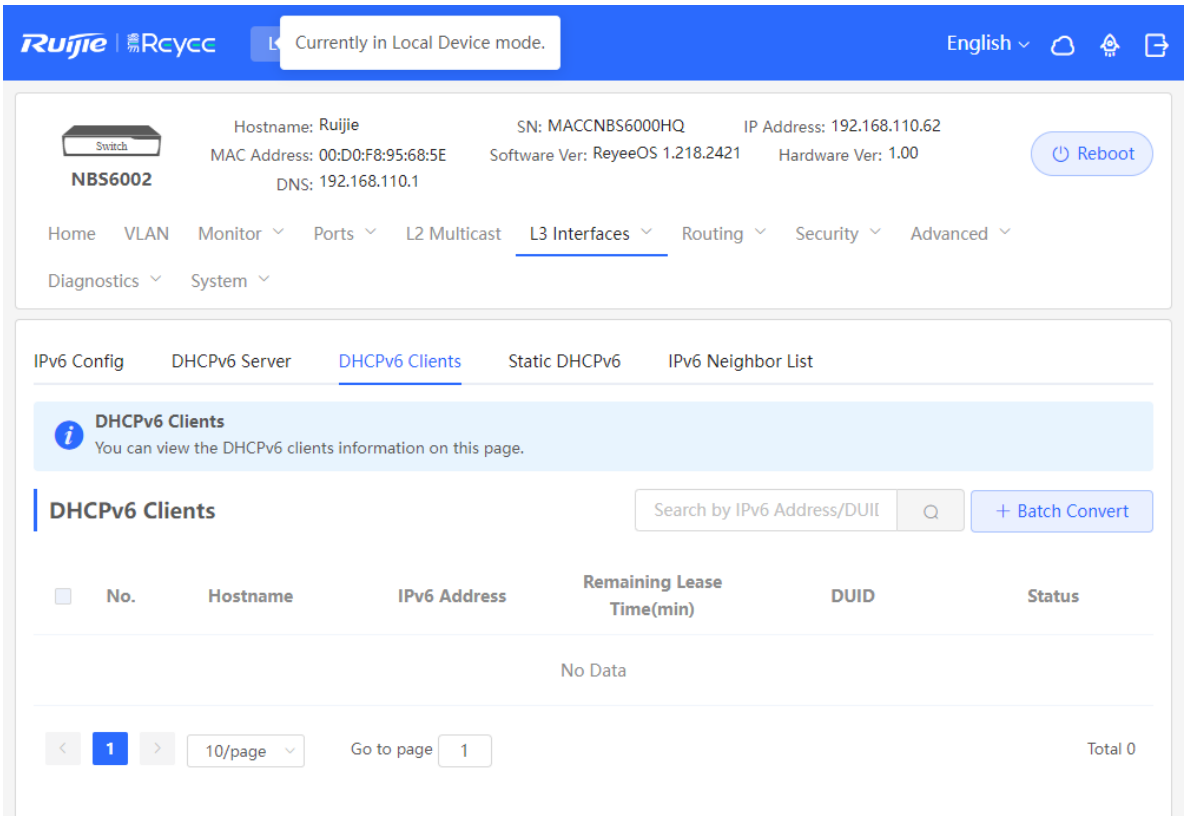
15.4.2 Configuring the Static DHCPv6 Address

Configure the IPv6 address statically bound to the DUID of a client so that the client can obtain the specified address each time.

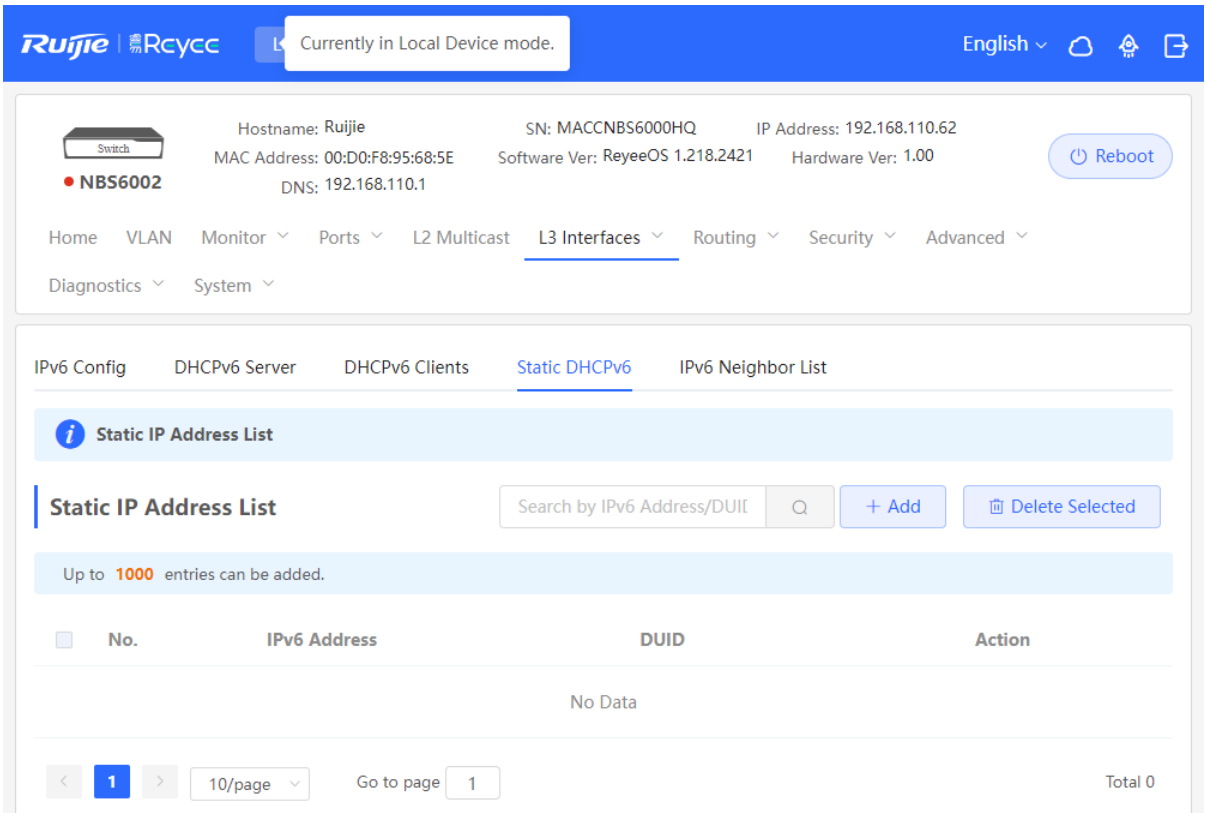
Choose **Local Device** > **L3 Interfaces** > **IPv6 Config** > **Static DHCPv6**.

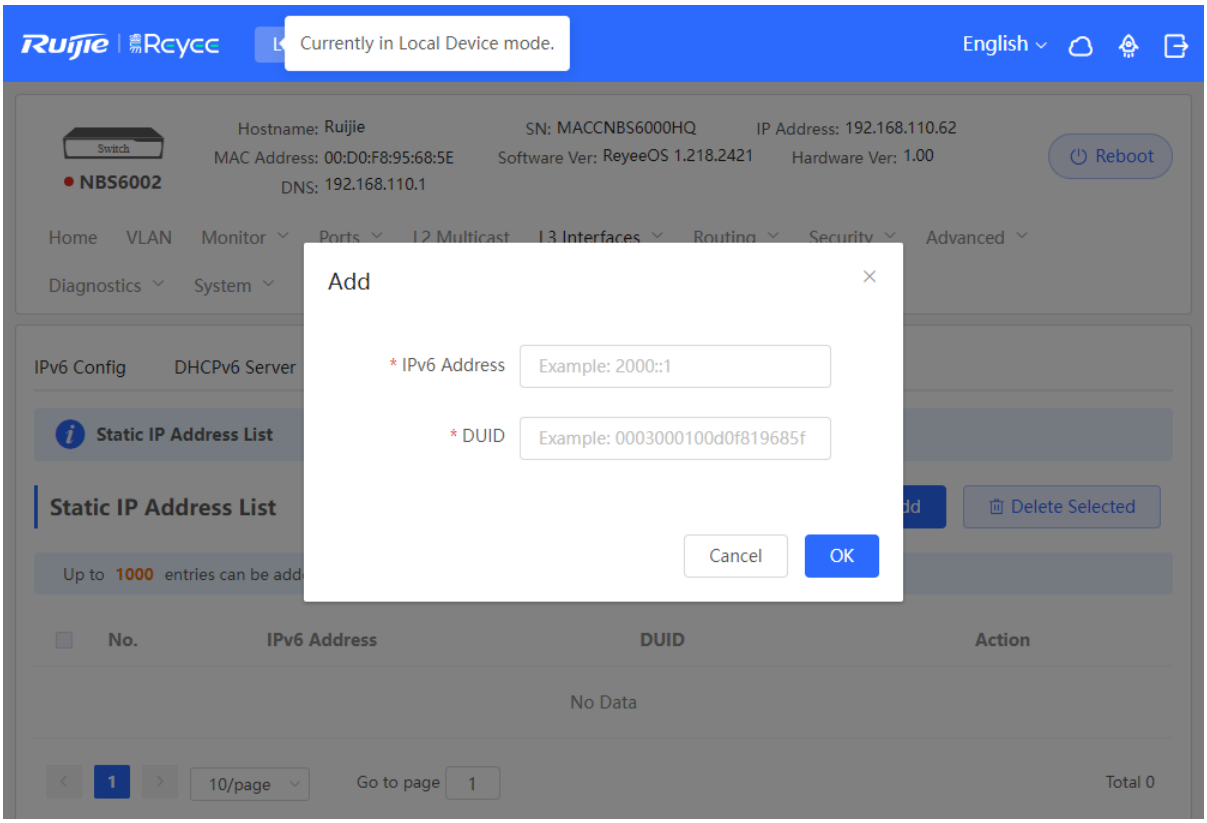
Click **Add**, and enter the IPv6 address and DUID. You are advised to bind the IPv6 address and DUID in the client list. You can run the **ipconfig /all** command on the Command Prompt in Windows to view the DUID.





You can view the DHCPv6 clients information on this page.


Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home VLAN Monitor Ports L2 Multicast L3 Interfaces Routing Security Advanced
Diagnostics System
IPv6 Config DHCPv6 Server DHCPv6 Clients Static DHCPv6 IPv6 Neighbor List
Static IP Address List
Static IP Address List
Search by IPv6 Address/DUI
+ Add
Delete Selected
Up to 1000 entries can be added.
No. IPv6 Address DUID Action
No Data
1
10/page
Go to page 1
Total 0


Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home VLAN Monitor Ports L2 Multicast L3 Interfaces Routing Security Advanced
Diagnostics System
Add
* IPv6 Address
Example: 2000::1
* DUID
Example: 0003000100d0f819685f
Cancel
OK
IPv6 Config DHCPv6 Server
Static IP Address List
Static IP Address List
Delete Selected
Up to 1000 entries can be add
No. IPv6 Address DUID Action
No Data
1
10/page
Go to page 1
Total 0

15.5 Configuring the IPv6 Neighbor List

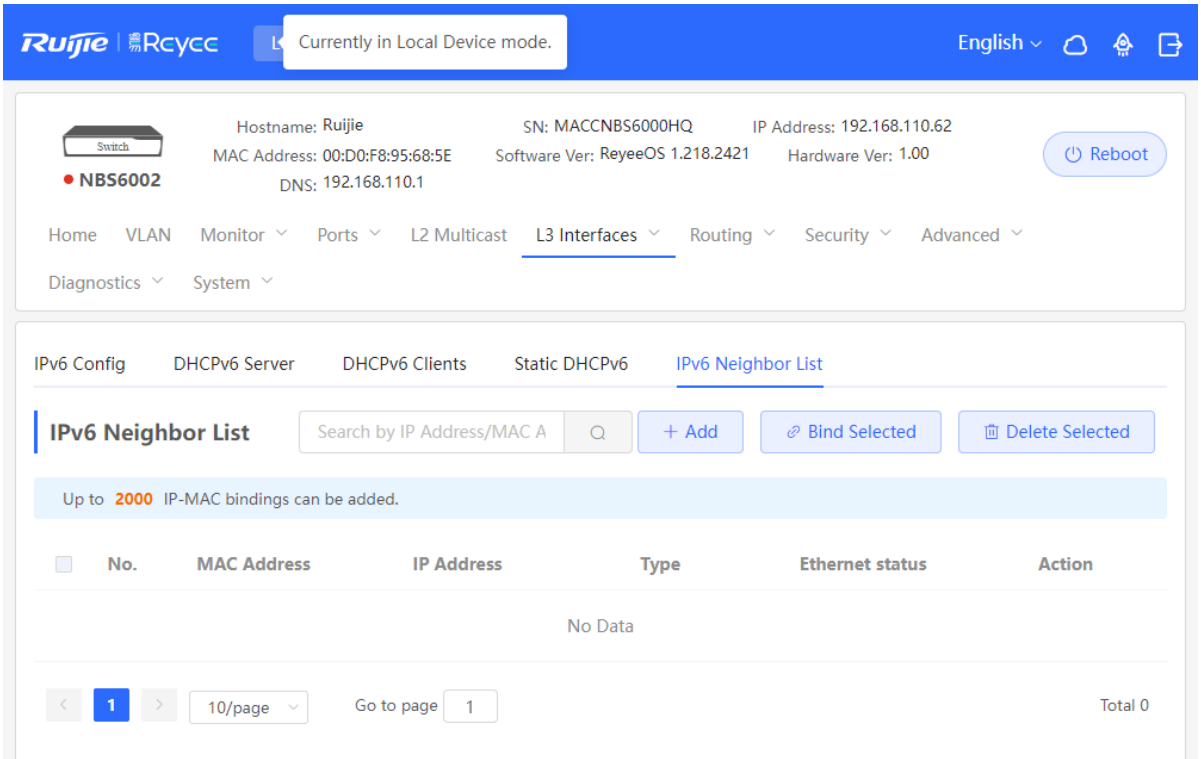
In IPv6, Neighbor Discovery Protocol (NDP) is an important basic protocol. NDP replaces the ARP and ICMP route discovery protocols of IPv4, and supports the following functions: address resolution, neighbor status tracking, duplicate address detection, router discovery, and redirection.

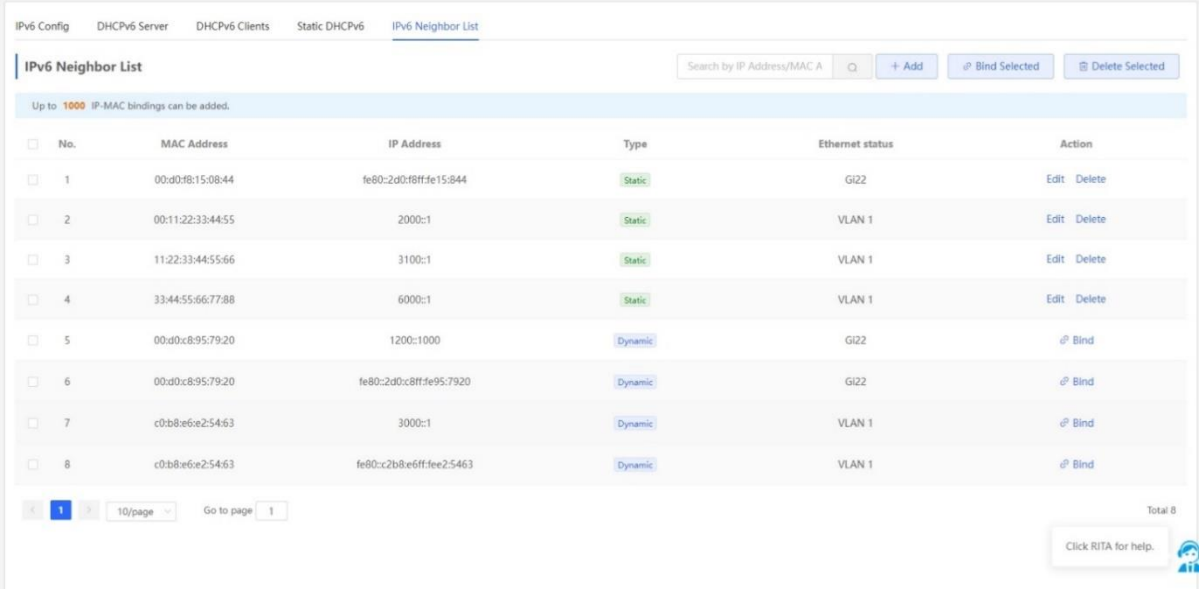
Choose **Local Device** > **L3 Interfaces** > **IPv6 Config** > **IPv6 Neighbor List**.

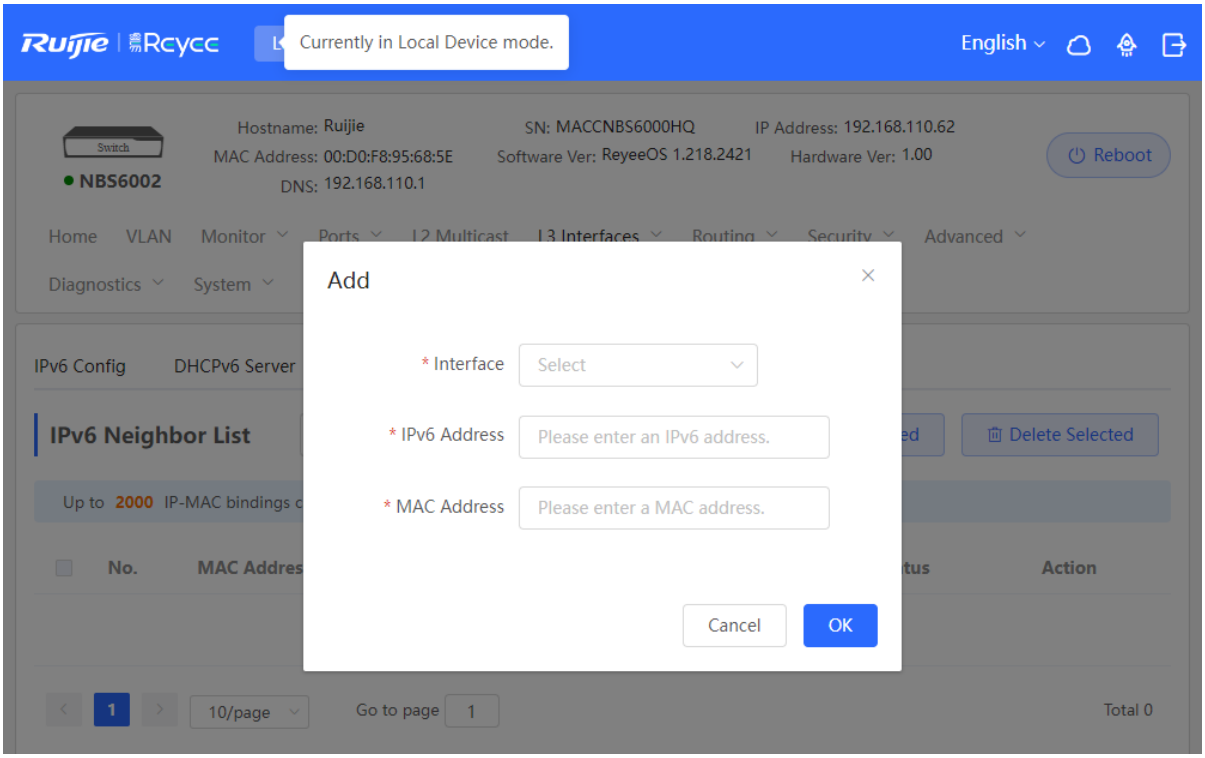
Click **Add** and manually add the interface, IPv6 address and MAC address of the neighbor.

Click **Bind Selected** to bind the IPv6 address and MAC address in the list to prevent ND attacks.

You can also modify, delete, batch delete, or search neighbors (by IP address or MAC address).







15.6 Configuring a Static ARP Entry

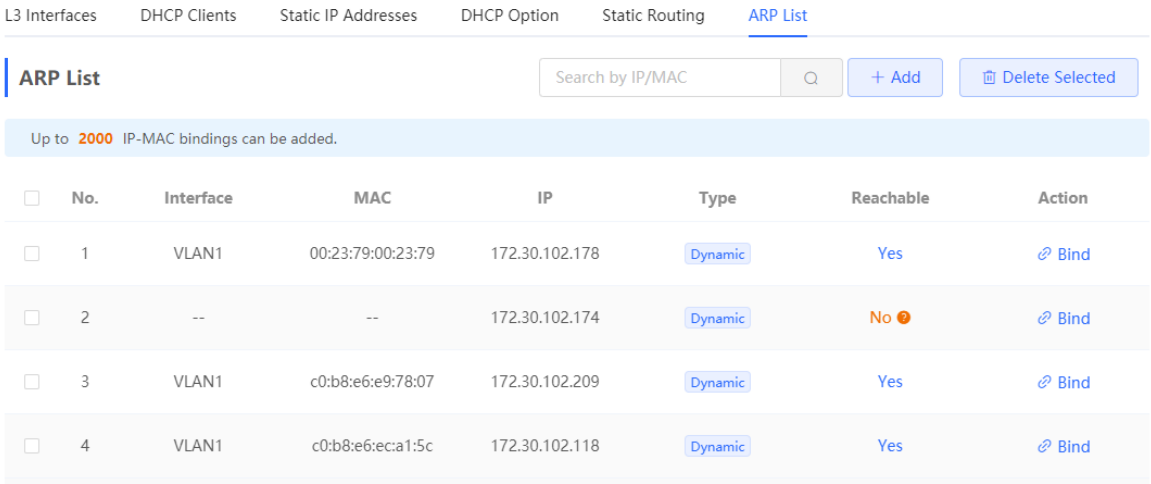
Choose **Local Device** > **L3 Interfaces** > **IPv4 Config** > **ARP List**.

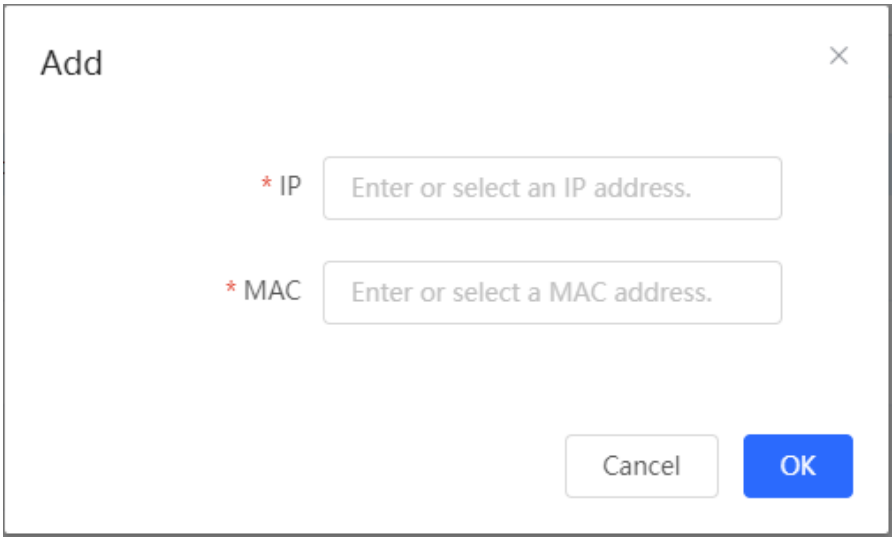
The device learns the IP address and MAC address of the network devices connected to its interfaces and generates the corresponding ARP entries. Supports binding ARP mappings or manually specifying the IP address and MAC address mapping to prevent devices from learning wrong ARP entries and improve network security.

- To bind a dynamic ARP entry to a static entry: Select the ARP mapping entry dynamically obtained in the

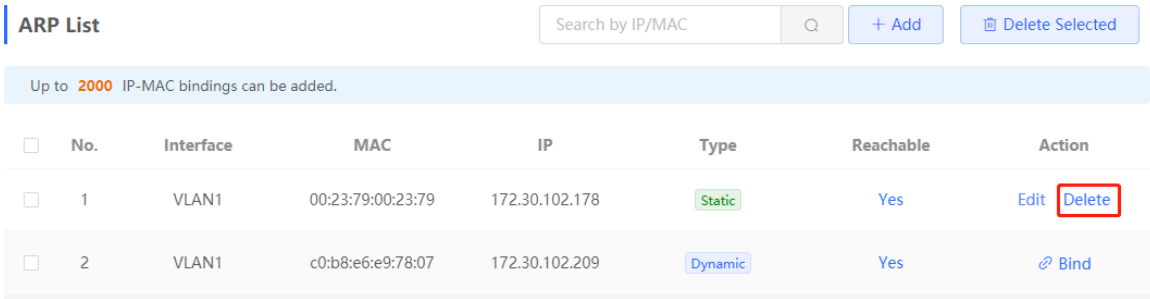
ARP List, and click **Bind** to complete the binding.

- To manually configure a static ARP entry: Click **Add**, enter the IP address and MAC address to be bound, and click **OK**.





To remove the binding between a static IP address and a MAC address, click **Delete** in the **Action** column.



16 NBS and NIS Series Switches Configuring Route

Caution

The content covered in this chapter is applicable solely to NBS series switches with Layer 3 capabilities. Switches from the RG-NIS series, RG-NBS3100 series, and RG-NBS3200 series do not support the features described in this section.

16.1 Configuring Static Routes

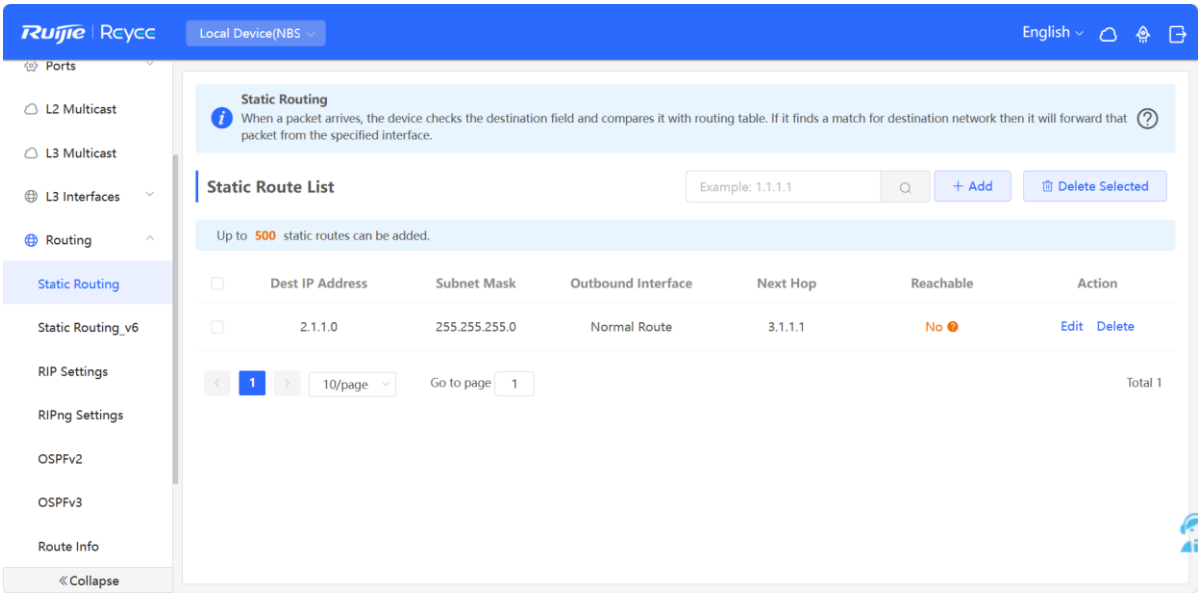
Choose **Local Device** > **Routing** > **Static Routing**.

Static routes are manually configured by the user. When a data packet matches a static route, the packet will be forwarded according to the specified forwarding mode.

Caution

Static routes cannot automatically adapt to changes of the network topology. When the network topology changes, you need to reconfigure the static routes.

Click **Add**. In the dialog box that appears, enter the destination address, subnet mask, outbound interface, and next-hop IP address to create a static route.



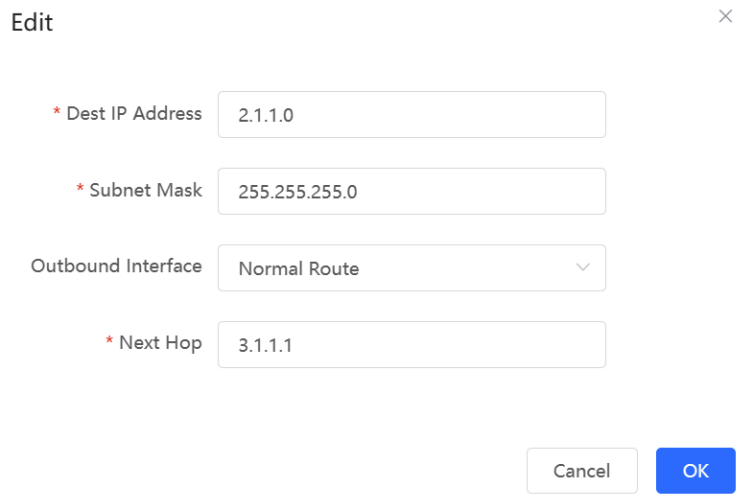
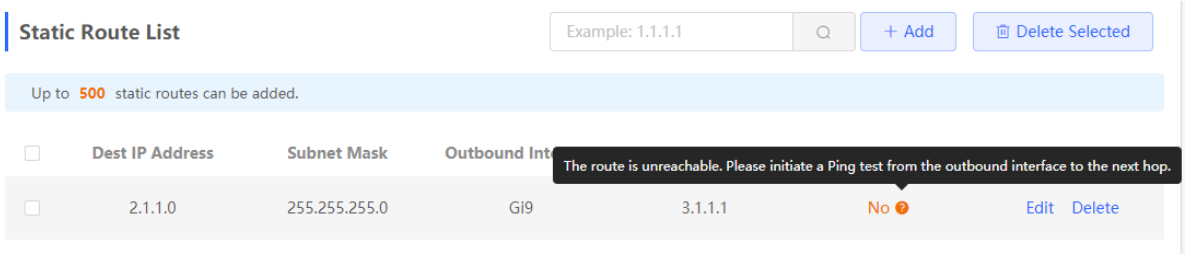


Table 16-1 Description of Static Routes Configuration Parameters

Parameter	Description
Dest IP Address	Specify the destination network to which the data packet is to be sent. The device matches the data packet based on the destination address and subnet mask.
Subnet Mask	Specify the subnet mask of the destination network. The device matches the data packet based on the destination address and subnet mask.
Outbound Interface	Specify the interface that forwards the data packet.
Next Hop	Specify the IP address of the next hop in the route for the data packet

After a static route is created, you can find the relevant route configuration and reachability status in the static route list. The **Reachable** parameter specifies whether the next hop is reachable, based on which you can determine whether the route takes effect. If the value is **No**, check whether the outbound interface in the current route can ping the next-hop address.



To delete or modify a static route, in **Static Route List**, you can click **Delete** or **Edit** in the last **Action** column; or select the static route entry to be deleted, click **Delete Selected** to delete multiple static route entries.

16.2 Configuring the IPv6 Static Route

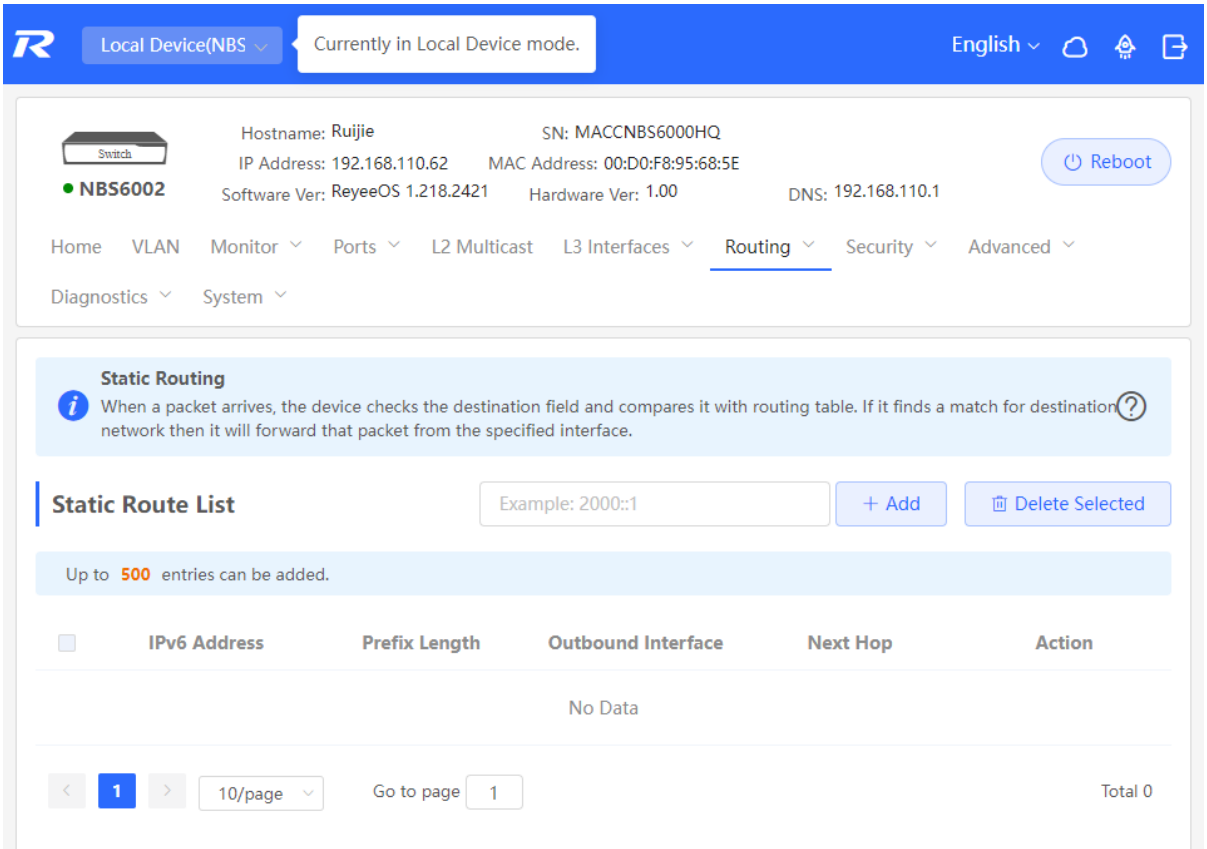
Choose **Local Device** > **Routing** > **Static Routing_v6**.

You need to manually configure an IPv6 static route. When the packet matches the static route, the packet will be forwarded according to the specified forwarding method.

Caution

The static route cannot automatically adapt to changes in the network topology. When the network topology changes, you need to manually reconfigure the static route.

Click **Add**, and enter the destination IPv6 address, length, outbound interface, and next-hop IP address to create a static route.



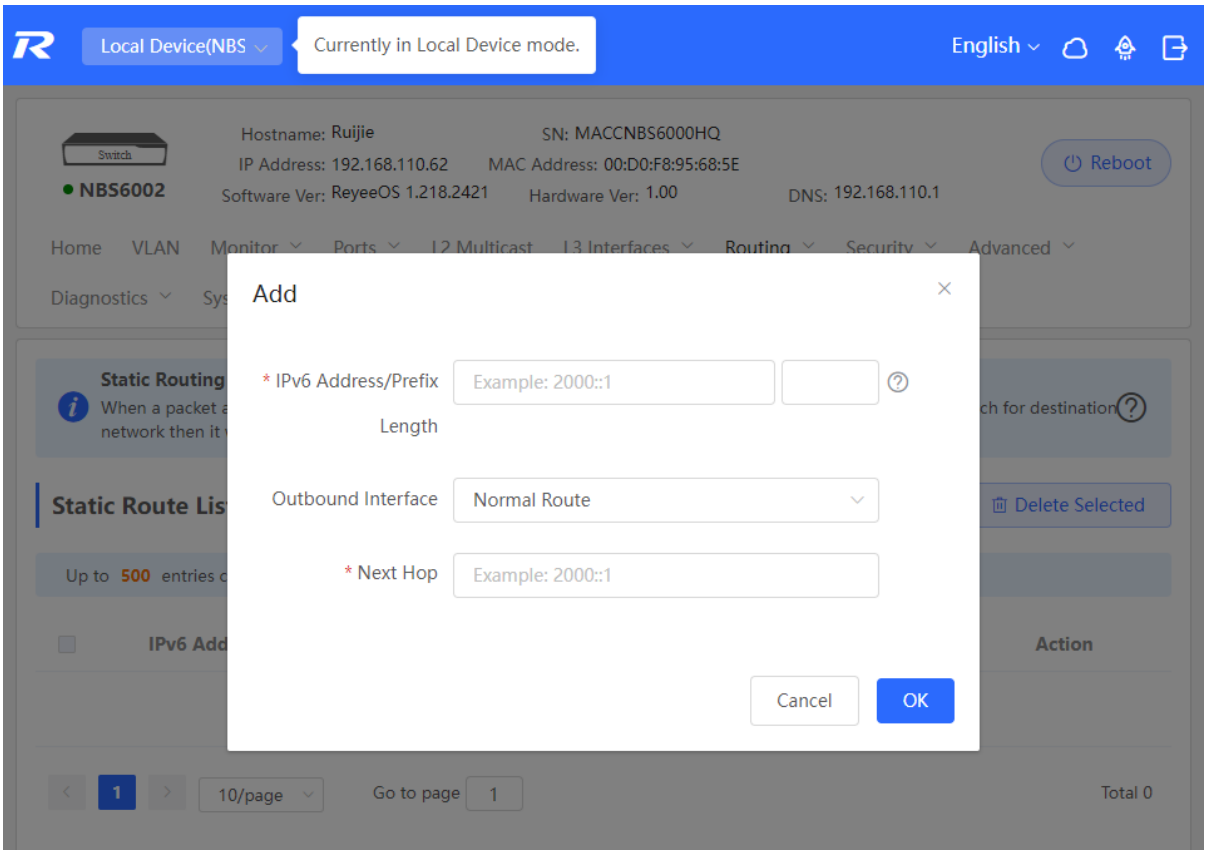


Table 16-2 IPv6 Static Route Configuration Parameters

Parameter	Description
IPv6 Address/Prefix Length	Destination network of the packet. The destination address of the packet is matched according to the IPv6 address and prefix length.
Outbound Interface	Interface that forwards the packet.
Next Hop	IP address of the next routing node to which the packet is sent.

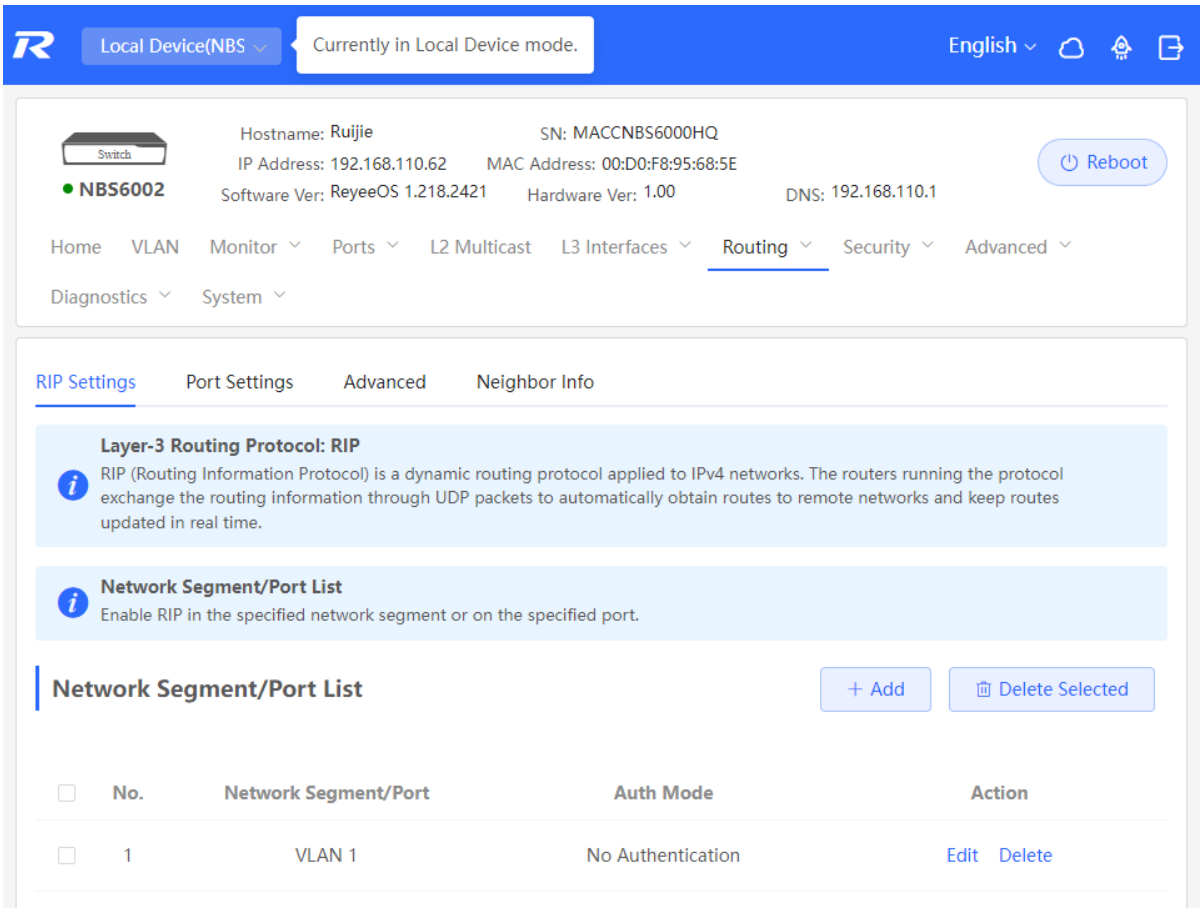
16.3 Configuring RIP

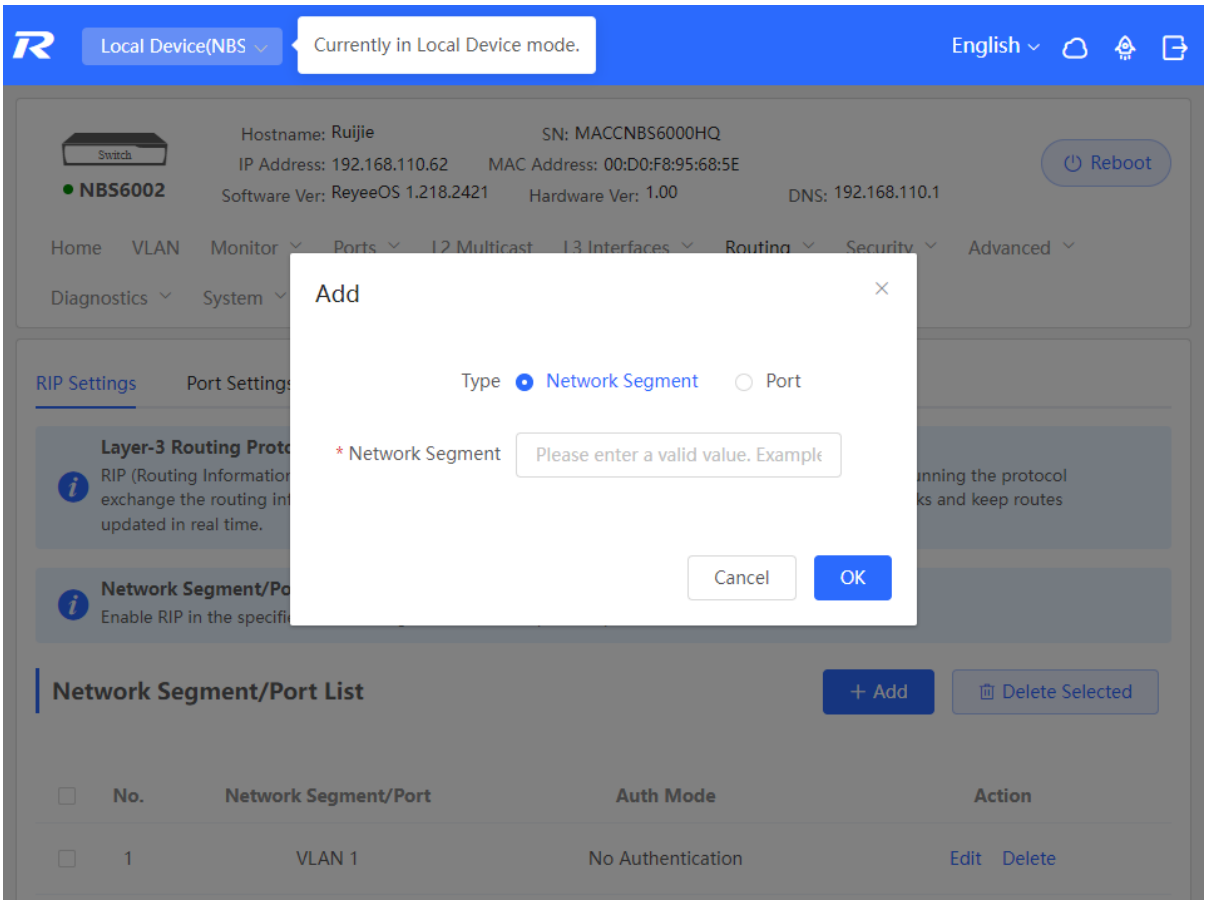
Routing Information Protocol (RIP) is applicable to small and medium-sized networks and is a dynamic routing protocol that is easy to configure. RIP measures the network distance based on the number of hops and selects a route based on the distance. RIP uses UDP port 520 to exchange the routing information.

16.3.1 Configuring RIP Basic Functions

Choose **Local Device** > **Routing** > **RIP Settings**.

Click **Add** and configure the network segment and interface.




Local Device(NBS
Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Interfaces
Routing
Security
Advanced
Diagnostics
System
Add
Type
Network Segment
Port
* Network Segment
Please enter a valid value. Example
Cancel
OK
RIP Settings
Port Settings
Layer-3 Routing Proto
RIP (Routing Information
exchange the routing int
updated in real time.
Network Segment/Po
Enable RIP in the specifi
Network Segment/Port List
+ Add
Delete Selected
No.
Network Segment/Port
Auth Mode
Action
1
VLAN 1
No Authentication
Edit
Delete

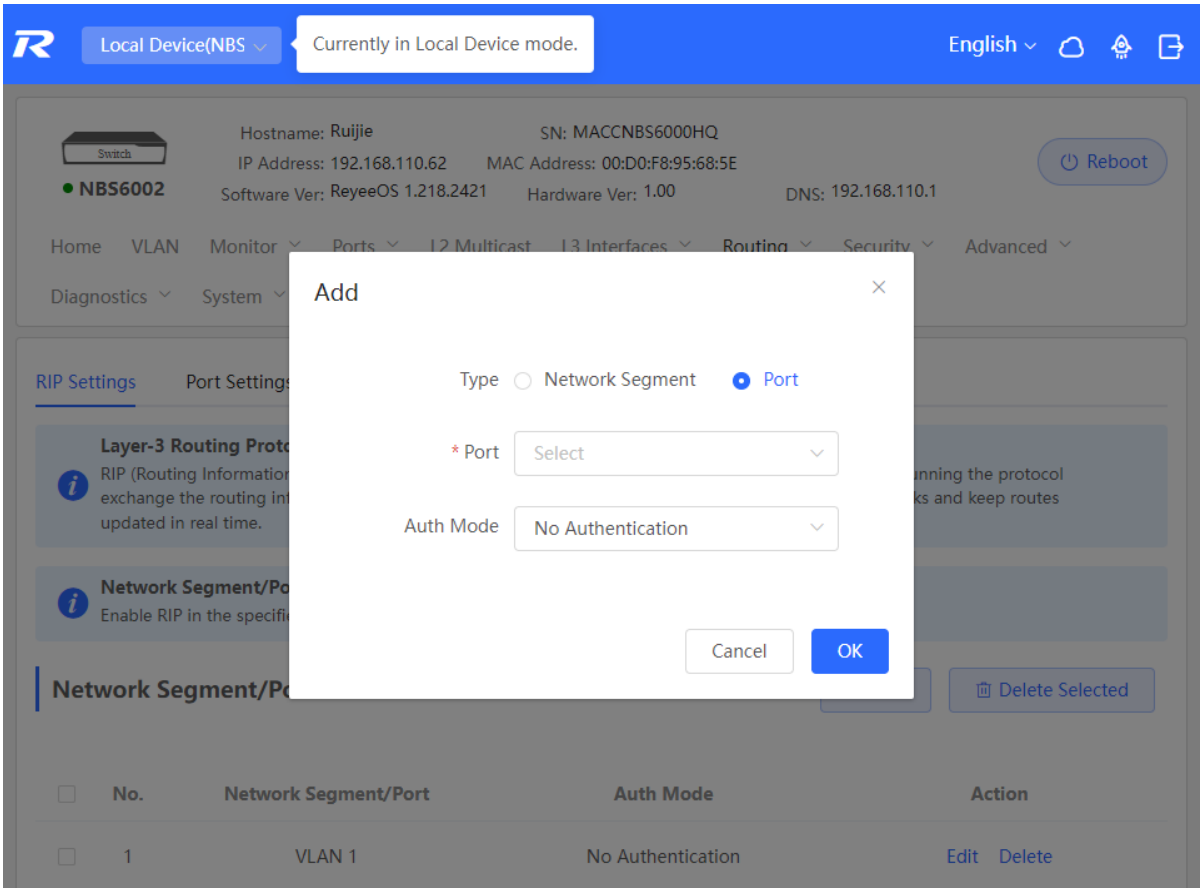

Local Device(NBS
Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Interfaces
Routing
Security
Advanced
Diagnostics
System
Add
Type
Network Segment
Port
* Port
Select
Auth Mode
No Authentication
Cancel
OK
RIP Settings
Port Settings
Layer-3 Routing Proto
RIP (Routing Information
exchange the routing int
updated in real time.
Network Segment/Po
Enable RIP in the specifi
Network Segment/Po
Delete Selected
No.
Network Segment/Port
Auth Mode
Action
1
VLAN 1
No Authentication
Edit
Delete

Table 16-3 RIP Configuration Parameters

Parameter	Description
Type	**Network Segment**: Enable RIP in the specified network segment. The IP addresses of this network segment are added to the RIP routing table. The device and its RIP-enabled neighbor devices learn the routing table from each other. **Port**: Enable RIP on the specified port. All the IP addresses of this port are added to the RIP routing table. The device and its RIP-enabled neighbor devices learn the routing table from each other.
Network Segment	Enter the network segment, for example, **10.1.0.0/24**, when **Type** is set to **Network Segment**. RIP will be enabled on all interfaces of the device covered by this network segment.
Port	Select a VLAN interface or physical port when **Type** is set to **Port**.
Auth Mode	**No Authentication**: The protocol packets are not authenticated. **Encrypted Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of encrypted text. **Plain Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of plain text.
Auth Key	Enter the authentication key to authenticate protocol packets when **Auth Mode** is set to **Encrypted Text** or **Plain Text**.

16.3.2 Configuring the RIP Port

Choose **Local Device** > **Routing** > **RIP Settings** > **Port Settings**.

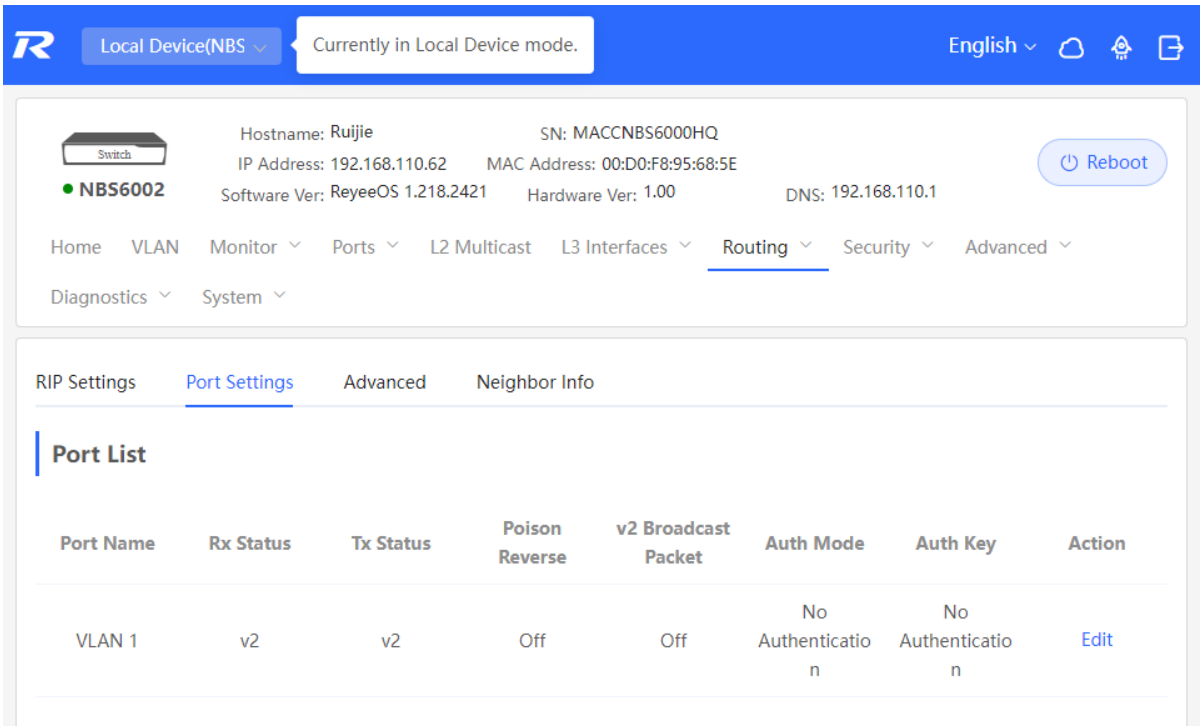


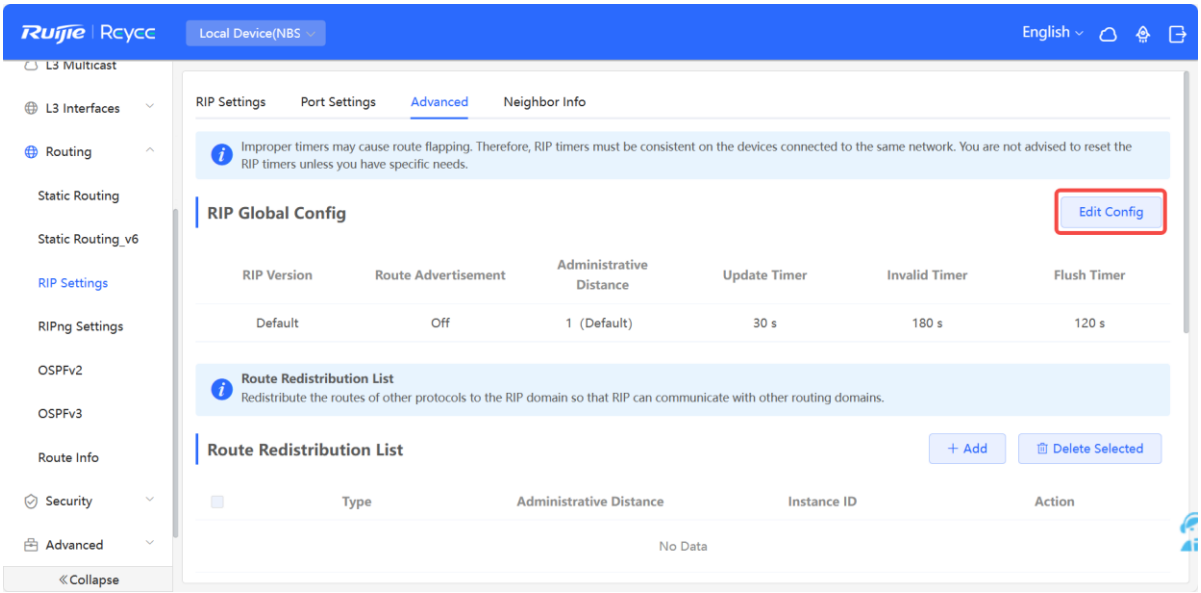
Table 16-4 Configuration Parameters in the Port List

Parameter	Description
Port Name	Name of the port where RIP is enabled.
Rx Status	RIP version of packets currently received.
Tx Status	RIP version of packets currently transmitted.
Poison Reverse	After the port learns the route, the route overhead is set to **16** (indicating that the route is unreachable), and the route is sent back to the neighbor from the original port to avoid a loop.
v2 Broadcast Packet	When a neighbor does not support multicast, broadcast packets can be sent. You are advised to disable RIPv2 broadcast packets to improve network performance.

Auth Mode	**No Authentication**: The protocol packets are not authenticated. **Encrypted Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of encrypted text. **Plain Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of plain text.
Auth Key	Enter the authentication key to authenticate protocol packets when **Auth Mode** is set to **Encrypted Text** or **Plain Text**.
Action	Click **Edit** to modify RIP settings of the port.

16.3.3 Configuring the RIP Global Configuration

Choose **Local Device** > **Routing** > **RIP Settings** > **Advanced**, click **Edit Config**, and configure RIP global configuration parameters.



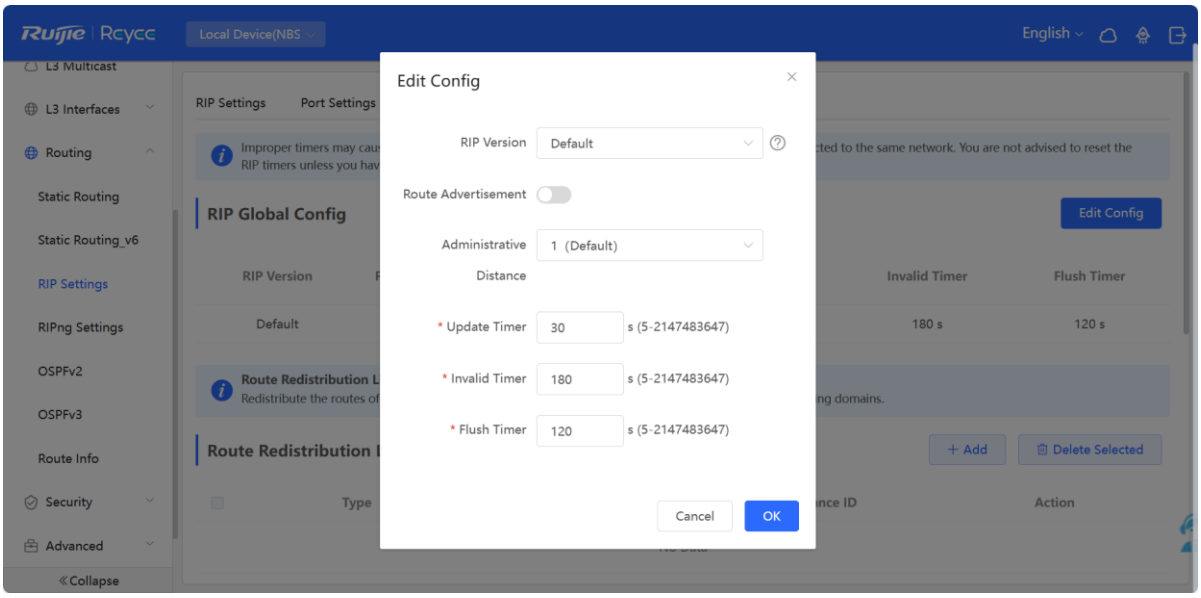


Table 16-5 RIP Global Configuration Parameters

Parameter	Description
RIP Version	**Default**: Select RIPv2 for sending packets and RIPv1/v2 for receiving packets. **V1**: Select RIPv1 for sending and receiving packets. **V2**: Select RIPv2 for sending and receiving packets.
Route Advertisement	After route advertisement is enabled, the current device generates a default route and sends it to the neighbor.
Administrative Distance	Redistribute routes of other protocols to the RIP domain so that RIP can interwork with other routing domains.
Update Timer	RIP update cycle. The routing information is updated every 30 seconds by default.
Invalid Timer	If no update is received before a route becomes invalid, the route is considered unreachable. The default value is 180 seconds.

Parameter	Description
Flush Timer	If no update is received before the flush timer of an invalid route expires, the route is completely deleted from the RIP routing table. The default value is 120 seconds.

16.3.4 Configuring the RIP Route Redistribution List

Redistribute routes of other protocols to the RIP domain so that RIP can interwork with other routing domains.

Choose **Local Device** > **Routing** > **RIP Settings** > **Advanced**, click **Add**, and select the type and administrative distance.

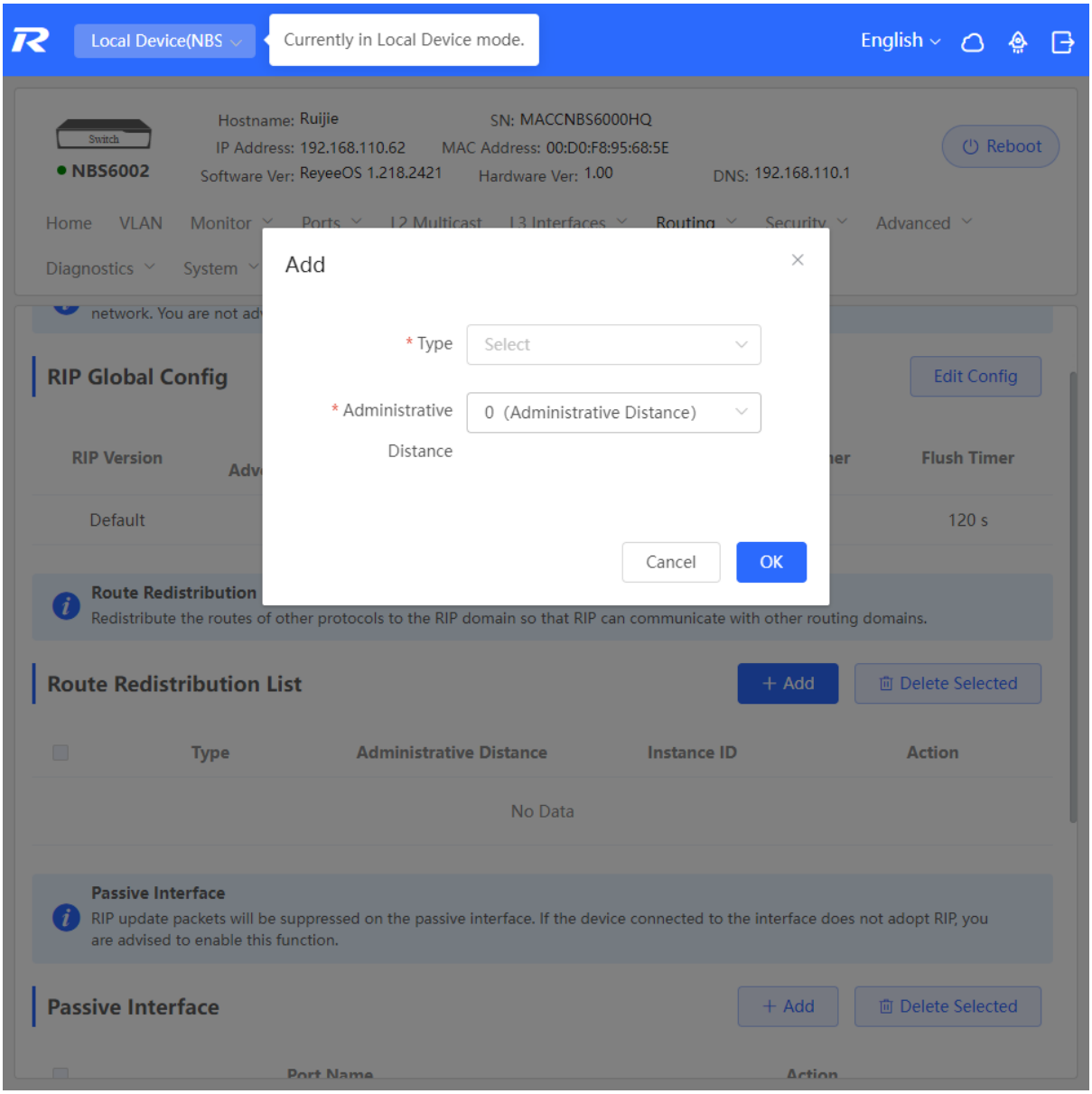
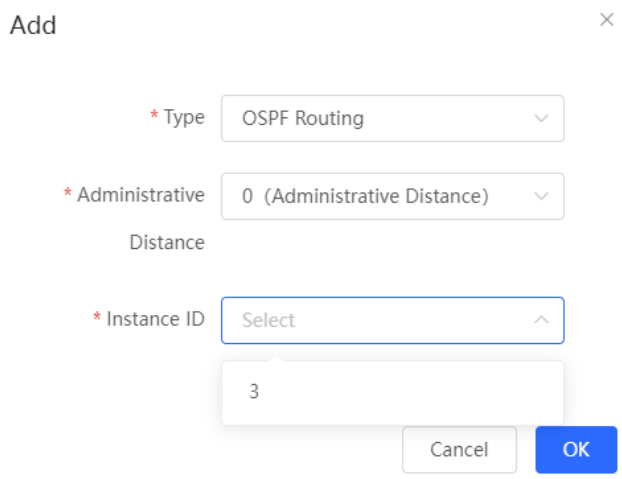


Table 16-6 RIP Route Redistribution Parameters

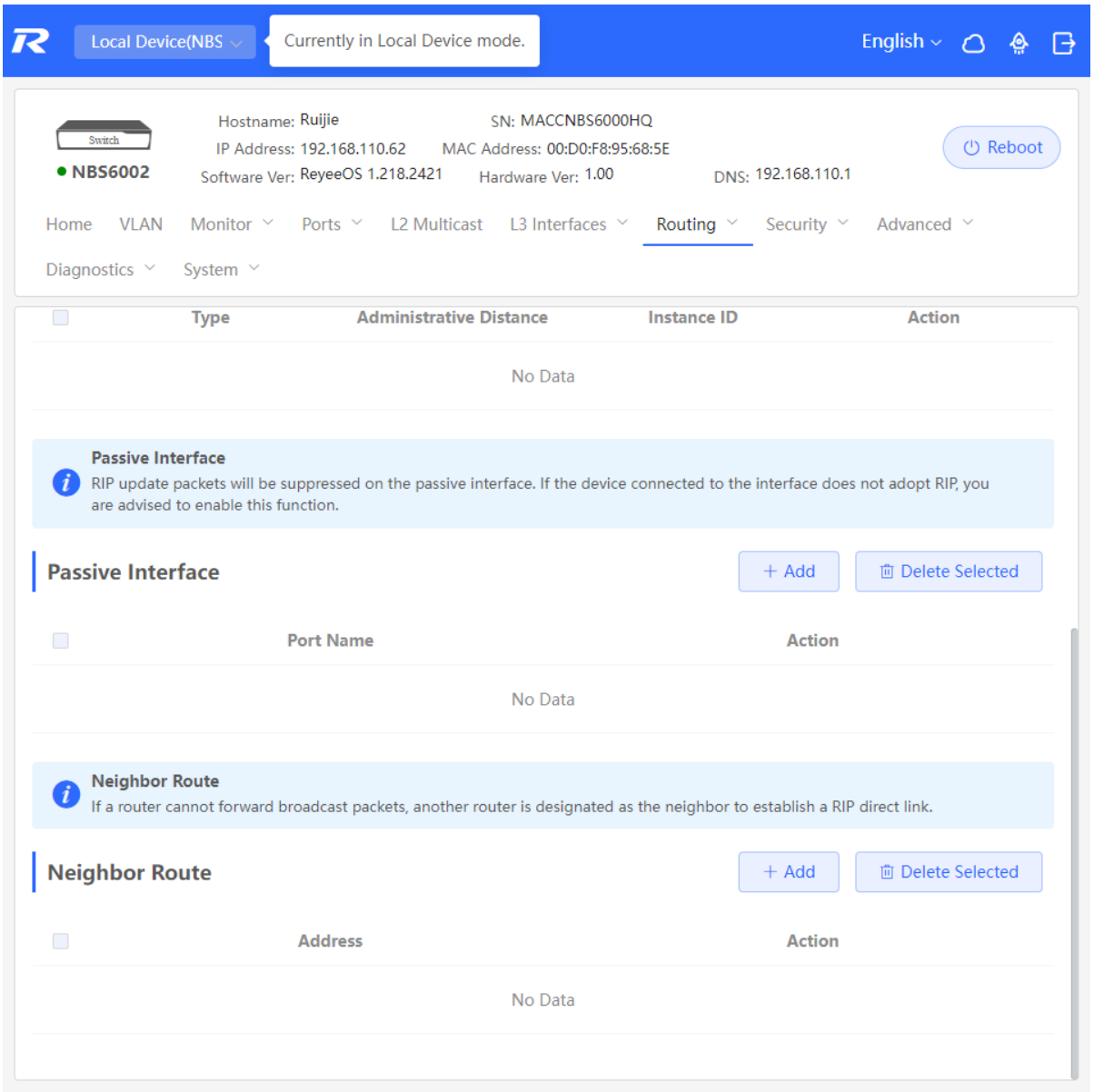
Parameter	Description
Type	Direct Routing OSPF Routing Static Routing
Administrative Distance	A smaller administrative distance indicates a higher priority. The default value is **0**. The value ranges from 0 to 16.
Instance ID	Select the instance ID of OSPF that needs to be redistributed. OSPFv2 needs to be enabled on the local device.

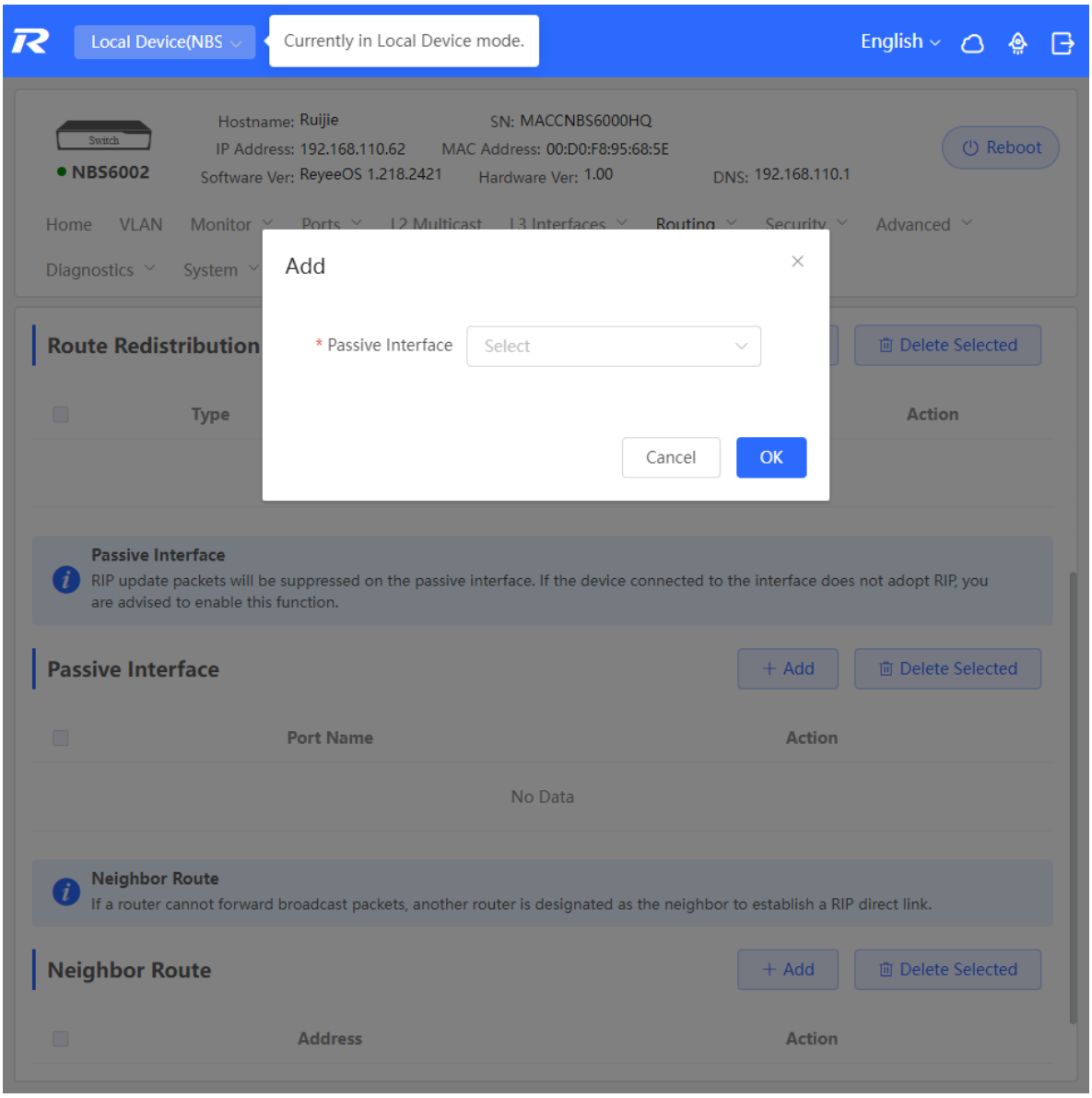


16.3.5 Configuring the Passive Interface

If an interface is configured as a passive interface, it will suppress RIP update packets. If the connected peer device does not run RIP, you are advised to enable the passive interface.

Choose **Local Device** > **Routing** > **RIP Settings** > **Advanced**, click **Add**, and select a passive interface.

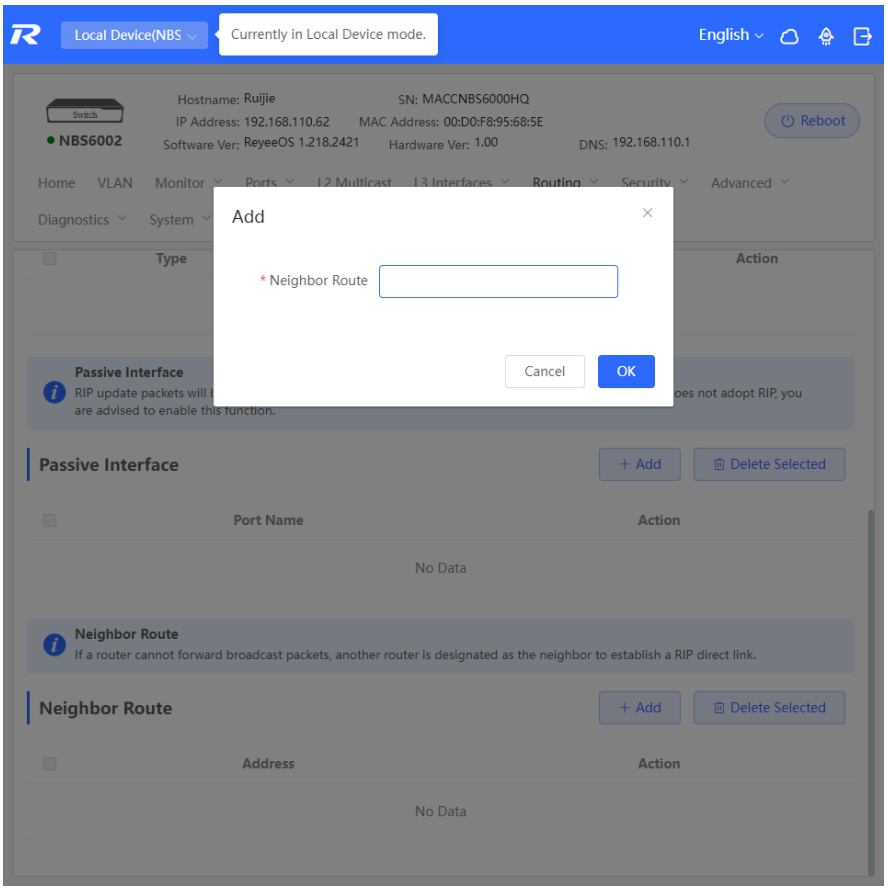

Local Device(NBS
Currently in Local Device mode.
English
Switch
NBS6002
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
Reboot
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Interfaces
Routing
Security
Advanced
Diagnostics
System
Type
Administrative Distance
Instance ID
Action
No Data
Passive Interface
RIP update packets will be suppressed on the passive interface. If the device connected to the interface does not adopt RIP, you are advised to enable this function.
Passive Interface
+ Add
Delete Selected
Port Name
Action
No Data
Neighbor Route
If a router cannot forward broadcast packets, another router is designated as the neighbor to establish a RIP direct link.
Neighbor Route
+ Add
Delete Selected
Address
Action
No Data

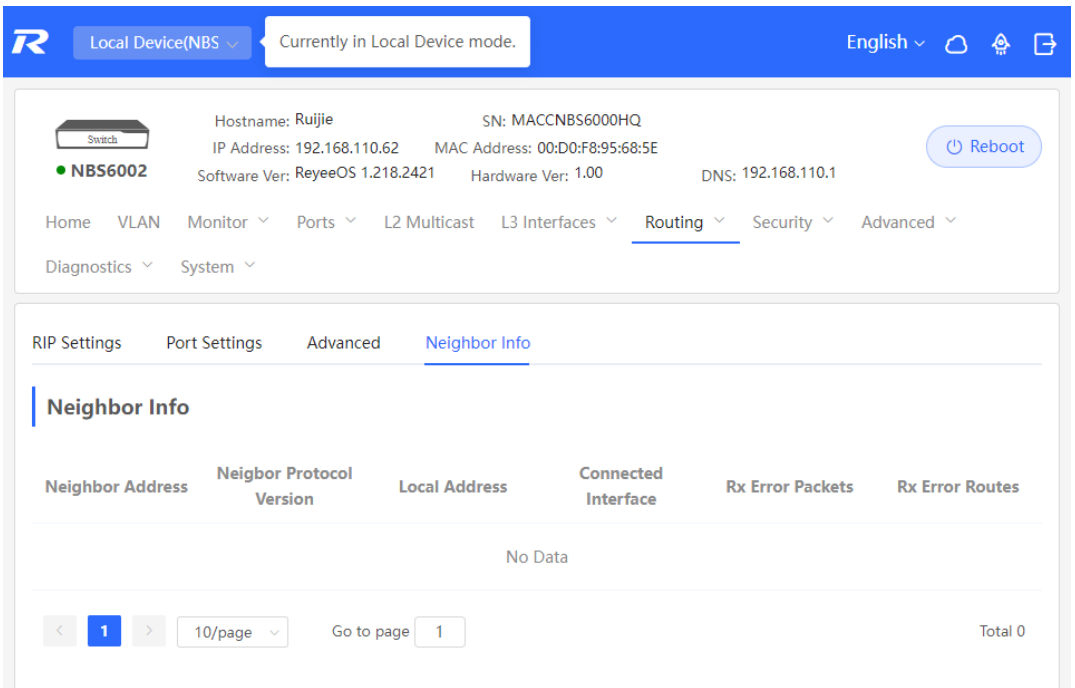


16.3.6 Configuring the Neighbor Route

When the router cannot process broadcast packets, another router can be designated as the neighbor to establish a RIP direct link.

Choose **Local Device** > **Routing** > **RIP Settings** > **Advanced**, click **Add**, and enter the IP address of the neighbor router.


Local Device(NBS
Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Interfaces
Routing
Security
Advanced
Diagnostics
System
Add
* Neighbor Route
Cancel
OK
Type
Action
Passive Interface
Passive Interface
+ Add
Delete Selected
Port Name
Action
No Data
Neighbor Route
If a router cannot forward broadcast packets, another router is designated as the neighbor to establish a RIP direct link.
Neighbor Route
+ Add
Delete Selected
Address
Action
No Data


Local Device(NBS
Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Interfaces
Routing
Security
Advanced
Diagnostics
System
RIP Settings
Port Settings
Advanced
Neighbor Info
Neighbor Info
Neighbor Address
Neigbor Protocol Version
Local Address
Connected Interface
Rx Error Packets
Rx Error Routes
No Data
1
10/page
Go to page
1
Total 0

16.4 Configuring RIPng

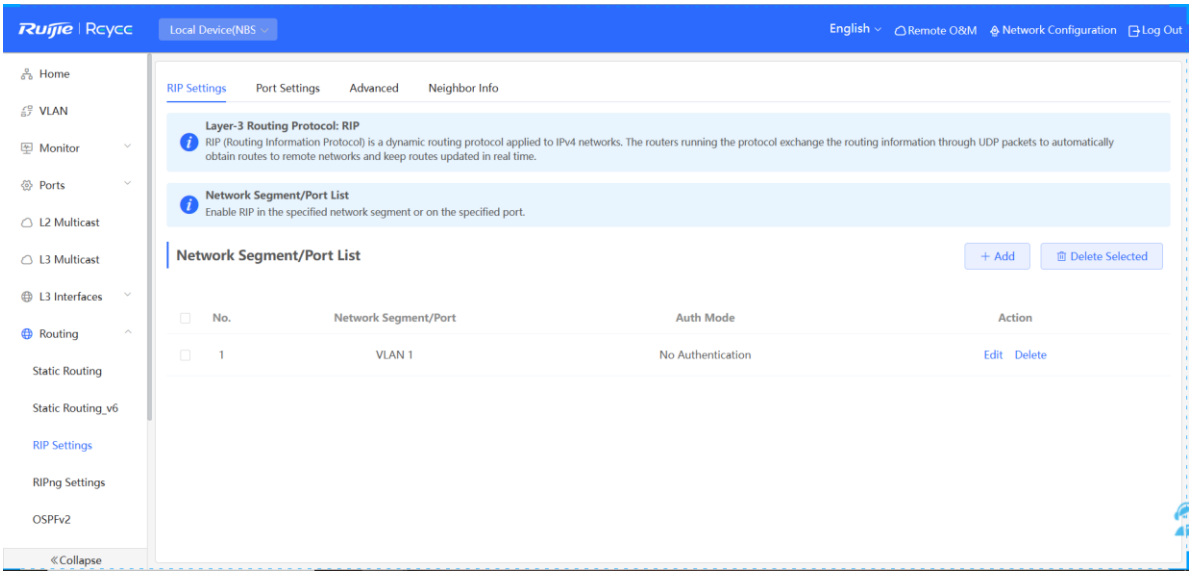
16.4.1 Configuring RIPng Basic Functions

RIP Next Generation (RIPng) provides the routing function for IPv6 networks.

RIPng uses UDP port 512 to exchange the routing information.

Choose **Local Device** > **Routing** > **RIPng Settings**.

Click **Add**, set **Type** to **Network Segment** or **Port**, and specify the network segment or port accordingly.

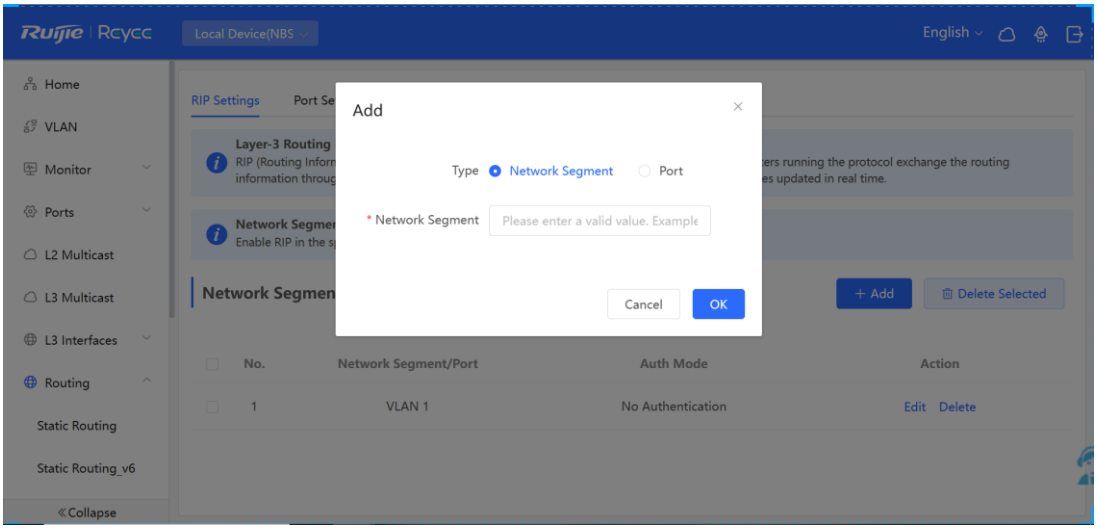


rip.protong

RIPng (Routing Information Protocol next generation) is a unicast routing protocol applied to IPv6 networks.

Network Segment/Port List

Enable RIPng in the specified network segment or on the specified port.



If the address length is between 48 and 64, the address will be used as a prefix.

Alternatively, enable RIPng on a specified port:

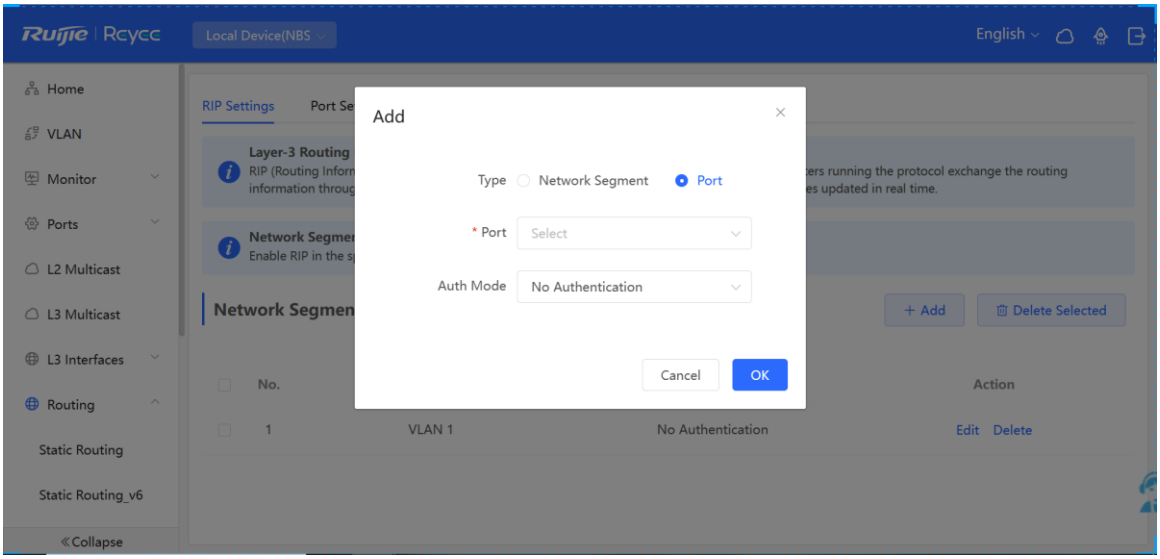


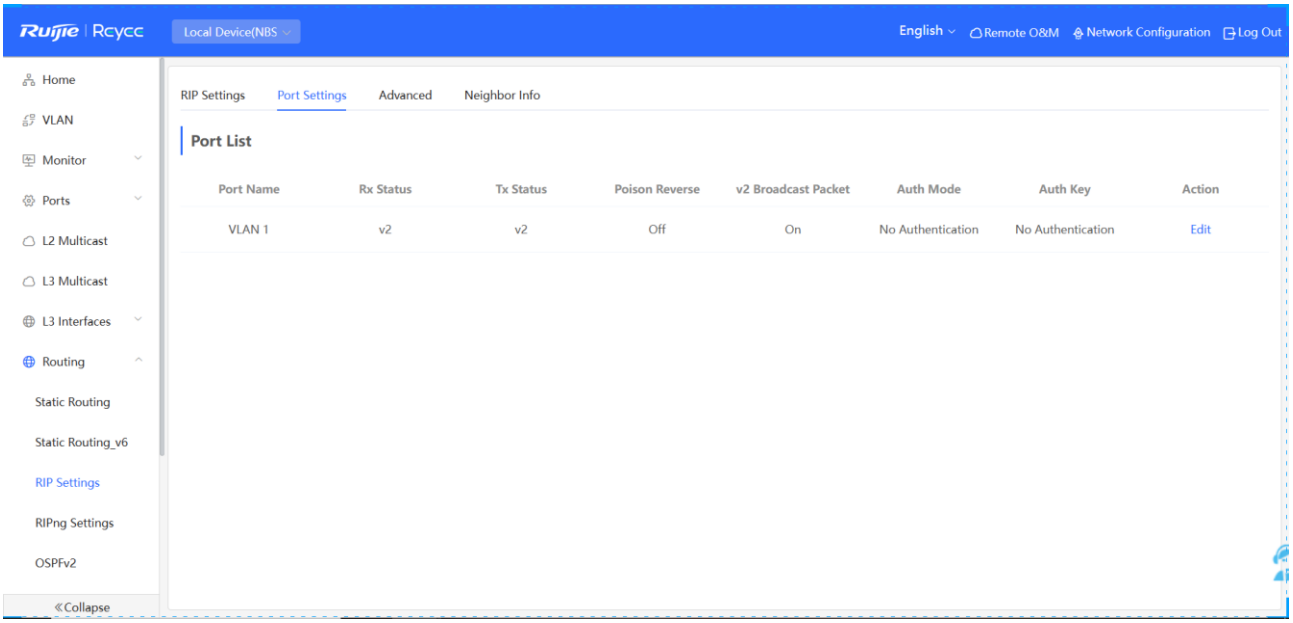
Table 16-7 RIPng Configuration Parameters

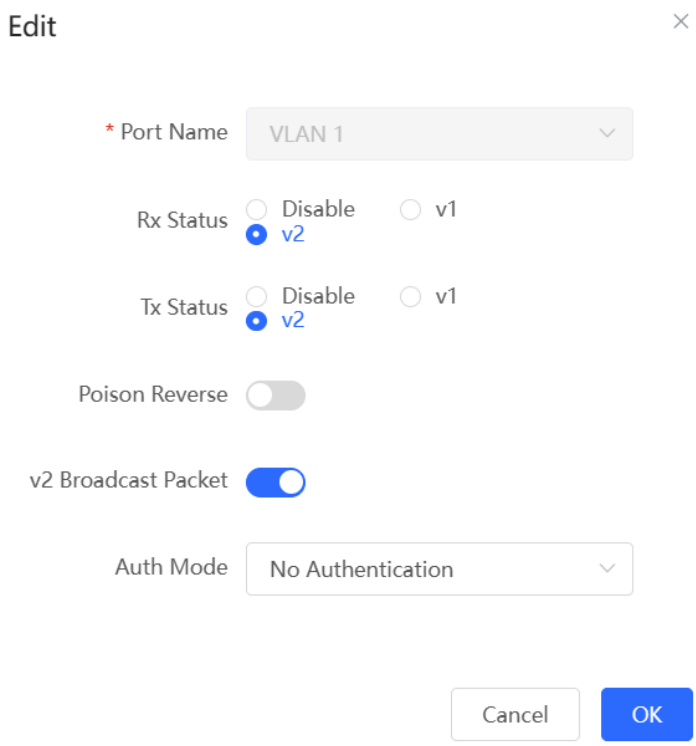
Parameter	Description
Type	**Network Segment**: Enable RIP in the specified network segment. The IP addresses of this network segment are added to the RIP routing table, and the device and its RIP-enabled neighbor devices learn the routing table from each other. **Port**: Enable RIP on the specified port. All the IP addresses of this port are added to the RIP routing table, and the device and its RIP-enabled neighbor devices learn the routing table from each other.
Network Segment	Enter the IPv6 address and prefix length when **Type** is set to **Network Segment**. RIPng will be enabled on all interfaces of the device covered by this network segment.
Port	Select a VLAN interface or physical port when **Type** is set to **Port**.

16.4.2 Configuring the RIPng Port

RIPng poison reverse: After the port learns the route, the route overhead is set to **16** (indicating that the route is unreachable), and the route is sent back to the neighbor from the original port to avoid a loop.

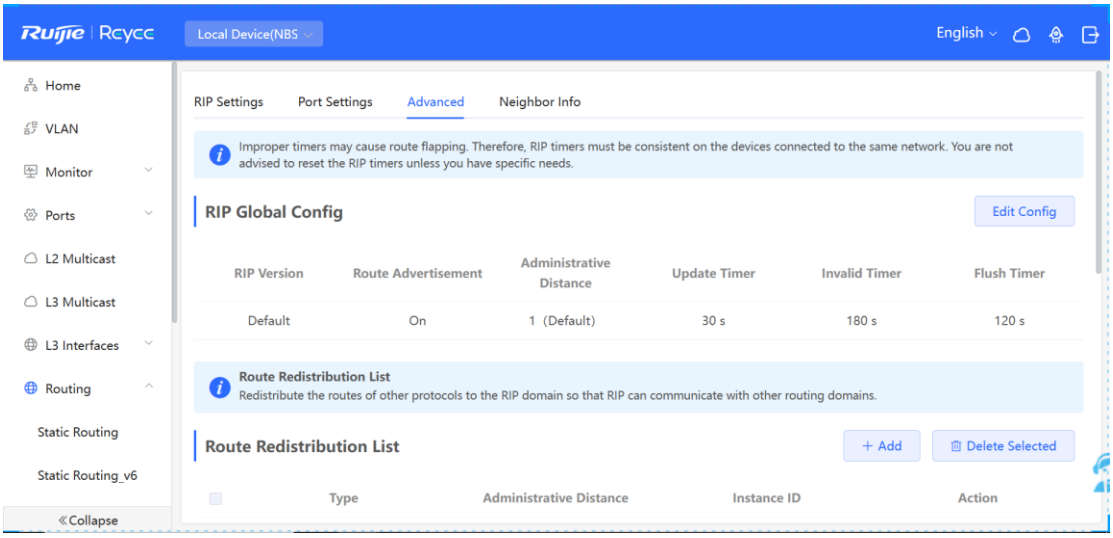
Choose **Local Device** > **Routing** > **RIPng Settings** > **Port Settings**, click Edit, and enable IPv6 poison reverse.





16.4.3 Configuring the RIPng Global Configuration

Choose **Local Device** > **Routing** > **RIPng Settings** > **Advanced**, and click **Edit Config**.



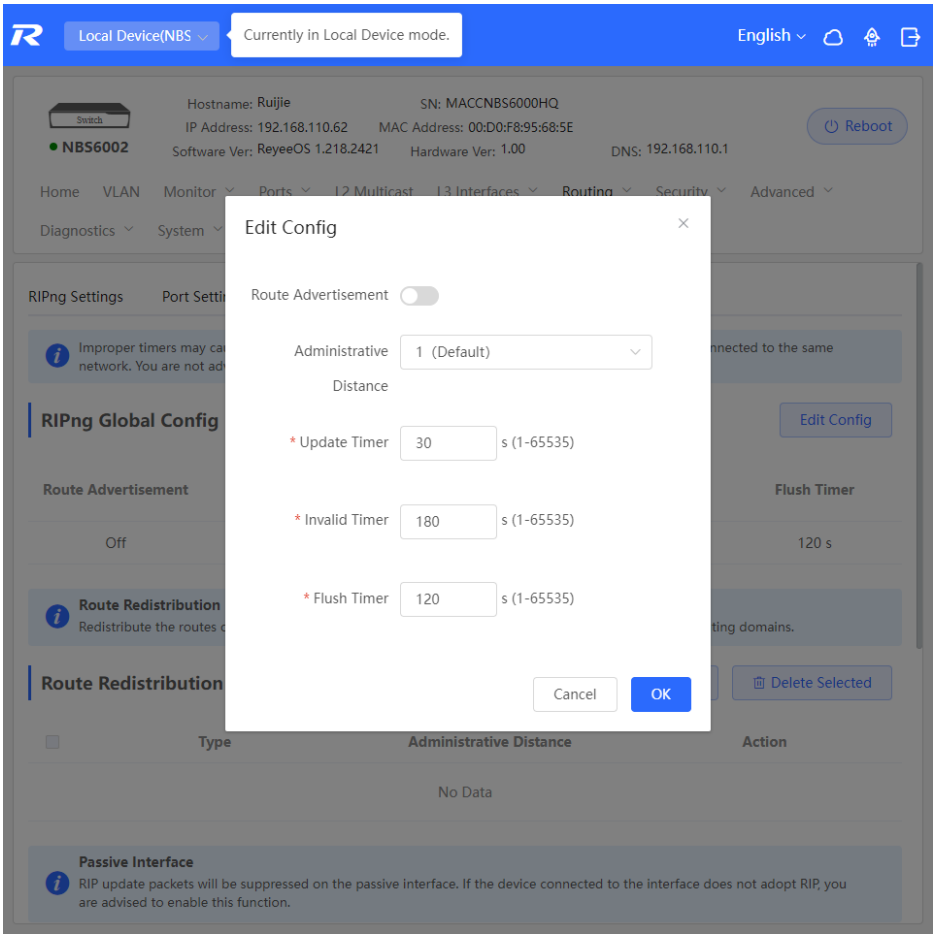


Table 16-8 RIPng Global Configuration Parameters

Parameter	Description
Route Advertisement	After route advertisement is enabled, the current device generates a default route and sends it to the neighbor.
Administrative Distance	Redistribute routes of other protocols to the RIP domain so that RIP can interwork with other routing domains.
Update Timer	RIP update cycle. The routing information is updated every 30 seconds by default.
Invalid Timer	If no update is received before a route becomes invalid, the route is considered unreachable. The default value is 180 seconds.
Flush Timer	If no update is received before the flush timer of an invalid route expires, the route is completely deleted from the RIP routing table. The default value is 120 seconds.

16.4.4 Configuring the RIPng Route Redistribution List

Redistribute routes of other protocols to the RIPng domain to interwork with other routing domains.

Choose **Local Device** > **Routing** > **RIPng Settings** > **Advanced**, and click **+ Add**.

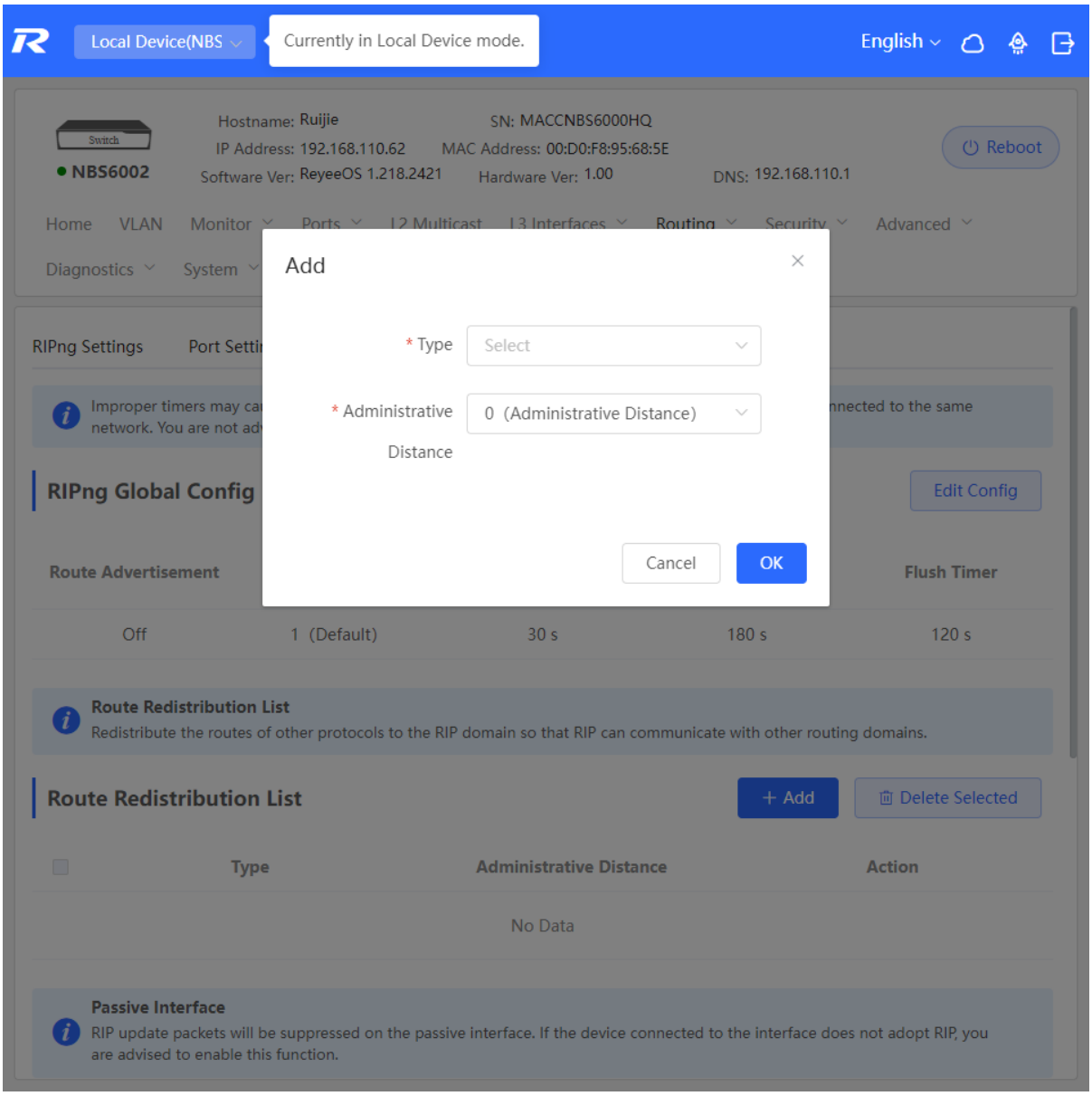


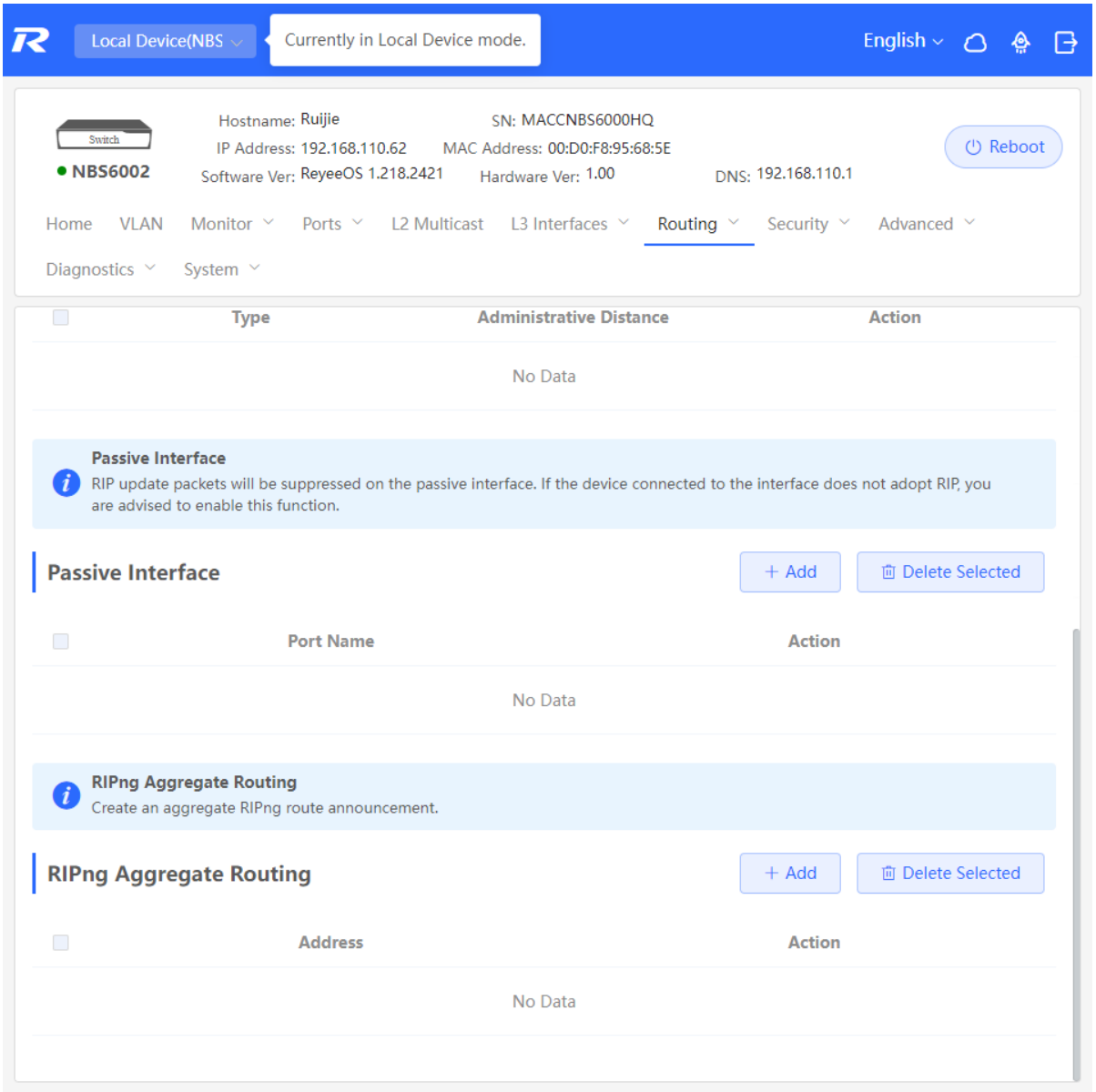
Table 16-9 RIP Route Redistribution Parameters

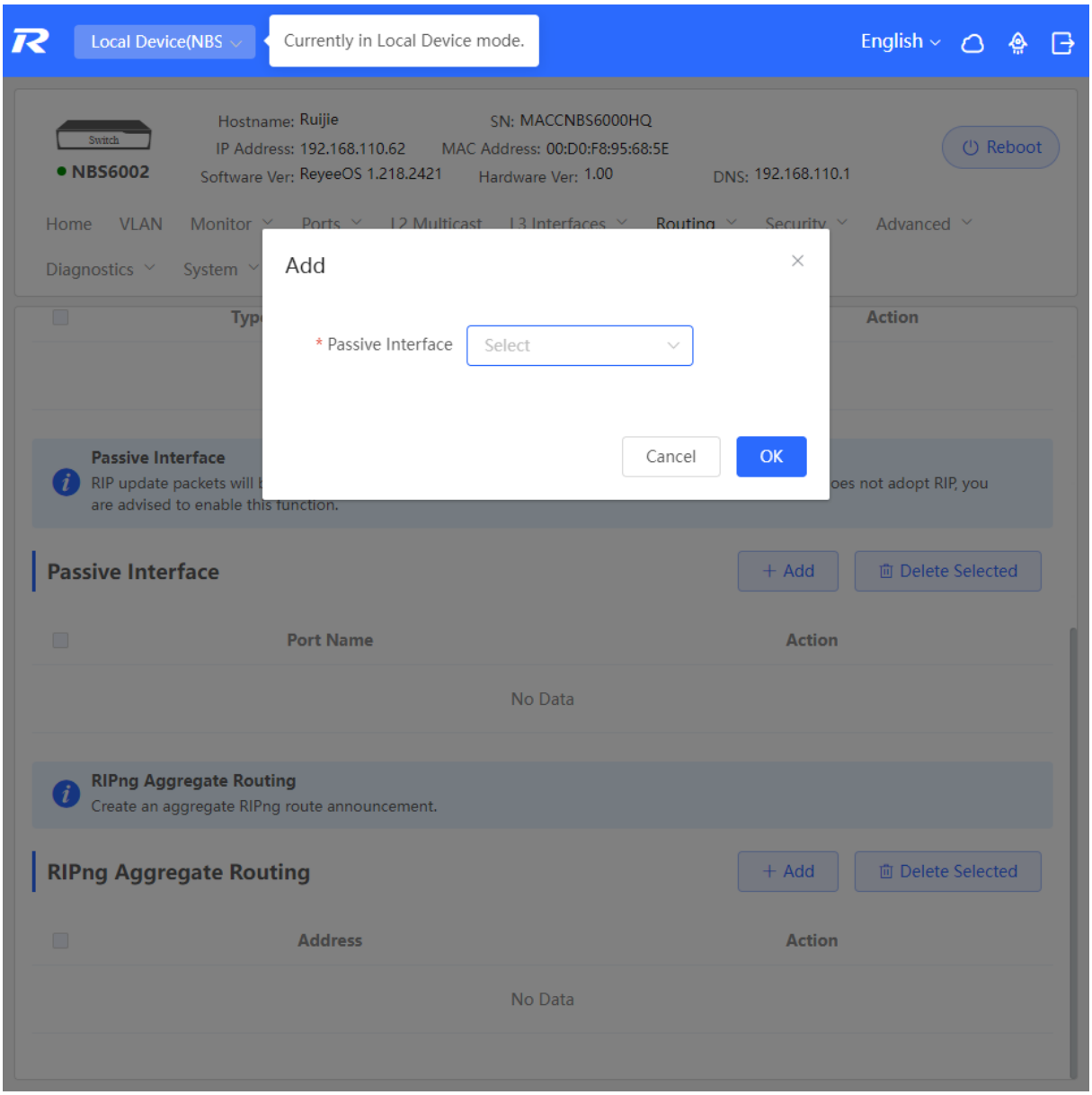
Parameter	Description
Type	Direct Routing OSPF Routing Static Routing
Administrative Distance	Value range: 0-16. The default value is **0**.

16.4.5 Configuring the RIPng Passive Interface

If an interface is configured as a passive interface, it will suppress RIPng update packets. If the connected peer device does not run RIP, you are advised to enable the passive interface.

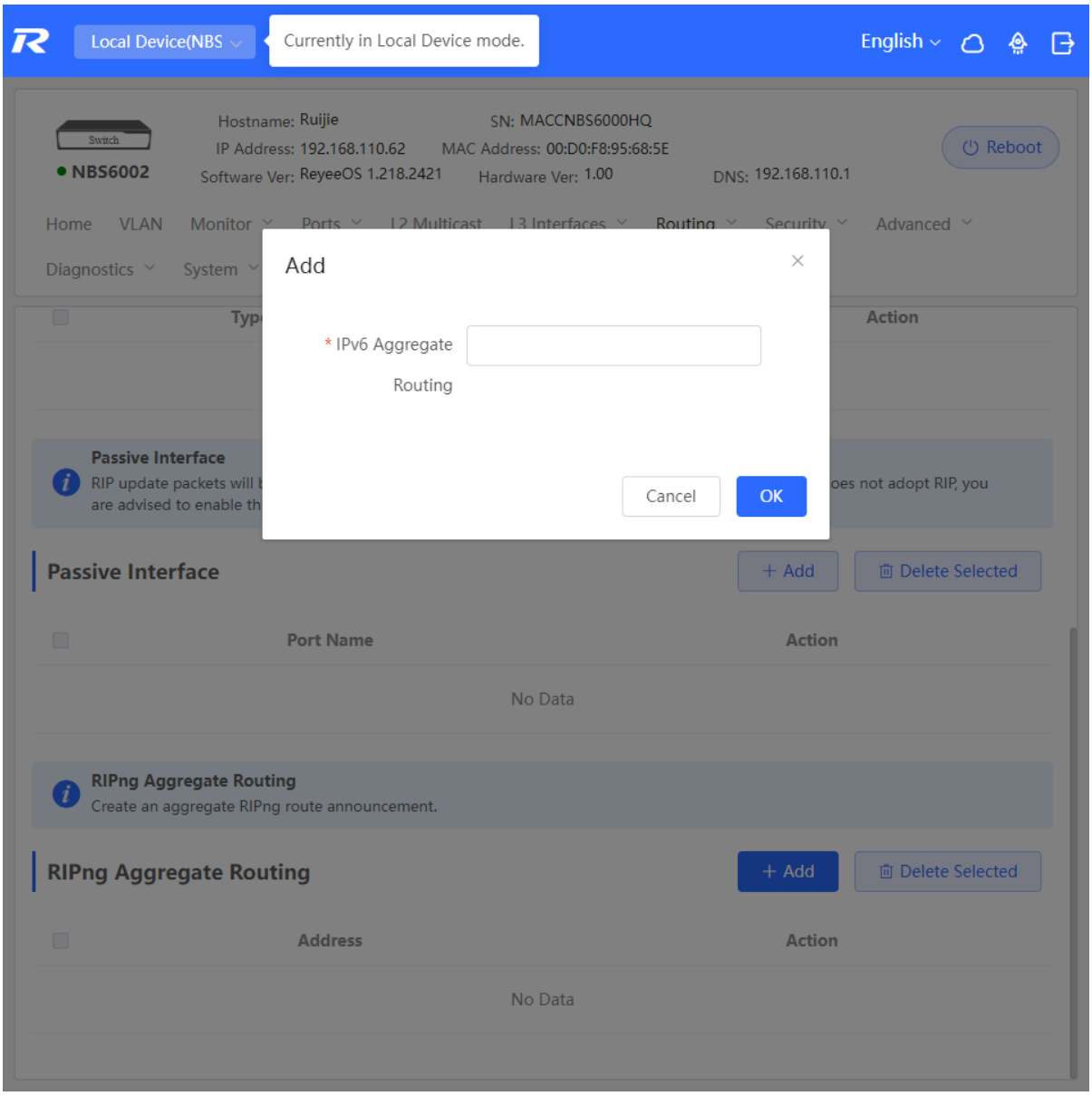
Choose **Local Device** > **Routing** > **RIPng Settings** > **Advanced**, click **Add**, and enter the IP address of the neighbor router.





16.4.6 Configuring the IPv6 Aggregate Route

Choose **Local Device** > **Routing** > **RIP Settings** > **Advanced**, click **Add**, and enter the IPv6 address and prefix length (value range: 0–128).



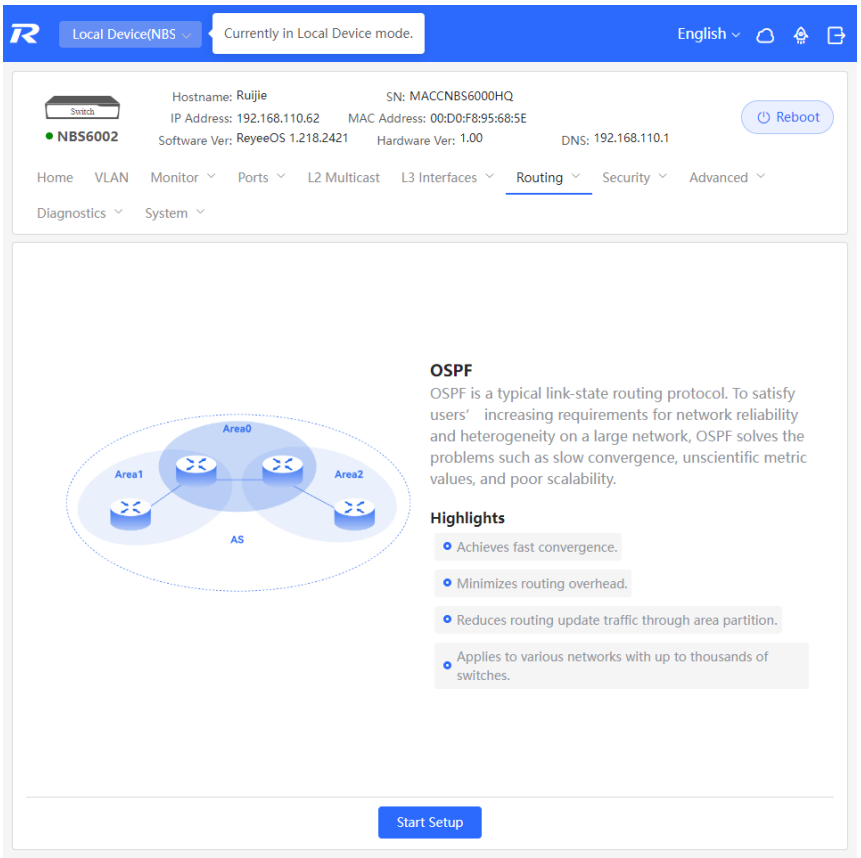
16.5 OSPFv2

Open Shortest Path First (OSPF) can be applied to large-scale networks. IPv4 uses OSPFv2, and IPv6 uses OSPFv3.

OSPF is a typical link-state routing protocol, which can solve the problems of slow route update, inaccurate measurement, and poor scalability in large networks. It is suitable for networks of various sizes, and even a network with up to thousands of devices.

16.5.1 Configuring OSPFv2 Basic Parameters

Choose **Local Device** > **Routing** > **OSPFv2**, click **Start Setup**, and then configure an instance and an interface respectively.



(1) Configure an instance.

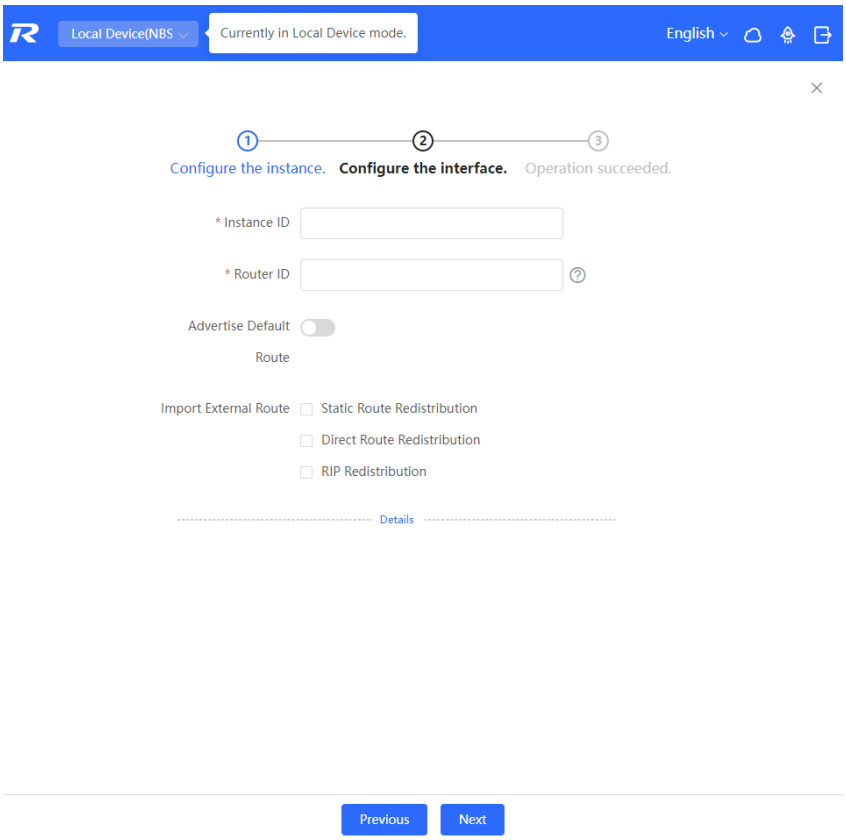


Table 16-10 Instance Configuration Parameters

Parameter	Description
Instance ID	Create an OSPF instance based on the service type. The instance only takes effect locally, and does not affect packet exchange with other devices.
Router ID	It identifies a router in an OSPF domain. **Caution** Router IDs within the same domain must be unique. The same configuration may cause neighbor discovery failures.
Advertise Default Route	Generate a default route and send it to the neighbor. After this function is enabled, you need to enter the metric and select a type. The default metric is **1**. Type 1: The metrics displayed on different routers vary. Type 2: The metrics displayed on all routers are the same.
Import External Route	Redistribute routes of other protocols to the OSPF domain to interwork with other routing domains. If **Static Route Redistribution** is selected, enter the metric, which is **20** by default. If **Direct Route Redistribution** is selected, enter the metric, which is **20** by default. If **RIP Redistribution** is selected, enter the metric, which is **20** by default.
Details	Expand the detailed configuration.

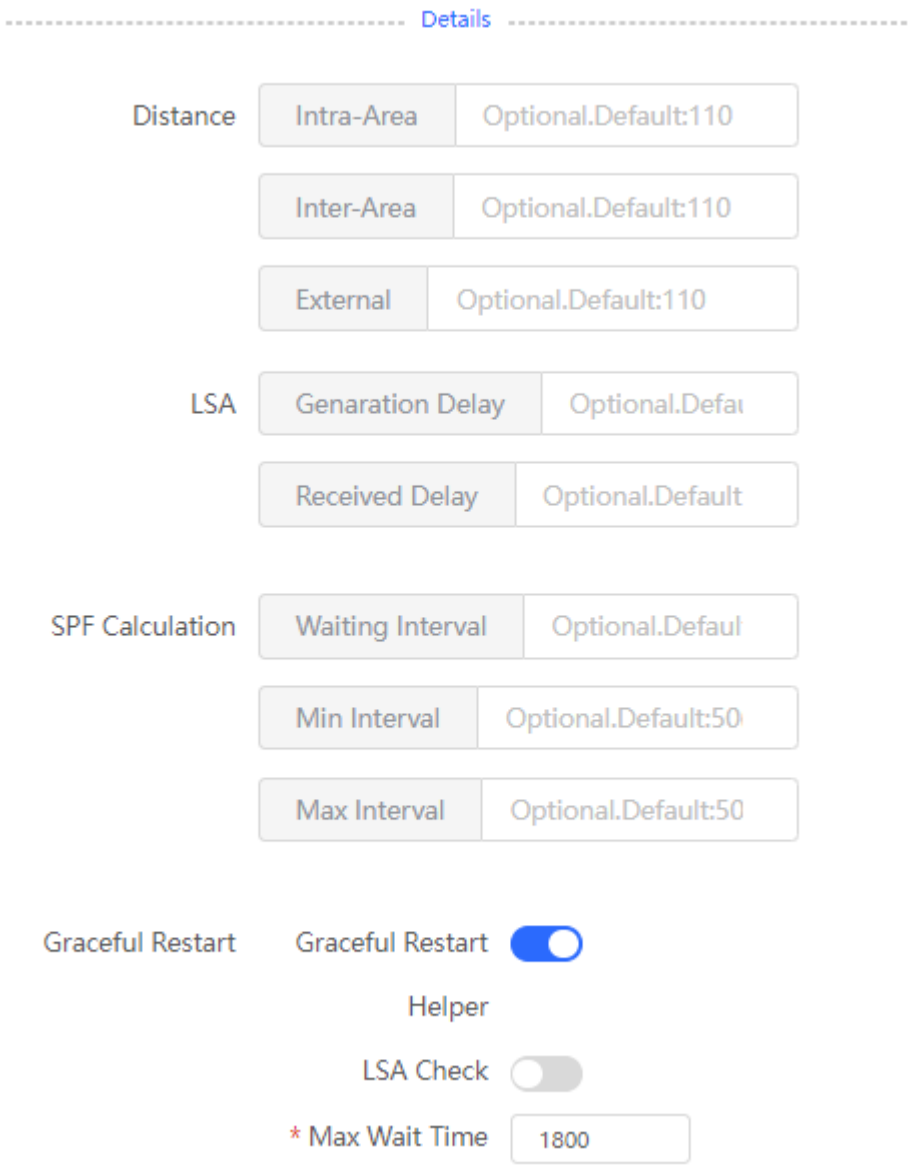


Table 16-11 Parameters in the Instance Detailed Configuration

Parameter	Description
Distance	It is used for protocol selection. By default, the intra-area, inter-area, and external distances are all **110**.

Parameter	Description
LSA	Frequent network changes and route flapping may occupy too much network bandwidth and device resources. The LSA generation and reception delays are specified in OSPF by default. The default value is 1000 ms.
SPF Calculation	When the link state database (LSDB) changes, OSPF recalculates the shortest path, and sets the interval to prevent frequent network changes from occupying a large number of resources **Waiting Interval**: When the state changes, the timer is triggered. The delay is calculated for the first time after the timer expires. The default value is 0 ms. **Min Interval**: As the number of changes increases, the time of each interval will increase according to the algorithm, and the default value is 50 ms. **Max Interval**: When the calculated interval reaches the maximum interval, the subsequent interval is always equal to the maximum interval. If the time from the last calculation exceeds the maximum interval and the LSDB is not updated, the timer is disabled.

Parameter	Description
Graceful Restart	Graceful Restart (GR) can avoid route flapping caused by traffic interruption and active/standby board switchover, thus ensuring the stability of key services. **Graceful Restart Helper**: The Graceful Restart Helper function is enabled when this switch is turned on. **LSA Check**: LSA packets outside the domain are checked when this switch is turned on. **Max Wait Time**: Timing starts after the device receives the GR packet from the peer device. If the peer device does not complete GR within **Max Wait Time**, the device exits the GR Helper mode. The default value is 1800 seconds.

(2) **Configure an interface.**

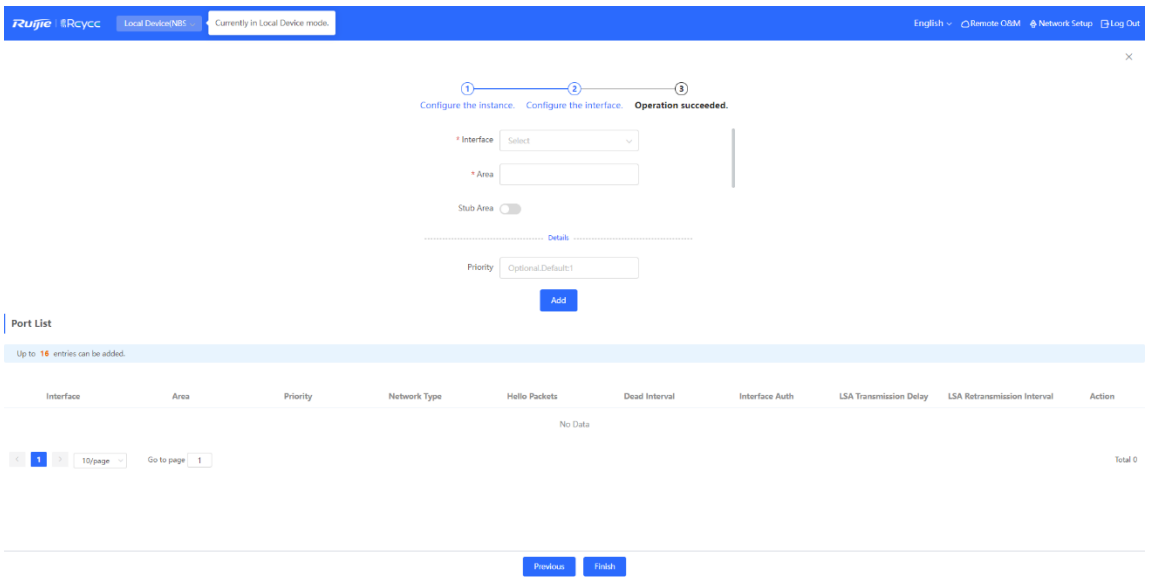
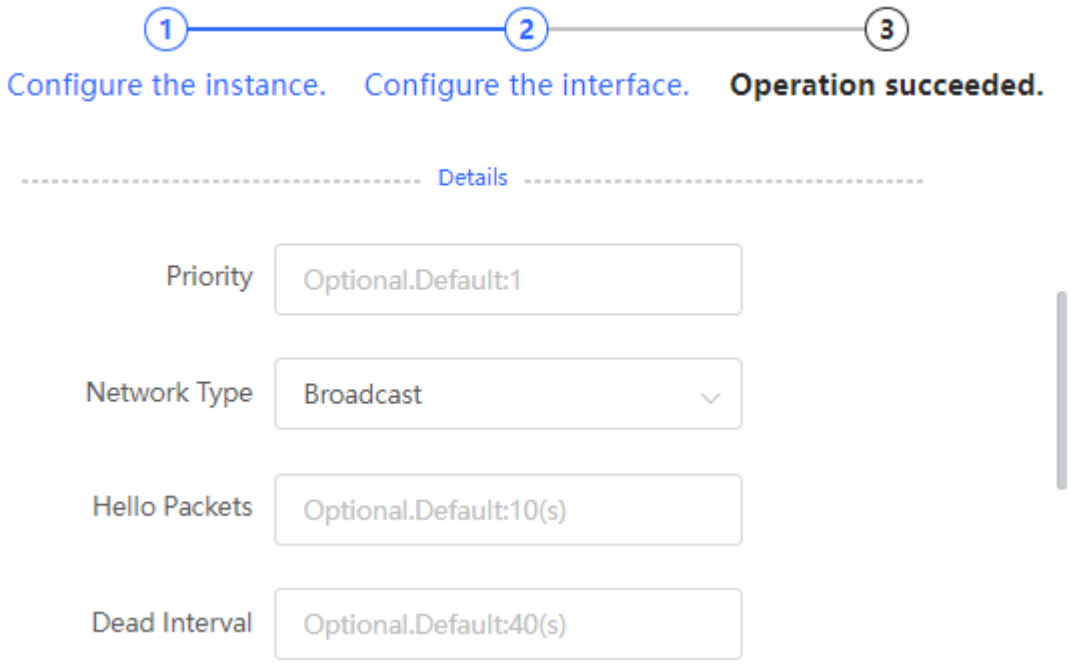


Table 16-12 Interface Configuration Parameters

Parameter	Description
Interface	Select the OSPF-enabled L3 interface.

Parameter	Description
Area	Configure the area ID. Value range: 0-4294967295
Stub Area	If **Stub Area** is enabled, you need to configure the area type and inter-area route isolation. Stub area: Routers at the edge of the area do not advertise routes outside the area, and the routing table in the area is small. Not-So-Stubby Area (NSSA): A few external routes can be imported. Inter-area route isolation: After this function is enabled, inter-area routes will not be imported to this area.
Details	Expand the detailed configuration.



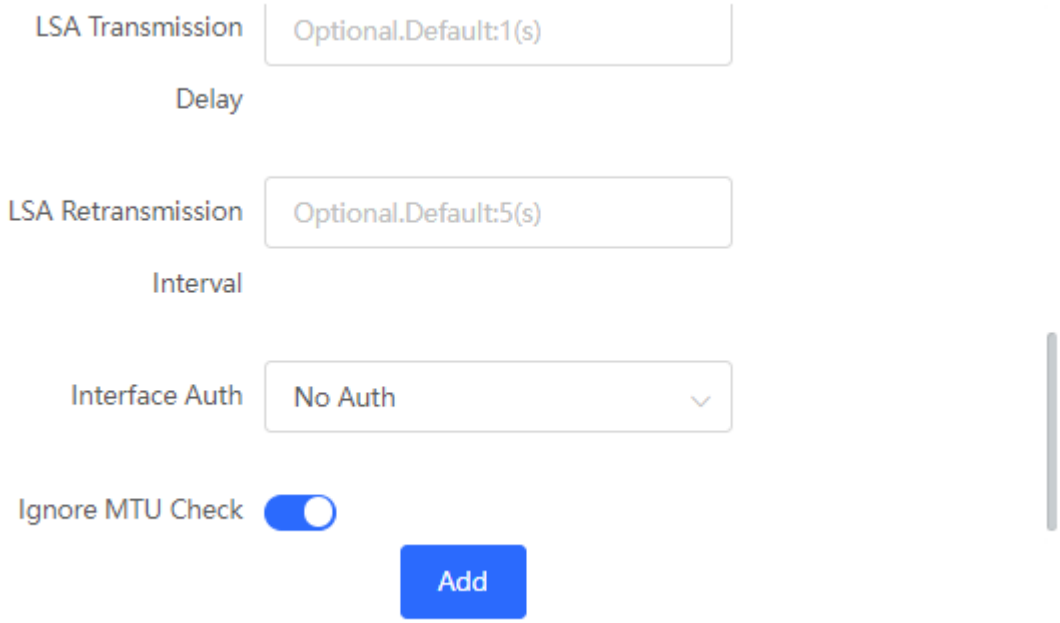


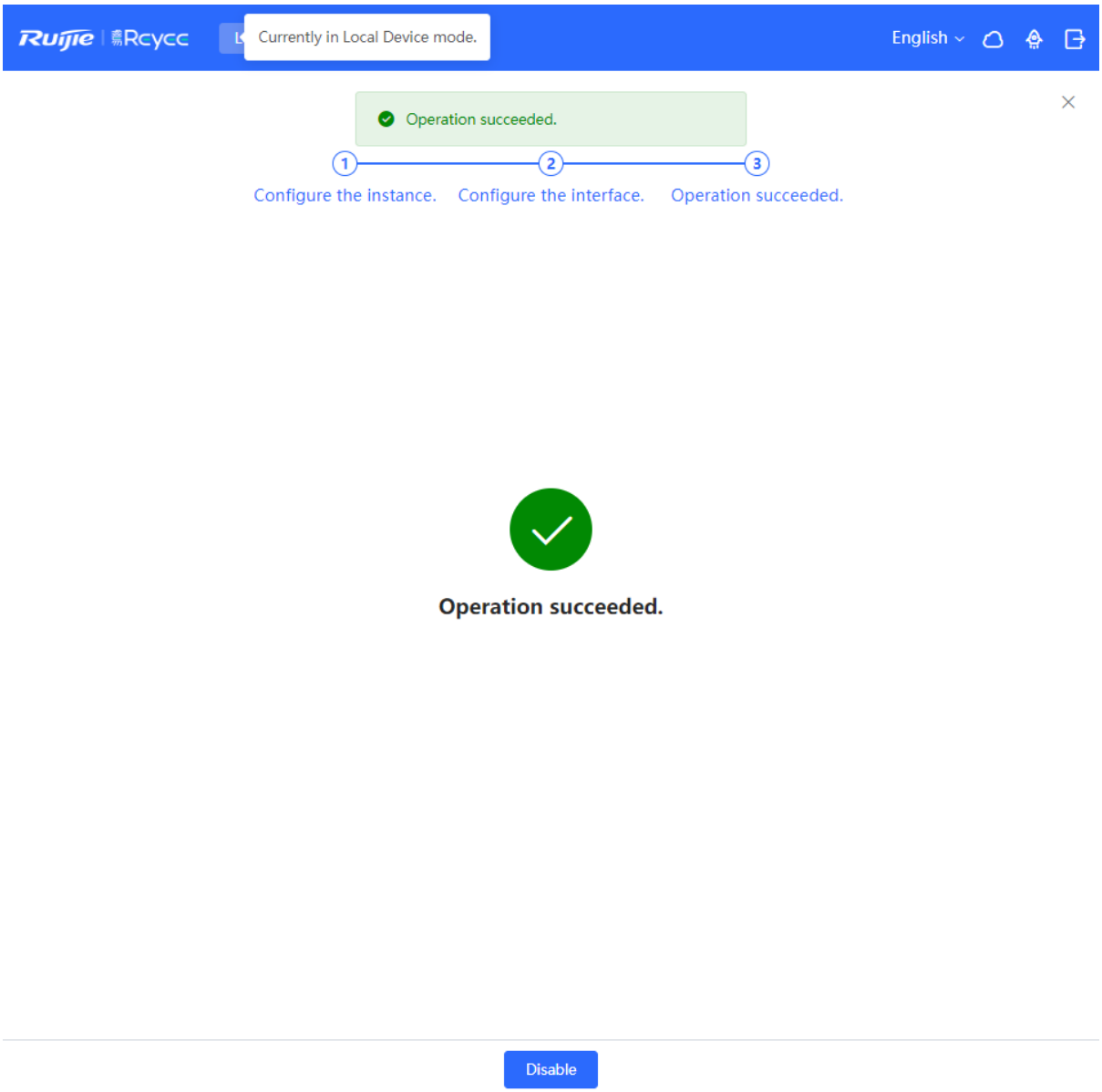
Table 16-13 Parameters in the Interface Detailed Configuration

Parameter	Description
Priority	It is 1 by default.
Network Type	Broadcast Unicast Multicast Non-Broadcast Multiple Access
Hello Packets	Interval for periodic transmission, which is used to discover and maintain OSPF neighbor relationship. The default value is 10 seconds.
Dead Interval	Time after which the neighbor becomes invalid. The default value is 40 seconds.
LSA Transmission Delay	LSA transmission delay of the interface. The default value is 1 second.

Parameter	Description
LSA Retransmission Interval	Time after which LSA is retransmitted after LSA is lost. The default value is 5 seconds.
Interface Auth	**No Auth**: The protocol packets are not authenticated. It is the default value. **Plain Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of plain text. **MD5**: The protocol packets are authenticated, and the authentication key is MD5 encrypted and then transmitted with the protocol packets.
Ignore MTU Check	Enabled by default.

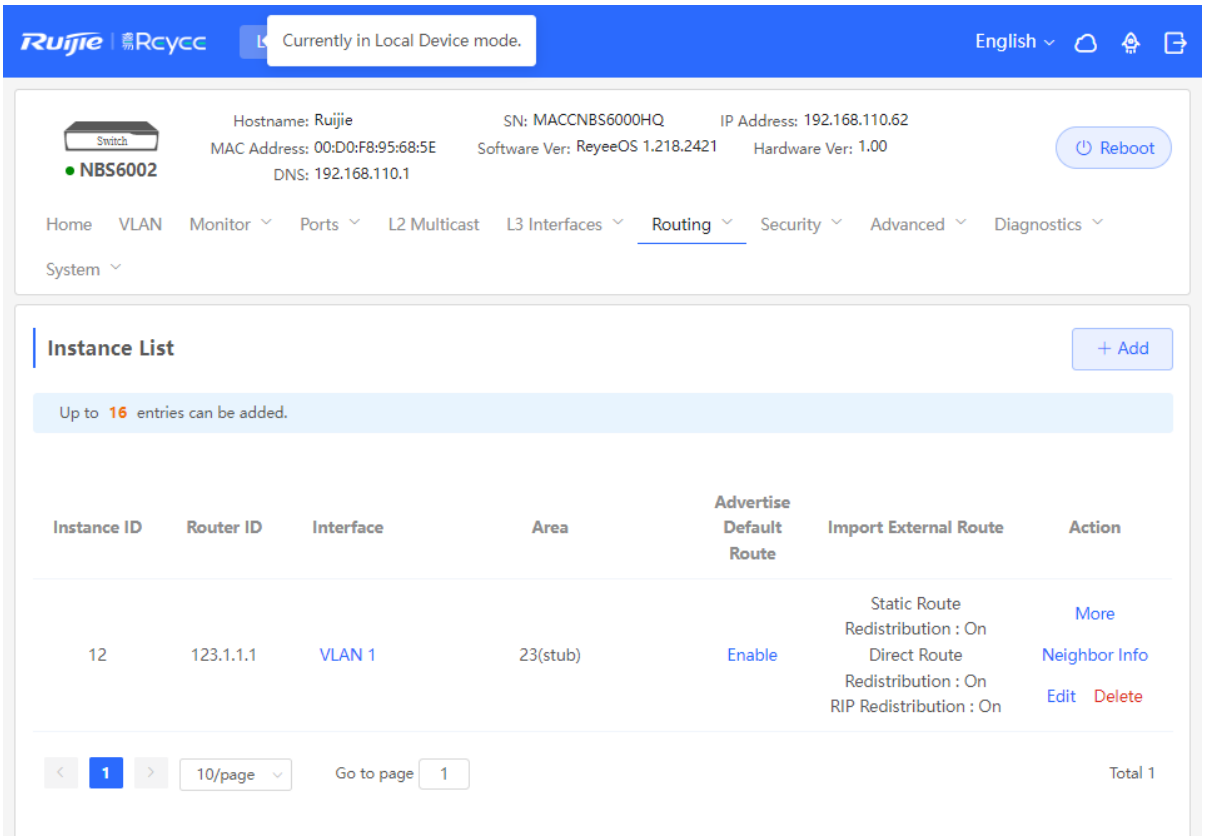
(2) Complete the configuration.

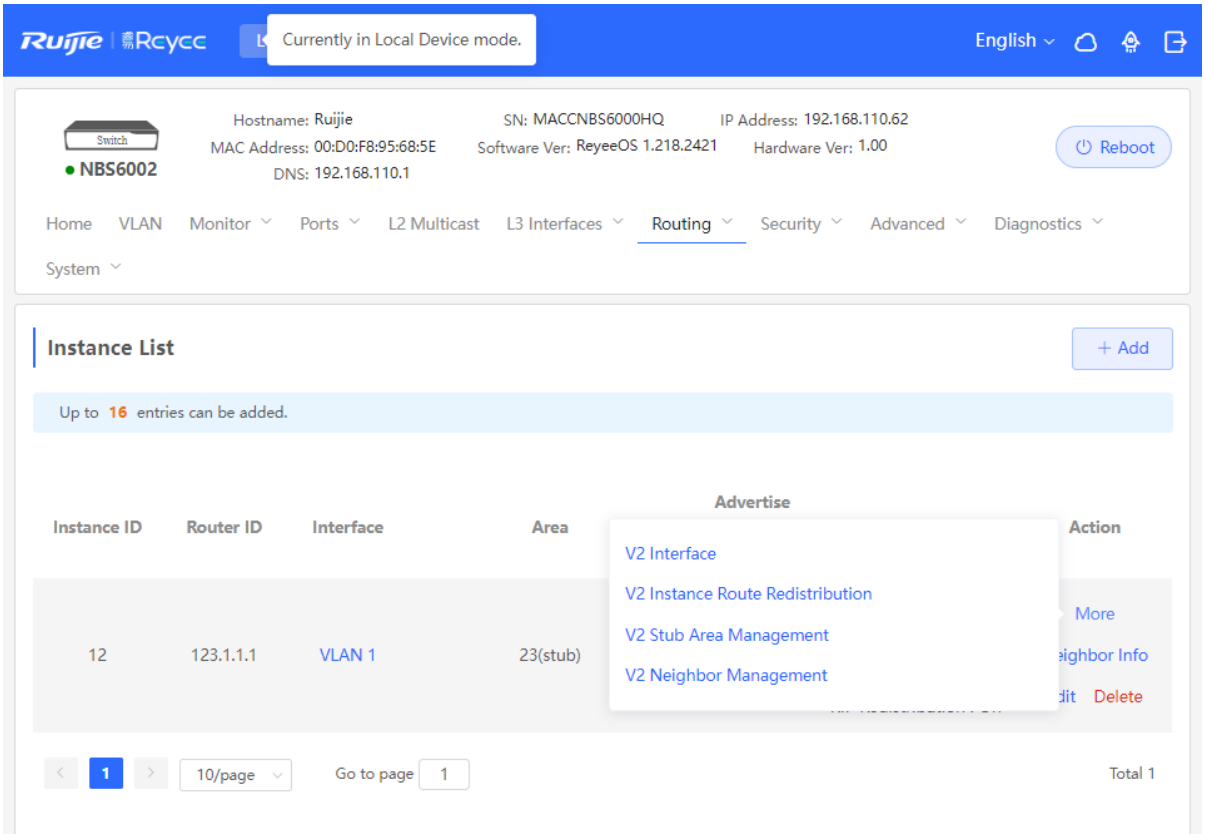
After completing the configuration, you can choose **Local Device** > **Routing** > **OSPFv2** and view the instance list.

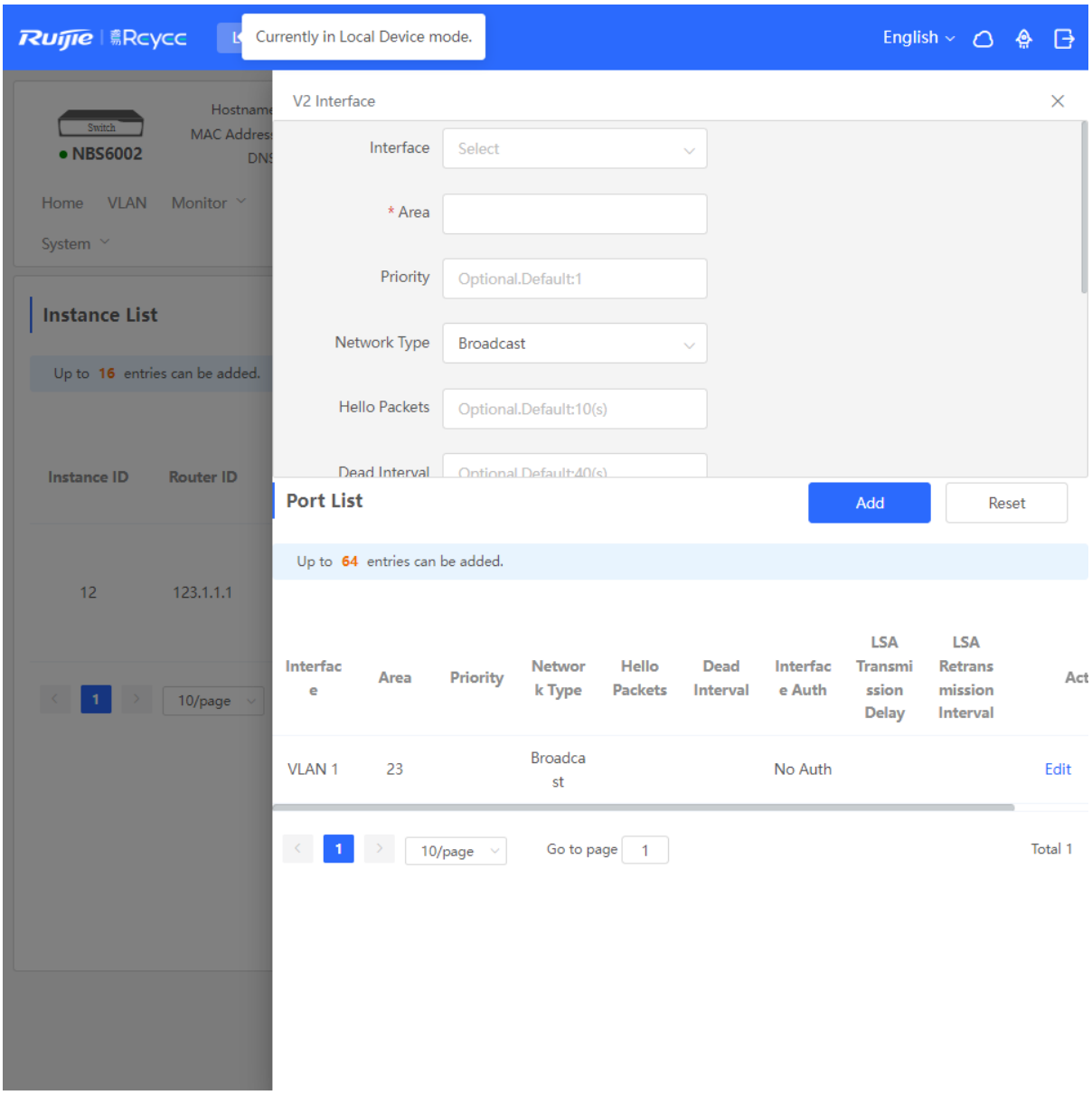


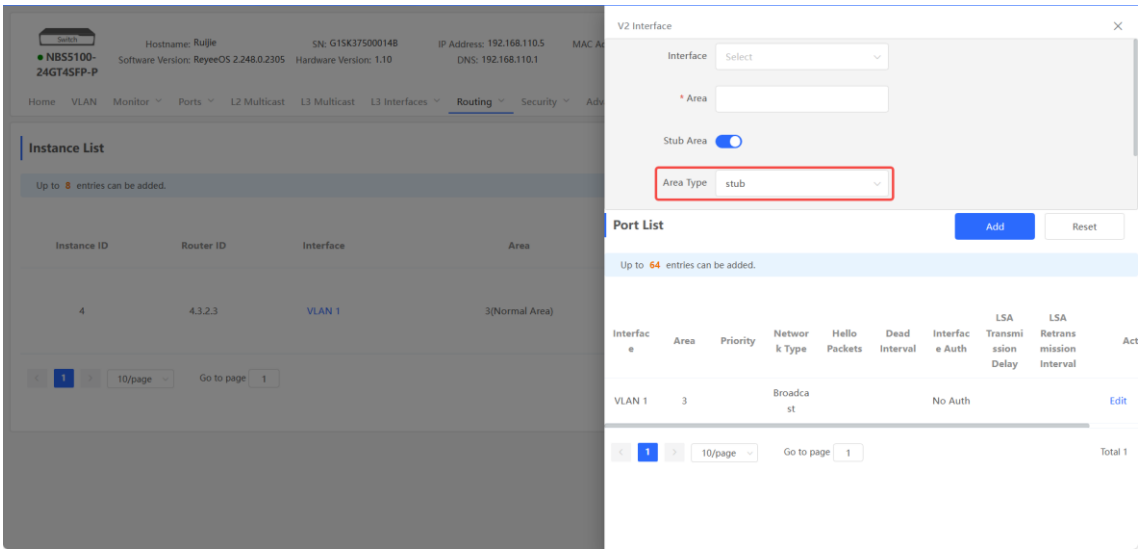
16.5.2 Adding an OSPFv2 Interface

Choose **Local Device** > **Routing** > **OSPFv2**, click **More** in the **Action** column, and select **V2 Interface**.


Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home VLAN Monitor Ports L2 Multicast L3 Interfaces Routing Security Advanced Diagnostics System
Instance List
+ Add
Up to 16 entries can be added.
Instance ID
Router ID
Interface
Area
Advertise Default Route
Import External Route
Action
12
123.1.1.1
VLAN 1
23(stub)
Enable
Static Route Redistribution : On
Direct Route Redistribution : On
RIP Redistribution : On
More
Neighbor Info
Edit
Delete
10/page
Go to page 1
Total 1

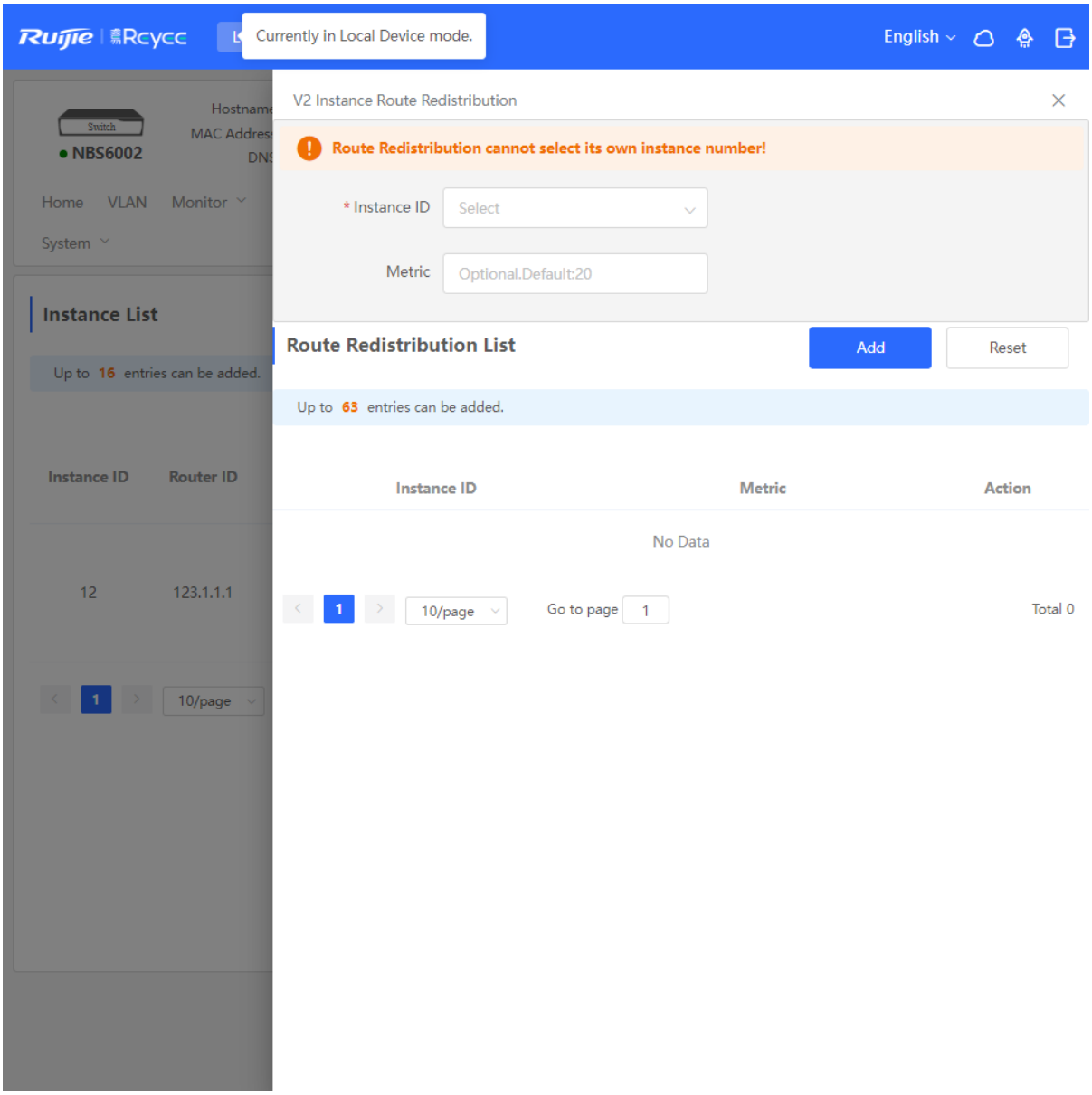

Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home VLAN Monitor Ports L2 Multicast L3 Interfaces Routing Security Advanced Diagnostics System
Instance List
+ Add
Up to 16 entries can be added.
Instance ID
Router ID
Interface
Area
Advertise
Action
V2 Interface
V2 Instance Route Redistribution
V2 Stub Area Management
V2 Neighbor Management
12
123.1.1.1
VLAN 1
23(stub)
More
Delete
10/page
Go to page 1
Total 1


Currently in Local Device mode.
English
NBS6002
Home
VLAN
Monitor
System
Instance List
Up to 16 entries can be added.
Instance ID
Router ID
12
123.1.1.1
V2 Interface
Interface
Select
* Area
Priority
Optional.Default:1
Network Type
Broadcast
Hello Packets
Optional.Default:10(s)
Dead Interval
Port List
Add
Reset
Up to 64 entries can be added.
Interface
Area
Priority
Network Type
Hello Packets
Dead Interval
Interface Auth
LSA Transmission Delay
LSA Retransmission Interval
Act
VLAN 1
23
Broadcast
No Auth
Edit
10/page
Go to page
1
Total 1


NBS5100-24GT4SFP-P
Instance List
Up to 8 entries can be added.
Instance ID
Router ID
Interface
Area
4
4.3.2.3
VLAN 1
3(Normal Area)
V2 Interface
Interface
Select
* Area
Stub Area
Area Type
stub
Port List
Add
Reset
Up to 64 entries can be added.
VLAN 1
3
Broadcast
No Auth
Edit
Total 1

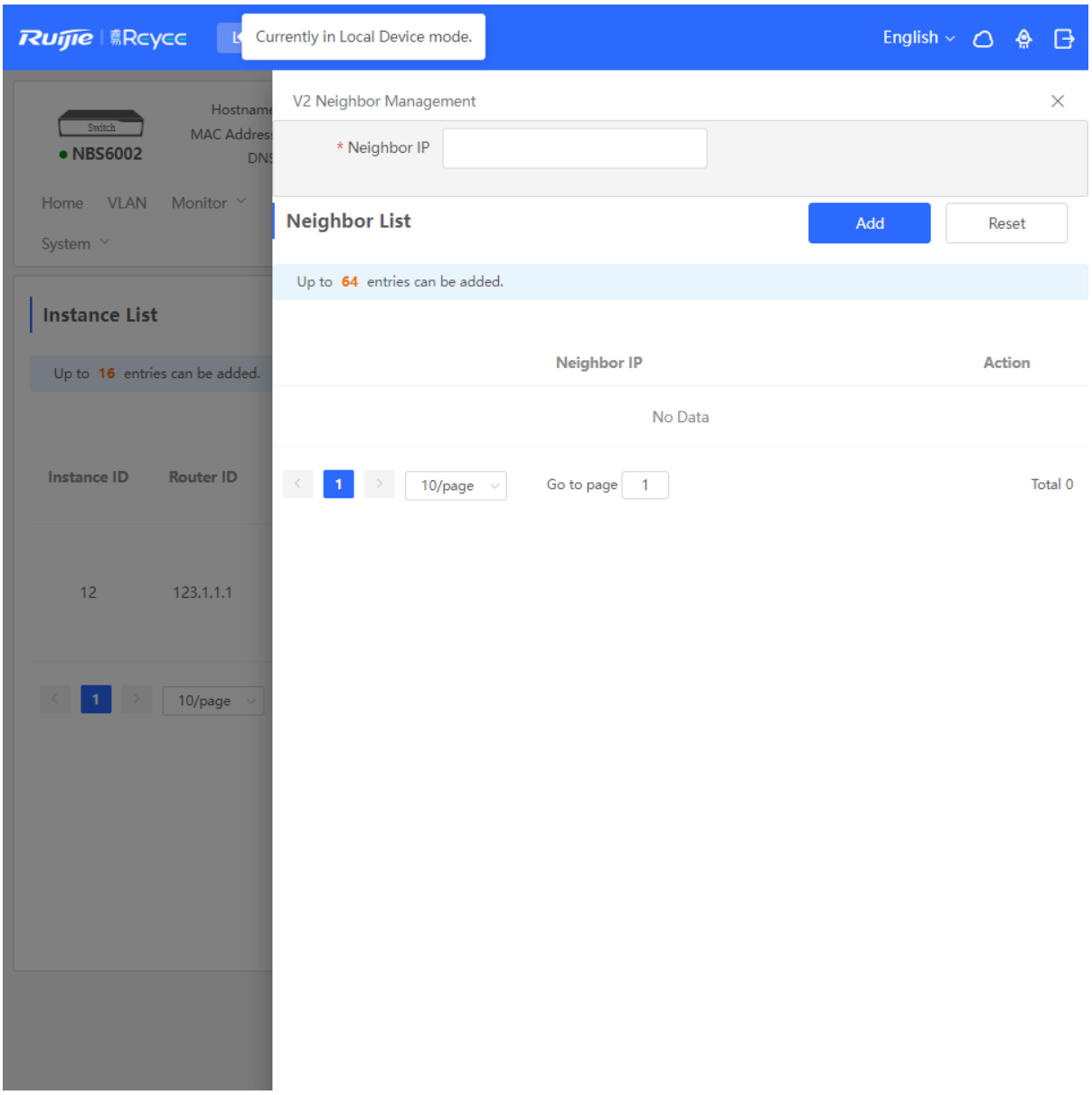
16.5.3 Redistributing OSPFv2 Instance Routes

Choose **Local Device** > **Routing** > **OSPFv2**, click **More** in the **Action** column, and select **V2 Instance Route Redistribution**.



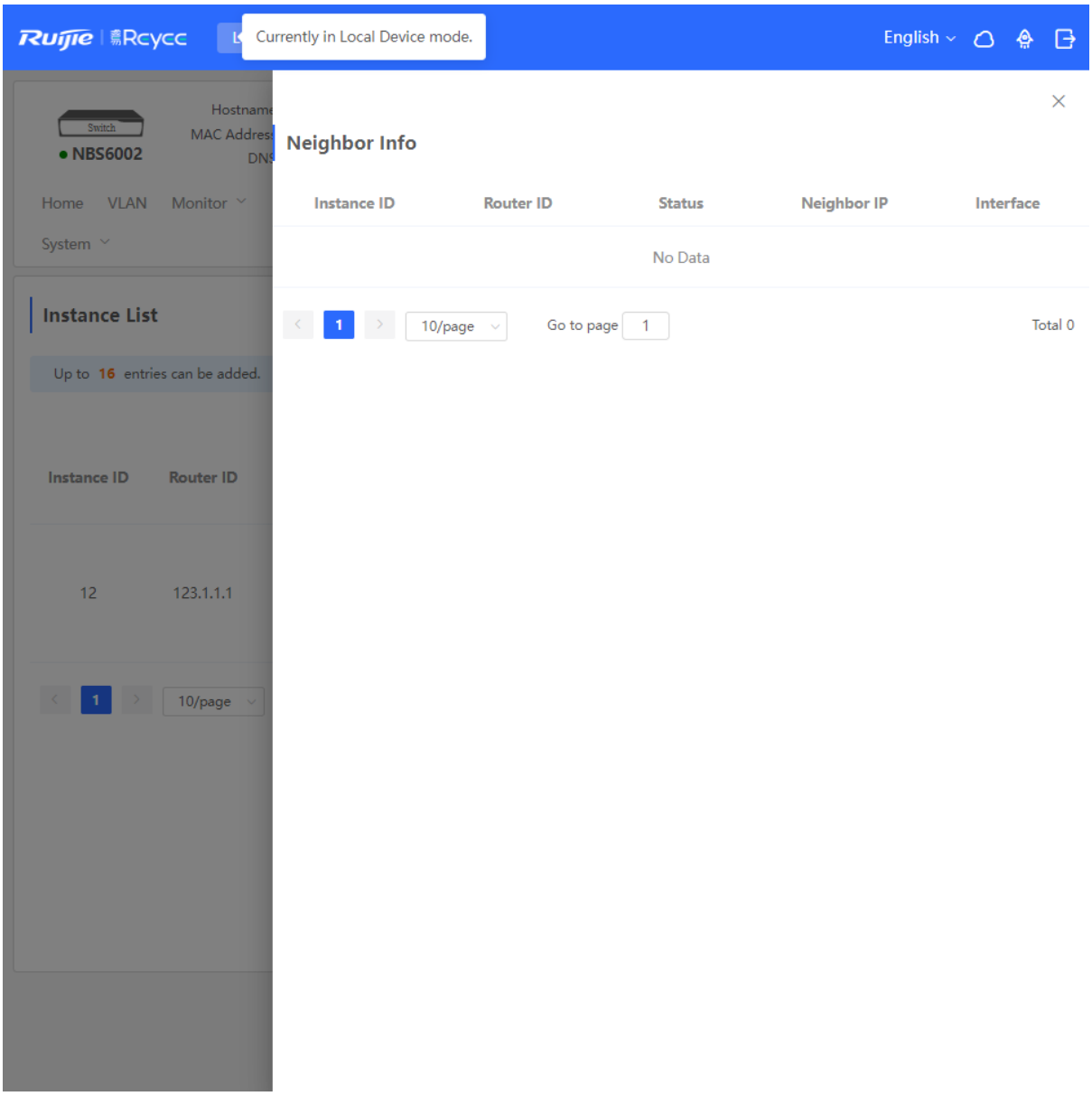
16.5.4 Managing OSPFv2 Neighbors

Choose **Local Device** > **Routing** > **OSPFv2**, click **More** in the **Action** column, and select **V2 Neighbor Management**.



16.5.5 Viewing OSPFv2 Neighbor Information

Choose **Local Device** > **Routing** > **OSPFv2**, and click **Neighbor Info** in the **Action** column.



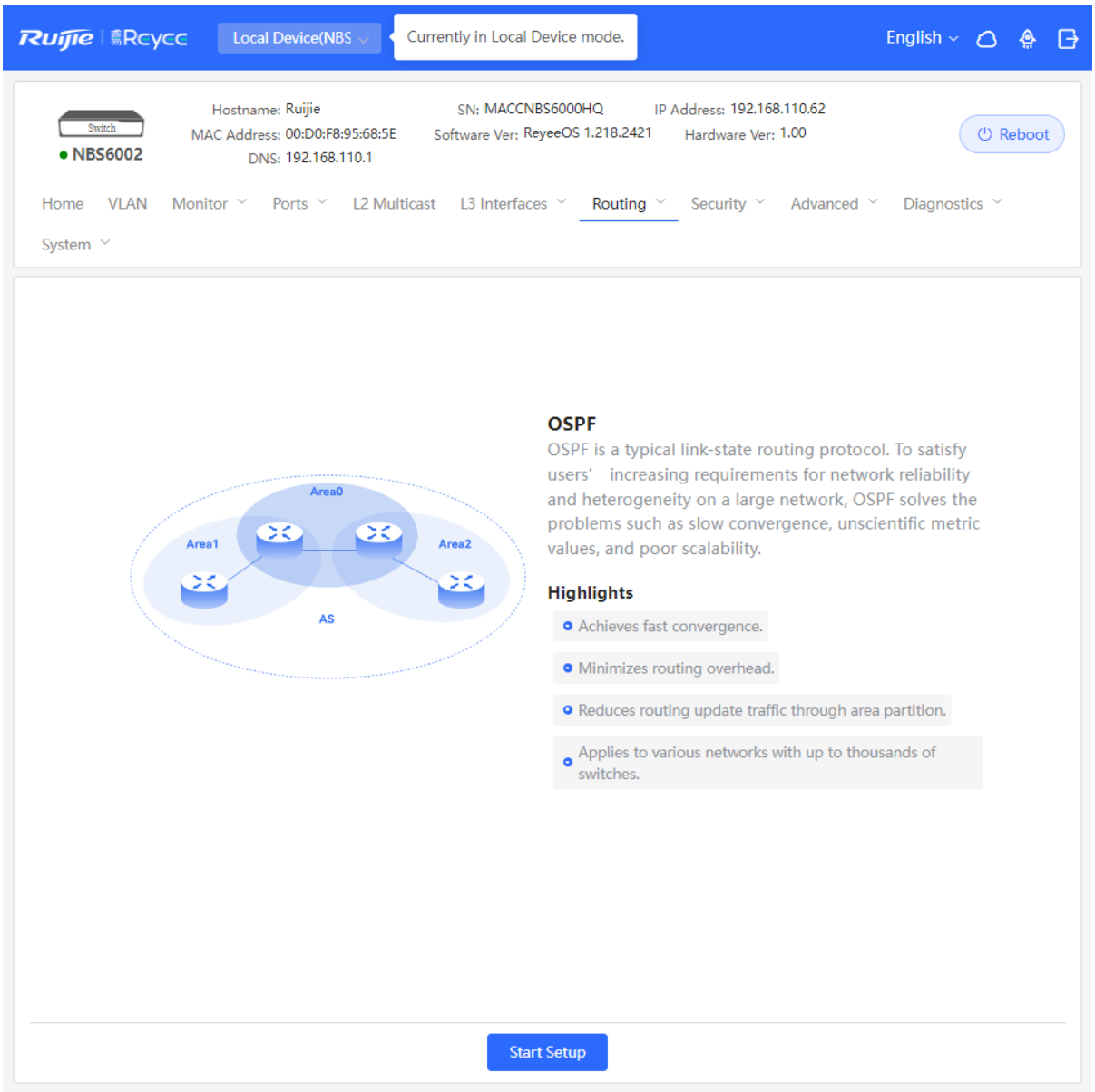
16.6 OSPFv3

Open Shortest Path First (OSPF) can be applied to large-scale networks. IPv4 uses OSPFv2, and IPv6 uses OSPFv3.

16.6.1 Configuring OSPFv3 Basic Parameters

Choose **Local Device** > **Routing** > **OSPFv3**, click **Start Setup**, and then configure an instance and an interface respectively.

1. Configure an instance.



OSPF

OSPF is a typical link-state routing protocol. To satisfy users' increasing requirements for network reliability and heterogeneity on a large network, OSPF solves the problems such as slow convergence, unscientific metric values, and poor scalability.

Highlights

Achieves fast convergence.

Minimizes routing overhead.

Reduces routing update traffic through area partition.

Applies to various networks with up to thousands of switches.

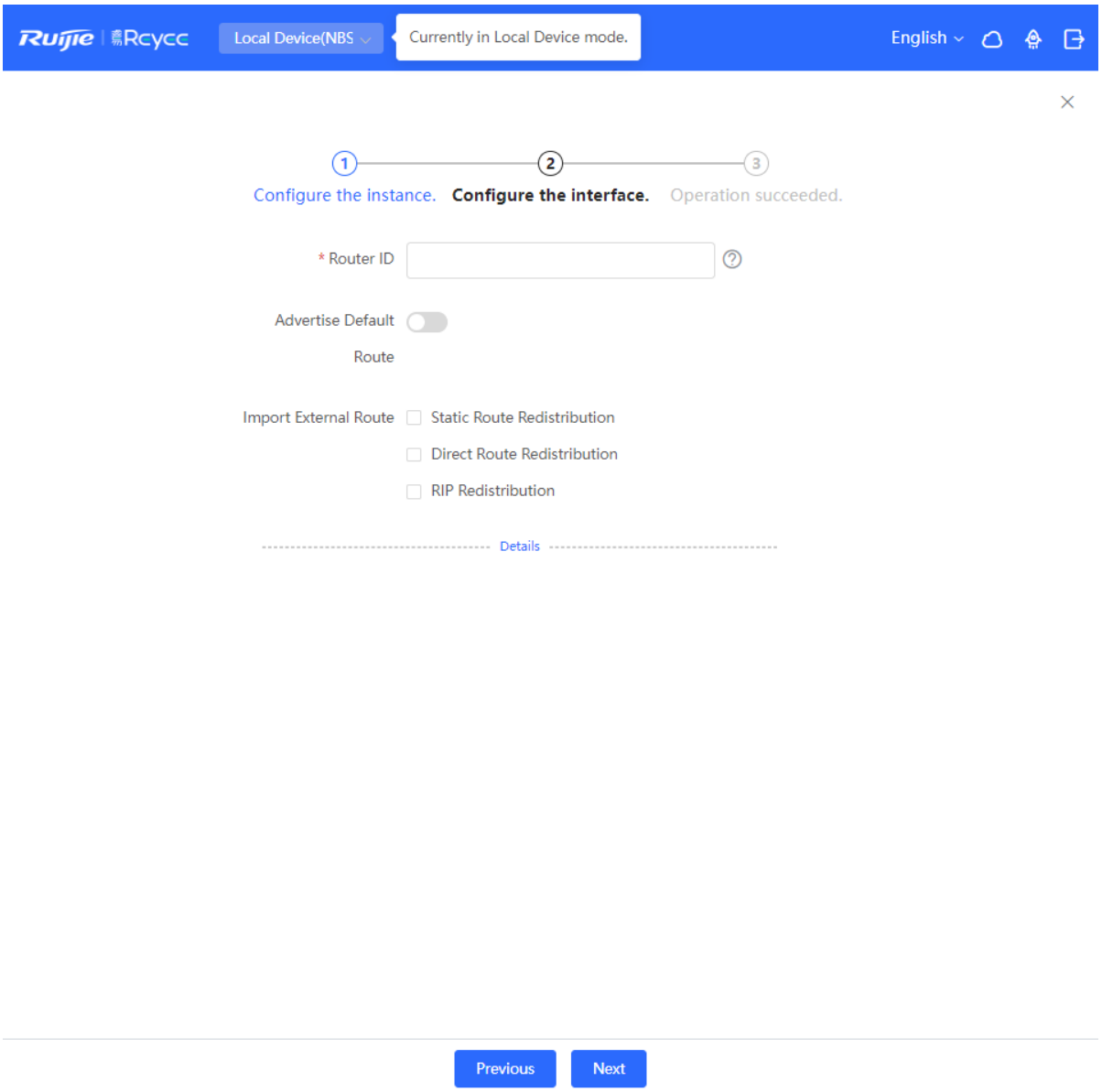
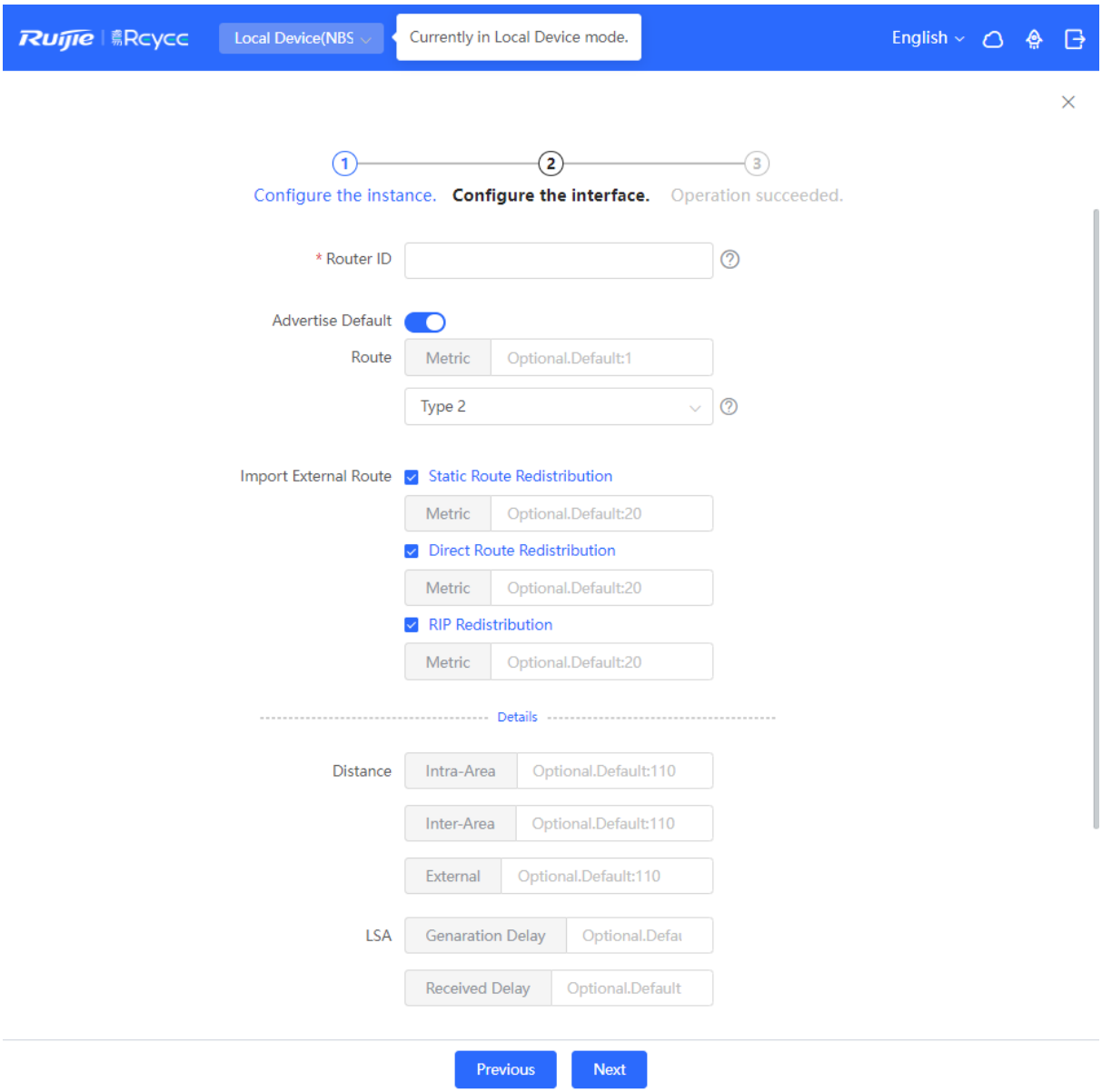


Table 16-14 Instance Configuration Parameters

Parameter	Description
Instance ID	Create an OSPF instance based on the service type. The instance only takes effect locally, and does not affect packet exchange with other devices.

Parameter	Description
Router ID	It identifies a router in an OSPF domain. **Caution** Router IDs within the same domain must be unique. The same configuration may cause neighbor discovery failures.
Advertise Default Route	Generate a default route and send it to the neighbor. After this function is enabled, you need to enter the metric and select a type. The default metric is **1**. Type 1: The metrics displayed on different routers vary. Type 2: The metrics displayed on all routers are the same.
Import External Route	Redistribute routes of other protocols to the OSPF domain to interwork with other routing domains. If **Static Route Redistribution** is selected, enter the metric, which is **20** by default. If **Direct Route Redistribution** is selected, enter the metric, which is **20** by default. If **RIP Redistribution** is selected, enter the metric, which is **20** by default.
Details	Expand the detailed configuration.


Local Device(NBS
Currently in Local Device mode.
English
1
2
3
Configure the instance.
Configure the interface.
Operation succeeded.
* Router ID
Advertise Default Route
Metric
Optional.Default:1
Type 2
Import External Route
Static Route Redistribution
Metric
Optional.Default:20
Direct Route Redistribution
Metric
Optional.Default:20
RIP Redistribution
Metric
Optional.Default:20
Details
Distance
Intra-Area
Optional.Default:110
Inter-Area
Optional.Default:110
External
Optional.Default:110
LSA
Genaration Delay
Received Delay
Optional.Default
Previous
Next

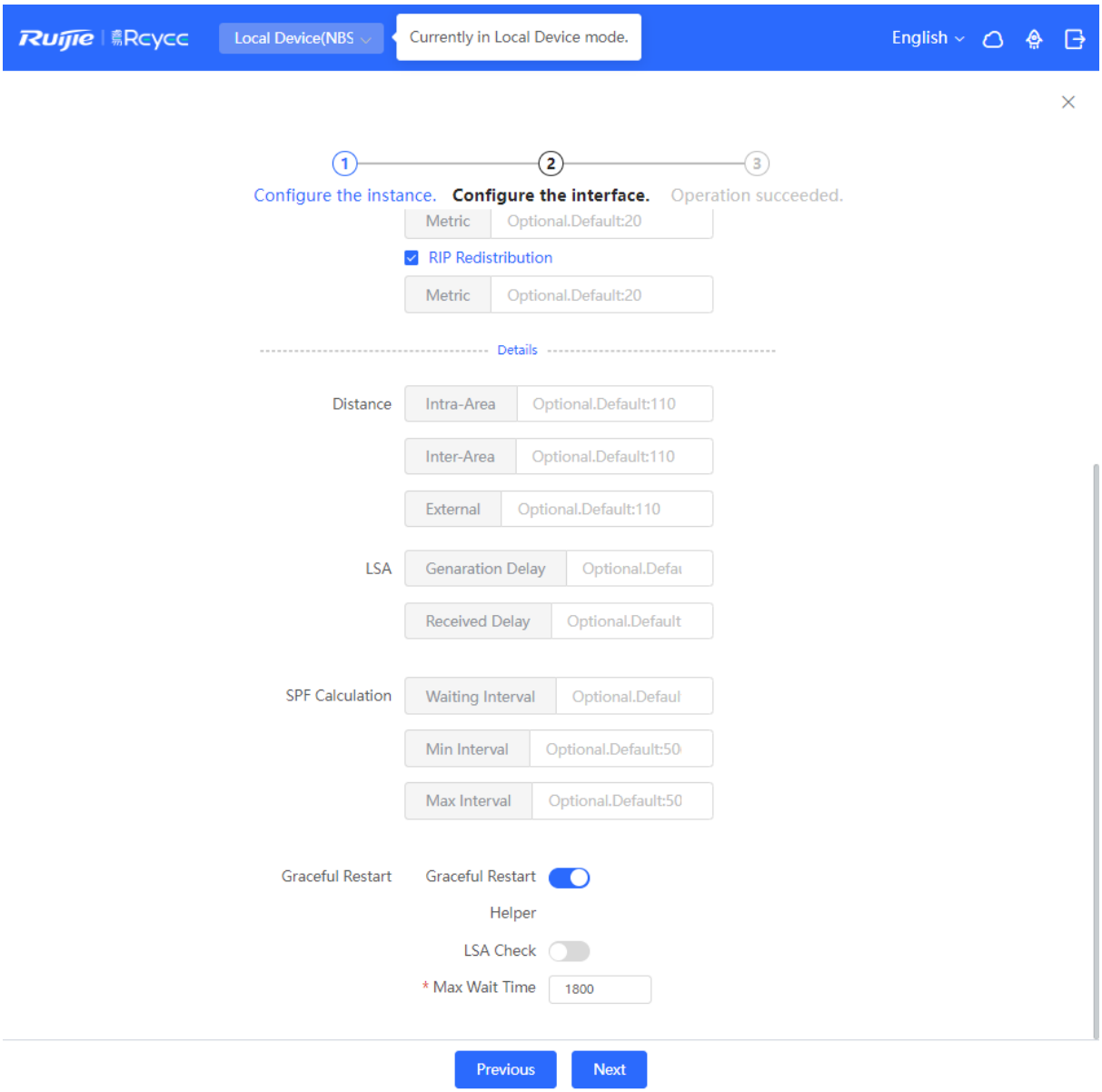


Table 16-15 Parameters in the Instance Detailed Configuration

Parameter	Description
Distance	It is used for protocol selection. By default, the intra-area, inter-area, and external distances are all **110**.

Parameter	Description
LSA	Frequent network changes and route flapping may occupy too much network bandwidth and device resources. The LSA generation and reception delays are specified in OSPF by default. The default value is 1000 ms.
SPF Calculation	When the link state database (LSDB) changes, OSPF recalculates the shortest path, and sets the interval to prevent frequent network changes from occupying a large number of resources **Waiting Interval**: When the state changes, the timer is triggered. The delay is calculated for the first time after the timer expires. The default value is 0 ms. **Min Interval**: As the number of changes increases, the time of each interval will increase according to the algorithm, and the default value is 50 ms. **Max Interval**: When the calculated interval reaches the maximum interval, the subsequent interval is always equal to the maximum interval. If the time from the last calculation exceeds the maximum interval and the LSDB is not updated, the timer is disabled.

Parameter	Description
Graceful Restart	Graceful Restart (GR) can avoid route flapping caused by traffic interruption and active/standby board switchover, thus ensuring the stability of key services. **Graceful Restart Helper**: The Graceful Restart Helper function is enabled when this switch is turned on. **LSA Check**: LSA packets outside the domain are checked when this switch is turned on. **Max Wait Time**: Timing starts after the device receives the GR packet from the peer device. If the peer device does not complete GR within **Max Wait Time**, the device exits the GR Helper mode. The default value is 1800 seconds.

2. Configure an interface.

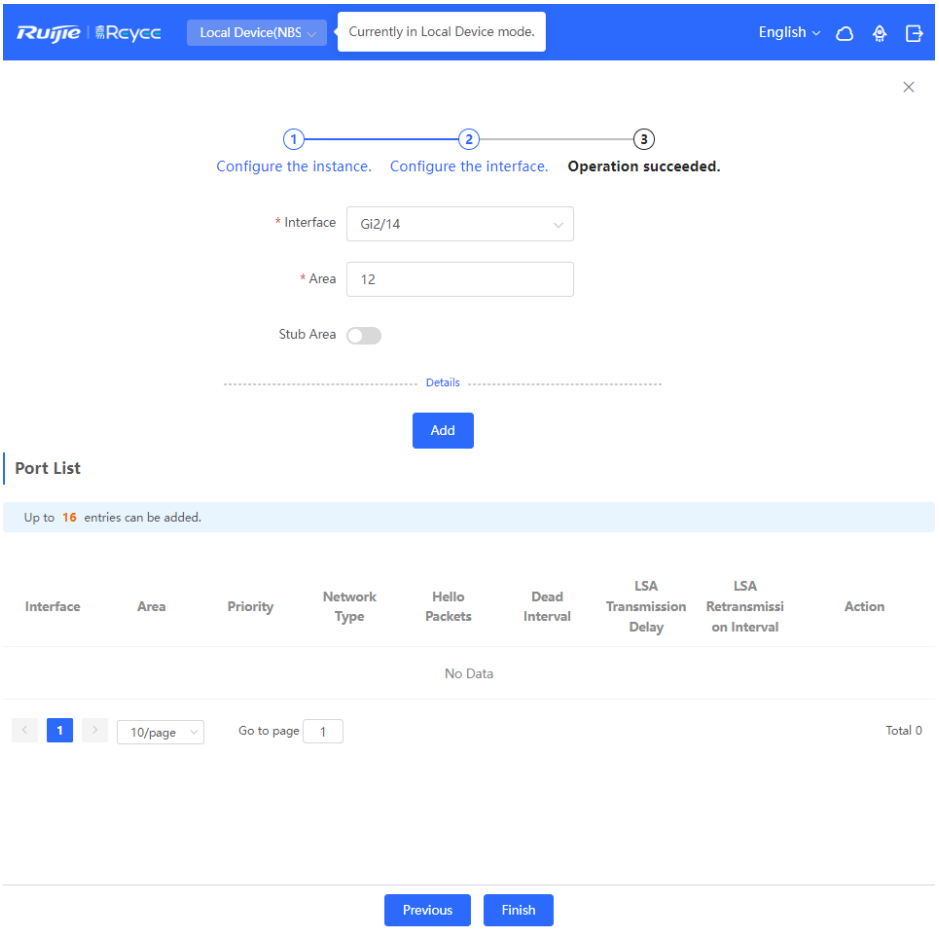
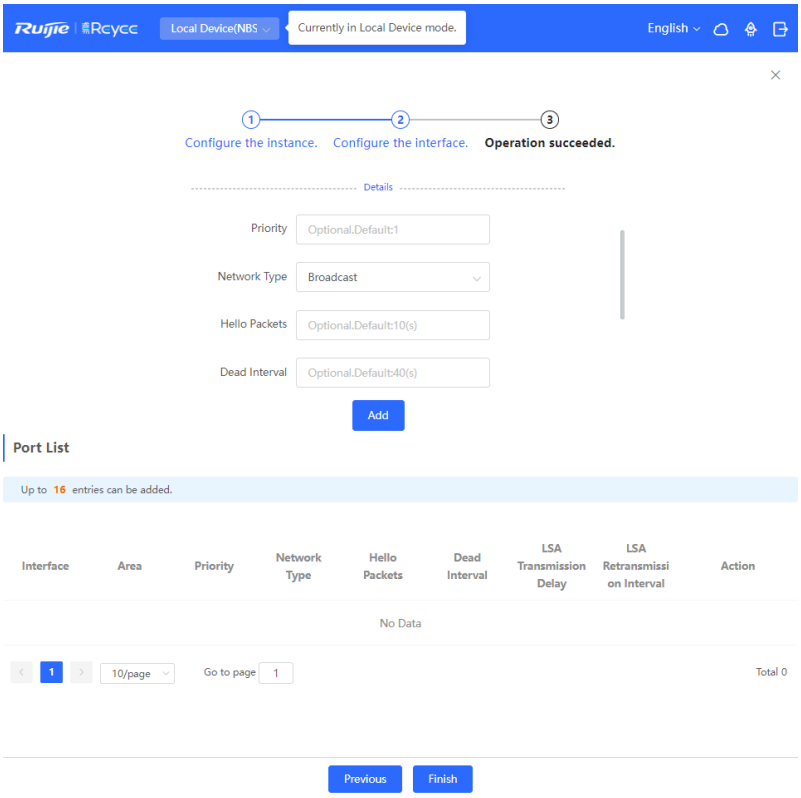
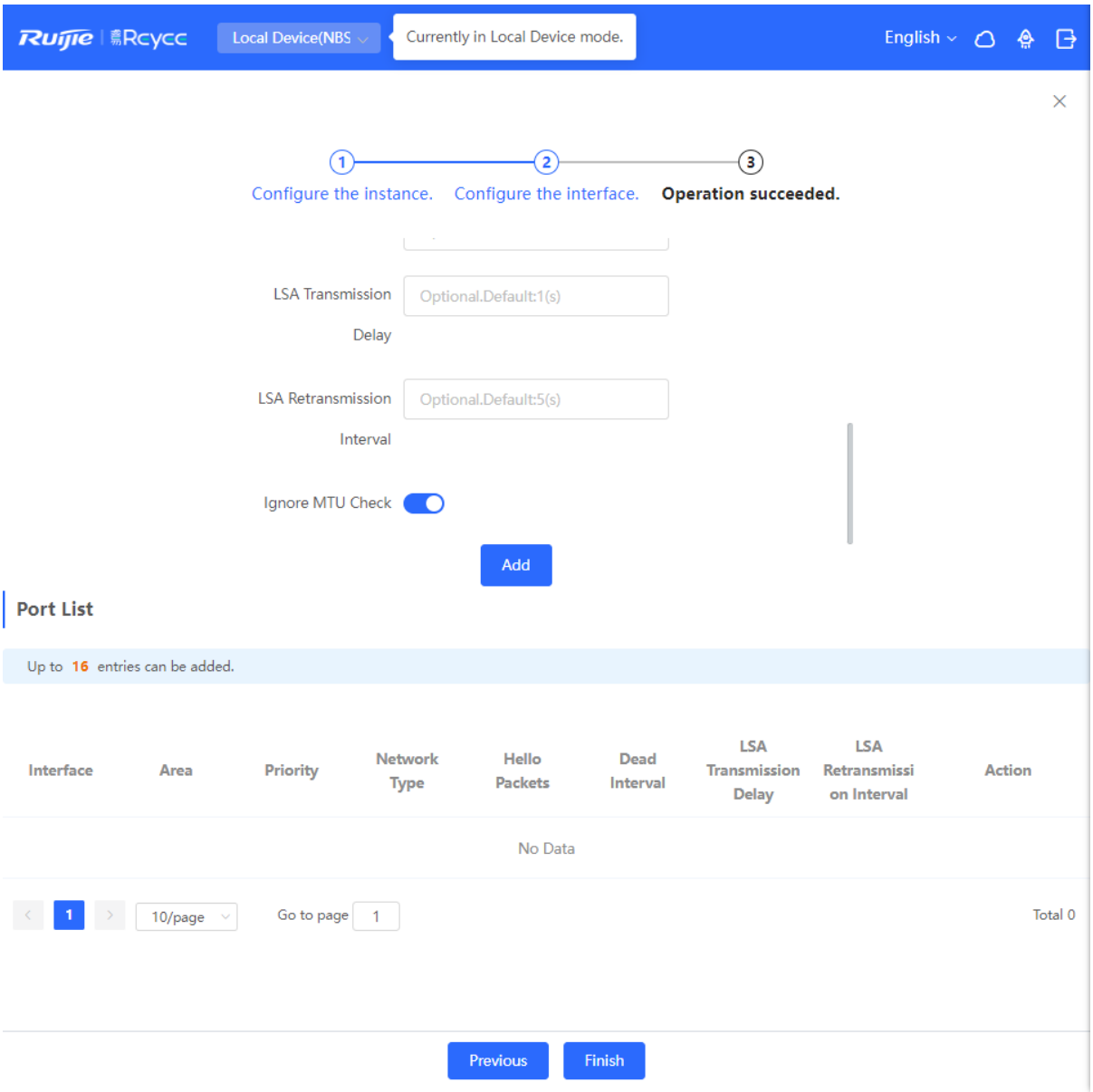


Table 16-16 Interface Configuration Parameters

Parameter	Description
Interface	Select the OSPF-enabled L3 interface.
Area	Configure the area ID. Value range: 0-4294967295
Stub Area	If **Stub Area** is enabled, you need to configure the area type and inter-area route isolation. Stub area: Routers at the edge of the area do not advertise routes outside the area, and the routing table in the area is small. Not-So-Stubby Area (NSSA): A few external routes can be imported.
Details	Expand the detailed configuration.




Local Device(NBS
Currently in Local Device mode.
English
1
2
3
Configure the instance.
Configure the interface.
Operation succeeded.
LSA Transmission Delay
Optional.Default:1(s)
LSA Retransmission Interval
Optional.Default:5(s)
Ignore MTU Check
Add
Port List
Up to 16 entries can be added.
Interface
Area
Priority
Network Type
Hello Packets
Dead Interval
LSA Transmission Delay
LSA Retransmission Interval
Action
No Data
1
10/page
Go to page
1
Total 0
Previous
Finish

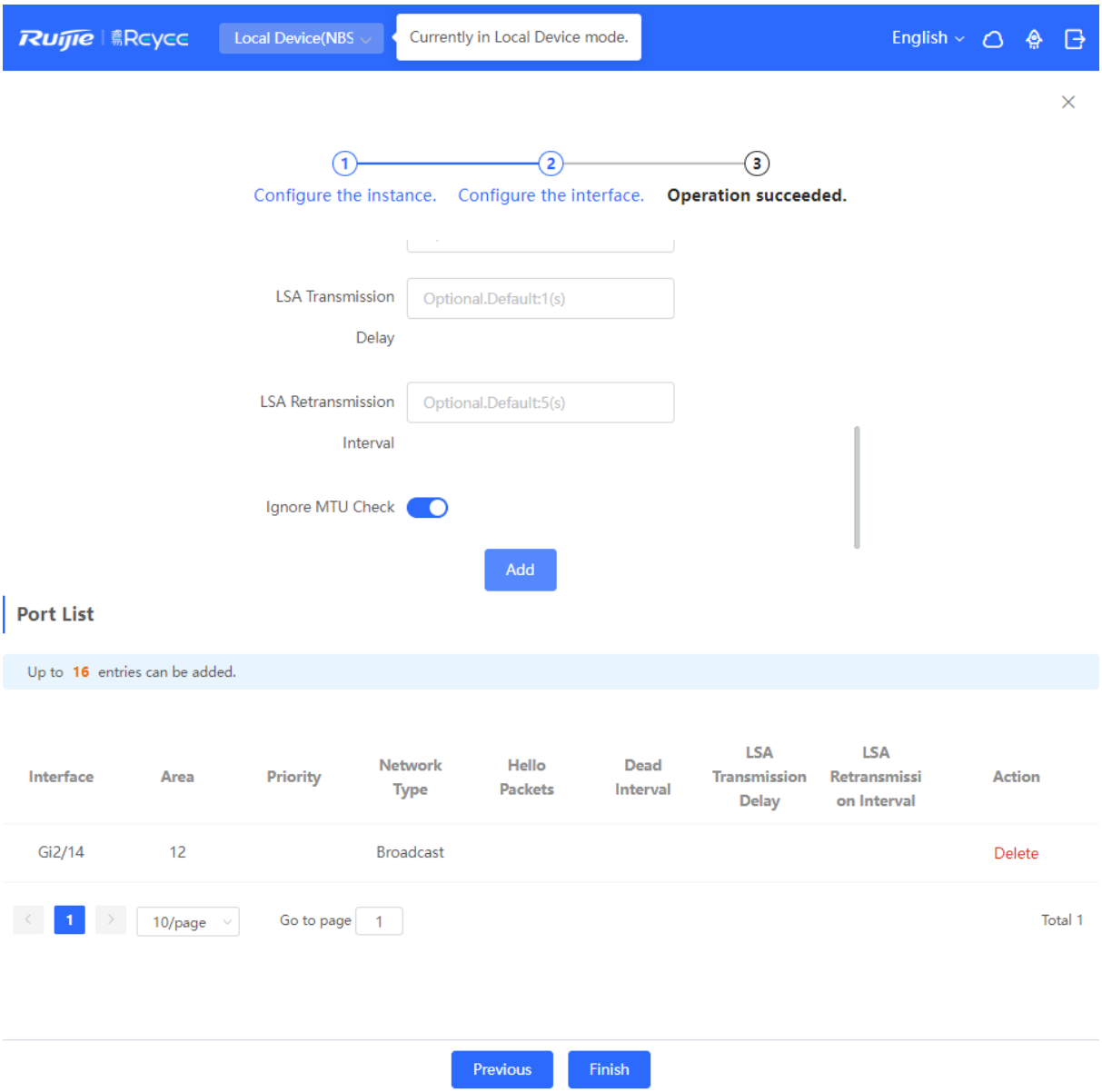
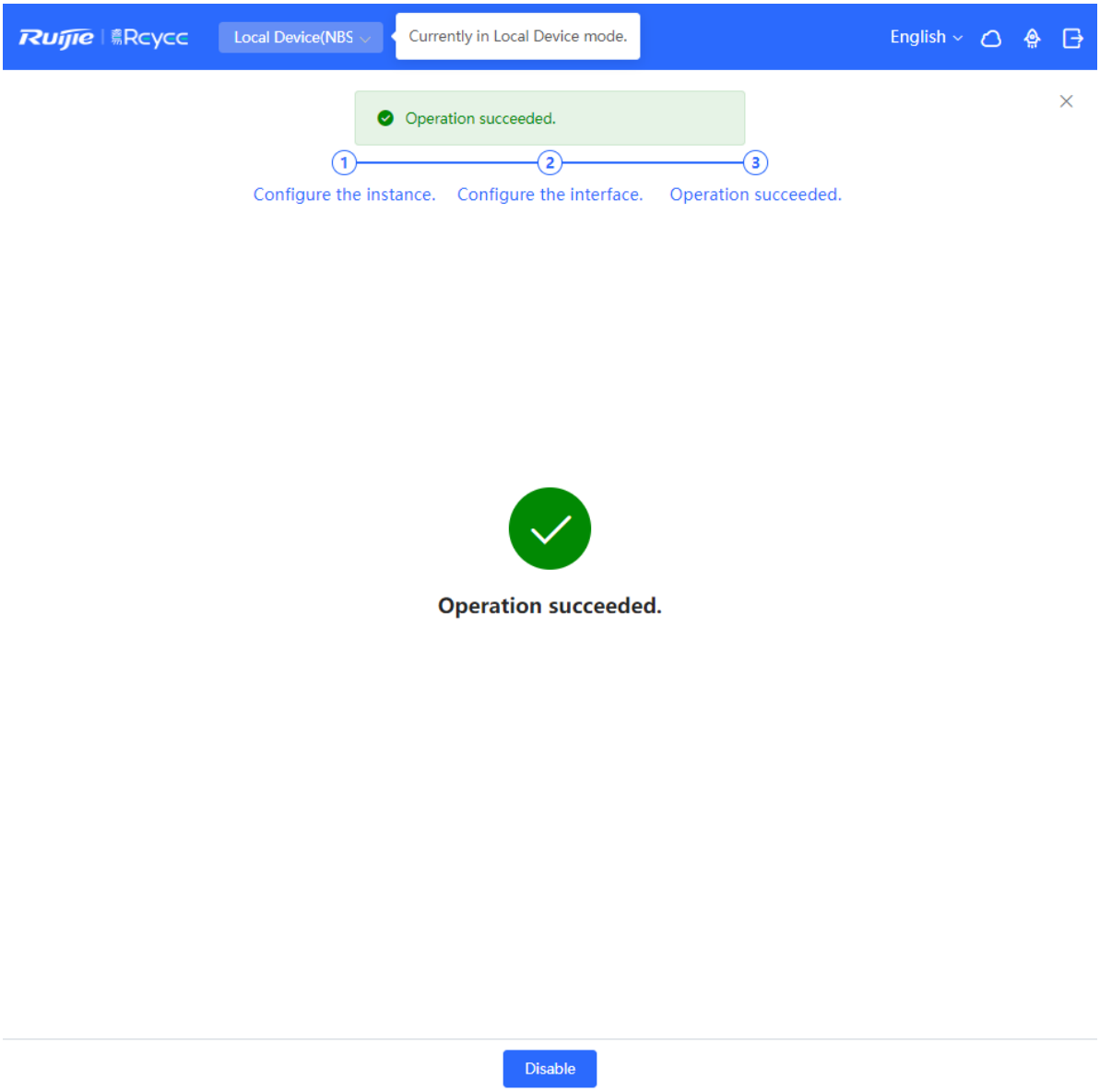


Table 16-17 Parameters in the Interface Detailed Configuration

Parameter	Description
Priority	It is 1 by default.

Parameter	Description
Network Type	Broadcast Unicast Multicast Non-Broadcast Multiple Access
Hello Packets	Interval for periodic transmission, which is used to discover and maintain OSPF neighbor relationship. The default value is 10 seconds.
Dead Interval	Time after which the neighbor becomes invalid. The default value is 40 seconds.
LSA Transmission Delay	LSA transmission delay of the interface. The default value is 1 second.
LSA Retransmission Interval	Time after which LSA is retransmitted after LSA is lost. The default value is 5 seconds.
Interface Auth	**No Auth**: The protocol packets are not authenticated. It is the default value. **Plain Text**: The protocol packets are authenticated, and the authentication key is transmitted with the protocol packets in the form of plain text. **MD5**: The protocol packets are authenticated, and the authentication key is MD5 encrypted and then transmitted with the protocol packets.
Ignore MTU Check	Enabled by default.

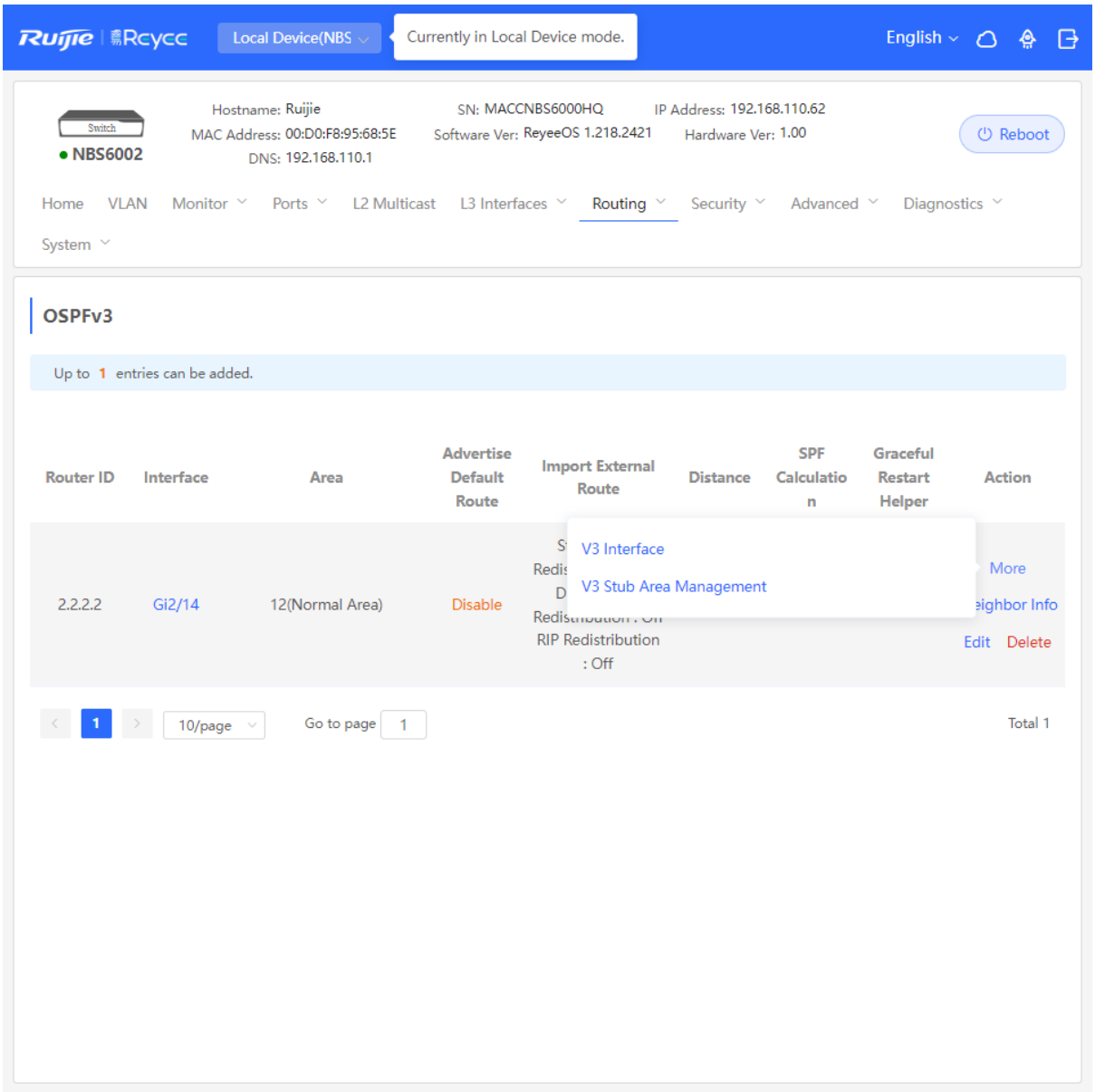
3. Complete the configuration.

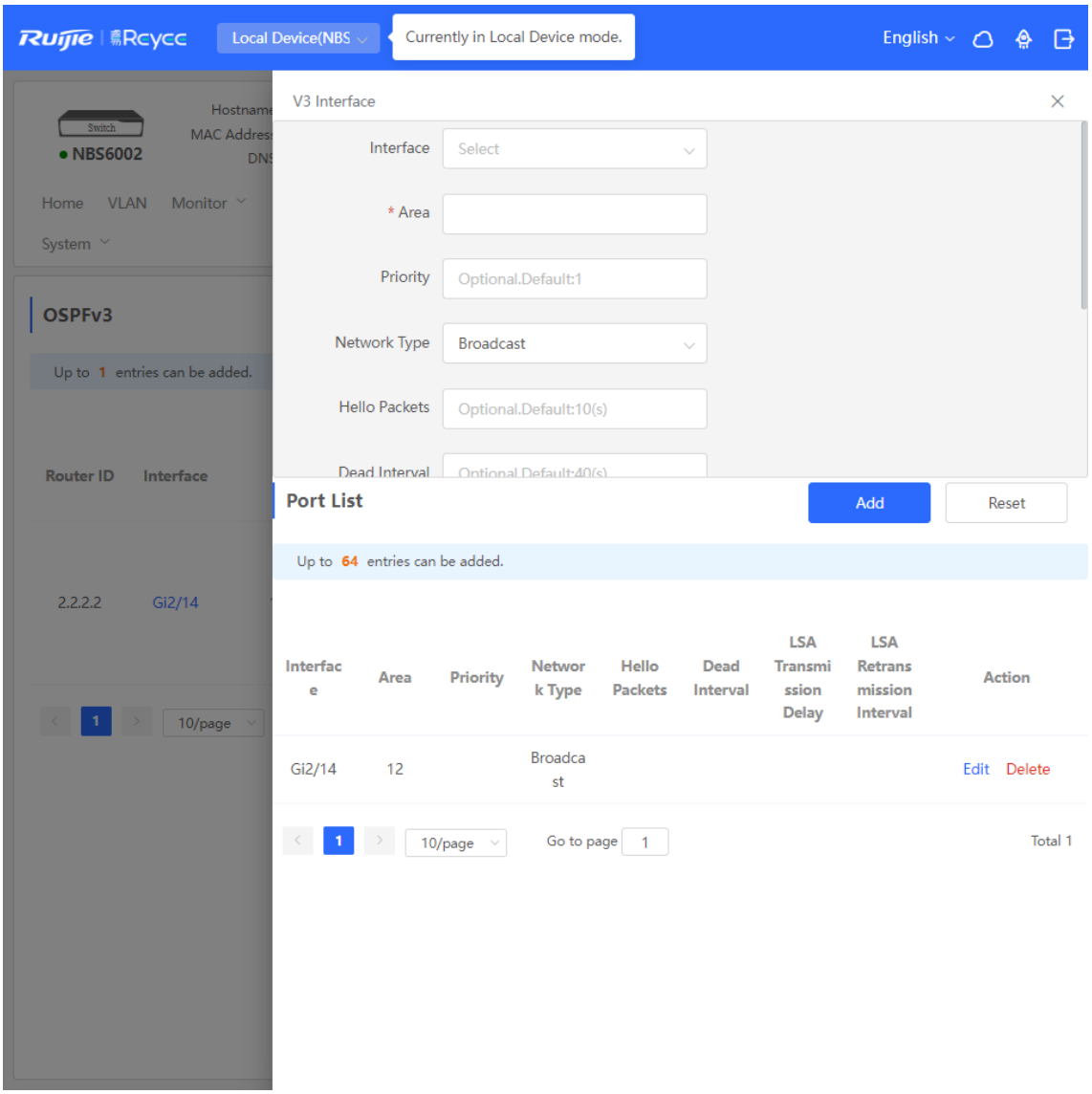


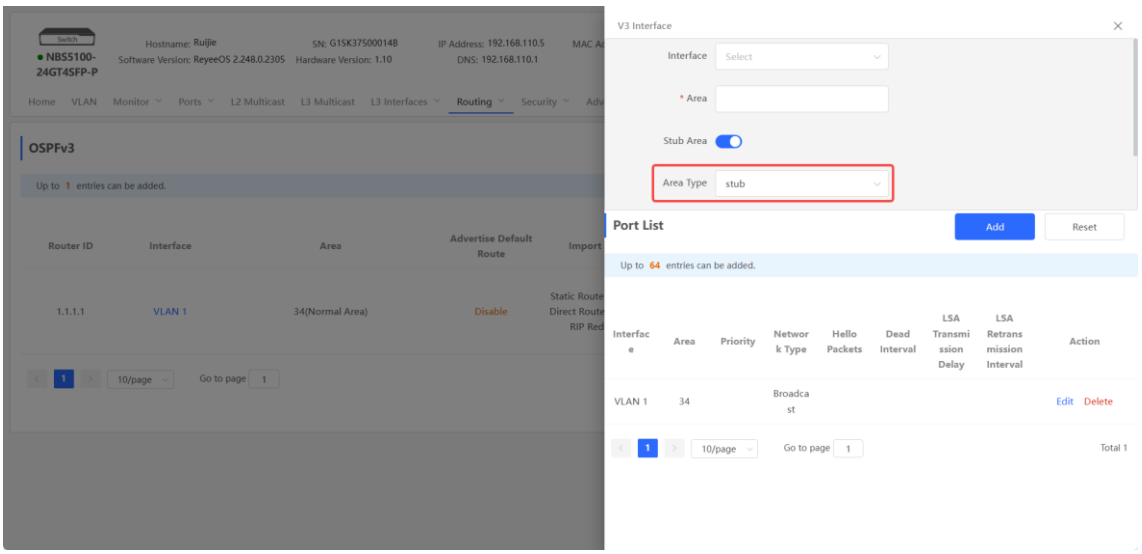
After completing the configuration, you can choose **Local Device** > **Routing** > **OSPFv**3 and view the instance list.

16.6.2 Adding an OSPFv3 Interface

Choose **Local Device** > **Routing** > **OSPFv3**, click **More** in the **Action** column, and select **V3 Interface**.

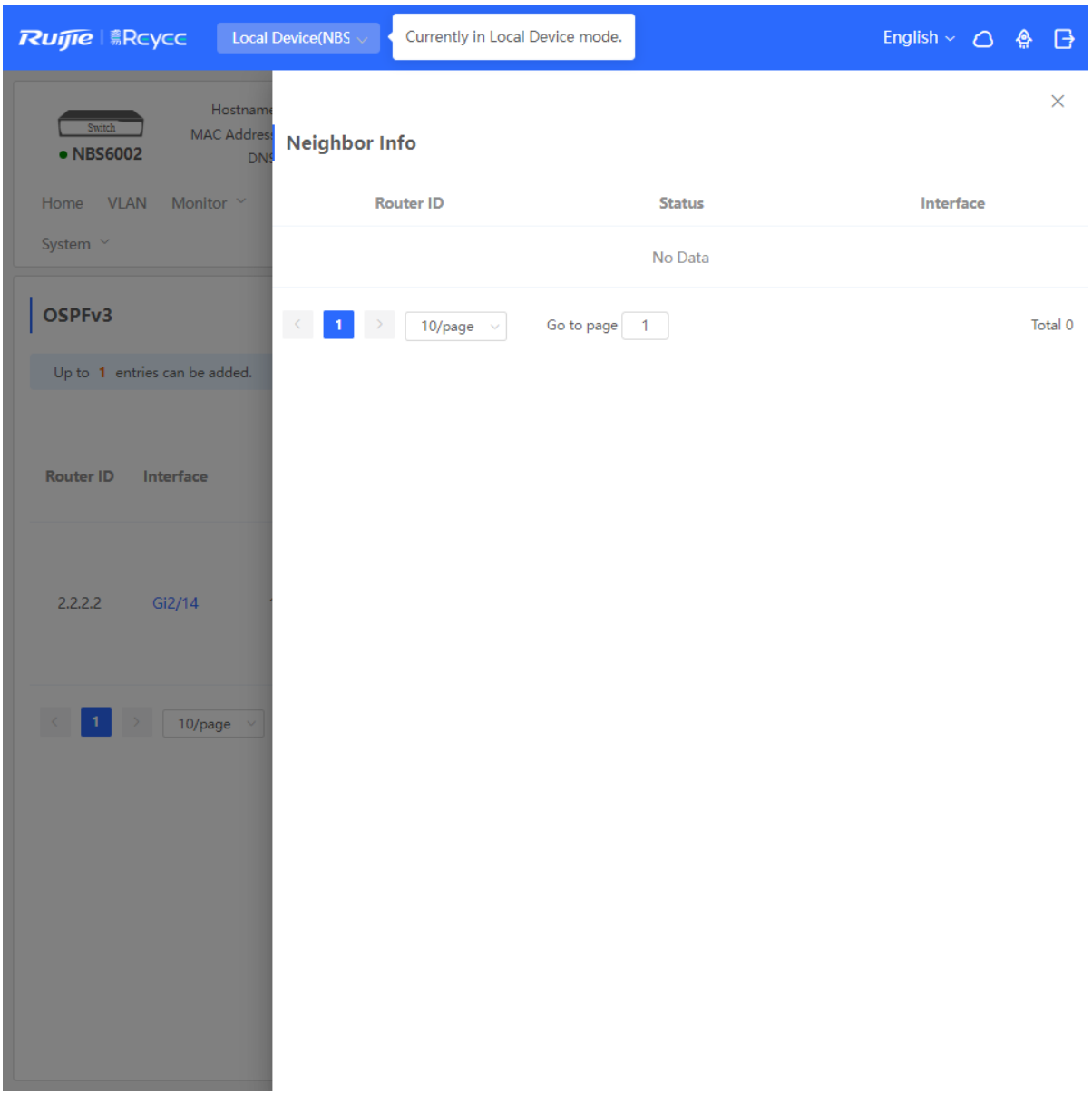

Local Device(NBS
Currently in Local Device mode.
English
Hostname: Ruijie
SN: MACCNBS6000HQ
IP Address: 192.168.110.62
MAC Address: 00:D0:F8:95:68:5E
Software Ver: ReyeeOS 1.218.2421
Hardware Ver: 1.00
DNS: 192.168.110.1
NBS6002
Reboot
Home VLAN Monitor Ports L2 Multicast L3 Interfaces Routing Security Advanced Diagnostics System
OSPFv3
Up to 1 entries can be added.
Router ID
Interface
Area
Advertise Default Route
Import External Route
Distance
SPF Calculation
Graceful Restart Helper
Action
2.2.2.2
Gi2/14
12(Normal Area)
Disable
RIP Redistribution : Off
V3 Interface
V3 Stub Area Management
More
Edit
Delete
10/page
Go to page 1
Total 1


Ruijie Rcycc
Local Device(NBS
Currently in Local Device mode.
English
NBS6002
Home
VLAN
Monitor
System
OSPFv3
Up to 1 entries can be added.
Router ID
Interface
2.2.2.2
Gi2/14
V3 Interface
Interface
Select
* Area
Priority
Optional.Default:1
Network Type
Broadcast
Hello Packets
Optional.Default:10(s)
Dead Interval
Port List
Add
Reset
Up to 64 entries can be added.
Interface
Area
Priority
Network Type
Hello Packets
Dead Interval
LSA Transmission Delay
LSA Retransmission Interval
Action
Gi2/14
12
Broadcast
Edit
Delete
10/page
Go to page
1
Total 1

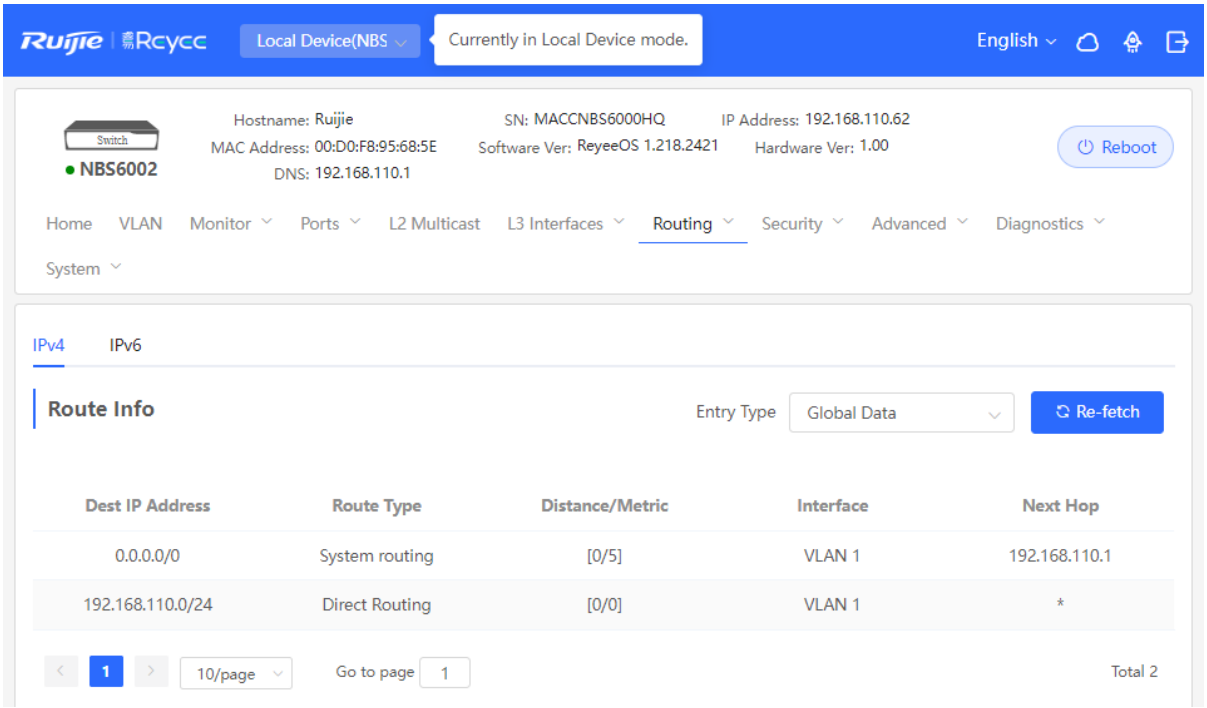

NBS5100-24GT4SFP-P
Hostname: Ruijie
Software Version: ReyeeOS 2.248.0.2305
Hardware Version: 1.10
Home
VLAN
Monitor
Ports
L2 Multicast
L3 Multicast
L3 Interfaces
Routing
Security
OSPFv3
Up to 1 entries can be added.
Router ID
Interface
Area
Advertise Default Route
1.1.1.1
VLAN 1
34(Normal Area)
Disable
V3 Interface
Interface
Select
* Area
Stub Area
Area Type
stub
Port List
Add
Reset
Up to 64 entries can be added.
Interface
Area
Priority
Network Type
Hello Packets
Dead Interval
LSA Transmission Delay
LSA Retransmission Interval
Action
VLAN 1
34
Broadcast
Edit
Delete
10/page
Go to page
1
Total 1

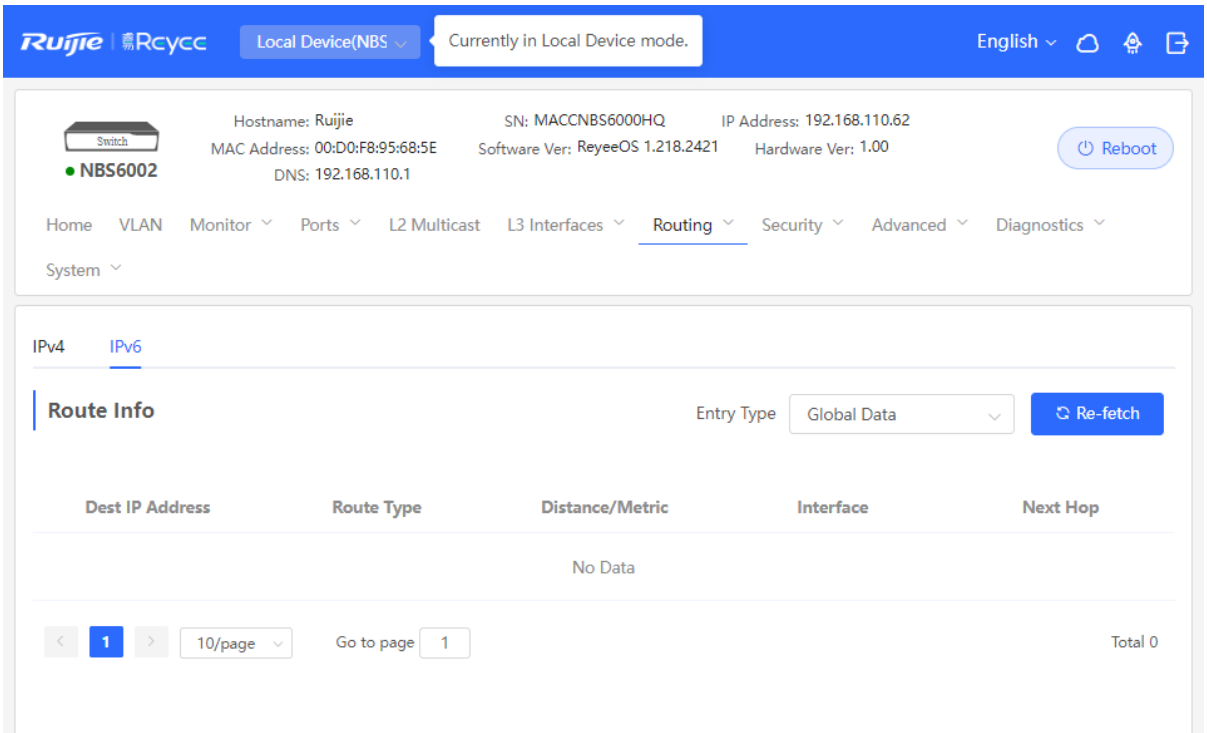
16.6.3 Viewing OSPFv3 Neighbor Information

Choose **Local Device** > **Routing** > **OSPFv3**, and click **Neighbor Info** in the **Action** column.



16.7 Routing Table Info





17 NBS and NIS Series Switches Security

17.1 DHCP Snooping

17.1.1 Overview

The Dynamic Host Configuration Protocol (DHCP) snooping function allows a device to snoop DHCP packets exchanged between clients and a server to record and monitor the IP address usage and filter out invalid DHCP packets, including request packets from the clients and response packets from the server. DHCP snooping records generated user data entries to serve security applications such as IP Source Guard.

17.1.2 Standalone Device Configuration

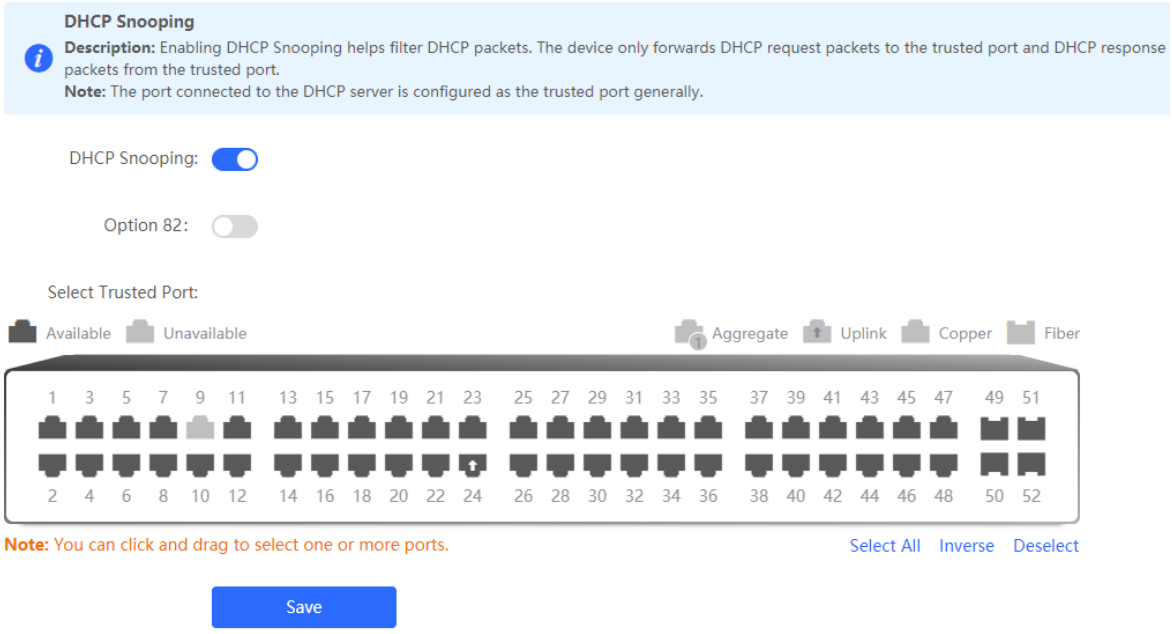
Choose **Local Device** > **Security** > **DHCP Snooping**.

Turn on the DHCP snooping function, select the port to be set as trusted ports on the port panel and click **Save**. After DHCP Snooping is enabled, request packets from DHCP clients are forwarded only to trusted ports; for response packets from DHCP servers, only those from trusted ports are forwarded.

Note

Generally, the uplink port connected to the DHCP server is configured as a trusted port.

Option 82 is used to enhance the DHCP server security and optimize the IP address assignment policy. Option 82 information will be carried in the DHCP request packet when Option 82 is turned on.

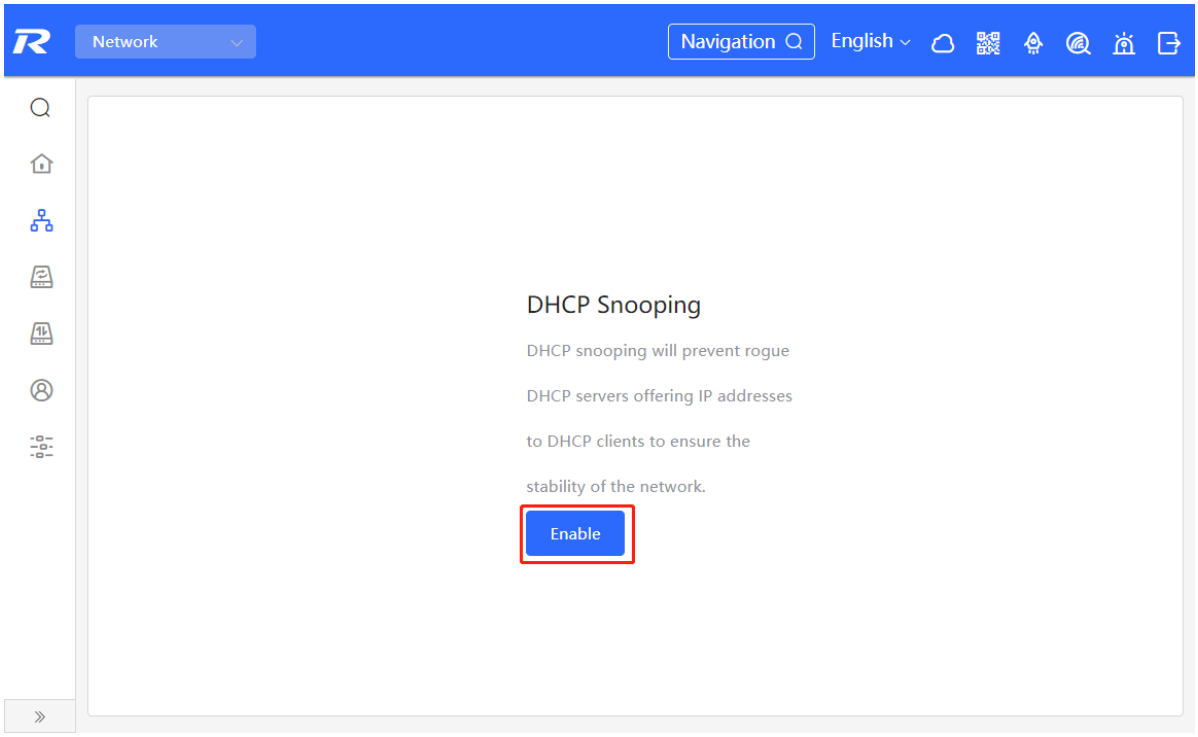


17.1.3 Batch Configuring Network Switches

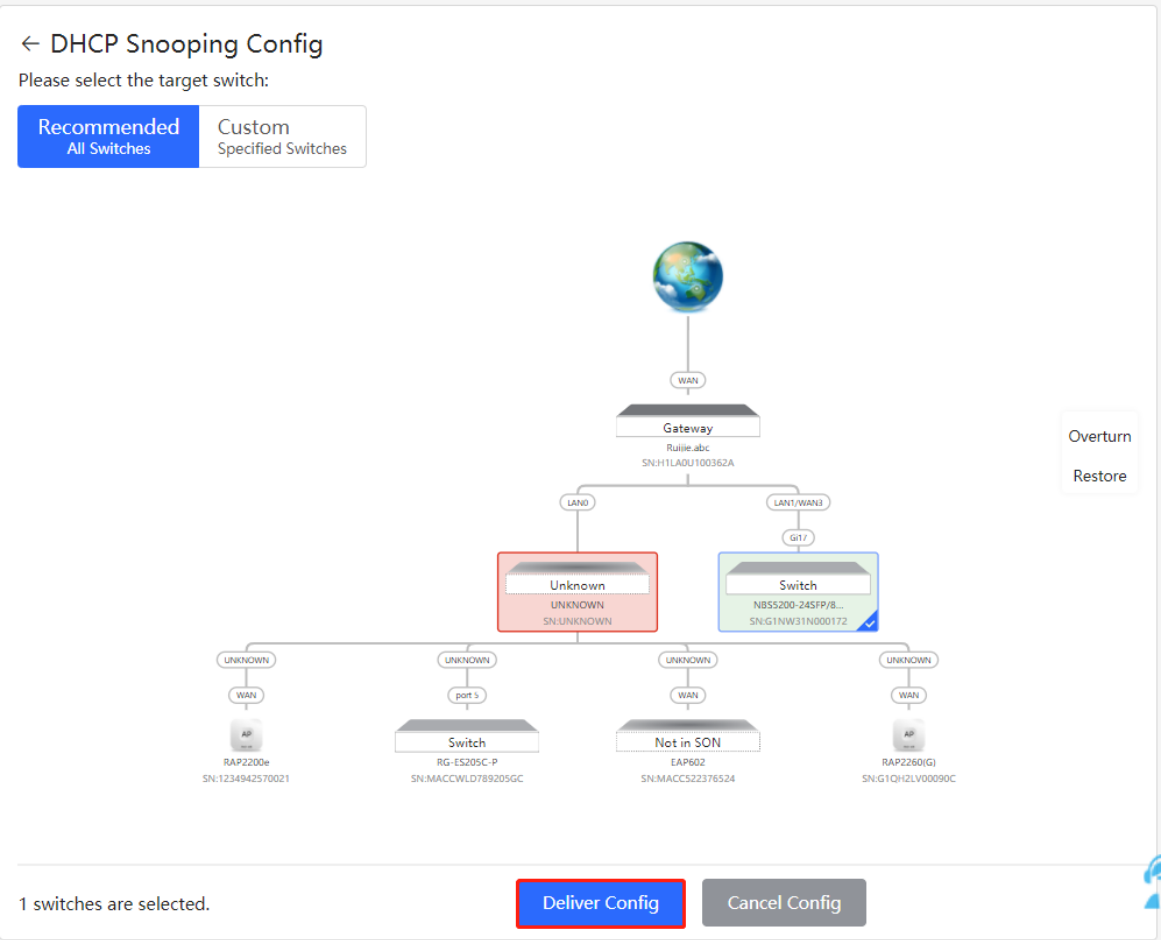
Choose **Network** > **DHCP Snooping**.

Enabling DHCP Snooping on network switches can ensure that users can only obtain network configuration parameters from the DHCP server within the control range, and avoid the occurrence of “the Internet terminal in the original network obtains the IP address assigned by the privately accessed router”, to guarantee the stability of the network.

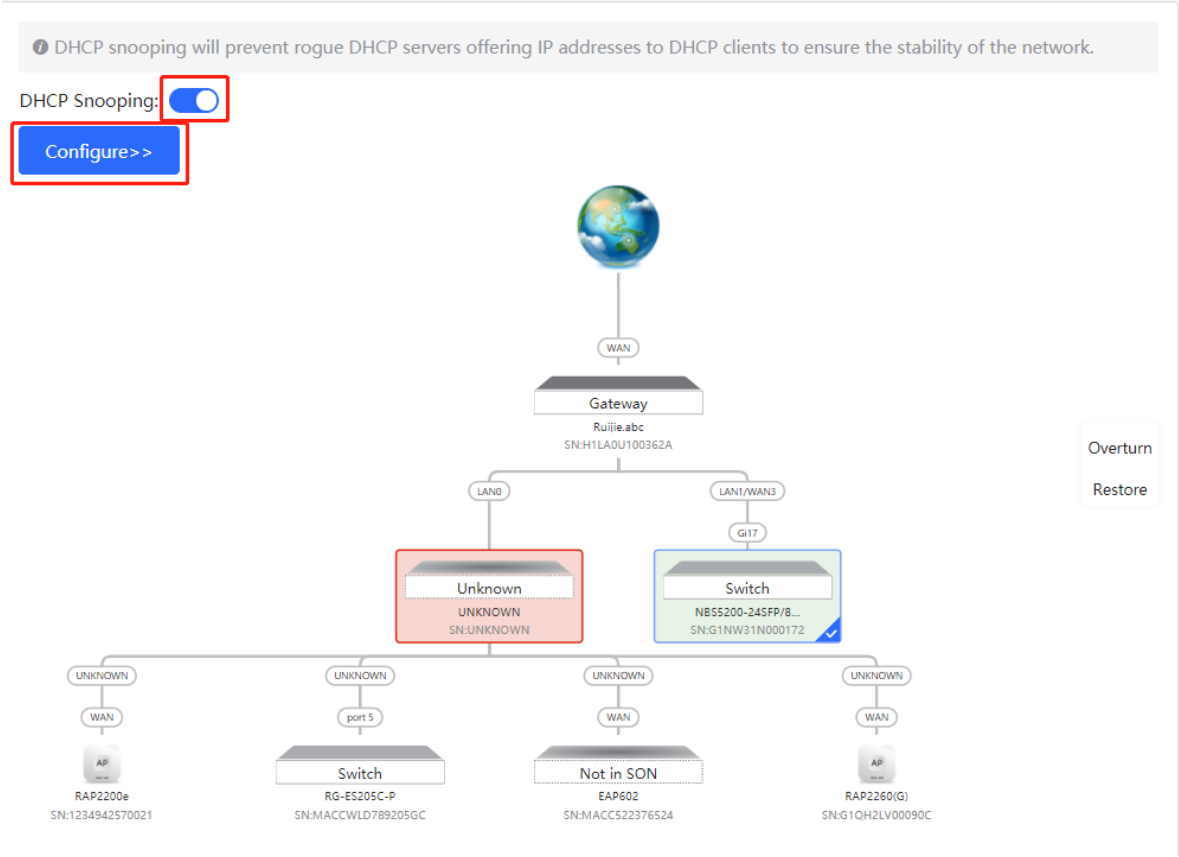
(1) Click **Enable** to access the **DHCP Snooping Config** page.



(2) In the networking topology, you can select the access switches on which you want to enable DHCP Snooping in either recommended or custom mode. If you select the recommended mode, all switches in the network are selected automatically. If you select the custom mode, you can manually select the desired switches. Click **Deliver Config**. DHCP Snooping is enabled on the selected switches.



(3) After the configuration is delivered, if you need to modify the effective range of the anti-private connection function, click **Configure** to reselect the switch that enables the anti-private connection in the topology. After the configuration is delivered, if you want to modify the effective range of the DHCP Snooping function, click **Configure** to select desired switches in the topology again. Turn off **DHCP Snooping** to disable DHCP Snooping on all switches with one click.



17.2 Storm Control

17.2.1 Overview

When a local area network (LAN) has excess broadcast, multicast, or unknown unicast data flows, the network speed will slow down and packet transmission will have an increased timeout probability. This is called LAN storm, which may be caused by topology protocol execution errors or incorrect network configuration.

Users can perform storm control separately for the broadcast, multicast, and unknown unicast data flows. When the rate of broadcast, multicast, or unknown unicast data flows received over a device port exceeds the specified range, the device transmits only packets in the specified range and discards packets beyond the range until the packet rate falls within the range. This prevents flooded data from entering the LAN and causing a storm.

17.2.2 Procedure

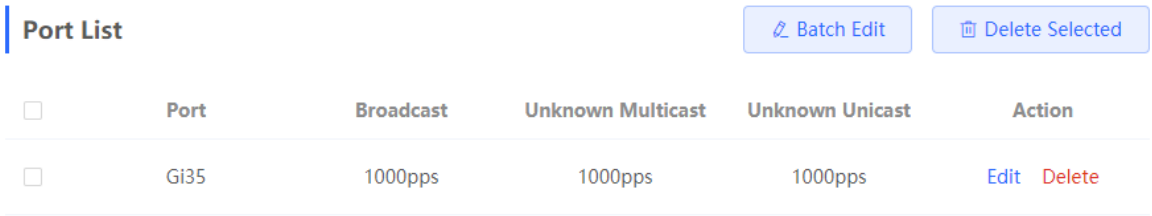
Choose **Local Device** > **Security** > **Storm Control**.

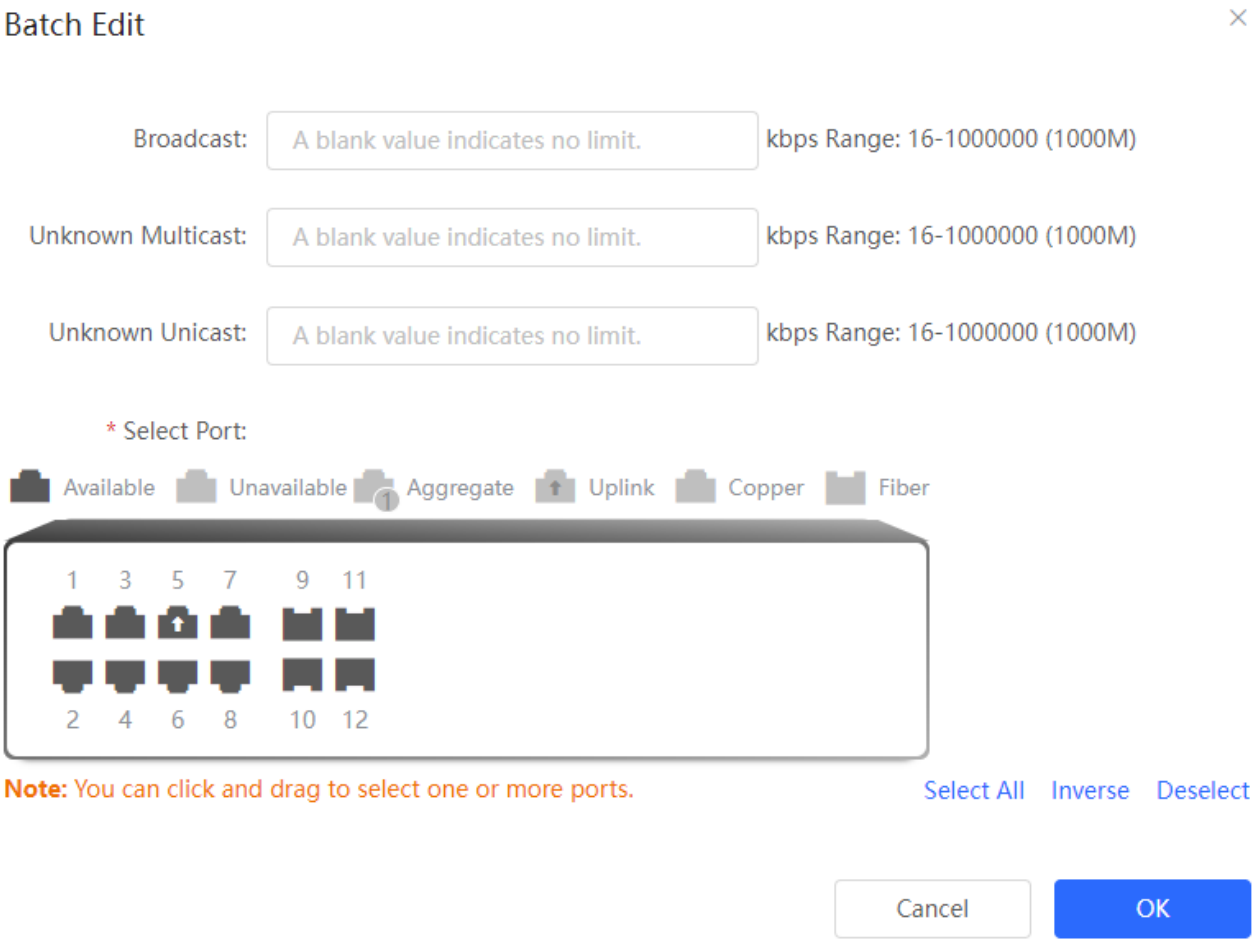
Click **Batch Edit**. In the displayed dialog box, select configuration types and ports, enter the rate limits of broadcast, unknown multicast, and unknown unicast, and click **OK**. To modify or delete the rate limit rules after completing the configuration, you can click **Edit** or **Delete** in the **Action** column.

There are two configuration types:

- Storm control based on packets per second: If the rate of data flows received over a device port exceeds the configured packets-per-second threshold, excess data flows are discarded until the rate falls within the threshold.

- Storm control based on kilobytes per second: If the rate of data flows received over a device port exceeds the configured kilobytes-per-second threshold, excess data flows are discarded until the rate falls within the threshold.





17.3 ACL

17.3.1 Overview

An access control list (ACL) is commonly referred to as packet filter in some documents. An ACL defines a series of permit or deny rules and applies these rules to device interfaces to control packets sent to and from the interfaces, so as to enhance security of the network device.

You can add ACLs based on MAC addresses or IP addresses and bind ACLs to ports.

17.3.2 Creating ACL Rules

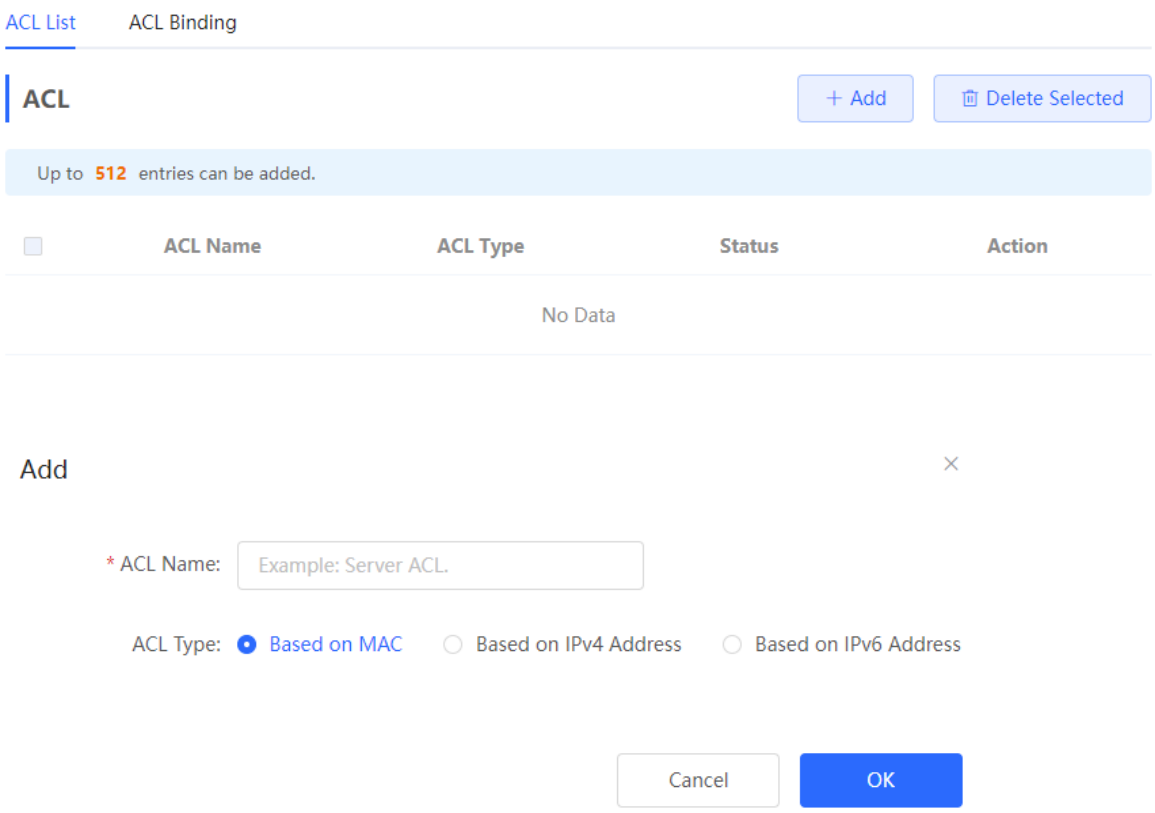
Choose **Local Device** > **Security** > **ACL** > **ACL List**.

(1) Click **Add** to set the ACL control type, enter an ACL name, and click **OK**.

Based on MAC address: To control the L2 packets entering/leaving the port, and deny or permit specific L2 packets destined to a network.

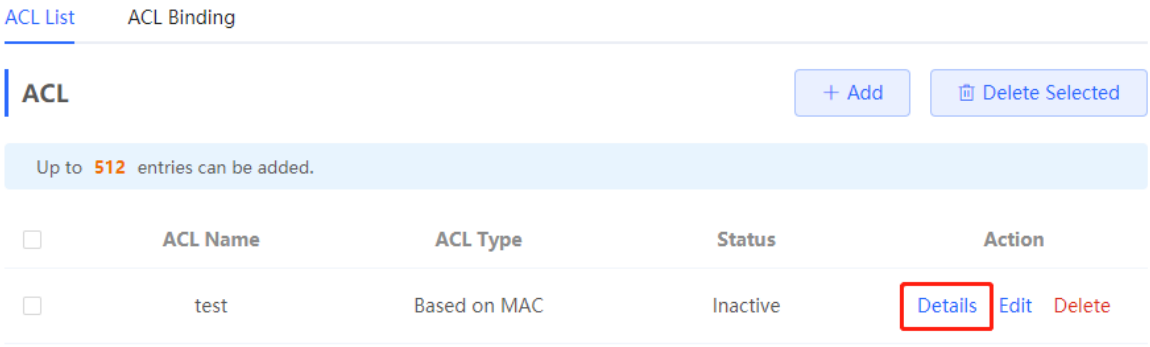
Based on IP address: To control the Ipv4 packets entering/leaving a port, and deny or permit specific Ipv4 packets destined to a network.

- MAC-based access control: Regulates the flow of Layer 2 packets entering and exiting ports, allowing or denying specific packets based on their Layer 2 addresses.
- IPv4-based access control: Regulates the flow of IPv4 packets entering and exiting ports, allowing or denying specific packets based on their IPv4 addresses.
- IPv6-based access control: Regulates the flow of IPv4 packets entering and exiting ports, allowing or denying specific packets based on their IPv4 addresses.



(2) Click **Details** in the **Action** column of the ACL entry, set the filtering rules in the pop-up sidebar, and click **Save** to add rules for the ACL. Multiple rules can be added.

The rules include two actions of **Allow** or **Block**, and the matching rules of packets. The sequence of a Rule in an ACL determines the matching priority of the Rule in the ACL. When processing packets, the network device matches packets with ACEs based on the Rule sequence numbers. Click **Move** in the rule list to adjust the matching order.



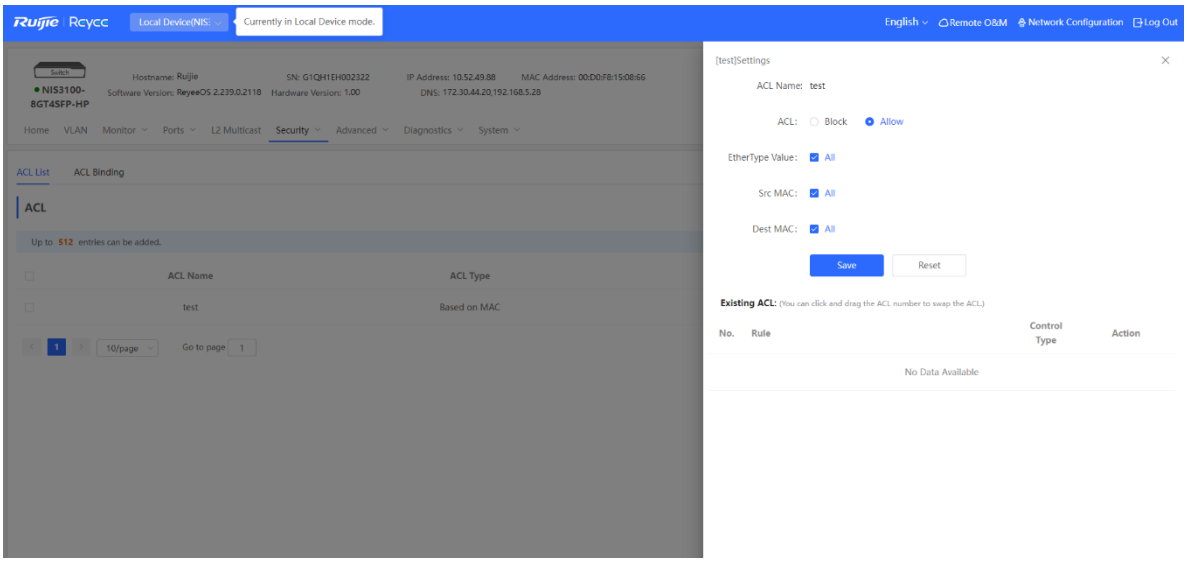


Table 7-1 Description of ACL Rule Configuration Parameters

Parameter	Description
ACL	Configuring ACL Rules Action Block: If packets match this rule, the packets are denied. Allow: If packets match this rule, the packets are permitted.
IP Protocol Number	Match IP protocol number The value ranges from 0 to 255. Check **All** to match all IP protocols. This applies to IPv4-based access control and IPv6-based access control.
Src IP Address	Match the source IP address of the packet. Check **All** to match all source IP addresses. This applies to IPv4-based access control and IPv6-based access control.

Parameter	Description
Dest IP Address	Match the destination IP address of the packet. Check **All** to match all destination IP addresses. This applies to IPv4-based access control and IPv6-based access control.
EtherType Value	Match Ethernet protocol type. The value range is 0x600~0xFFFF. Check **All** to match all protocol type numbers. This applies to MAC-based access control.
Src Mac	Match the MAC address of the source host. Check **All** to match all source MAC addresses. This applies to MAC-based access control.
Dest MAC	Match the MAC address of the destination host. Check **All** to match all destination MAC addresses. This applies to MAC-based access control.

Note

- ACLs cannot have the same name. Only the name of a created ACL can be edited.
- An ACL applied by a port cannot be edited or deleted. To edit, unbind the ACL from the port first.
- There is one default ACL rule that denies all packets hidden at the end of an ACL.

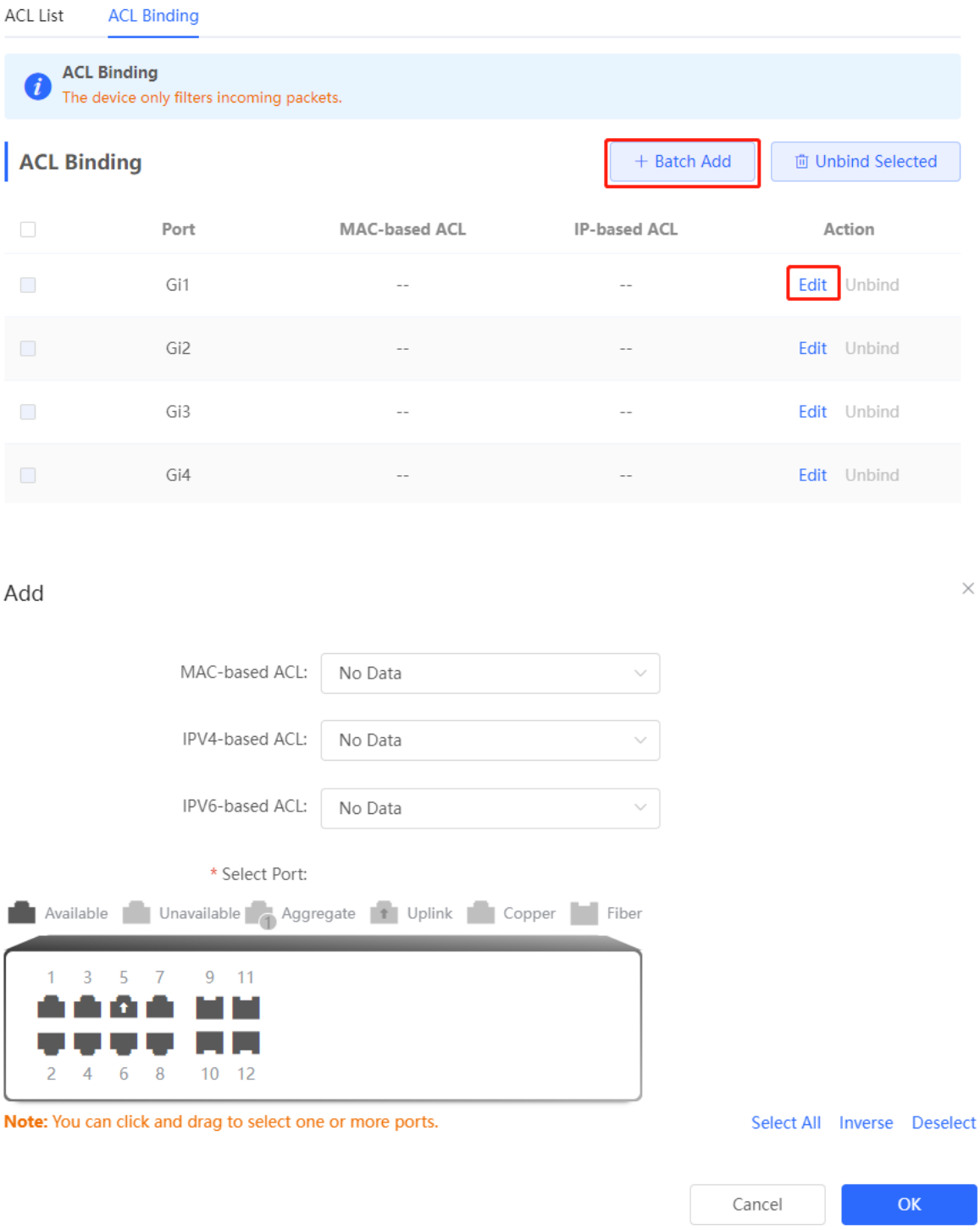
17.3.3 Applying ACL Rules

Choose **Local Device** > **Security** > **ACL** > **ACL List**.

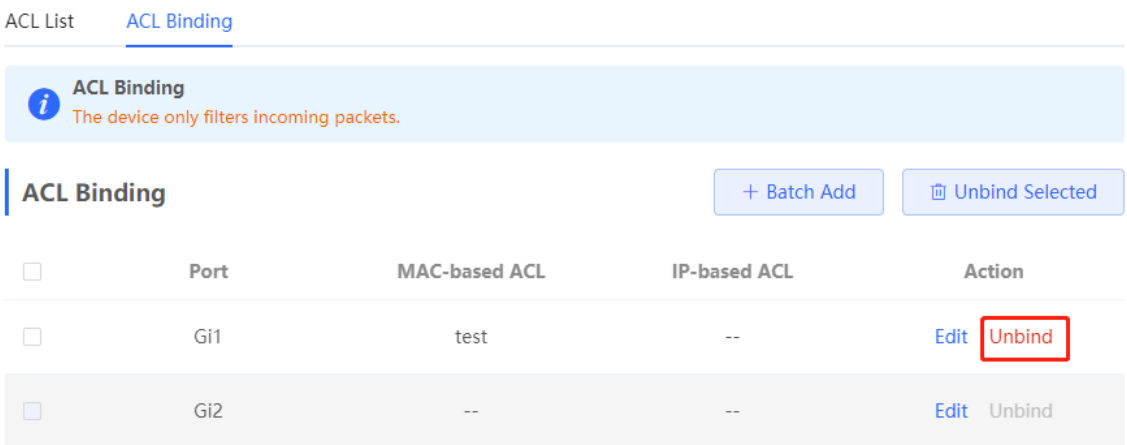
Click **Batch Add** or **Edit** in the **Action** column, select the desired ACL for ports, and click **OK**.

Note

Currently, ACLs can be applied only in the inbound direction of ports, that is, to filter incoming packets.



After an ACL is applied to a port, you can click **Unbind** in the **Action** column, or check the port entry and click **Delete Selected** to unbind the ACL from the port.

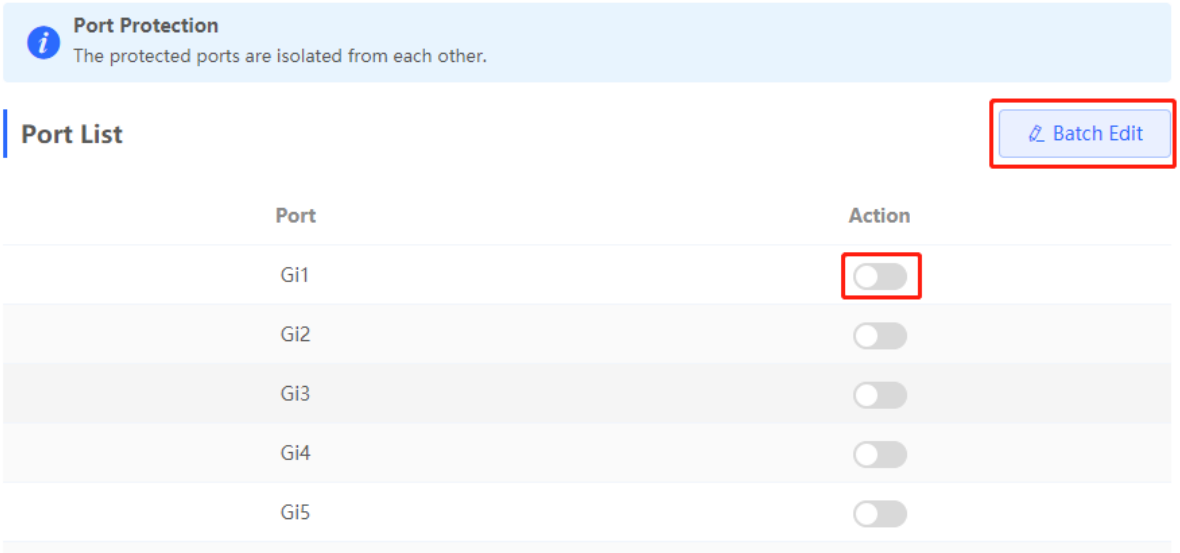


17.4 Port Protection

Choose **Local Device** > **Security** > **Port Protection**.

In some scenarios, it is required that communication be disabled between some ports on the device. For this purpose, you can configure some ports as protected ports. Ports that enable port protection (protected ports) cannot communicate with each other, users on different ports are L2-isolated. The protected ports can communicate with non-protected ports.

Port protection is disabled by default, which can be enabled by clicking to batch enable port protection for multiple ports, you can click **Batch Edit** to enable port protection**,** select desired port and click **OK.**



17.5 IP-MAC Binding

17.5.1 Overview

After IP-MAC binding is configured on a port, to improve security, the device checks whether the source IP addresses and source MAC addresses of IP packets are those configured for the device, filters out IP packets not matching the binding, and strictly control the validity of input sources.

17.5.2 Procedure

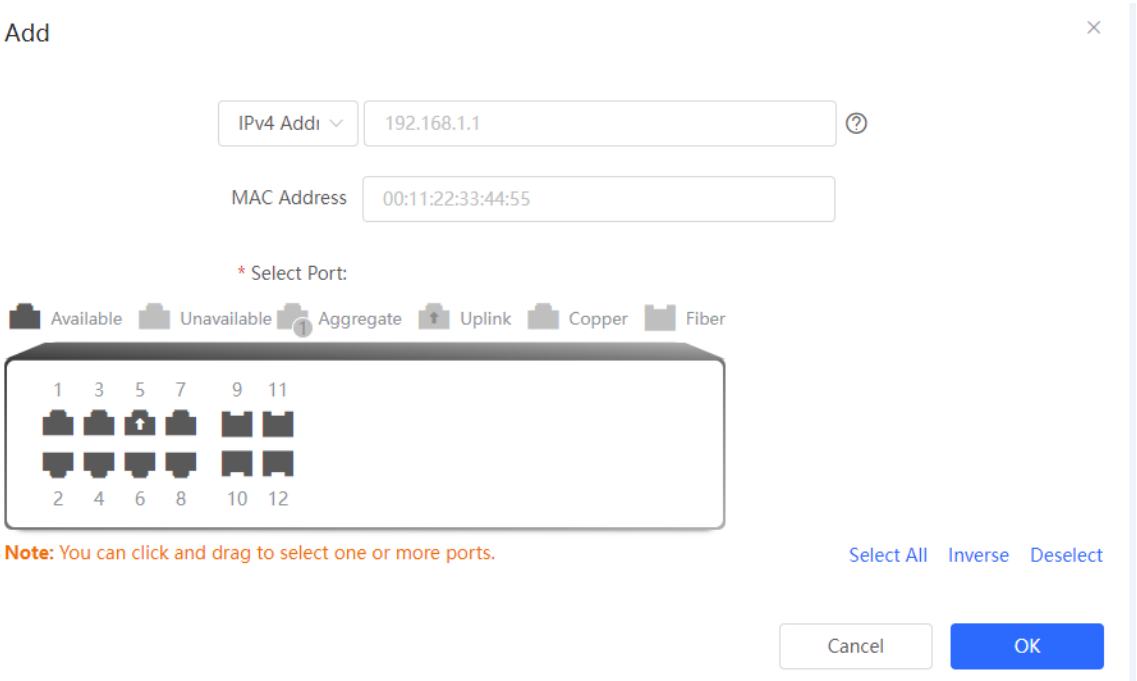
Choose **Local Device** > **Security** > **IP-MAC Binding**.

1. Adding an IP-MAC Binding Entry

Click **Add**, select the desired port, enter the IP address and MAC address to be bound, and click **OK**. At least one of the IP address and MAC address needs to be entered. To modify the binding, you can click **Edit** in the **Action** column.

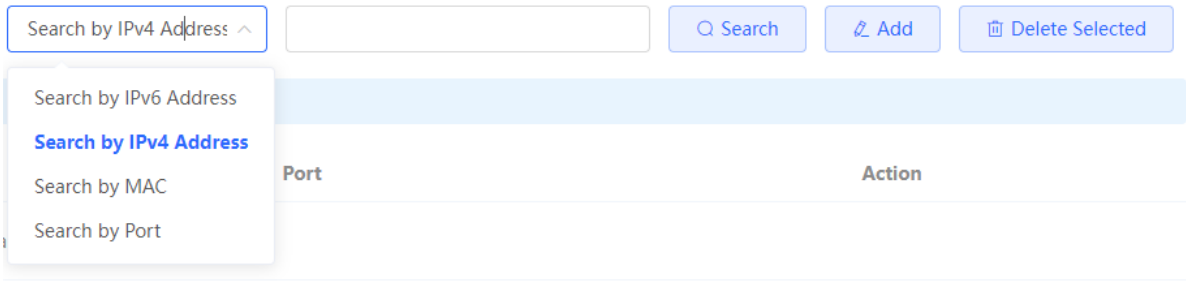
Caution

IP-MAC Binding take effects prior to ACL, but it has the same privilege with IP Source Guard. The packet matching either configuration will be allowed to pass through.



2. Searching Binding Entries

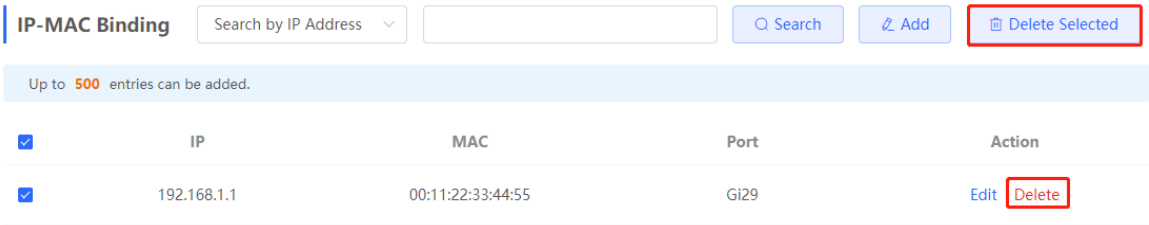
The search box in the upper-right corner supports finding binding entries based on IP addresses, MAC addresses or ports. Select the search type, enter the search string, and click **Search**. Entries that meet the search criteria are displayed in the list.



3. Deleting an IP-MAC Binding Entry

Batch Configure: In **IP-MAC Binding List**, select an entry to be deleted and click **Delete Selected**. In the displayed dialog box, click **OK**.

Delete one binding entry: click **Delete** in the last **Action** column of the entry in the list. In the displayed dialog box, click **OK**.



17.6 IP Source Guard

17.6.1 Overview

After the IP Source Guard function is enabled, the device checks IP packets from DHCP non-trusted ports. You can configure the device to check only the IP field or IP+MAC field to filter out IP packets not matching the binding list. It can prevent users from setting private IP addresses and forging IP packets.

Caution

IP Source Guard should be enabled together with DHCP snooping. Otherwise, IP packet forwarding may be affected. To configure DHCP Snooping function, see 17.1 DHCP Snooping for details.

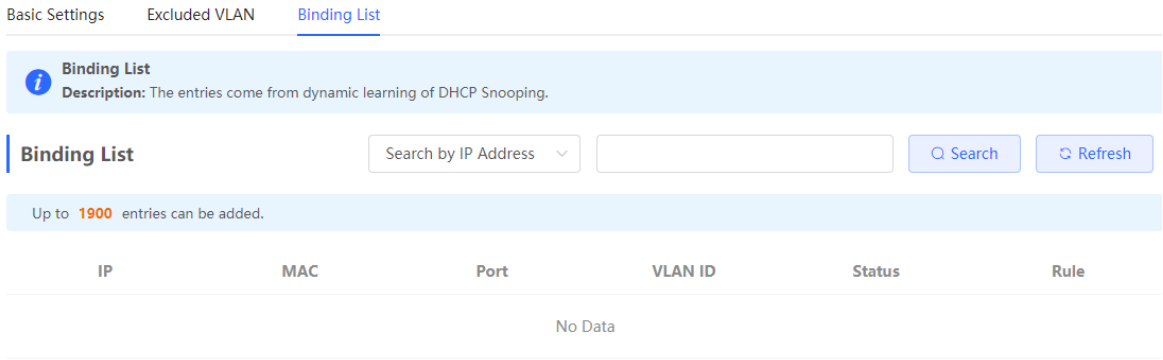
17.6.2 Viewing Binding List

Choose **Local Device** > **Security** > **IP Source Guard** > **Binding List**.

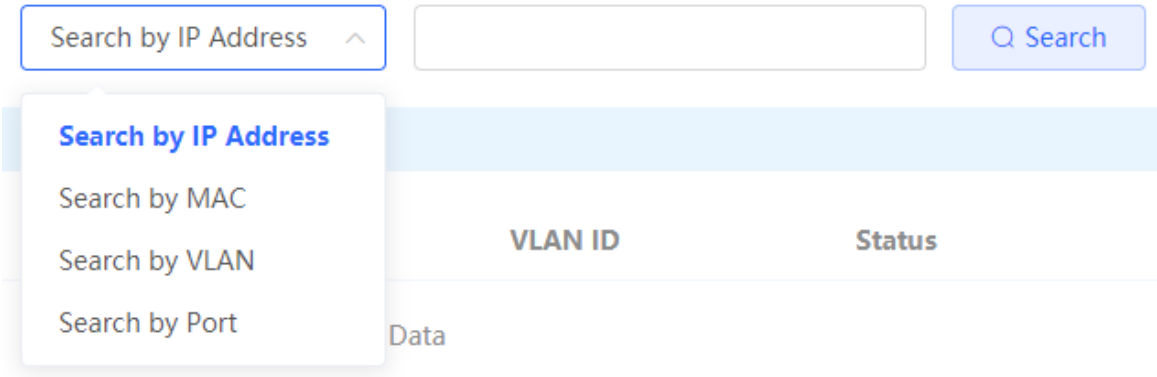
The binding list is the basis for IP Source Guard. Currently, data in **Binding List** is sourced from dynamic learning results of DHCP snooping binding database. When IP Source Guard is enabled, data of the DHCP

Snooping binding database is synchronized to the binding list of IP Source Guard. In this case, IP packets are filtered strictly through IP Source Guard on devices with DHCP Snooping enabled.

Click **Refresh** to obtain the latest data in **Binding List**.



The search box in the upper-right corner supports finding the specified entry in **Binding List** based on IP addresses, MAC addresses, VLANs or ports. Click the drop-down list box to select the search type, enter the search string, and click **Search**.



17.6.3 Enabling Port IP Source Guard

Choose **Local Device** > **Security** > **IP Source Guard** > **Basic Settings**.

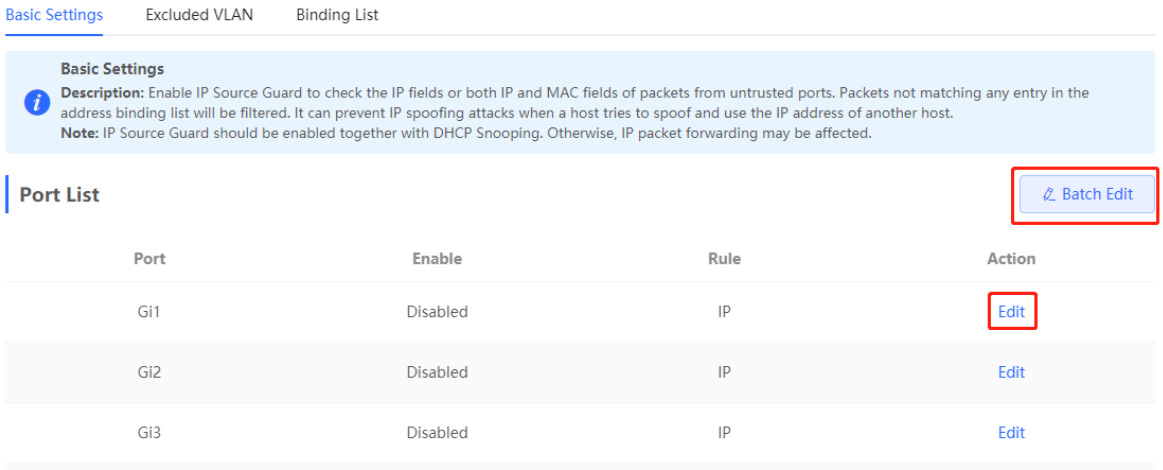
In Port List, click **Edit** in the **Action** column. Select **Enabled** and select the match rule, and click **OK**.

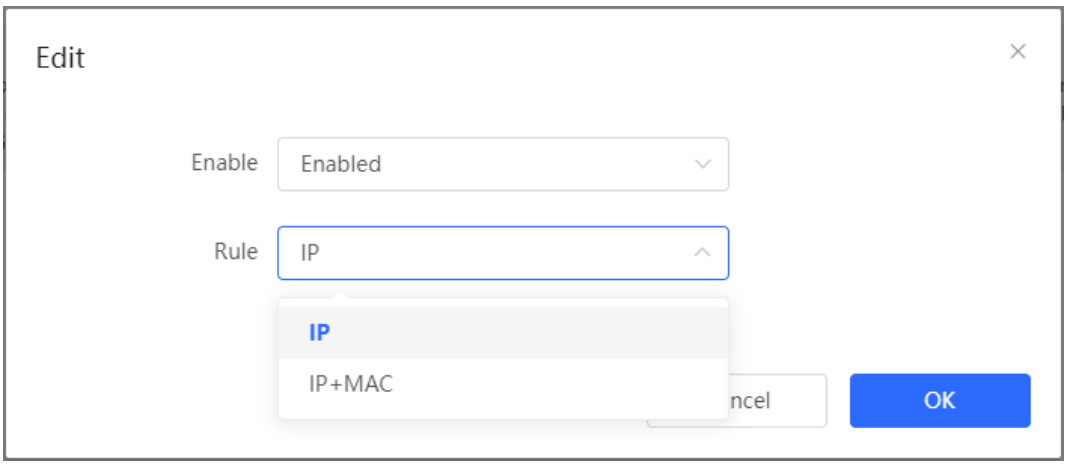
There are two match rules:

- IP address: The source IP addresses of all IP packets passing through the port are checked. Packets are allowed to pass through the port only when the source IP addresses of these packets match those in the binding list.
- IP address+ MAC address: The source IP addresses and MAC addresses of IP packets passing through the port are checked. Packets are allowed to pass through the port only when both the L2 source MAC addresses and L3 source IP addresses of these packets match an entry in the binding list.

Caution

- IP Source Guard is not supported to be enabled on a DHCP Snooping trusted port.
- Only on an L2 interface is IP Source Guard supported to be enabled.





17.6.4 Configuring Exceptional VLAN Addresses

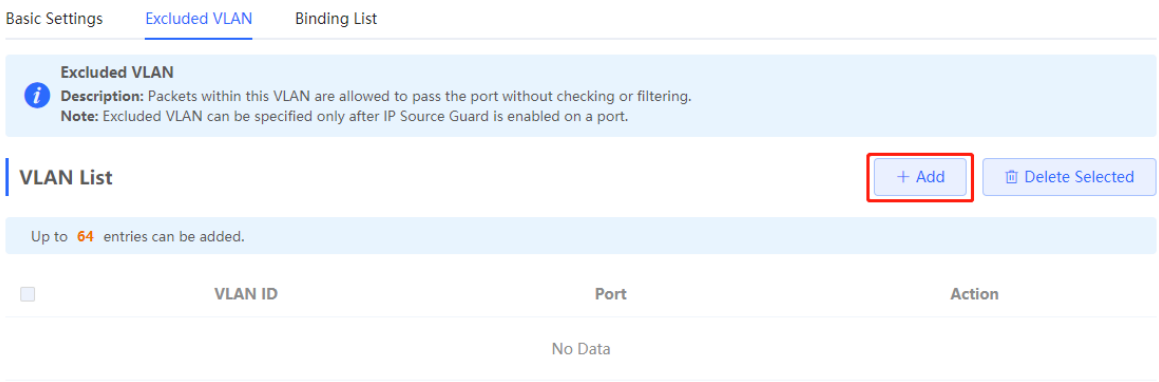
Choose **Local Device** > **Security** > **IP Source Guard** > **Excluded VLAN**.

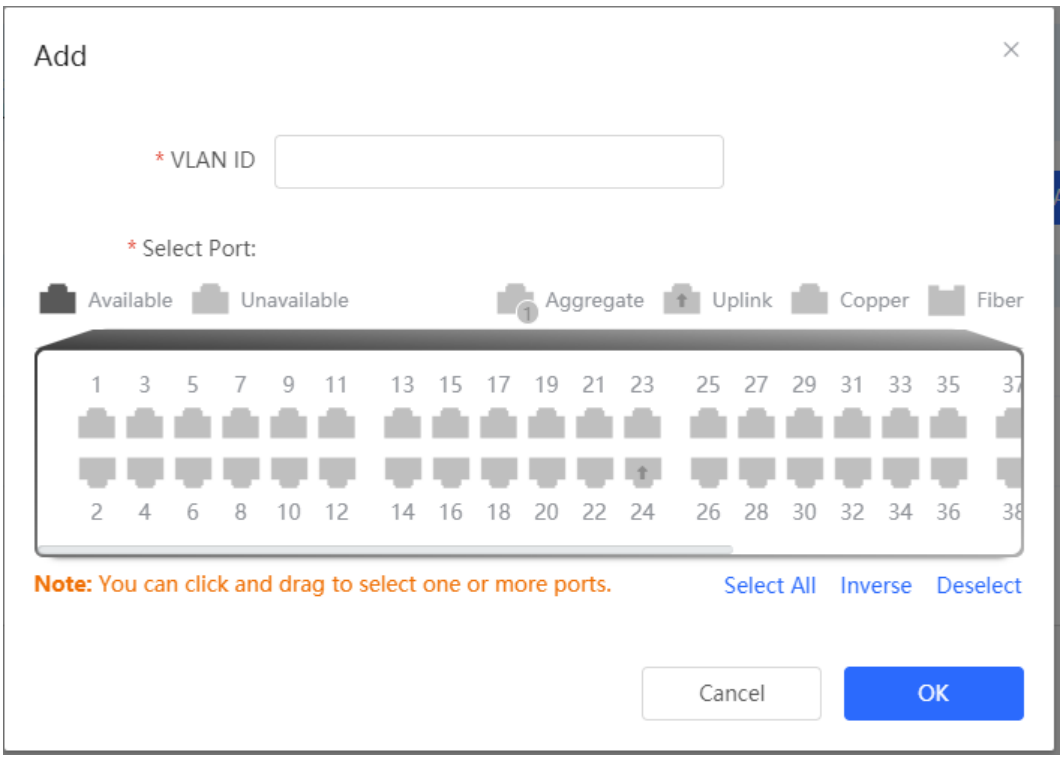
When IP Source Guard is enabled on an interface, it is effective to all the virtual local area networks (VLANs) under the interface by default. Users can specify excluded VLANs, within which IP packets are not checked or filtered, that is, such IP packets are not controlled by IP Source Guard.

Click **Edit**, enter the Excluded VLAN ID and the desired port, and click **OK**.

Caution

Excluded VLANs can be specified on a port only after IP Source Guard is enabled on the port. Specified excluded VLANs will be deleted automatically when IP Source Guard is disabled on the port.





17.7 Configure 802.1x authentication

17.7.1 Function introduction

IEEE802.1x (Port-Based Network Access Control) is a port-based network access control standard that provides secure access services for LANs.

IEEE 802 LAN, as long as users can connect to network devices, they can directly access network resources without authentication and authorization. This uncontrolled behavior will bring security risks to the network. The IEEE 802.1x protocol was proposed to solve the security problem of 802 LAN.

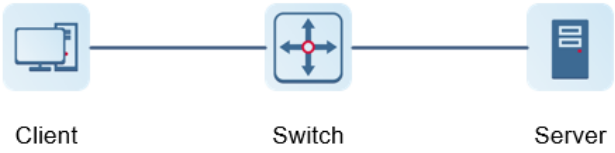
802.1x supports Authentication, Authorization, and Accounting three security applications, referred to as AAA.

- Authentication: Authentication, used to determine whether users can obtain access rights and restrict illegal users;
- Authorization: Authorization, which services authorized users can use, and control the rights of legitimate users;

- Accounting: Accounting, recording the use of network resources by users, and providing a basis for charging.

802.1x can be deployed in a network that controls access users to implement authentication and authorization services for access users.

802.1x system is a typical Client/Server structure, including three entities: client, access device and authentication server. A typical architecture diagram is shown in the figure.



- The client is generally a user terminal device, and the user can initiate 802.1X authentication by starting the client software. The client must support the Extensible Authentication Protocol over LANs (EAPoL).
- AP or switching device that supports the 802.1x protocol. It provides a port for the client to access the LAN. The port can be a physical port or a logical port.
- The authentication server is used to implement user authentication, authorization, and accounting, and it is usually a RADIUS server.

Note

RG- NBS switching devices only support the authentication function.

17.7.2 Configuration 802.1x

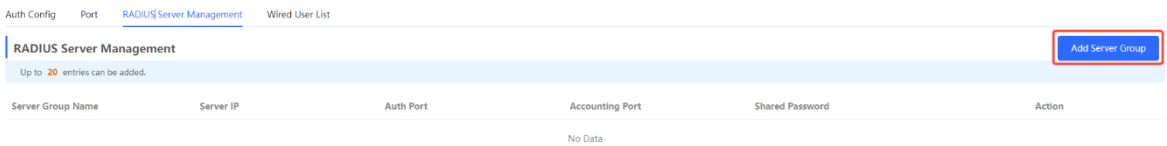
1. Configuring RADIUS Server

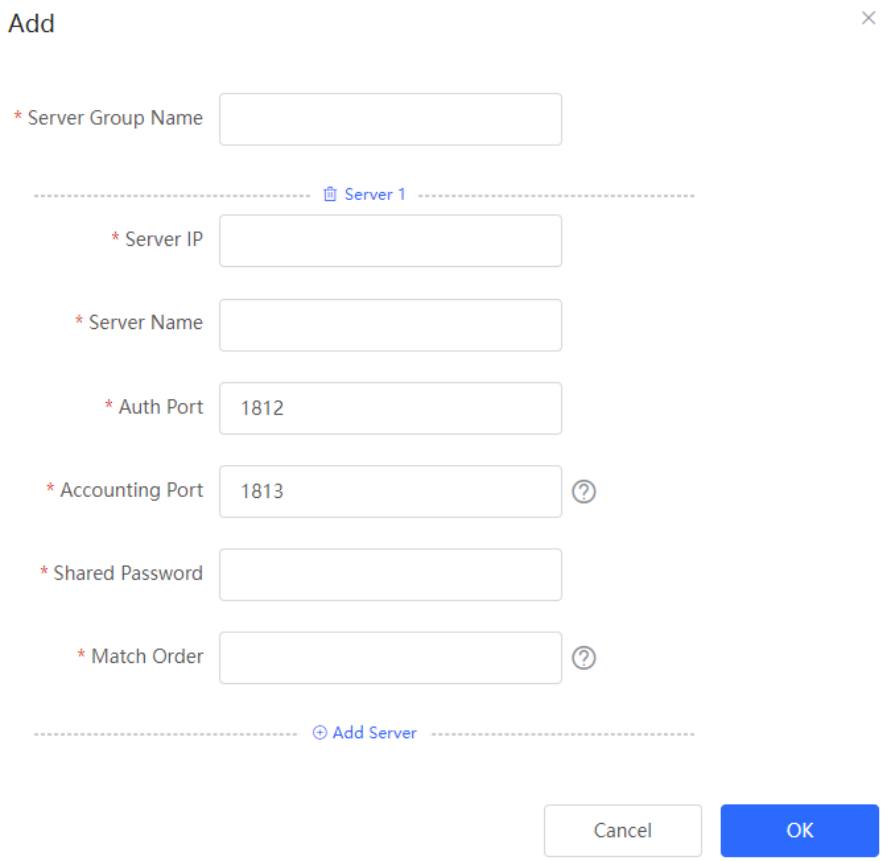
Choose **Local Device** > **Security** > **802.1x Authentication** > **RADIUS Server Management**.

Before configuration, please confirm:

- The Radius server is fully built and configured as follows.
  - Add username and password for client login.
  - Close the firewall, otherwise the authentication message may be intercepted, resulting in authentication failure.
  - a trusted IP on the Radius server.
- The network connection between the authentication device and the Radius server.
- IP addresses of the Radius server and the authentication device have been obtained..

(1) Click **Add Server Group** to add a server group.

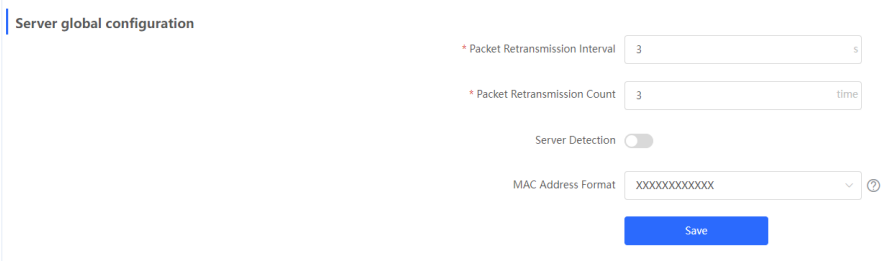




parameter	Description
Server Group Name	Name of the server group. Multiple servers can be added to a server group. If the server with a higher priority does not respond, the system switches to other servers in the matching order. **Note** This function requires the server detection function to be enabled.
Server IP	Radius server address.
Auth Port	The port number used for accessing user authentication on the Radius server.
Accounting Port	The port number used to access the accounting process on the Radius server.
Shared Password	Radius server shared key.

parameter	Description
Match Order	The system supports adding up to 5 Radius servers. The higher the matching order value is, the higher the priority is.

(2) Configure server global settings and click **Save**..

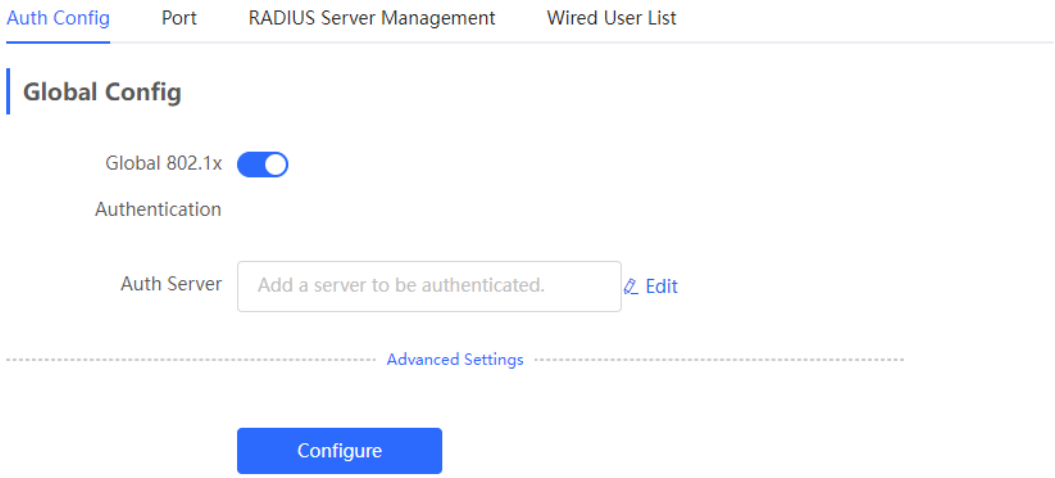


Parameter	Description
Packet Retransmission Interval	Configure the interval for the device to send request packets before confirming that there is no response from RADIUS
Packet Retransmission Count	Configure the number of times the device sends request packets before confirming that there is no response from RADIUS
Server Detection	If this function is enabled, you need to set "Server Detection Period", "Server Detection Times" and "Server Detection Username". It is used to determine the status of the server, so as to decide whether to enable functions such as escape.
MAC Address Format	Configure the MAC address format of RADIUS attribute No. 31 (Calling-Stationg-ID). The following formats are supported: Dotted hexadecimal format, such as 00d0.f8aa.bbcc IETF format, such as 00-D0-F8-AA-BB-CC No format (default), eg 00d0f8aabbcc

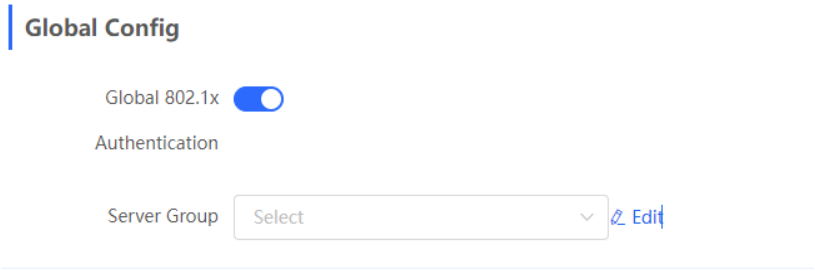
2. Configuring 802.1x Global Settings

Choose **Local Device** > **Security** > **802.1x Authentication** > **Auth Config.**

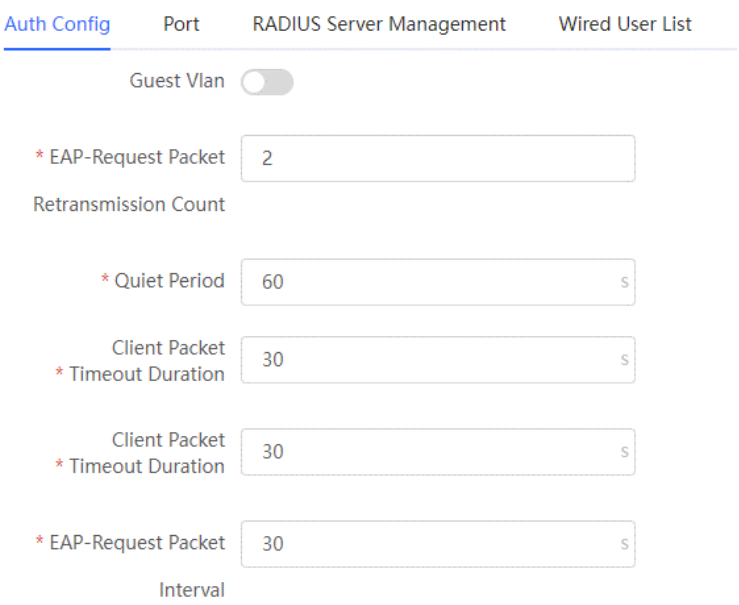
(1) Click the " Global 802.1x " switch, the system prompts to confirm whether to enable it, click <Configure>.



(2) Select the server group.



(3) Click Advanced Settings to configure parameters such as Guest VLAN.



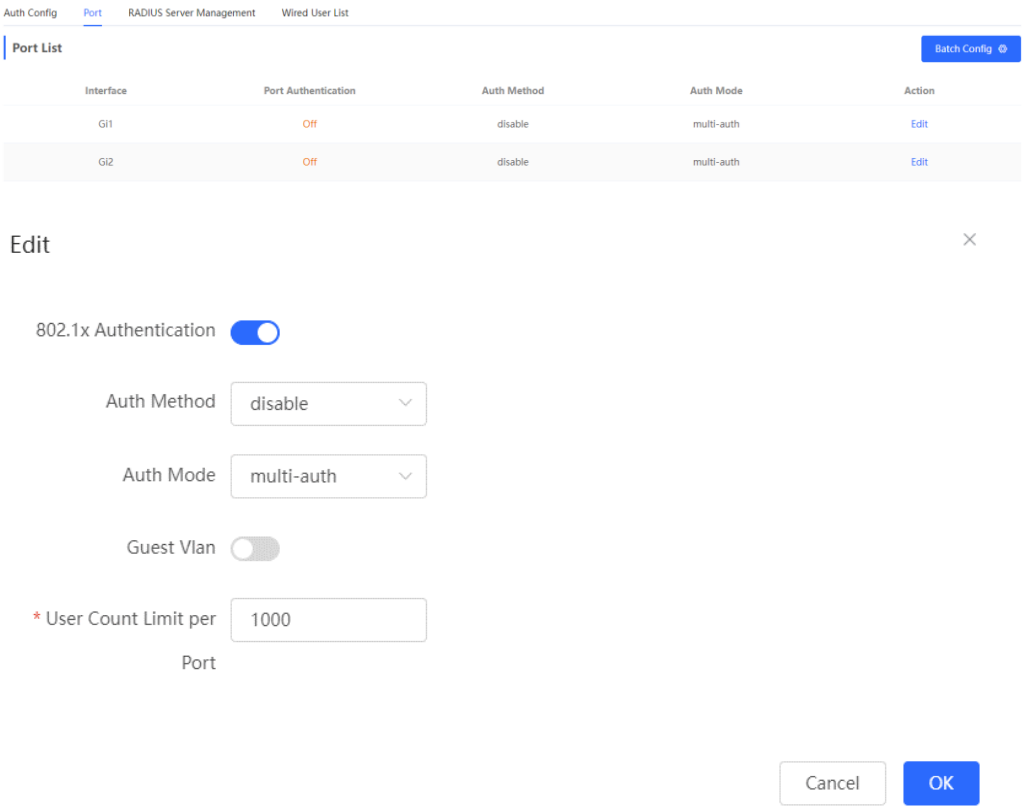
Parameter	Description
Server Escape	If the server disconnection is detected, all users will be allowed to access the Internet
Re-authentication	Require clients to re-authenticate at certain intervals to ensure network security
Guest VLAN	Provide a VLAN for unauthenticated clients to restrict their access
EAP-Request Packet Retransmission Count	Define the number of times the EAP request message will be retransmitted when no response is received, value range: 1- 10 times
Quiet Period	During the authentication process, the idle time between the client and the server does not exchange authentication messages, value range: 0-65535 seconds
Client Packet Timeout Duration	The time limit for the server to wait for the response from the client. Exceeding this time will be regarded as an authentication failure. Value range: 1-65535 seconds

Parameter	Description
Client Packet Timeout Duration	The time limit for the client to wait for the server to respond, exceeding this time will be considered as an authentication failure, value range: 1-65535 seconds
EAP-Request Packet Interval	Define the time interval between sending EAP request messages to control the rate of the authentication process, value range: 1-65535 seconds

3. Configure the effective interface

Choose **Local Device** > **Security** > **802.1x authentication** > **Port**.

(1) Click interface configuration, click modify or batch configuration after a single interface, and edit the authentication parameters of the interface.



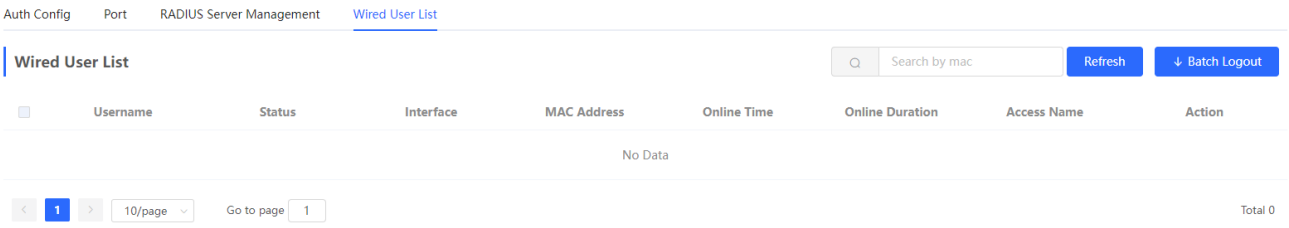
Parameter	Description
802.1x Authentication	When enabled, the selected interface will enable 8.02.1x authentication.

Parameter	Description
Auth Method	disable: Turn off the authentication method, which has the same effect as turning off the 802.1x authentication switch force-auth: Mandatory authentication, the client can directly access the Internet without a password force-unauth: force no authentication, the client cannot authenticate and cannot access the Internet auto: automatic authentication, the device needs to be authenticated, and can access the Internet after passing the authentication It is recommended to select the auto authentication method.
Auth Mode	multi-auth: Supports multiple devices using the same port for authentication, but each device needs to be authenticated independently multi-host: Multiple devices are allowed to share the same port. As long as one user passes the authentication, subsequent users can access the Internet single-host: Each port only allows one device to be authenticated, and can access the Internet after successful authentication
Guest Vlan	When enabled, devices that fail authentication will be dynamically assigned to the specified Guest VLAN Notice You need to create a VLAN ID first and apply it to the interface, then in Security Management > 802.1x Authentication > Advanced settings in the authentication configuration enable Guest VLAN and enter the ID
User Count Limit per Port	Limit the number of users under the interface Product Difference Description The value range of NBS3100 series switches is 1-256, and other switches are 1-1000

17.7.3 View the list of wired authentication users

8.02.1x function is configured on the entire network and a terminal is authenticated and connected to the network, you can view the list of authenticated users.

Choose **Local Device** > **Security Management** > **802.1x Authentication** to obtain specific user information.



Click <Refresh> to get the latest user list information.

If you want to disconnect a certain user from the network, you can select the user and click <Offline> in the "Operation" column ; you can also select multiple users and click <Batch Offline>.

17.8 Anti-ARP Spoofing

17.8.1 Overview

Gateway-targeted ARP spoofing prevention is used to check whether the source IP address of an ARP packet through an access port is set to the gateway IP address. If yes, the packet will be discarded to prevent hosts from receiving wrong ARP response packets. If not, the packet will not be handled. In this way, only the uplink devices can send ARP packets, and the ARP response packets sent from other clients which pass for the gateway are filtered out.

17.8.2 Procedure

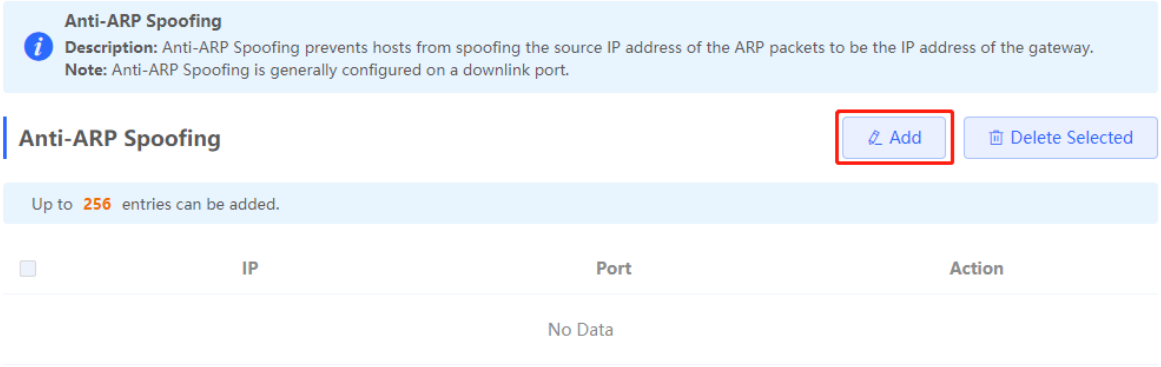
Choose **Local Device** > **Security** > **IP Source Guard** > **Excluded VLAN**.

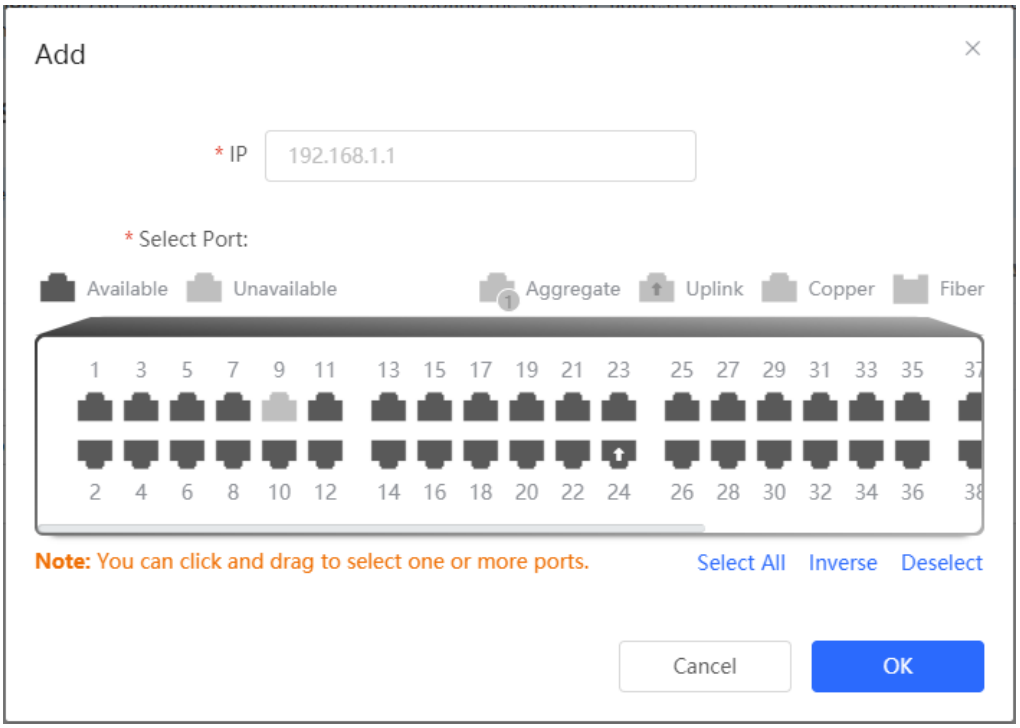
1. Enabling Anti-ARP Spoofing

Click **Add**, select the desired port and enter the gateway IP, click **OK**.

Note

Generally, the anti-ARP spoofing function is enabled on the downlink ports of the device.

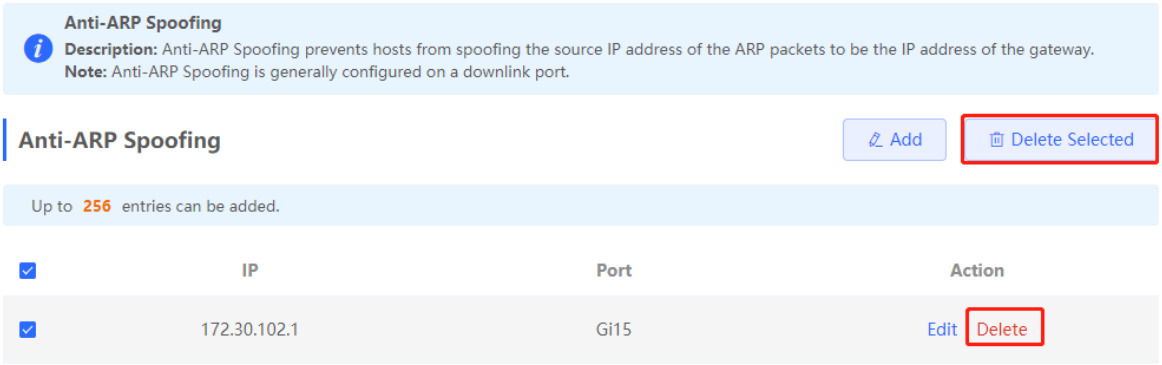




2. Disabling Anti-ARP Spoofing

Batch disable: Select an entry to be deleted in the list and click **Delete Selected**.

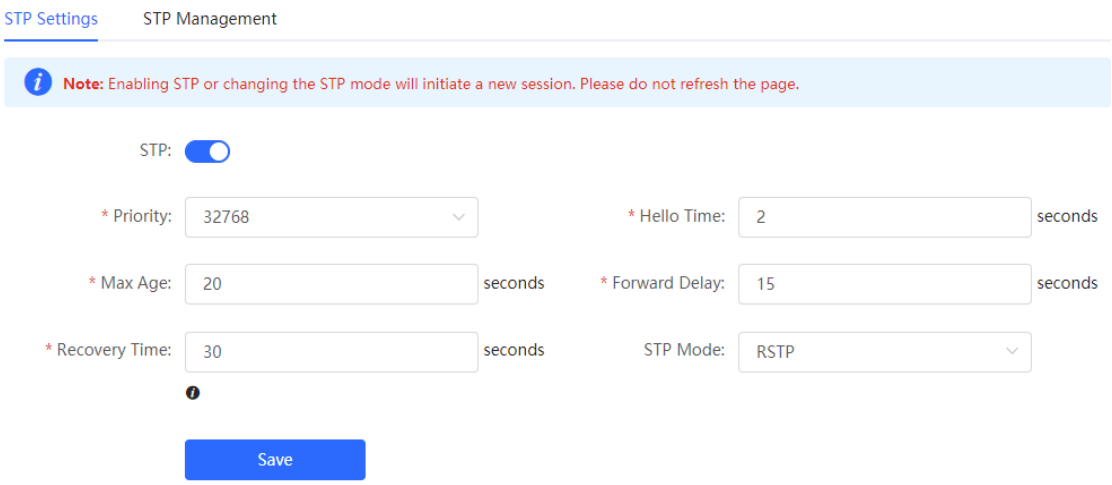
Disable one port: click **Delete** in the last **Action** column of the corresponding entry.



18 NBS and NIS Series Switches Advanced Configuration

18.1 STP

STP (Spanning Tree Protocol) is an L2 management protocol that eliminates L2 loops by selectively blocking redundant links in the network. It also provides the link backup function.



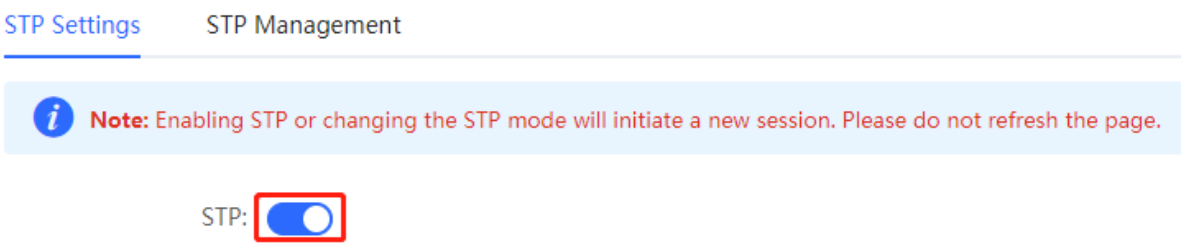
18.1.1 STP Global Settings

Choose **Local Device** > **Advanced** > **STP** > **STP.**

(1) Click to enable the STP function, and click OK in the displayed box. The STP function is disabled by default.

Caution

Enabling the STP or changing the STP mode will initiate a new session. Do not refresh the page during the configuration.



(2) Configure the STP global parameters, and click **Save.**

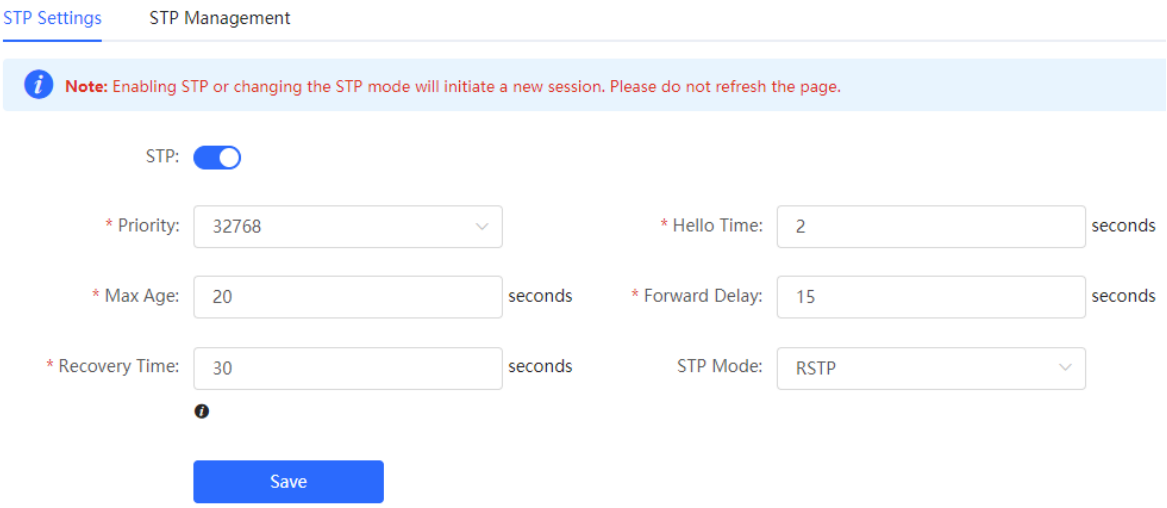


Table 10-1 Description of STP Global Configuration Parameters

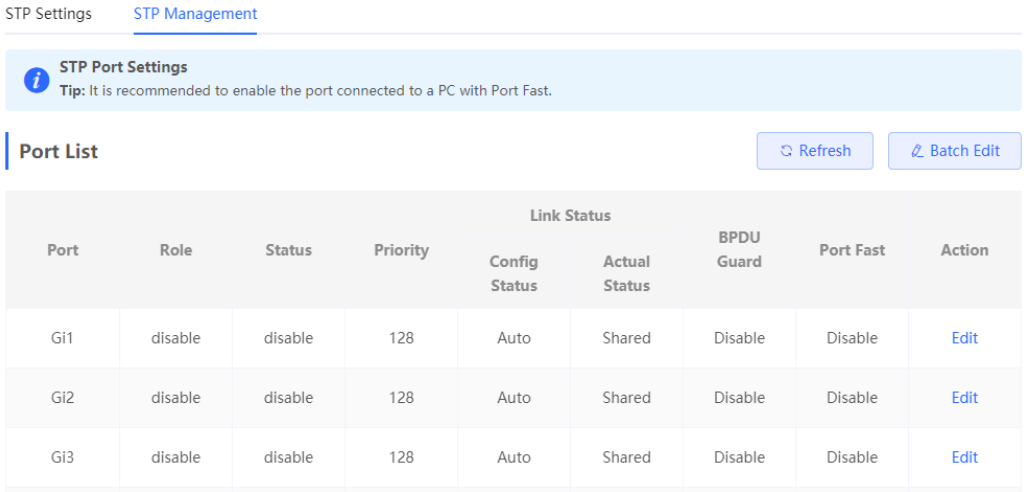
Parameter	Description	Default Value
STP	Whether to enable the STP function. It takes effect globally. STP attributes can be configured only after STP is enabled.	Disable
priority	Bridge priority. The device compares the bridge priority first during root bridge selection. A smaller value indicates a higher priority.	32768
Max Age	The maximum expiration time of BPDUs The packets expiring will be discarded. If a non-root bridge fails to receive a BPDU from the root bridge before the aging time expires, the root bridge or the link to the root bridge is deemed as faulty	20 seconds
Recovery Time	Network recovery time when redundant links occur on the network.	30 seconds
hello time	Interval for sending two adjacent BPDUs	2 seconds
Forward Delay	The interval at which the port status changes, that is, the interval for the port to change from Listening to Learning, or from Learning to Forwarding.	15 seconds

Parameter	Description	Default Value
STP Mode	The versions of Spanning Tree Protocol. Currently the device supports STP (Spanning Tree Protocol) and RSTP (Rapid Spanning Tree Protocol).	RSTP

18.1.2 Applying STP to a Port

Choose **Local Device** > **Advanced** > **STP** > **STP.**

Configure the STP properties for a port Click **Batch Edit** to select ports and configure STP parameters, or click **Edit** in the **Action** column in **Port List** to configure designated ports.



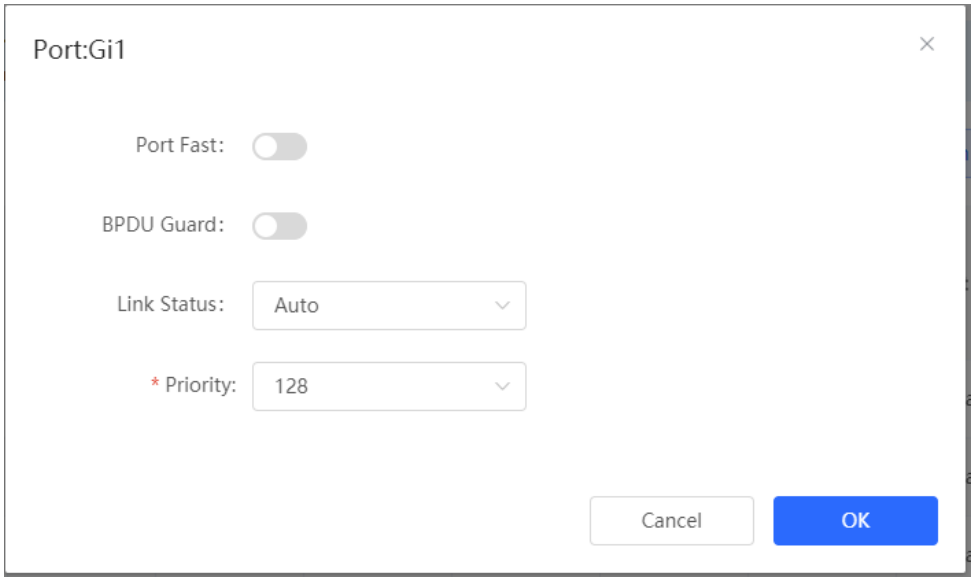


Table 18-1 Description of STP Configuration Parameters of Ports

Parameter	Description	Default Value
role	● Root: A port with the shortest path to the root ● Alternate: A backup port of a root port. Once the root port fails, the alternate port becomes the root port immediately. ● Designated (designated ports): A port that connects a root bridge or an upstream bridge to a downstream device. ● Disable (blocked ports): Ports that have no effect in the spanning tree.	NA
Status	● Disable: The port is closed manually or due to a fault, does not participate in spanning tree and does not forward data, and can be turned into a blocking state after initialization or opening. ● Blocking: A port in the blocking state cannot forward data packets or learn addresses, but can send or receive configuration BPDUs and send them to the CPU. ● Listening: If a port can become the root port or designated port, the port will enter the listening state. **Listening:** A port in the listening state does not forward data or learn addresses, but can receive and send configuration BPDUs. ● Learning: A port in the learning state cannot forward data, but starts to learn addresses, and can receive, process, and send configuration BPDUs. ● Forwarding: Once a port enters the state, it can forward any data, learn addresses, and receive, process, and send configuration BPDUs.	NA
priority	The priority of the port is used to elect the port role, and the port with high priority is preferentially selected to enter the forwarding state	128
Link Status Config Status	Configure the link type, the options include: Shared, Point-to-Point and Auto. In auto mode, the interface type is determined based on the duplex mode. For full-duplex ports, the interface type is point-to-point, and for half-duplex ports, the interface type is shared.	Auto

Parameter	Description	Default Value
Link Status Actual Status	Actual link type: Shared, Point-to-Point	NA
BPDU Guard	Whether to enable the BPDU guard function. After the function is enabled, if Port Fast is enabled on a port or the port is automatically identified as an edge port connected to an endpoint, but the port receives BPDUs, the port will be disabled and enters the Error-disabled state. This indicates that an unauthorized user may add a network device to the network, resulting in network topology change.	Disable
Port Fast	Whether to enable the Port Fast function. After Port Fast is enabled on a port, the port will neither receive nor send BPDUs. In this case, the host directly connected to the port cannot receive BPDU.s. If a port, on which Port Fast is enabled exits the Port Fast state automatically when it receives BPDUs, the BPDU filter feature is automatically disabled. Generally, the port connected to a PC is enabled with Port Fast.	Disable

Note

- It is recommended to enable Port Fast on the port connected to a PC.
- A port switches to the forwarding state after STP is enabled more than 30 seconds. Therefore transient disconnection may occur and packets cannot be forwarded.

18.2 LLDP

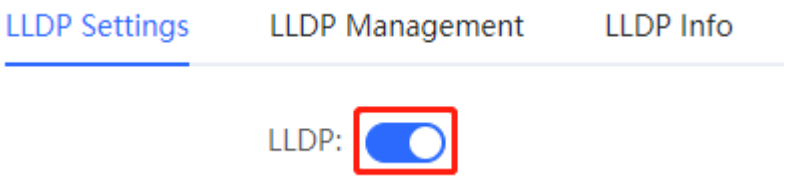
18.2.1 Overview

LLDP (LINK Layer Discovery Protocol) is defined by ieee 802.1ab. LLDP Can Discover Devices and Detect Topology CHANGES. With LLDP, The EWEB Management System M Can Learn The Topology Connection Status, for Example, Ports of the Device that are connected to other devices, port rates at both ends of a link, and duplex mode matching status. An administrator can locate and troubleshoot faults quickly based on the preceding information.

18.2.2 LLDP Global Settings

Choose **Local Device** > **Advanced** > **LLDP** > **LLDP Settings.**

(1) Click to enable the LLDP function, and click **OK** in the displayed box. The STP function is enabled by default. When the LLDP is enabled, this step can be skipped.



(2) Configure the global LLDP parameters and click **Save.**

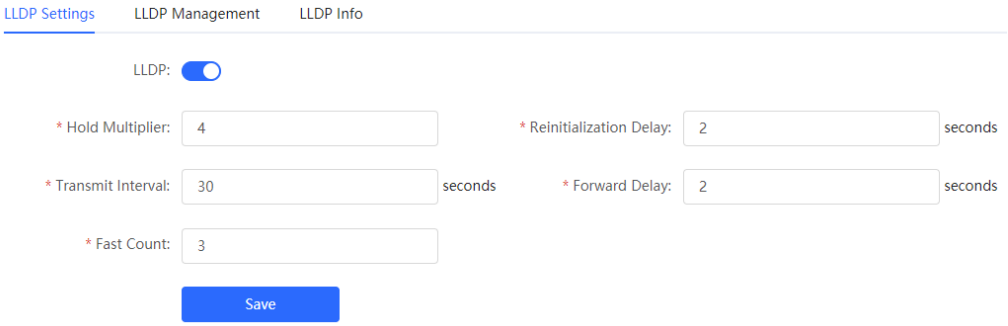


Table 18-2 Description of LLDP Global Configuration Parameters

Parameter	Description	Default Value
LLDP	Indicates whether the LLDP function is enabled.	enable
Hold Multiplier	TTL multiplier of LLDP In LLDP packets, TTL TLV indicates the TTL of local information on a neighbor. The value of TTL TLV is calculated using the following formula: TTL TLV = TTL multiplier × Packet transmission interval + 1. The TTL TLV value can be modified by configuring the TTL multiplier and LLDP packet transmission interval.	4
Transmit Interval	Transmission interval of LLDP packets, in seconds The value of TTL TLV is calculated using the following formula: TTL TLV = TTL multiplier × Packet transmission interval + 1. The TTL TLV value can be modified by configuring the TTL multiplier and LLDP packet transmission interval.	30 seconds

Parameter	Description	Default Value
Fast Count	Number of packets that are transmitted rapidly When a new neighbor is discovered, or the LLDP working mode is changed, the device will start the fast transmission mechanism in order to let the neighboring devices learn the information of the device as soon as possible. The fast transmission mechanism shortens the LLDP packet transmission interval to 1s, sends a certain number of LLDP packets continuously, and then restores the normal transmission interval. You can configure the number of LLDP packets that can be transmitted rapidly for the fast transmission mechanism.	3
Reinitialization Delay	Port initialization delay, in seconds You can configure an initialization delay to prevent frequent initialization of the state machine caused by frequent changes of the port work mode.	2 seconds
Forward Delay	Delay for sending LLDP packets, in seconds. When local information of a device changes, the device immediately transmits LLDP packets to its neighbors. You can configure a transmission delay to prevent frequent transmission of LLDP packets caused by frequent changes of local information. If the delay is set to a very small value, frequent change of the local information will cause frequent transmission of LLDP packets. If the delay is set to a very large value, no LLDP packet may be transmitted even if local information is changed. Set an appropriate delay according to actual conditions.	2 seconds

18.2.3 Applying LLDP to a Port

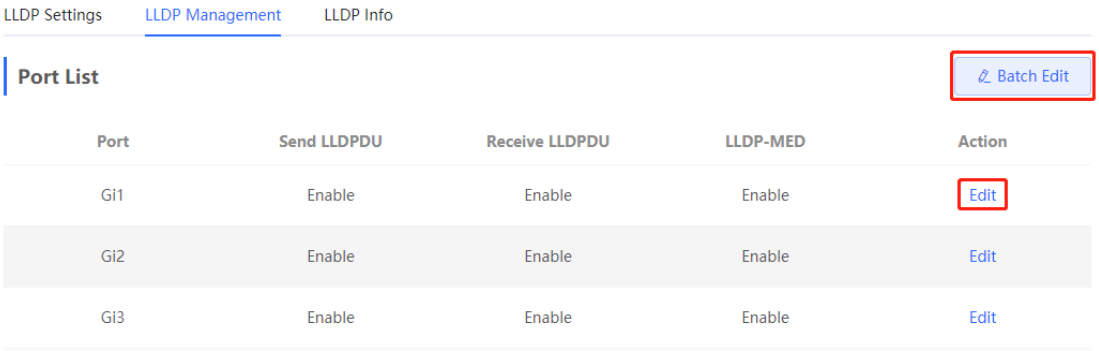
Choose **Local Device** > **Advanced** > **LLDP** > **LLDP Management.**

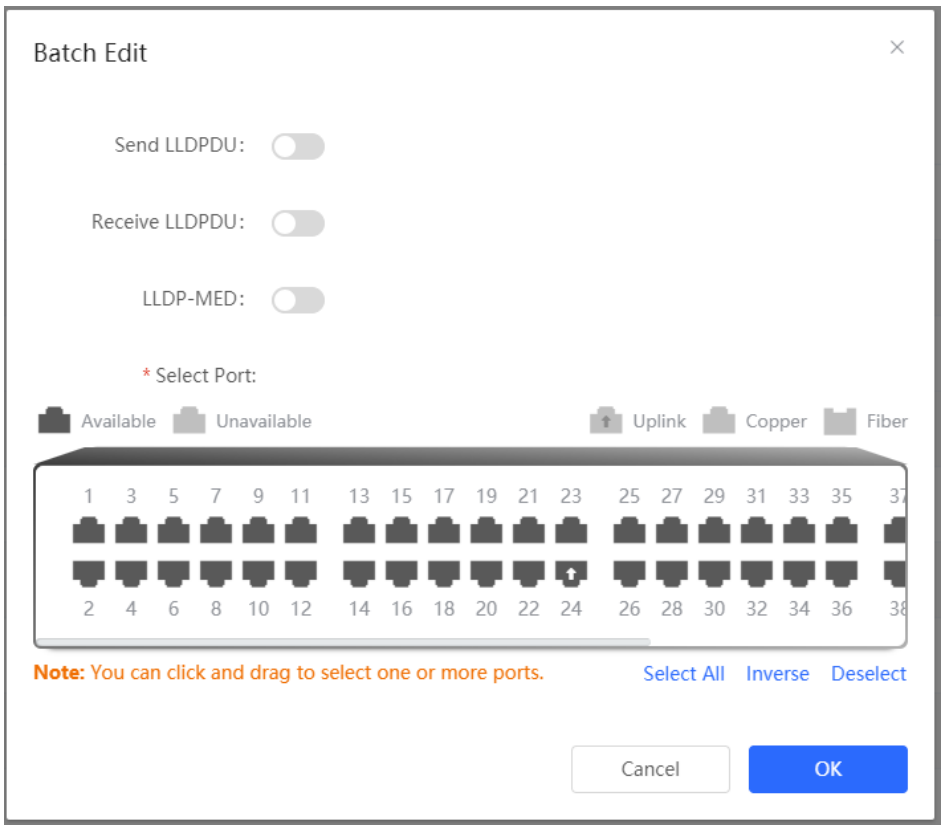
In **Port List,** Click **Edit** in the **Action** column, or click **Batch Edit,** select the desired port, configure the LLDP working mode on the port and whether to enable LLDP-MED, and click **OK.**

Send LLDPDU: After **Send LLDPDU** is enabled on a port, the port can send LLDPDUs.

Receive LLDPDU: After **Receive LLDPDU** is enabled on a port, the port can receive LLDPDUs.

LLDPMED: After **LLDPMED** is enabled, the device is capable of discovering neighbors when its peer endpoint supports LLDP-MED (the Link Layer Discovery Protocol-Media Endpoint Discovery).



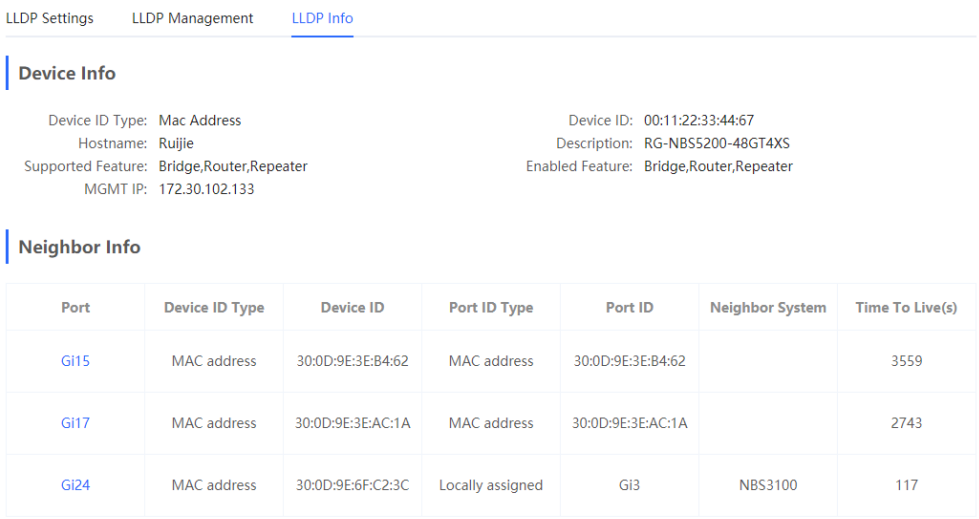


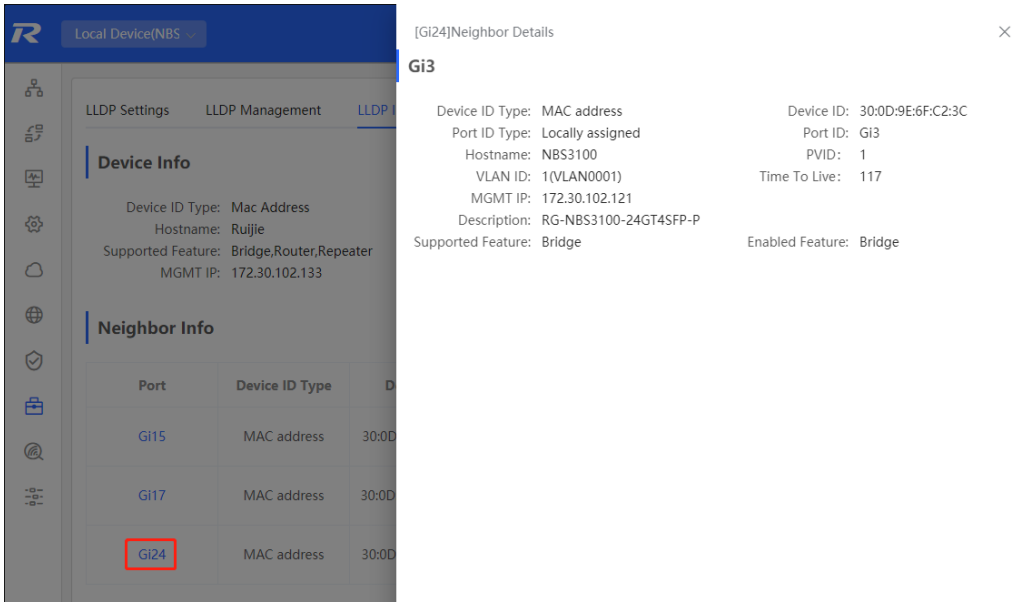
18.2.4 Displaying LLDP information

Choose **Local Device** > **Advanced** > **LLDP** > **LLDP Info.**

To display LLDP information, including the LLDP information of the local device and the neighbor devices of each port. Click the port name to display details about port neighbors.

You can check the topology connection through LLDP information, or use LLDP to detect errors. For example, if two switch devices are directly connected in the network topology. When an administrator configures the VLAN, port rate, duplex mode, an error will be prompted ted If the configurations do not match those on the connected neighbor.





18.3 RLDP

18.3.1 Overview

The Rapid Link Detection Protocol (RLDP) is an Ethernet link failure detection protocol, which is used to rapidly detect unidirectional link failures, bidirectional link failures, and downlink loop failures. When a failure is found, RLDP automatically shuts down relevant ports or ask users to manually shut down the ports according to the configured failure handling methods, to avoid wrong forwarding of traffic or Ethernet L2 loops.

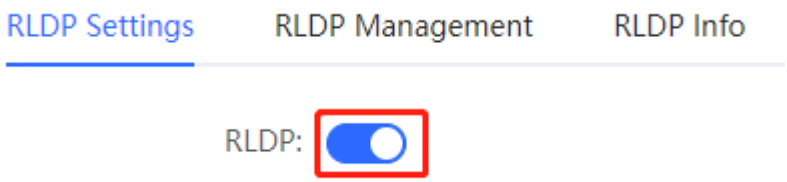
Supports enabling the RLDP function of the access switches in the network in a batch. By default, the switch ports will be automatically shut down when a loop occurs. You can also set a single switch to configure whether loop detection is enabled on each port and The handling methods after a link fault is detected

18.3.2 Standalone Device Configuration

1. RLDP Global Settings

Choose **Local Device** > **Advanced** > **RLDP** > **RLDP Settings.**

(1) Enable the RLDP function and click **OK** in the displayed dialog box. The RLDP function is disabled by default.



(2) Configure RLDP global parameters and click **Save.**

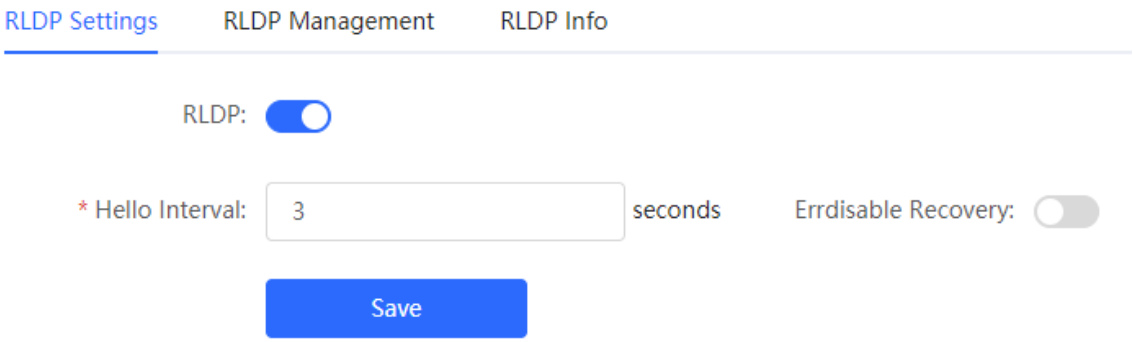


Table 18-3 Description of RLDP Global Configuration Parameters

Parameter	Description	Default Value
RLDP	Indicates whether the RLDP function is enabled.	Disable
Hello Interval	Interval for RLDP to send detection packets, in seconds	3 seconds
Errdisable Recovery	After it is enabled, a port automatically recovers to the initialized state after a loop occurs.	Disable
Errdisable Recovery Interval	The interval at which the failed ports recover to the initialized state regularly and link detection is restarted, in seconds.	30 seconds

2. Applying RLDP to a Port

Choose **Local Device** > **Advanced** > **RLDP** > **RLDP Management.**

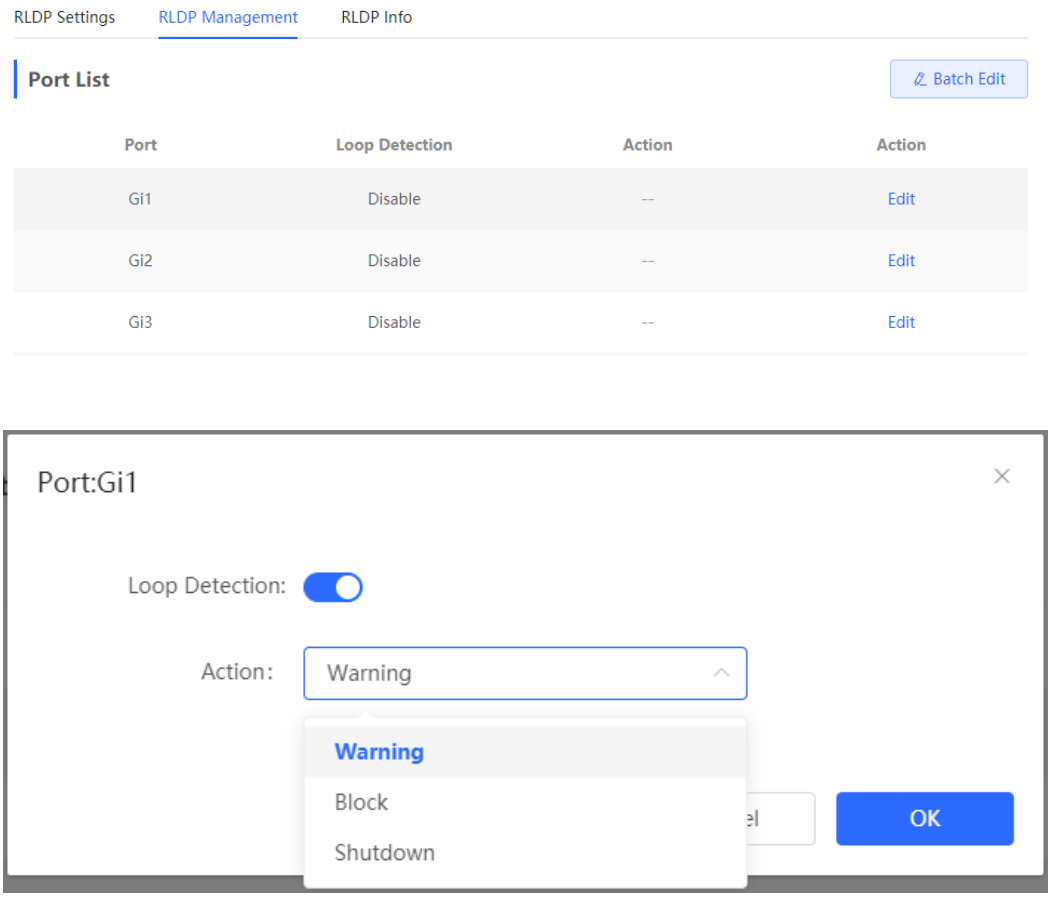
In **Port List,** click **Edit** in the Action column or click **Batch Edit,** select the desired port, configure whether to enable loop detection on the port and the handling method after a fault is detected, and click **OK.**

There are three methods to handle port failures:

- Warning: Only the relevant information is prompted to indicate the failed port and the failure type.
- Block: After alerting the fault, set the faulty port not to forward the received packets
- Shutdown port: After alerting the fault, shut down the port.

Caution

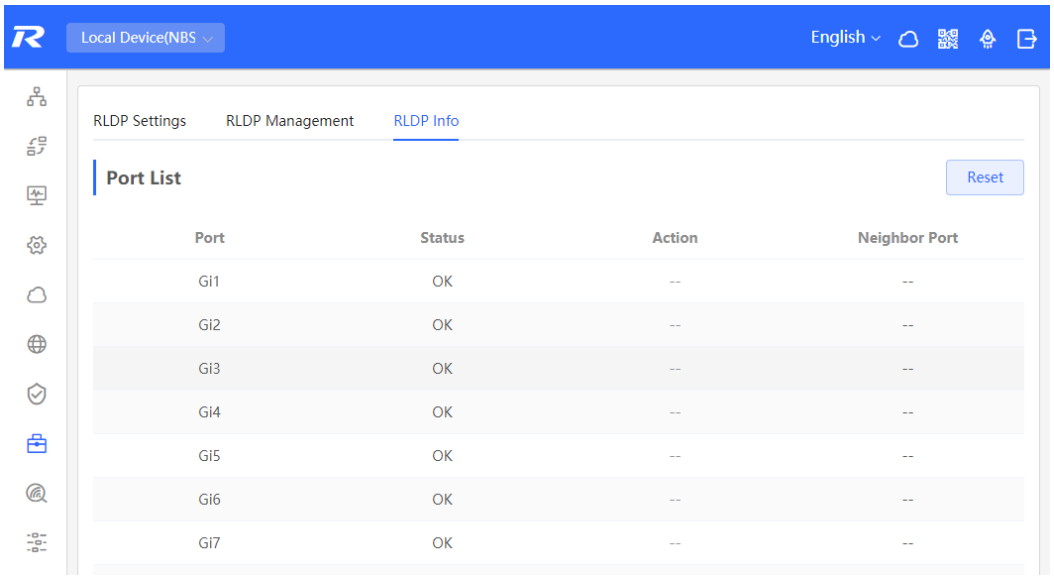
- When RLDP is applied to an aggregate port, the Action can only be set to Warning and Shutdown.
- When performing RLDP detection on an aggregate port, if detection packets are received on the same device, even if the VLANs of the port sending the packets and the port receiving them are different, it will not be judged as a loop failure.



3. Displaying RLDP information

Choose **Local Device** > **Advanced** > **RLDP** > **RLDP Info.**

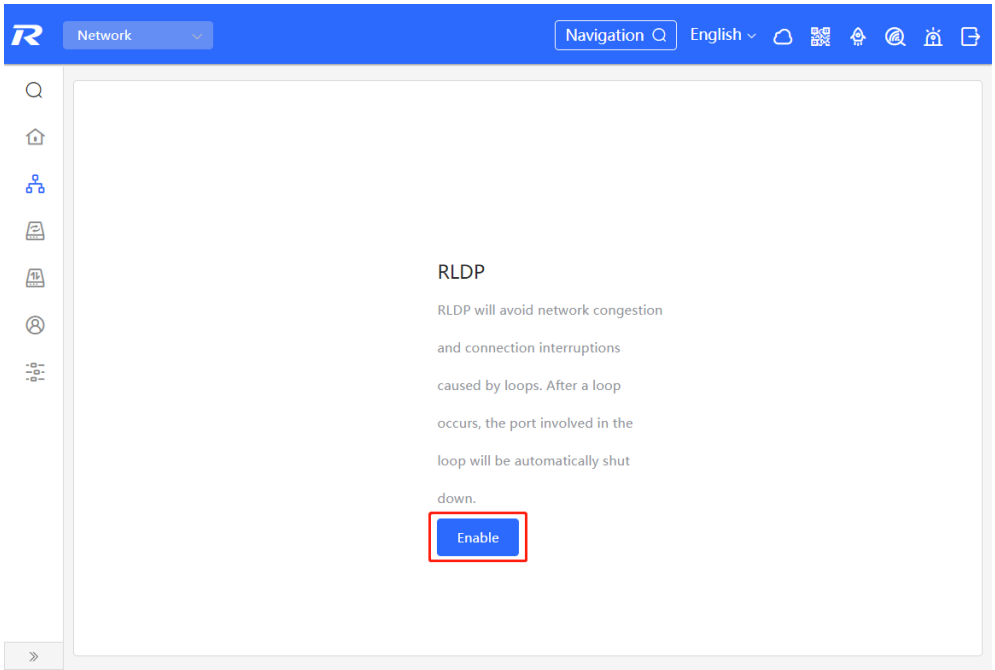
You can view the detection status, failure handling methods, and ports that connect the neighbor device to the local device. You can click **Reset** to restore the faulty RLDP status triggered by a port to the normal state.



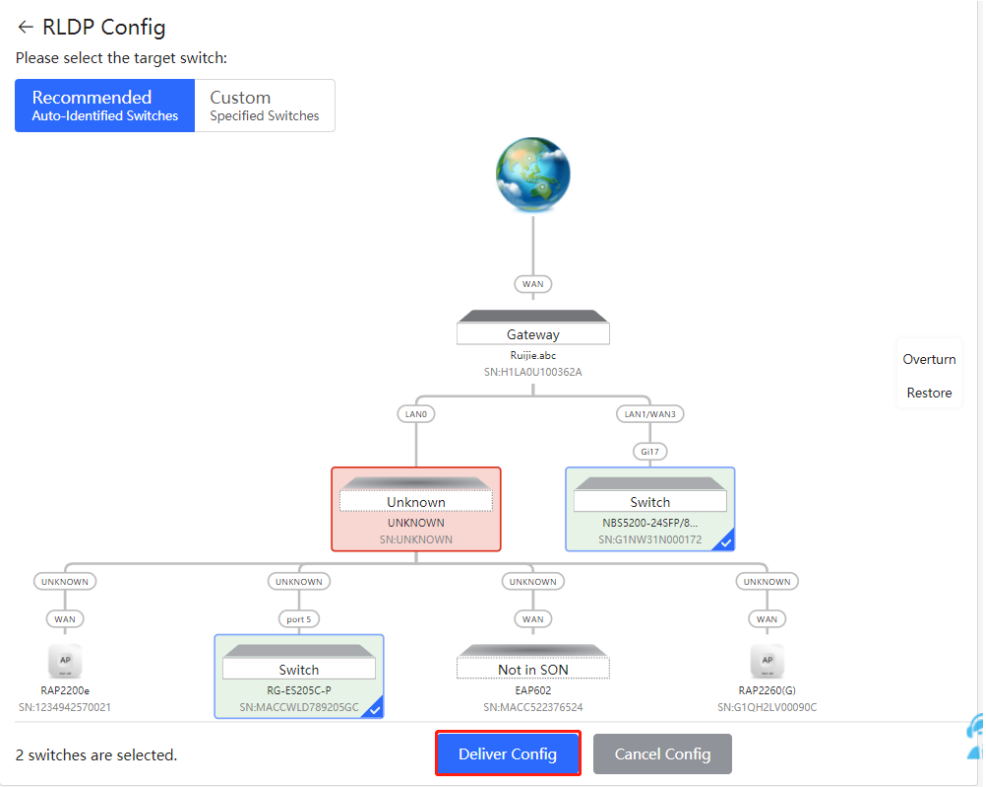
18.3.3 Batch Configuring Network Switches

Choose **Network** > **RLDP.**

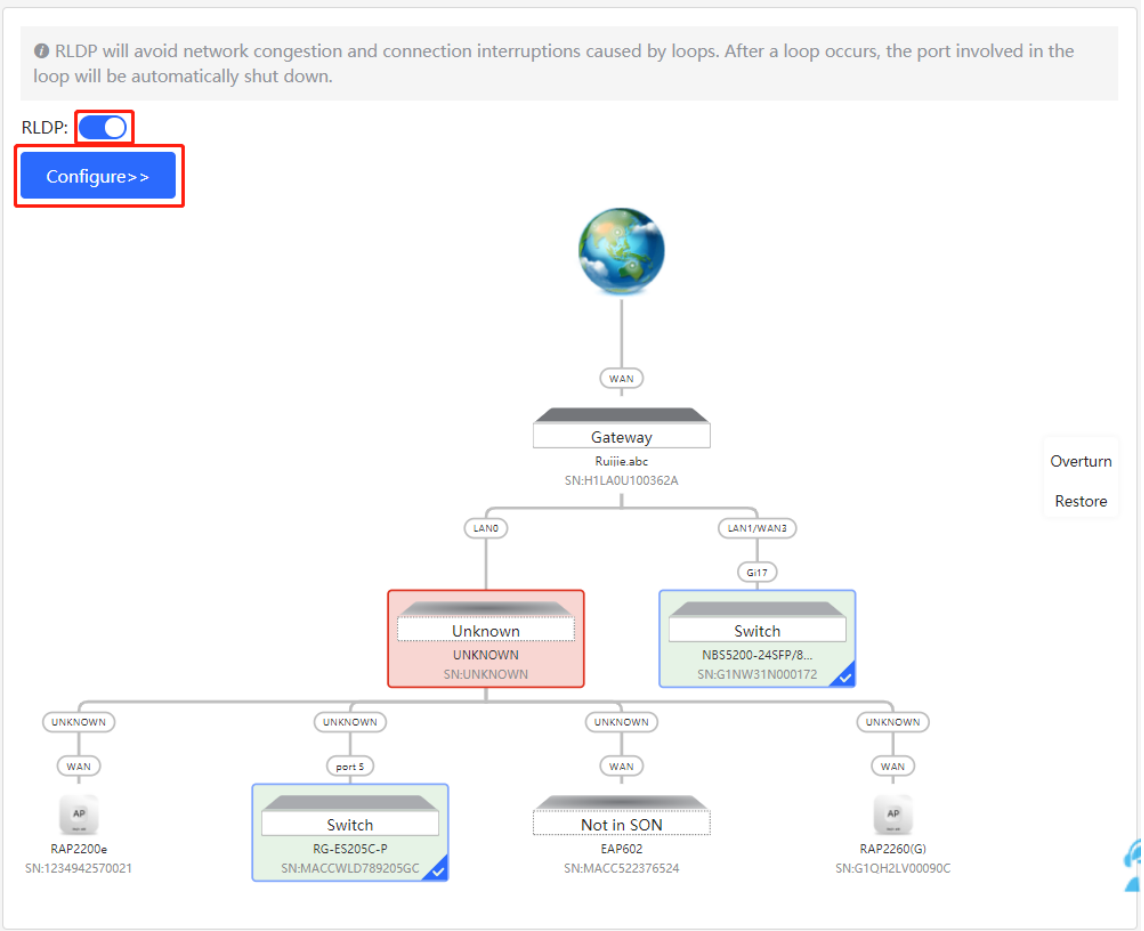
(1) Click **Enable** to access the **RLDP Config** page.



(2) In the networking topology, you can select the access switches on which you want to enable RLDP in either recommended or custom mode. If you select the recommended mode, all access switches in the network are selected automatically. If you select the custom mode, you can manually select the desired access switches. Click **Deliver Config.** RLDP is enabled on the selected switches.



(3) After the configuration is delivered, if you want to modify the effective range of the RLDP function, click **Configure** to select desired switches in the topology again. Turn off **RLDP** to disable RLDP on all the switches with one click.

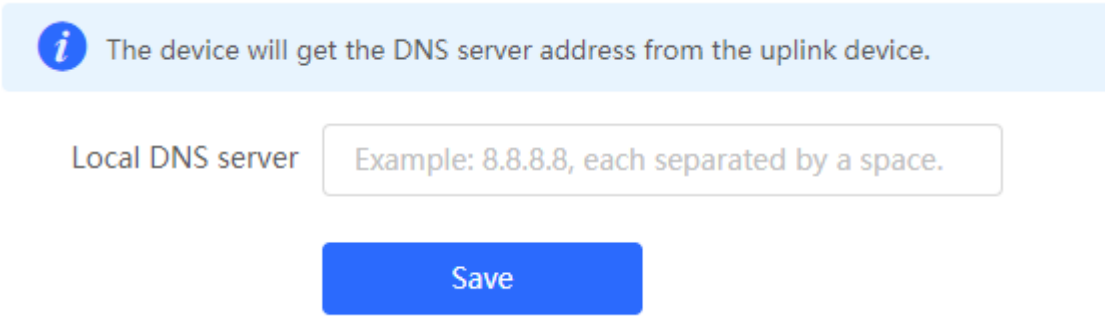


18.4 Configuring the Local DNS

The local DNS server is optional. The device obtains the DNS server address from the connected uplink device by default.

Choose **Local Device** > **Advanced** > **Local DNS.**

Enter the DNS server address used by the local device. If multiple addresses exist, separate them with spaces. Click **Save.** After configuring the local DNS, the device first use the DNS of the management IP address for resolving domain names. If the device fail To parse domain names, then use this DNS address instead.



18.5 Voice VLAN

Caution

The Voice VLAN function is supported by RG-NBS3100 Series, RG-NBS3200 Series, RG-NBS5100 Series and RG-NBS5200 Series Switches.

18.5.1 Overview

A voice virtual local area network (VLAN) is a VLAN dedicated to voice traffic of users. By creating a voice VLAN and adding ports connected to voice devices to the voice VLAN, you can have voice data transmitted in the voice VLAN and deliver specified policy of the quality of service (QoS) for voice streams, to improve the transmission priority of voice traffic and ensure the call quality.

18.5.2 Voice VLAN Global Configuration

Choose **Local Device** > **Advanced** > **Voice VLAN** > **Global Settings.**

Turn on the voice VLAN function, configure global parameters, and click **Save.**

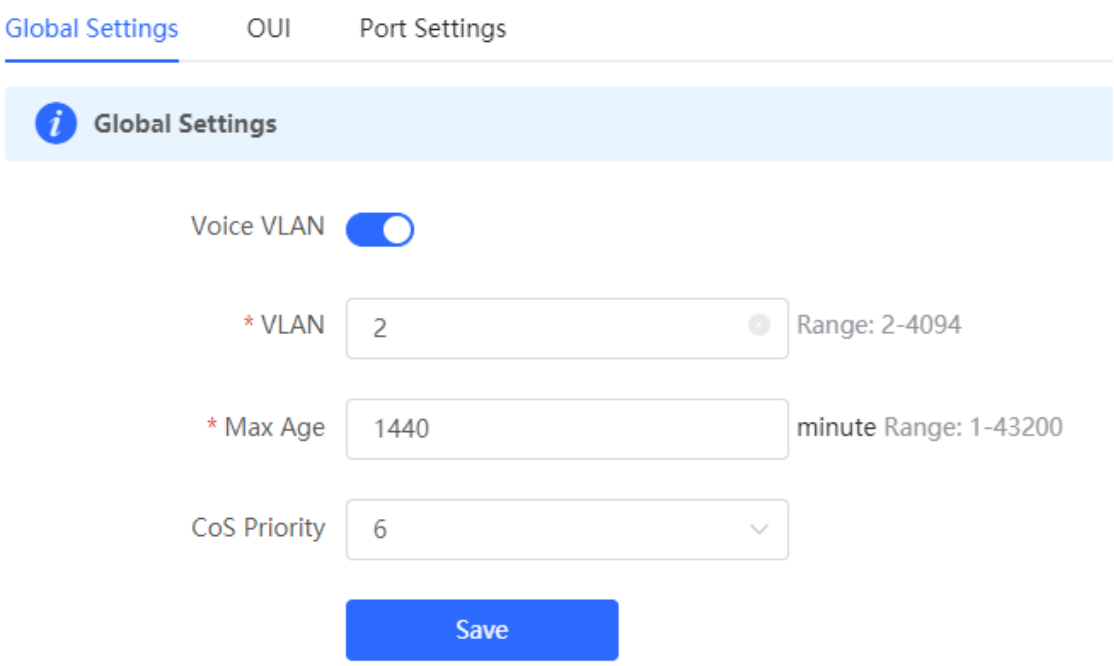


Table 18-4 Description of VLAN Global Configuration Parameters

Parameter	Description	Default Value
Voice VLAN	Whether to enable the Voice VLAN function	Disable

Parameter	Description	Default Value
VLAN	VLAN ID as Voice VLAN	NA
Max Age	Aging time of voice VLAN, in minutes. In automatic mode, after the MAC address in a voice packet ages, if the port does not receive any more voice packets within the aging time, the device removes this port from the voice VLAN	1440 minutes
CoS Priority	The L2 Priority of voice stream packets in a Voice VLAN. The value range is from 0 to 7. A greater value indicates a higher priority. You can modify the priority of the voice traffic to improve the call quality.	6

18.5.3 Configuring a Voice VLAN OUI

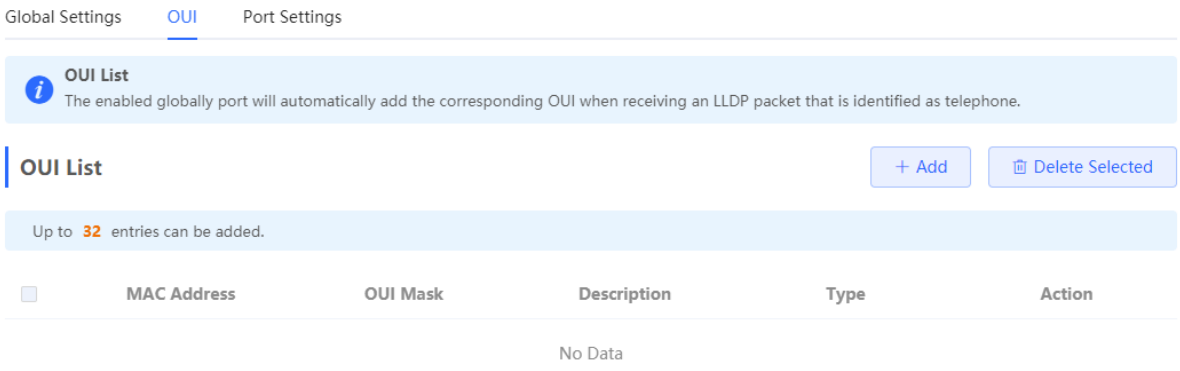
Choose **Local Device** > **Advanced** > **Voice VLAN** > **OUI.**

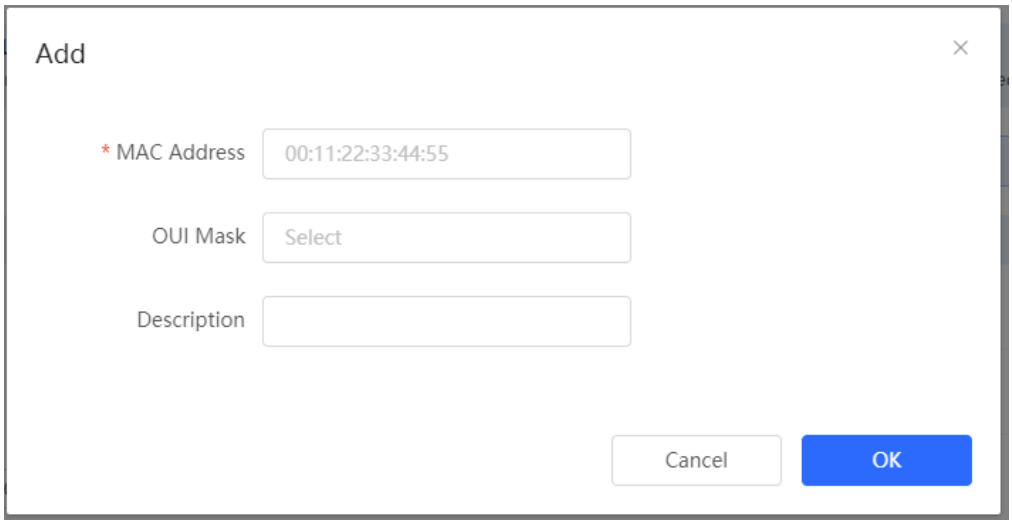
The source MAC address of a voice packet contains the organizationally unique identifier (OUI) of the voice device manufacturer. After the voice VLAN OUI is configured, the device compares the voice VLAN OUI with the source MAC address in a received packet to identify voice data packets, and send them to the voice VLAN for transmission.

Note

After the voice VLAN function is enabled on a port, when the port receives LLDP packets sent by IP phones, it can identify the device capability fields in the packets, and identify the devices with the capability of Telephone as voice devices. It also **extracts** the source MAC address of a protocol packet and processes it as the MAC address of the voice device. In this way, the OUI can be added automatically.

Click **Add.** In the displayed dialog box, enter an MAC address and OUI, and click **OK.**

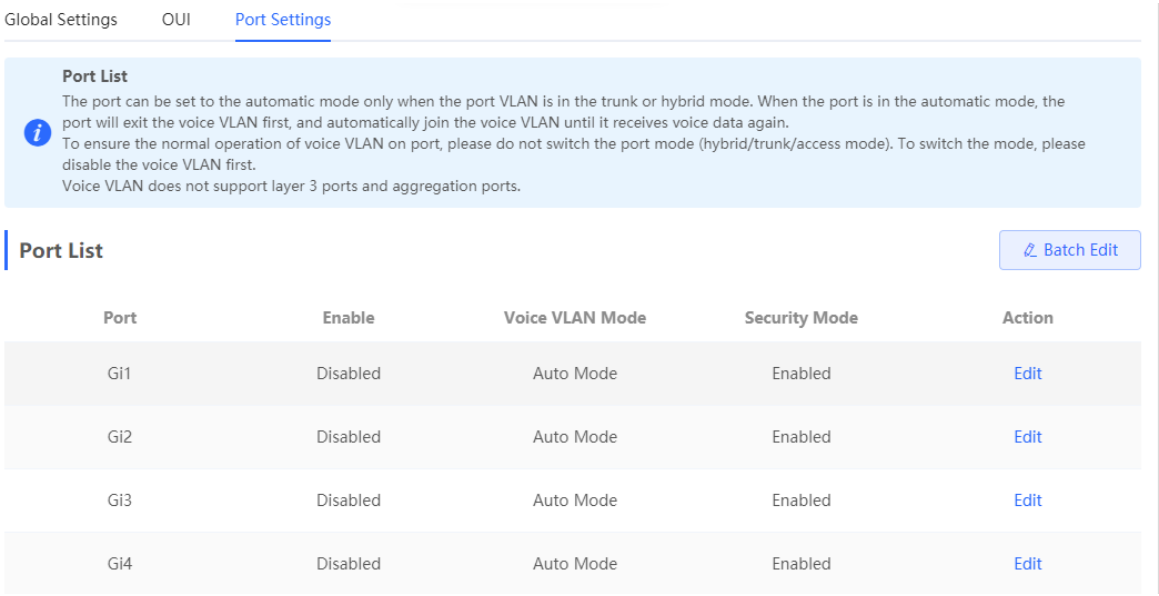




18.5.4 Configuring the Voice VLAN Function on a Port

Choose **Local Device** > **Advanced** > **Voice VLAN** > **Port Settings.**

Click **Edit** in the port entry or click **Batch Edit** on the upper -right corner. In the displayed dialog box, select whether to enable the voice VLAN function on the port, voice VLAN mode to be applied, and whether to enable the security mode, and Click **OK.**



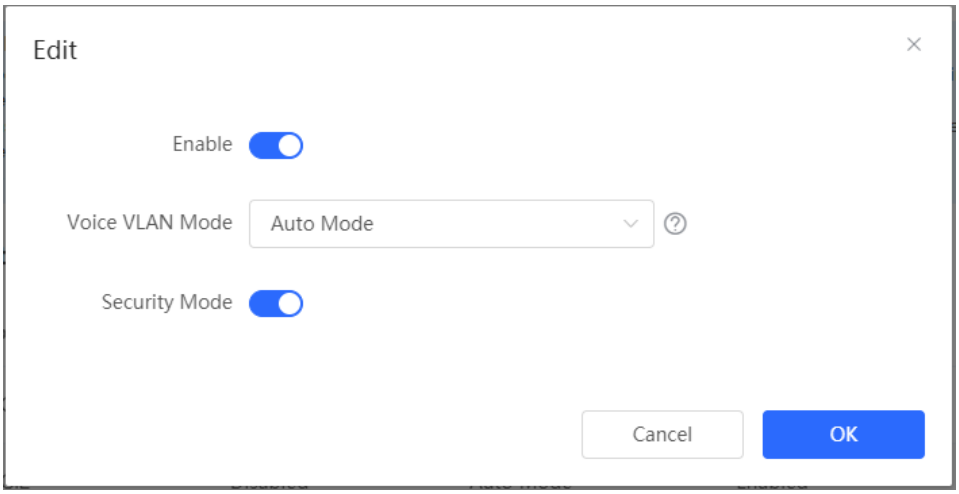


Table 18-5 Description of the Voice VLAN Configuration Parameters on a Port

Parameter	Description	Default Value
Voice VLAN Mode	Based on different ways the Voice VLAN function is enabled on the port, the Voice VLAN Mode can be Auto Mode or Manual Mode: ● **Auto Mode:** In this mode, the device checks whether the permit VLANs of a port contain the voice VLAN after the voice VLAN function is enabled on the port. If yes, the device deletes the voice VLAN from the permit VLANs of the port until the port receives a voice packet containing a specified OUI. Then, the device automatically adds the voice VLAN to the port's permit VLANs. If the port does not receive a voice packet containing the specified OUI within the global aging time, the device removes the Voice VLAN from the permit VLANs of the port. ● **Manual Mode:** If the permit VLANs of a port contains the voice VLAN, voice packets can be transmitted in the voice VLAN.	Auto Mode
Security Mode	When the security mode is enabled, only voice traffic can be transmitted in the voice VLAN. The device checks the source MAC address in each packet. When the source MAC address in the packet matches the voice VLAN OUI, the packet can be transmitted in the voice VLAN. Otherwise, the device discards the packet. When the security mode is disabled, the source MAC addresses of packets are not checked and all packets can be transmitted in the voice VLAN.	enable

Caution

- The voice VLAN mode of the port can be set as the auto mode only when the VLAN mode of the port is Trunk mode. When the voice VLAN mode of the port work in the auto mode, the port exits the voice VLAN first and is automatically added to the voice VLAN only after receiving voice data.
- After the voice VLAN function is enabled on a port, do not switch the L2 mode (trunk or access mode) of the port to ensure normal operation of the function. If you need to switch the L2 mode of the port, disable the voice VLAN function on the port first.
- It is not recommended that both voice data and service data be transmitted over the voice VLAN. If you want to transmit both voice data and service data over the voice VLAN, disable the voice VLAN function in security mode.
- The voice VLAN function is unavailable on L3 ports or aggregate ports.

18.6 Configuring Smart Hot Standby (VCS)

Smart hot standby enables multiple switches to act as a hot standby device for each other, ensuring uninterrupted data forwarding in the event of a single point failure.

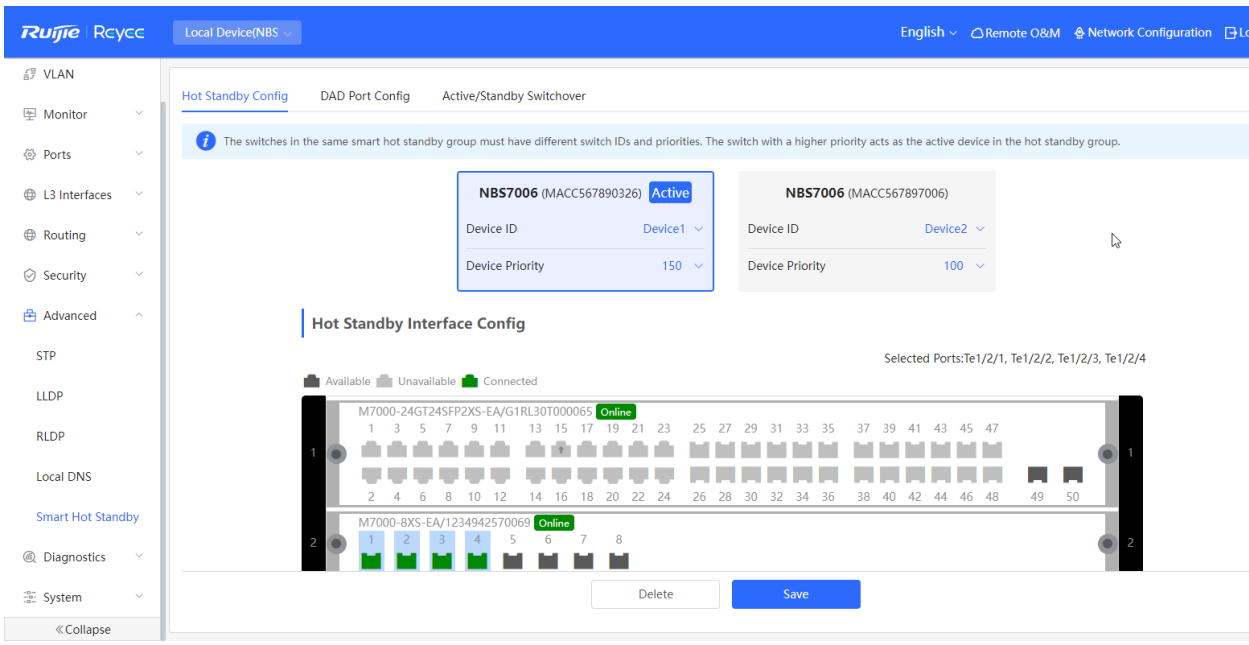
18.6.1 Configuring Hot Standby

View or modify selected hot standby interfaces, device IDs and priorities. The switch with a higher priority is selected as the active switch in a hot standby group.

Caution

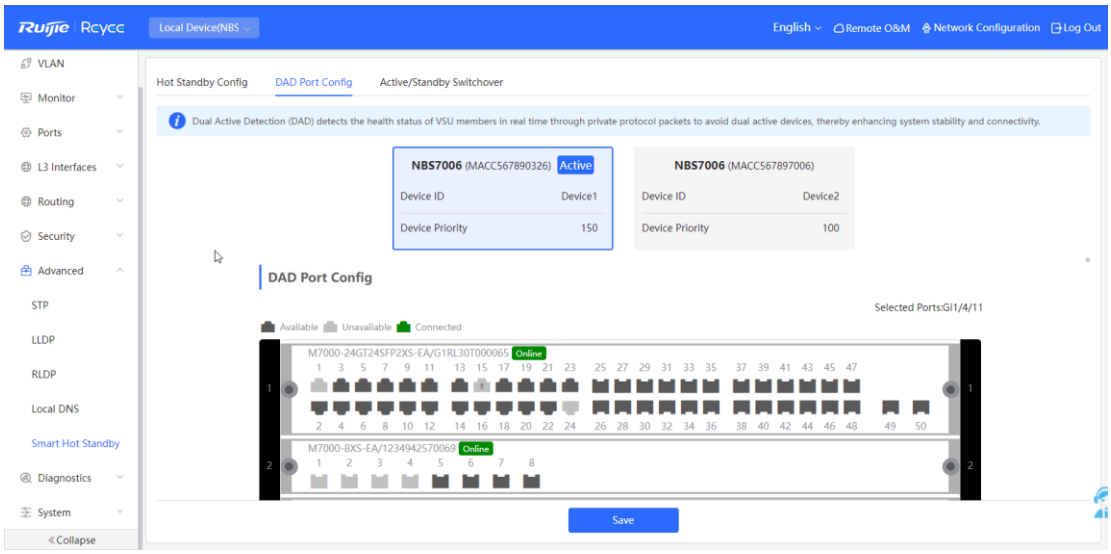
The devices in a hot standby group must have unique device IDs and priorities configured.

Choose **Local Device** > **Advanced** > **Smart Hot Standby.**



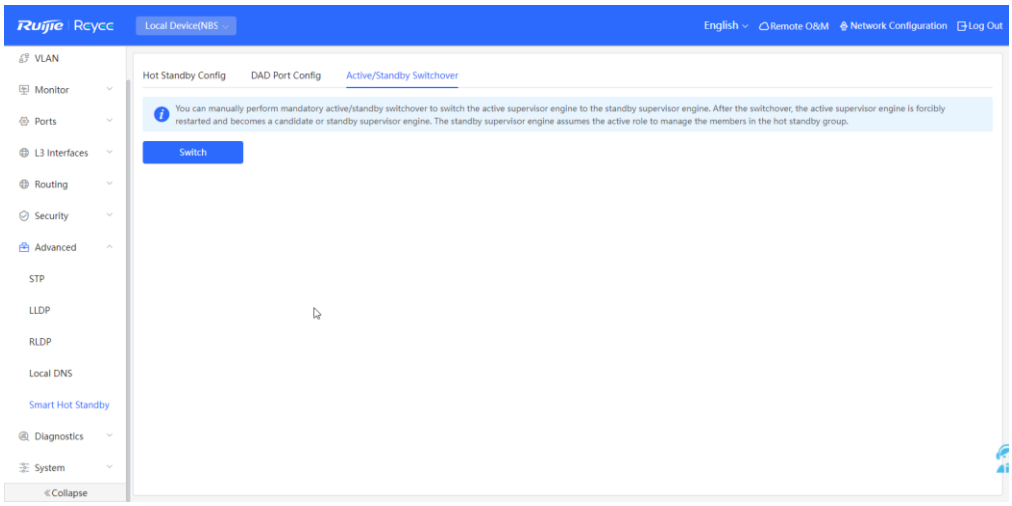
18.6.2 Configuring DAD Interfaces

After selecting the DAD interfaces of both the active and standby switches, connect these DAD interfaces with a network cable to prevent network failures caused by dual active devices.



18.6.3 Active/Standby Switchover

Active/Standby Switchover allow manual switching between the active and standby supervisor engines. Clicking the **Switch** button will restart the supervisor engine. Please exercise caution.

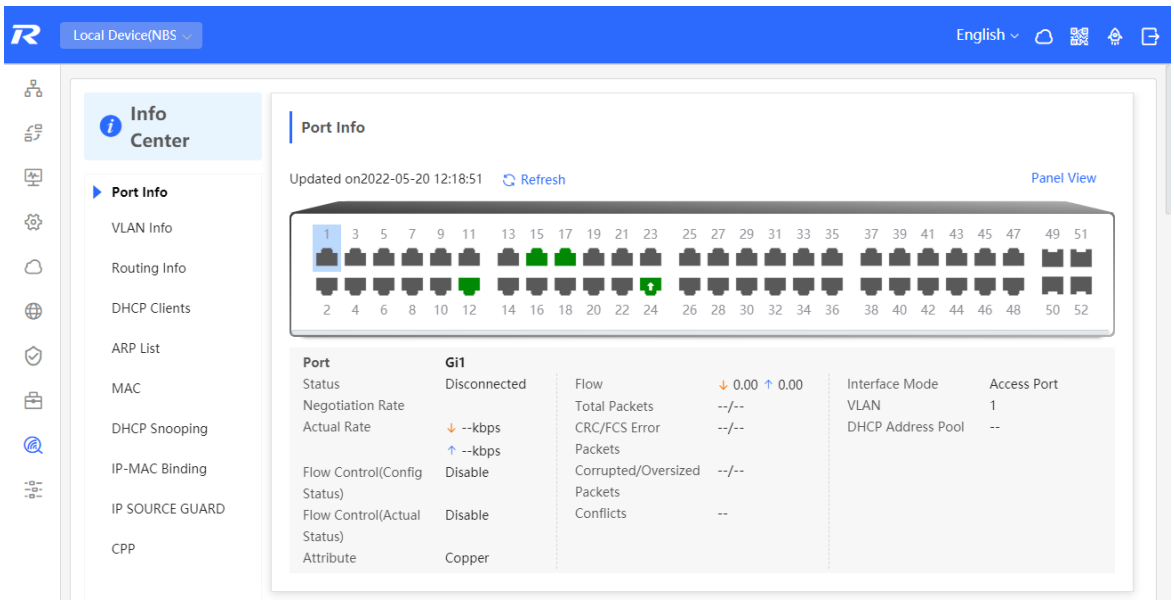


19 NBS and NIS Series Switches Diagnostics

19.1 Info Center

Choose **Local Device** > **Diagnostics** > **Info Center.**

In **Info Center,** you can view port traffic, VLAN information, routing information, client list, ARP list, MAC address, DHCP snooping, IP-MAC binding, IP Source Guard, and CPP statistics of the device and relevant configurations.



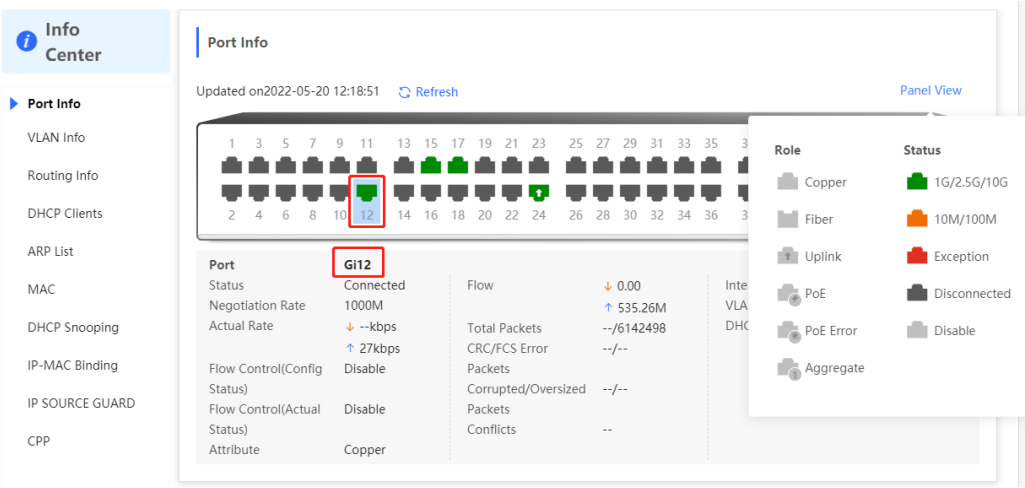
19.1.1 Port Info

Choose **Local Device** > **Diagnostics** > **Info Center** > **Port Info.**

Port Info displays the status and configuration information of the port. Click the port icon to view the detailed information of the port.

Note

- To configure the flow control of the port or the optical/electrical attribute of a combo port, see 12.2 Port Configuration.
- To configure the L2 mode of the port and the VLAN to which it belongs, see 11.6.3 Configuring Port VLAN.



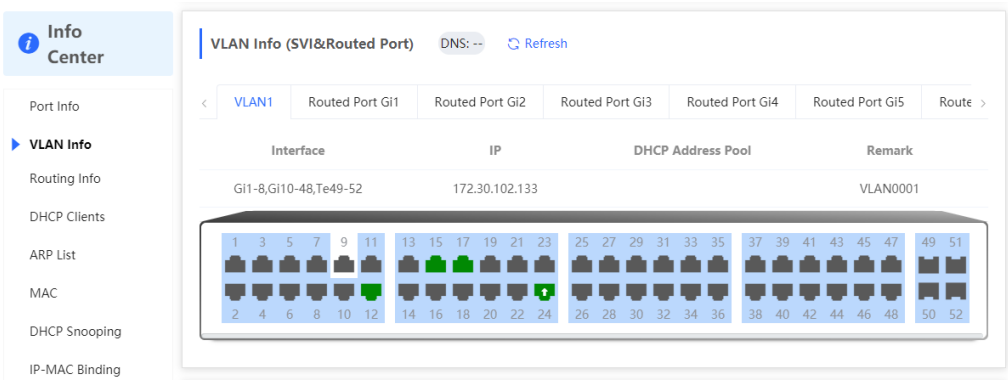
19.1.2 VLAN Info

Choose **Local Device** > **Diagnostics** > **Info Center** > **VLAN Info.**

Display SVI port and routed port information, including the port information included in the VLAN, the port IP address, and whether the DHCP address pool is enabled.

Note

- To configure VLAN, see 11.6 VLAN.
- To configure SVI ports and routed ports, see 15.1 Setting an L3 Interface.



19.1.3 Routing Info

Caution

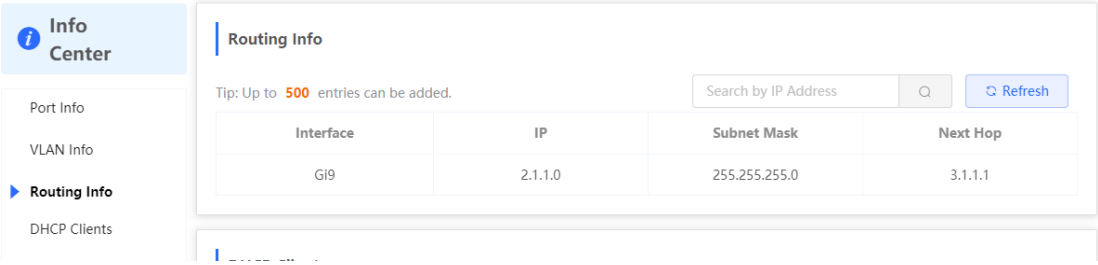
If the device does not support L3 functions (such as RG-NBS3100 Series and RG-NBS3200 Series Switches), this type of information is not displayed.

Choose **Local Device** > **Diagnostics** > **Info Center** > **Routing Info.**

Displays the routing information on the device. The search box in the upper-right corner supports finding route entries based on IP addresses.

Note

To set up static routes, see 15.4 Configuring the DHCPv6 Server .



19.1.4 DHCP Clients

Caution

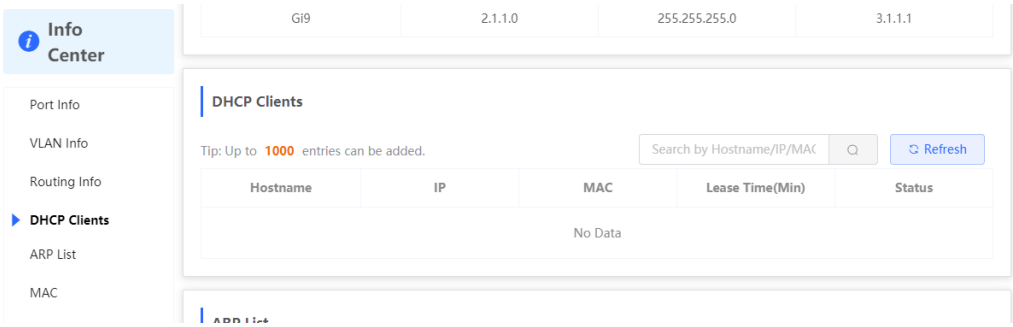
If the device does not support L3 functions (such as RG-NBS3100 Series and RG-NBS3200 Series Switches), this type of information is not displayed.

Choose **Local Device** > **Diagnostics** > **Info Center** > **DHCP Clients.**

Displays the IP address information assigned to endpoints by the device as a DHCP server.

Note

To configure DHCP server related functions, see 15.4 Configuring the DHCPv6 Server.



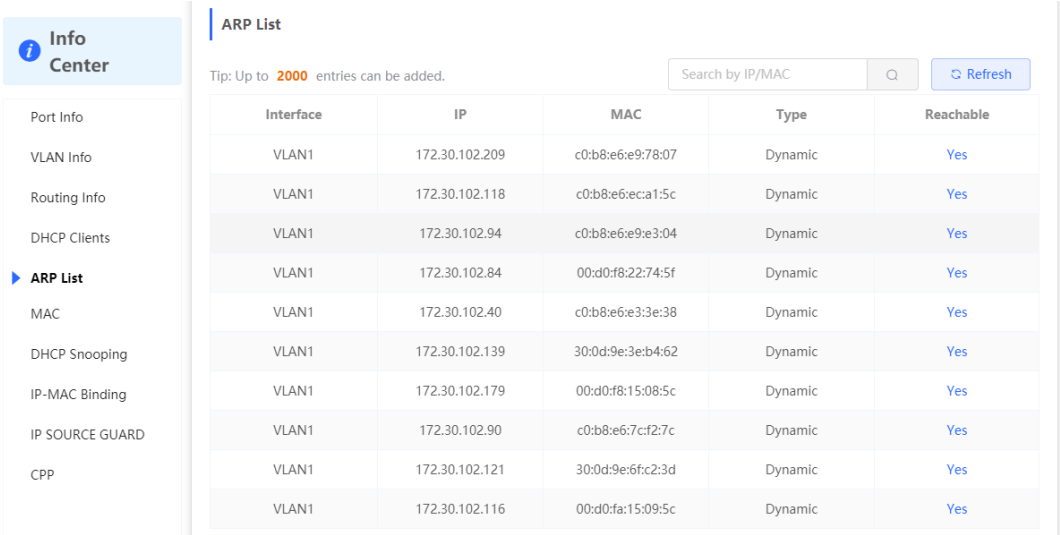
19.1.5 ARP List

Choose **Local Device** > **Diagnostics** > **Info Center** > **ARP List.**

Displays ARP information on the device, including dynamically learned and statically configured ARP mapping entries.

Note

To bind dynamic ARP or manually configure static ARP, see 15.6 Configuring a Static ARP Entry.



Interface	IP	MAC	Type	Reachable
VLAN1	172.30.102.209	c0:b8:e6:e9:78:07	Dynamic	Yes
VLAN1	172.30.102.118	c0:b8:e6:ec:a1:5c	Dynamic	Yes
VLAN1	172.30.102.94	c0:b8:e6:e9:e3:04	Dynamic	Yes
VLAN1	172.30.102.84	00:d0:f8:22:74:5f	Dynamic	Yes
VLAN1	172.30.102.40	c0:b8:e6:e3:3e:38	Dynamic	Yes
VLAN1	172.30.102.139	30:0d:9e:3e:b4:62	Dynamic	Yes
VLAN1	172.30.102.179	00:d0:f8:15:08:5c	Dynamic	Yes
VLAN1	172.30.102.90	c0:b8:e6:7c:f2:7c	Dynamic	Yes
VLAN1	172.30.102.121	30:0d:9e:6f:c2:3d	Dynamic	Yes
VLAN1	172.30.102.116	00:d0:fa:15:09:5c	Dynamic	Yes

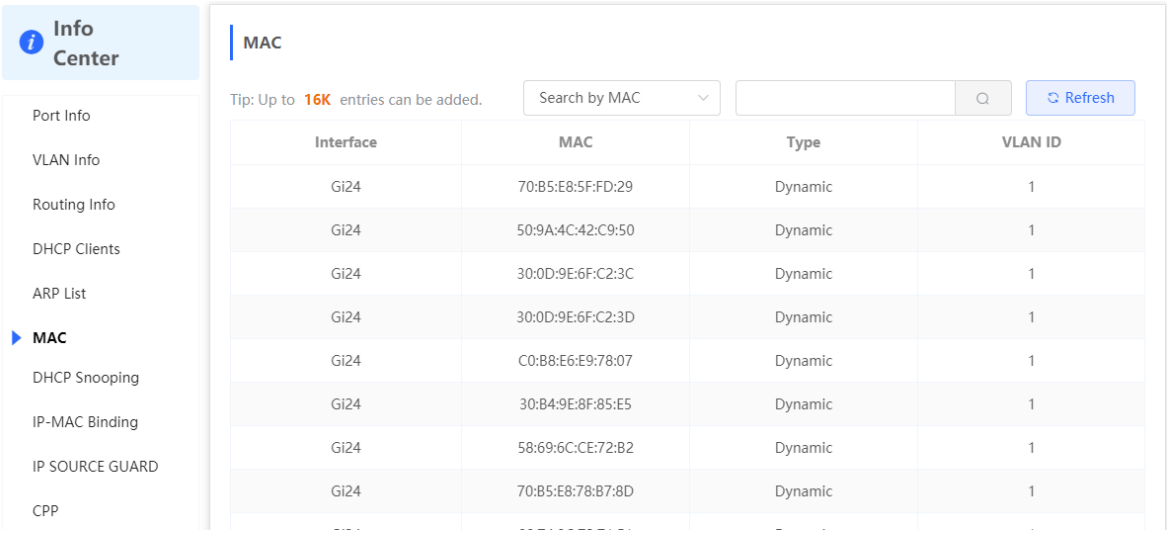
19.1.6 MAC Address

Choose **Local Device** > **Diagnostics** > **Info Center** > **MAC.**

Displays the MAC address information of the device, including the static MAC address manually configured by the user, the filtering MAC address, and the dynamic MAC address automatically learned by the device.

Note

To configure and manage the MAC address, see 11.3 MAC Address Management



Interface	MAC	Type	VLAN ID
Gi24	70:B5:E8:5F:FD:29	Dynamic	1
Gi24	50:9A:4C:42:C9:50	Dynamic	1
Gi24	30:0D:9E:6F:C2:3C	Dynamic	1
Gi24	30:0D:9E:6F:C2:3D	Dynamic	1
Gi24	C0:B8:E6:E9:78:07	Dynamic	1
Gi24	30:B4:9E:8F:85:E5	Dynamic	1
Gi24	58:69:6C:CE:72:B2	Dynamic	1
Gi24	70:B5:E8:78:B7:8D	Dynamic	1

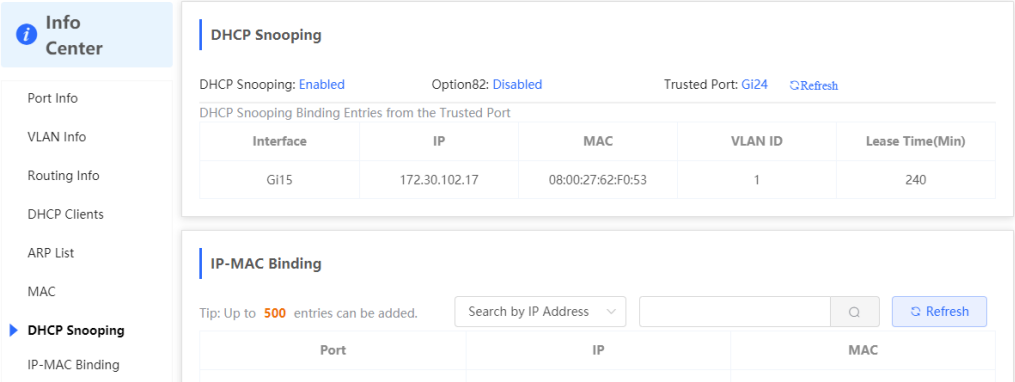
19.1.7 DHCP Snooping

Choose **Local Device** > **Diagnostics** > **Info Center** > **DHCP Snooping.**

Displays the current configuration of the DHCP snooping function and the user information dynamically learned by the trust port.

Note

To modify DHCP Snooping related configuration, see 17.1 DHCP Snooping.



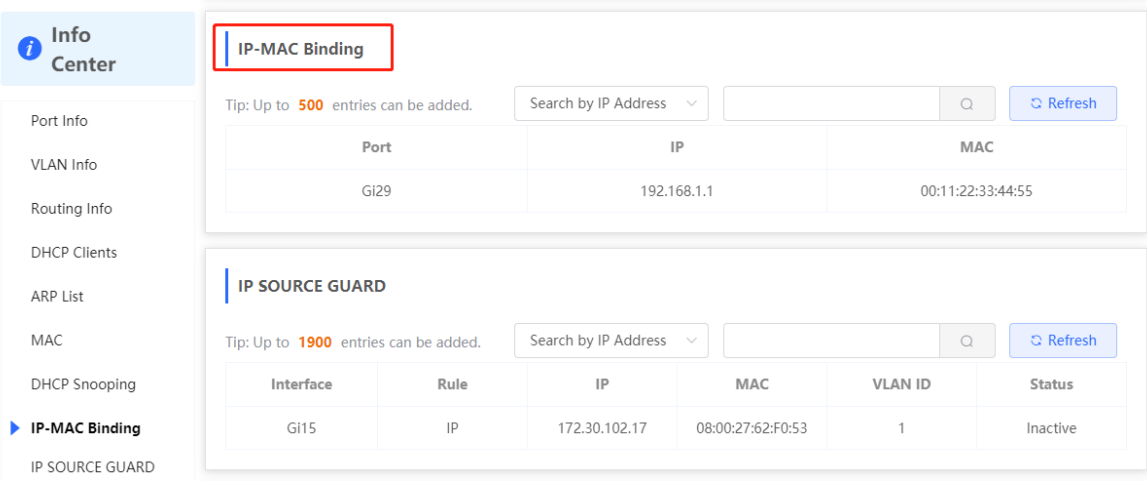
19.1.8 IP-MAC Binding

Choose **Local Device** > **Diagnostics** > **Info Center** > **IP-MAC Binding.**

Displays the configured IP-MAC binding entries. The device checks whether the source IP addresses and source MAC addresses of IP packets match those configured for the device and filters out IP packets not matching the binding.

Note

To add or modify the IP-MAC binding, see 17.5 IP-MAC Binding .



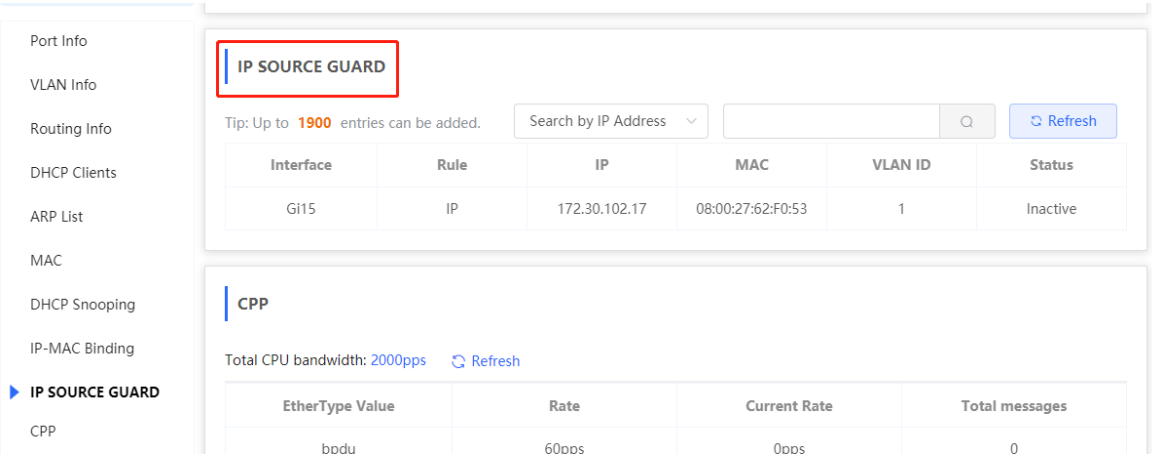
19.1.9 IP Source Guard

Choose **Local Device** > **Diagnostics** > **Info Center** > **Source Guard.**

Displays the binding list of the IP Source Guard function. The IP Source Guard function will check the IP packets from non-DHCP trusted ports according to the list, and filter out the IP packets that are not in the binding list.

Note

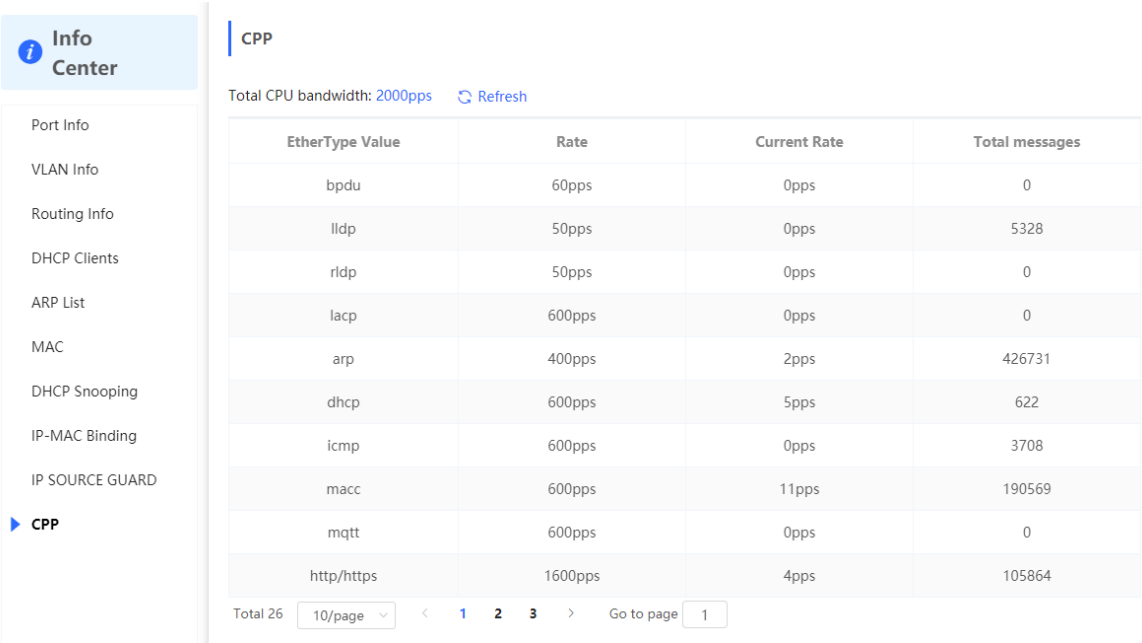
To configure IP Source Guard function, see 17.6 IP Source Guard.



19.1.10 CPP Info

Choose **Local Device** > **Diagnostics** > **Info Center** > **CPP.**

Displays the current total CPU bandwidth and statistics of various packet types, including the bandwidth, current rate, and total number of packets.



19.2 Network Tools

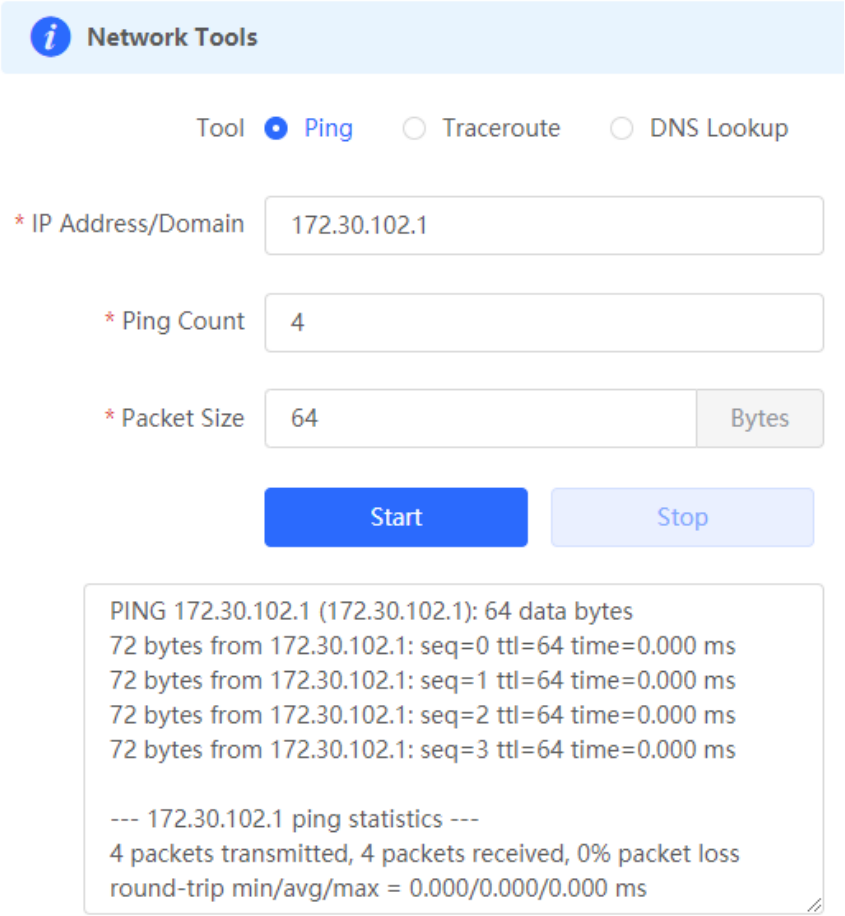
The **Network Tools** page provides three tools to detect the network status: **Ping, Traceroute,** and **DNS Lookup.**

19.2.1 Ping

Choose **Local Device** > **Diagnostics** > **Network Tools.**

The **Ping** command is used to detect the network connectivity.

Select **Ping** as the diagnosis mode, enter the destination IP address or website address, configure the ping count and packet size, and click **Start** to test the network connectivity between the device and the IP address or website. If "Ping failed" is displayed, The device is not reachable to the IP address or website.

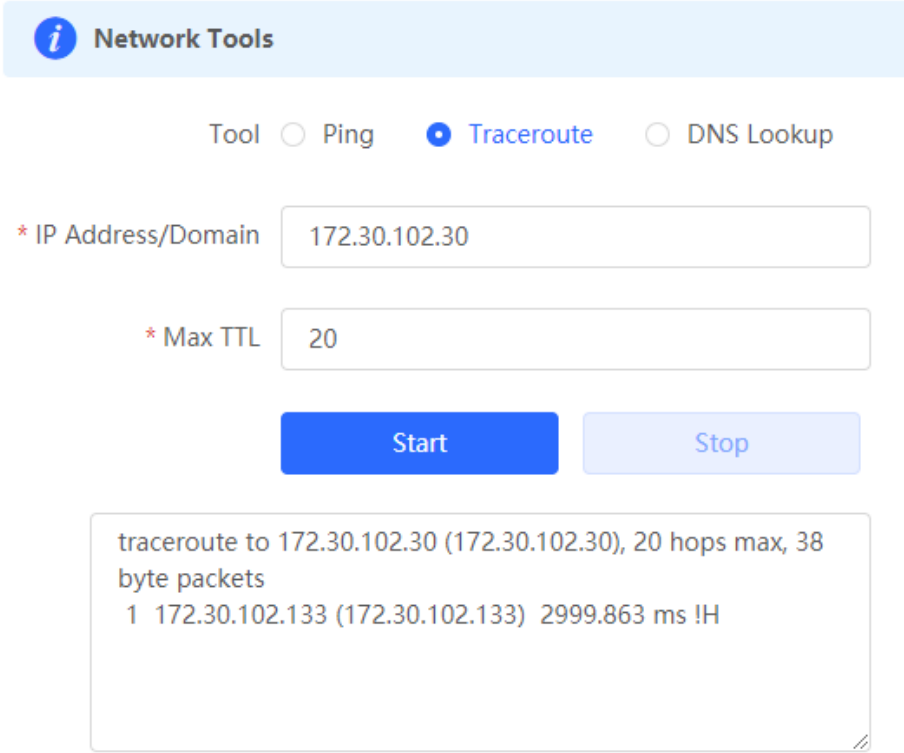


19.2.2 Traceroute

Choose **Local Device** > **Diagnostics** > **Network Tools.**

The **Traceroute** function is used to identify the network path from one device to another. On a simple network, the network path may pass through only one routing node or none at all. On a complex network, packets may pass through dozens of routing nodes before reaching their destination. The traceroute function can be used to judge the transmission path of data packets during communication.

Select **Traceroute** as the diagnosis mode, enter a destination IP address or the maximum TTL value used by the URL and traceroute, and click **Start.**

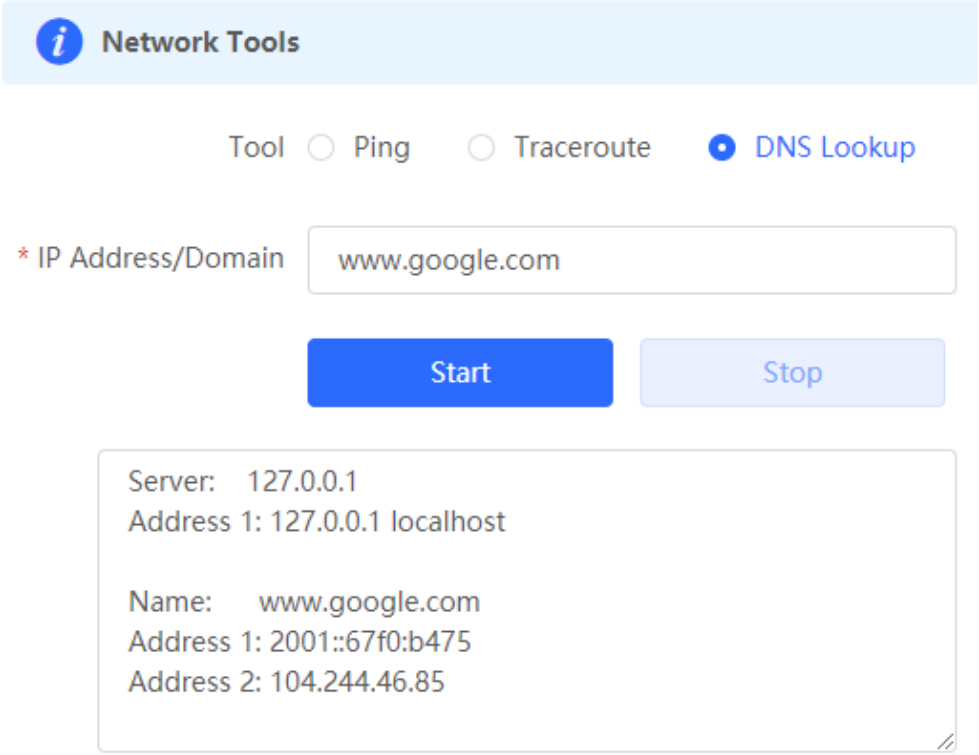


19.2.3 DNS Lookup

Choose **Local Device** > **Diagnostics** > **Network Tools.**

DNS Lookup is used to query the information of network domain name or diagnose DNS server problems. If the device can ping through the IP address of the Internet from your web page but the browser cannot open the web page, you can use the DNS lookup function to check whether domain name resolution is normal.

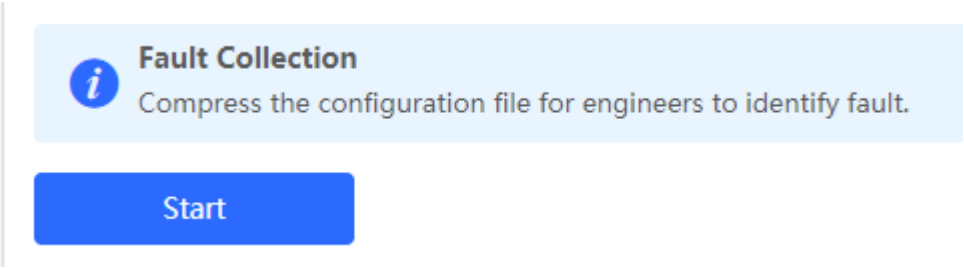
Select **DNS Lookup** as the diagnosis mode, enter a destination IP address or URL, and click **Start.**



19.3 Fault Collection

Choose **Local Device** > **Diagnostics** > **Fault Collection.**

When an unknown fault occurs on the device, you can collect fault information by one click on this page. Click **Start.** The configuration files of the device will be packed into a compressed file. Download the compressed file locally and provide it to R&D personnel for fault locating.

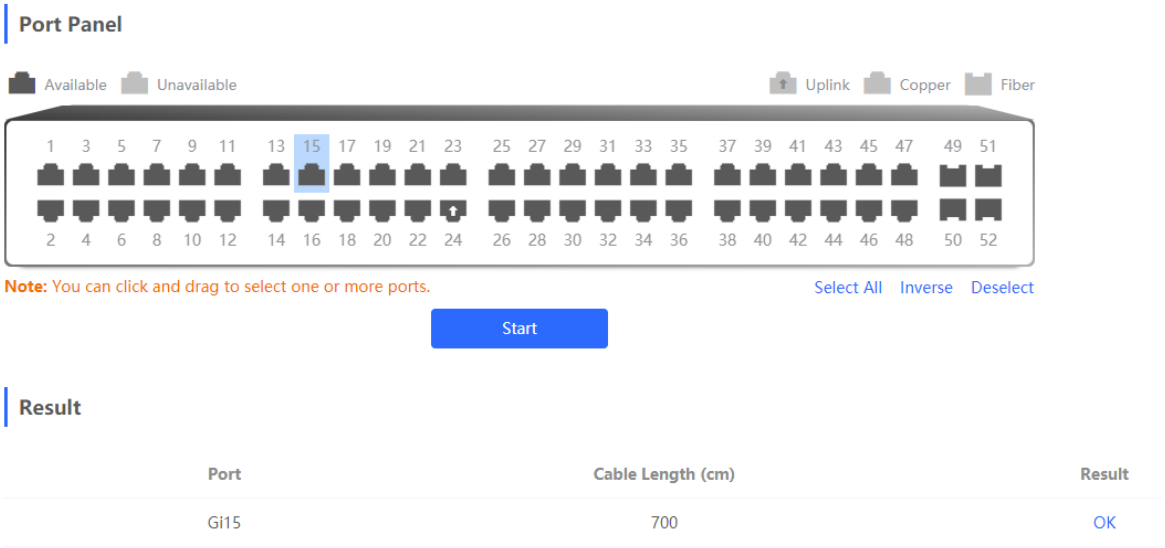


19.4 Cable Diagnostics

Choose **Local Device** > **Diagnostics** > **Cable Diagnostics.**

The cable diagnostics function can detect the approximate length of a cable connected to a port and whether the cable is faulty.

Select the port to be detected on the port panel and click **Start.** The detection results will be displayed below.



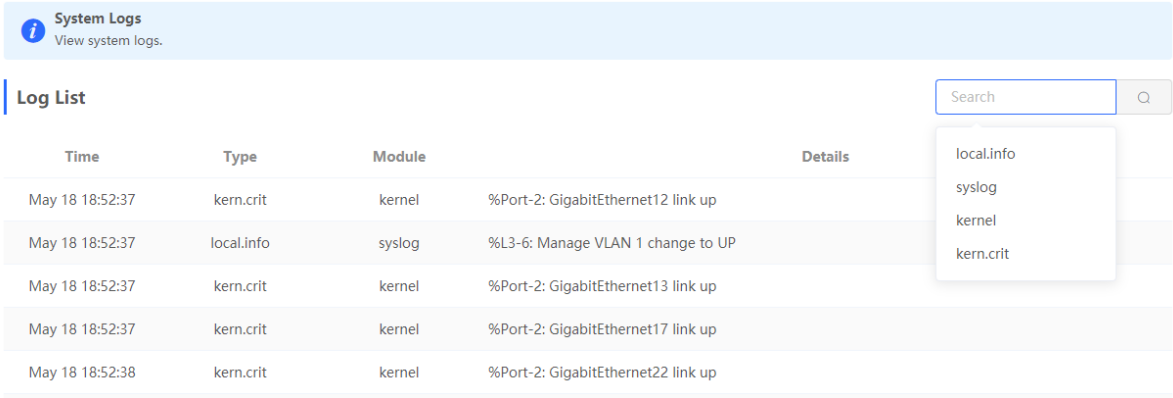
Caution

- The SPF port does not support the function.
- If a detected port contains an uplink port, the network may be intermittently disconnected. Exercise caution when performing this operation.

19.5 System Logs

Choose **Local Device** > **Diagnostics** > **System Logs.**

System logs record device operations, operation time, and operation modules. System logs are used by administrators to monitor the running status of the device, analyze network status, and locate faults. You can search for specified logs by fault type, faulty module, and keyword in fault information.



19.6 Alerts

Choose **Local Device** > **Diagnostics** > **Alerts.**

Note

Choose **Network** > **Alerts** to view the alert information of other devices in the network.

Displays possible problems on the network environment to facilitate fault prevention and troubleshooting. You can view the alert occurrence time, port, alert impact, and handling suggestions, and rectify device faults according to handling suggestions.

All types of alerts are concerned by default. You can click **Unfollow** to unfollow this type of alert. The system will no longer display this type of alert. To enable the notification function of a type of alert again, follow the alert type on the **Removed Alert** page.

Caution

After unfollowing an alert, the system will not issue an alert prompt for this type of fault, and users cannot find and deal with the fault in time. Exercise caution when performing this operation.

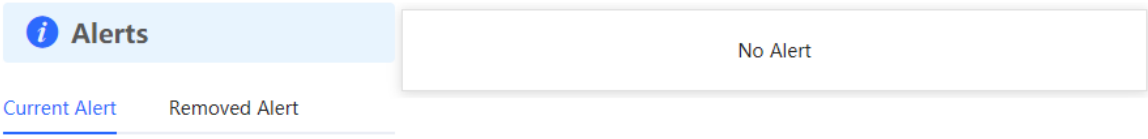


Table 11-1 Alert Types and Product Support

Alert Type	Description	Support Description
Addresses in the DHCP address pool are to be exhausted.	The device acts as a DHCP server, and the number of allocated addresses is about to reach the maximum number of addresses that can be allocated in the address pool.	It is applicable only to devices that support L3 functions. Products that do not support L3 functions such as RG-NBS3100 Series, RG-NBS3200 Series Switches do not support this type of alert.

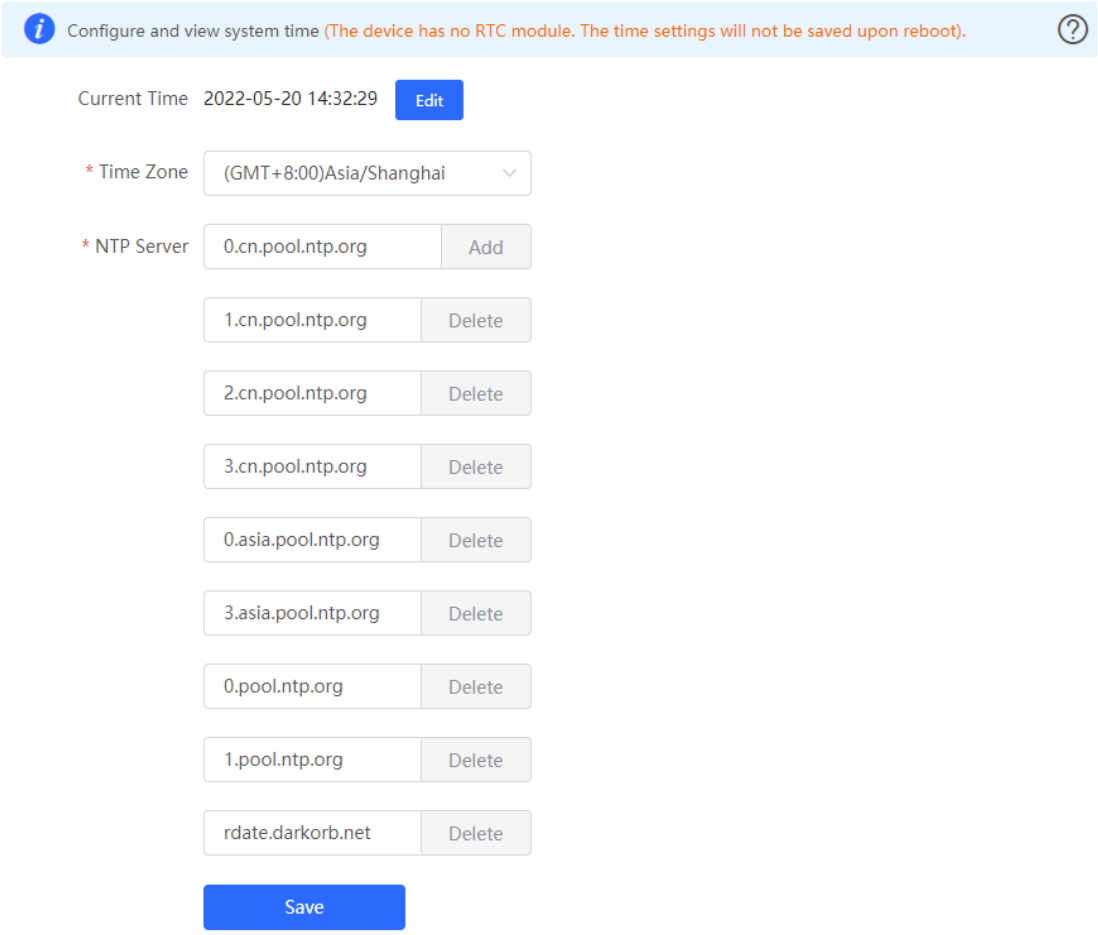
Alert Type	Description	Support Description
The IP address of the local device conflicts with that of another device.	The IP address of the local device conflicts with that of another client on the LAN.	NA
An IP address conflict occurs on downlink devices connected to the device.	Among the devices connected to the current device on the LAN, an IP address conflict occurs on one or more devices.	NA
The MAC address table is full of entries.	The number of L2 MAC address entries is about to reach the hardware capacity limit of the product.	NA
The ARP table is full of ARP entries.	The number of ARP entries on the network exceeds the ARP capacity of the device.	NA
The PoE process is not running.	The PoE service of the device fails and no power can be supplied.	It is applicable only to NBS Series Switches that support the PoE function. (The device models are marked with "-P".)
The total PoE power is overloaded.	The total PoE power of the device is overloaded, and the new connected PD cannot be powered properly.	It is applicable only to NBS Series Switches that support the PoE function. (The device models are marked with "-P".)
The device has a loop alarm.	A network loop occurs on the LAN.	NA

20 NBS and NIS Series Switches System Configuration

20.1 Setting the System Time

Choose **Networkwide Management** > **System** > **System Time.**

You can view the current system time. If the time is incorrect, check and select the local time zone. If the time zone is correct but time is still incorrect, click Edit to manually set the time. In addition, the device supports **Network** Time Protocol (NTP) servers. By default, multiple servers serve as the backup of each other. You can add or delete the local server as required.



Click **Current Time** when modifying the time, and the system time of the currently logged-in device will be automatically filled in.

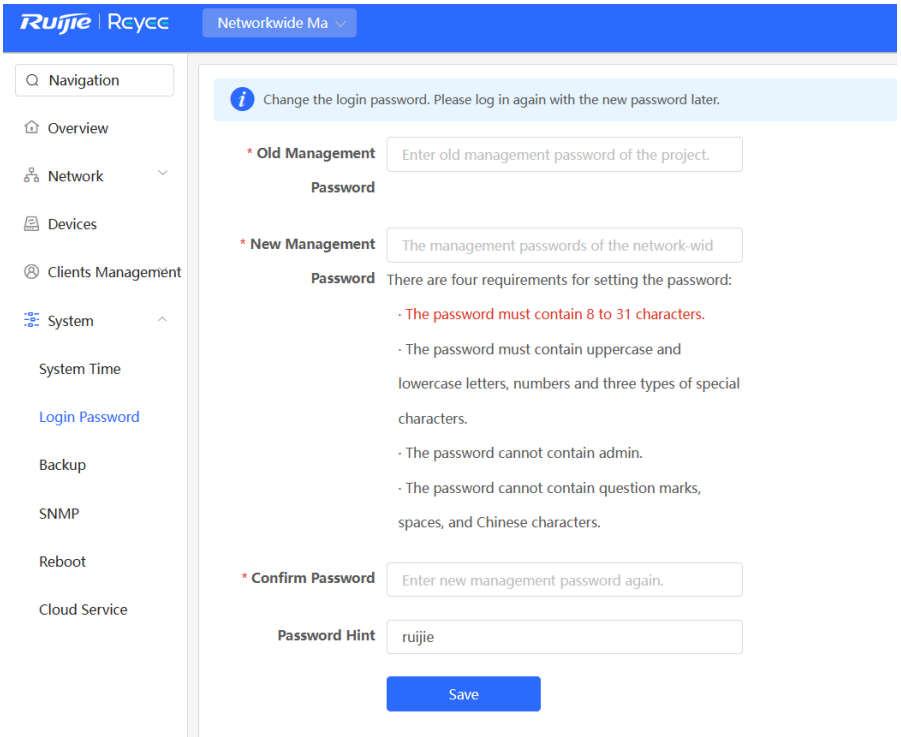
20.2 Setting the Web Login Password

Choose **Networkwide Management** > **System** > **Login Password.**

Enter the old password and new password. After saving the configuration, use the new password to log in.

Caution

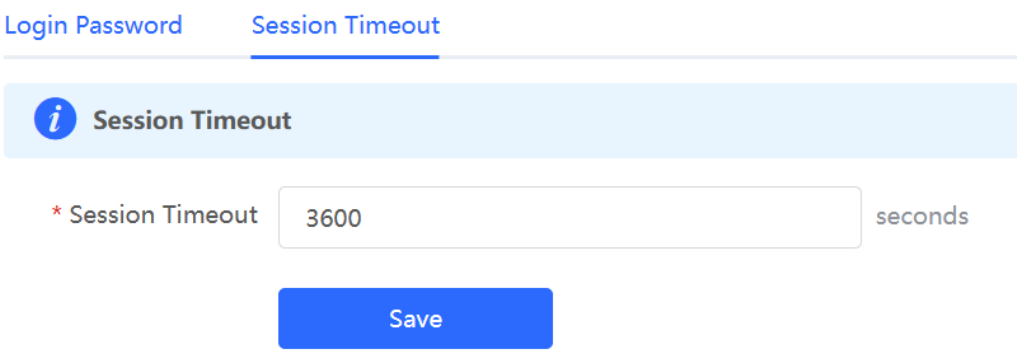
When self-organizing network discovery is enabled, the login password of all devices in the network will be changed synchronously.



20.3 Setting the Session Timeout Duration

Choose **Local Device** > **System** > **Login** > **Session Timeout**.

If you do not log out after login, the Eweb management system allows you to continue the access without authentication on the current browser within one hour by default. After one hour, the Eweb management system automatically refreshes the page and you need to relog in before continuing your operations. You can change the session timeout duration.



20.4 Configuring SNMP

20.4.1 Overview

SNMP (Simple Network Management Protocol) is a protocol used for managing network devices. It is based on the client/server model and can remotely monitor and control network devices.

SNMP consists of a management station and agents, with the management station communicating with agents through the SNMP protocol to obtain information such as device status, configuration information, performance data, etc., while also being able to configure and manage devices.

SNMP can be used to manage various network devices including routers, switches, servers, firewalls, etc. Users can use the SNMP configuration interface for user management and third-party software to monitor and control devices.

20.4.2 Global Configuration

1. Overview

The purpose of global configuration is to enable SNMP services and implement basic configurations such as SNMP protocol version (v1/v2c/v3), local port settings, device location settings, contact information settings.

SNMPv1: v1 is the earliest version of SNMP with poor security that only supports simple community string authentication. The v1 version has some defects such as plaintext transmission of community strings which makes it vulnerable to attacks; therefore it is not re recommended for use in modern networks.

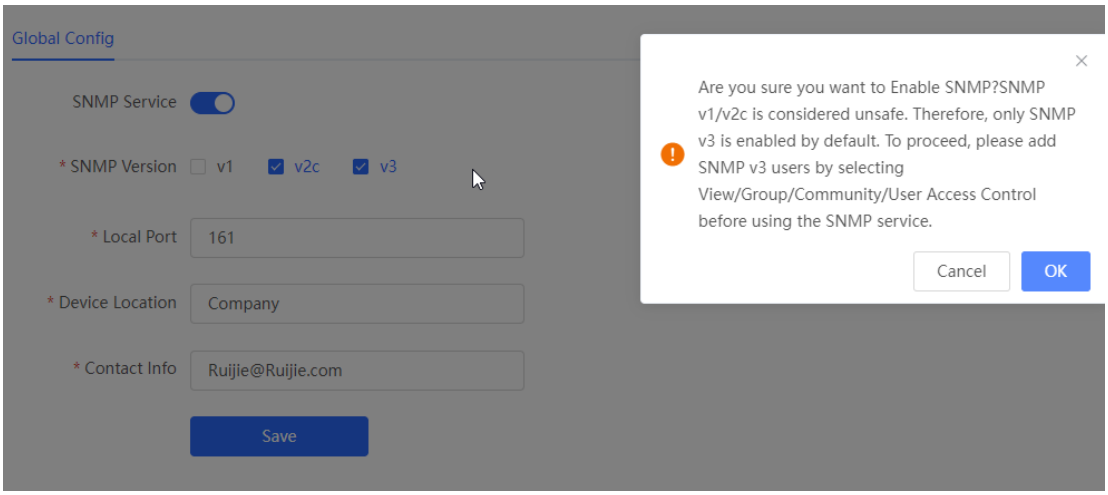
SNMPv2c: v2c is an improved version over v1 that supports richer functionality and more complex data types while enhancing security measures compared to its predecessor. The v2c version provides better security features than v1 along with greater flexibility ity allowing users to configure according to their specific needs.

SNMPv3: This latest version of the SNMP protocol includes additional security mechanisms like message authentication encryption compared to its predecessors - V1 & V2C - resulting in significant improvements in terms of access control & overall safety measures im plemented by this standard.

2. Configuration Steps:

Network Management > System > SNMP >Global Config

(1) Enable SNMP services.



When first opened, the system prompts to enable SNMPv3 by default. Click < **OK** >.

(1) Set global configuration parameters for SNMP service.

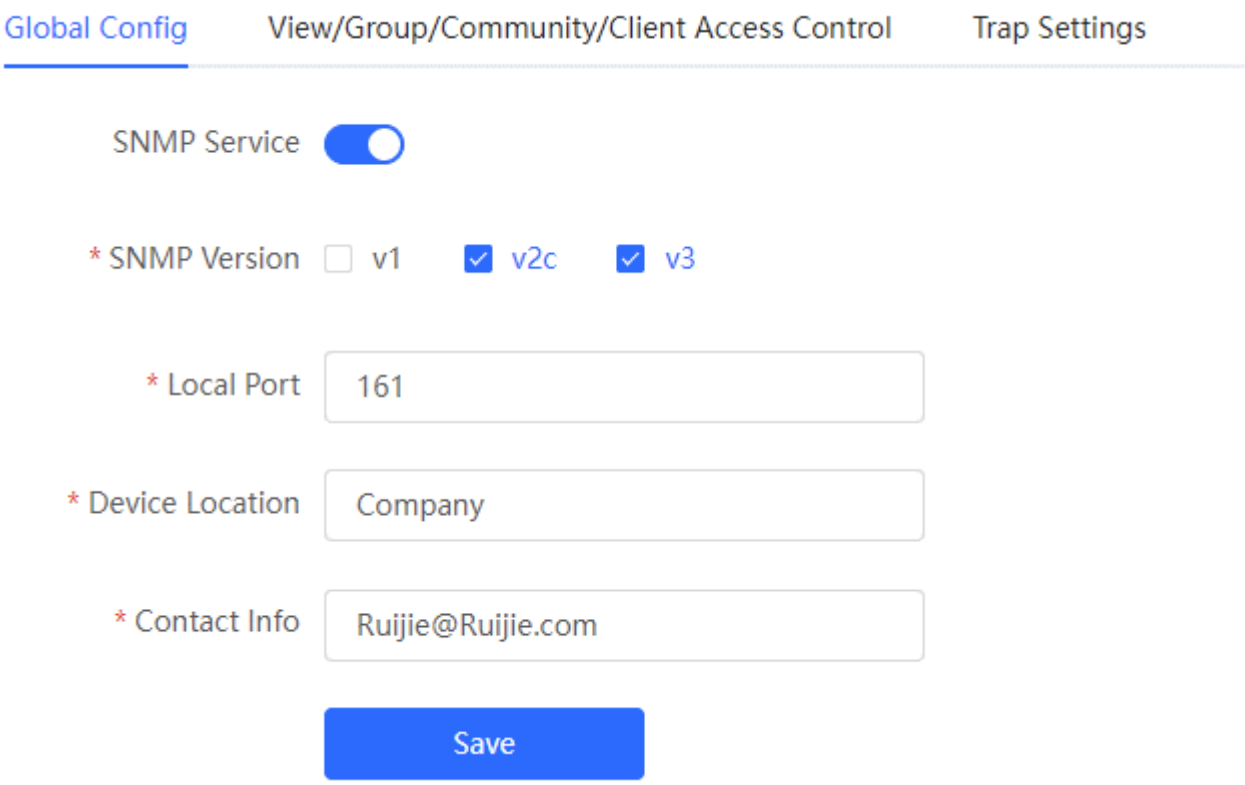


Table 20-1 Global Configuration Description Table

Parameter	Parameter
SNMP Service	Whether the SNMP service is enabled or not.
SNMP Protocol Version	SNMP protocol version number includes v1 version, v2c version, and v3 version.
Local Port	[1, 65535]
Device Location	Cannot contain Chinese characters, full-width characters, question marks and spaces. Character length: 1-64.
Contact Information	Cannot contain Chinese characters, full-width characters, question marks and spaces. Character length: 1-64.

(2) Click <**Save**>.

After enabling the SNMP service takes effect, click <**Save**> to make basic configurations such as SNMP protocol version number take effect .

20.4.3 View/Group/Community/Client Access Control

1. View/Group/Community/Client Access Control

MIB (Management Information Base) can be regarded as a database of different status information and performance data of network devices containing a large number of OID (Object Identifiers), which are used to identify different status information and performance data of network devices in snmp.

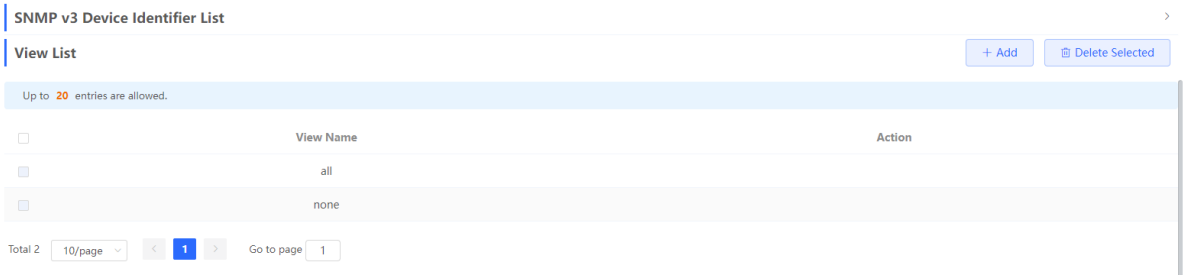
The role of views in snmp is to limit the node range that management systems can access in MIBs so as to improve network management security and reliability. Views are an indispensable part of SNMP management that needs to be configured and customized according to specific management requirements rements.

Views can define multiple subtrees according to requirements limiting the MIB nodes that management systems can only access within these subtrees while unauthorized MIB nodes cannot be accessed by unauthenticated system administrators thus protecting network device security. At the same time views also optimize network management efficiency improving response speed for managing systems.

Configuration Steps:

Network Management > System > SNMP > View/Group/Community/Client Access Control > View List

(1) Click <**Add**> to create a view.



(2) Configure the basic information of the view .

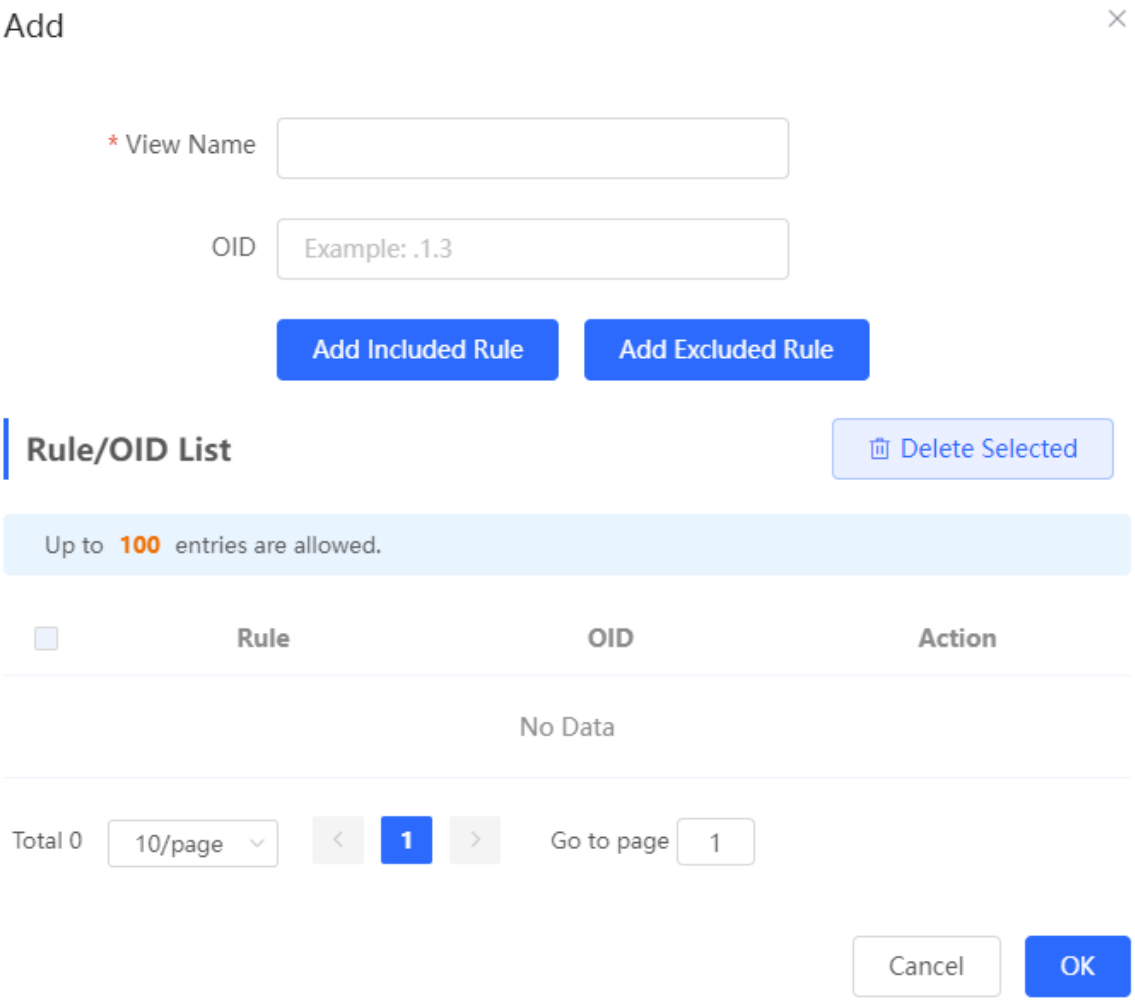


Table 20-2 View configuration information description table

parameter	Description
View Name	The name used to identify the view. The length is 1 to 32 characters, and cannot contain Chinese and full-width characters.

parameter	Description
OIDs	Define the range of OIDs included in the view, which can be a single OID or a subtree of OIDs
Add Included Rule or Excluded Rule Add Included Rule Add Excluded Rule	Divided into inclusion rules and exclusion rules ● Include rules allow access only to OIDs within the OID range. Click <Add Inclusion Rule> to set up this type of view. ● Exclusion rules allow access to all OIDs except the OID range. Click <Add Exclusion Rule> to set up this type of view.

Notice

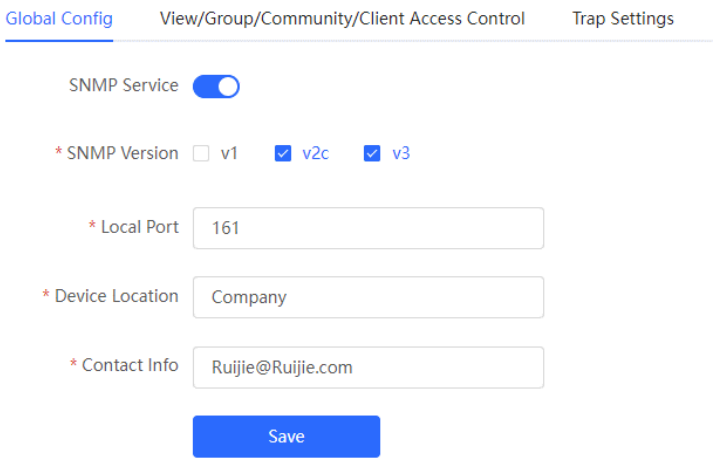
For the created view, add at least one OID rule, otherwise a warning message will appear.

(1) Click <**OK**>.

2. v1 /v2c user configuration

- Introduction

  When the SNMP protocol version is set to v1/v2c, user configuration needs to be completed.



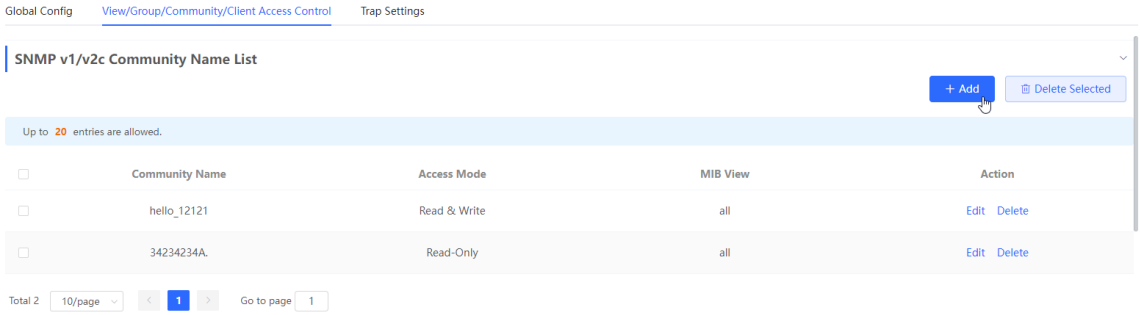
Note

Select the SNMP protocol version, click <**Save**>, and the corresponding configuration options will appear on the view/group/group/user access control interface.

- configuration steps

Choose **Networkwide Management** > **System >SNMP> View/Group/Community/Client Access Control**

(1) In the " SNMP v1/v2c Community Name List " area, click <**Add**>.



(2) Create v1/v2c users.

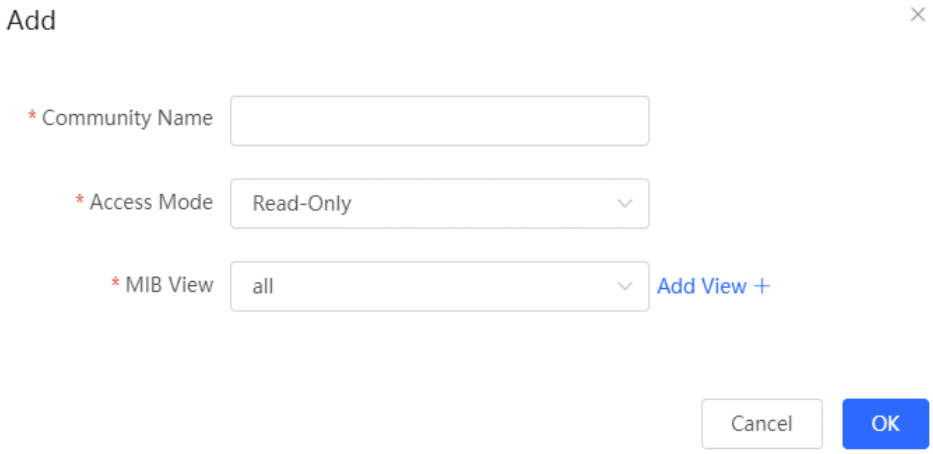


Table 20-3 v1 / v2c user information description table

Parameter	Description
Community Name	at least 8 characters Contains three types of uppercase letters, lowercase letters, numbers, and special characters Does not contain admin/public/private Do not contain question marks, spaces and Chinese
Access Mode	Access rights of the community name (read-only, read-write) Read & Write Read-Only
MIB View	The options in the drop-down box are configured views (default views all, none)

Notice

- Among v1/v2c users, the community name cannot be repeated.
- Click <**Add View**> to add a view.

3. v3 group configuration

- Introduction

SNMPv3 introduces the concept of grouping for better security and access control. A group is a group of SNMP users with the same security policy and access control settings. Using SNMPv3, multiple groups can be configured, each group can have its own security policy and access control settings, and each group can also have one or more users.

- prerequisite

When the SNMP protocol version is set to v3, the v3 group configuration needs to be completed.

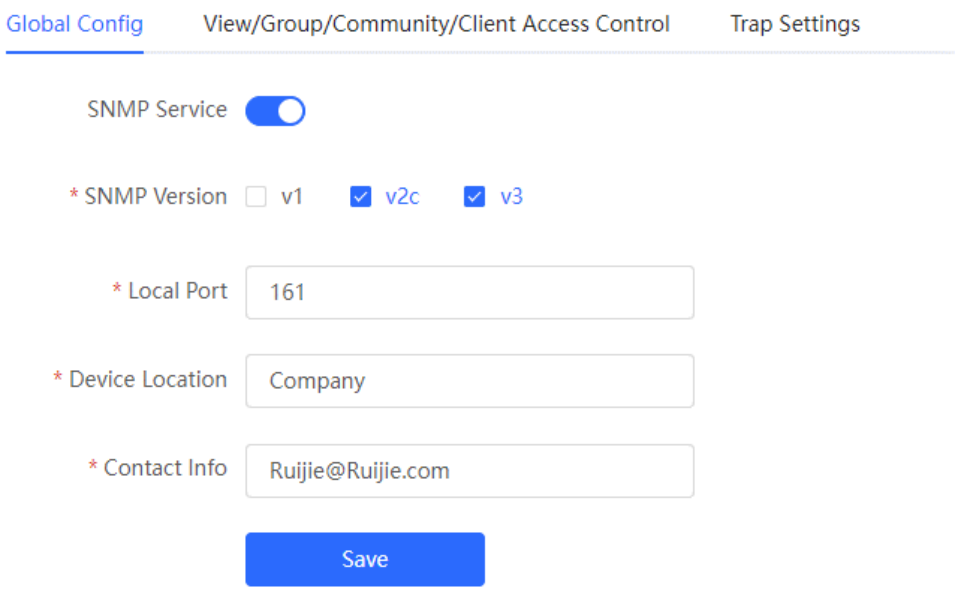
Note

Select the SNMP protocol version, click <**Save**>, and the corresponding configuration options will appear on the view/group/group/user access control interface.

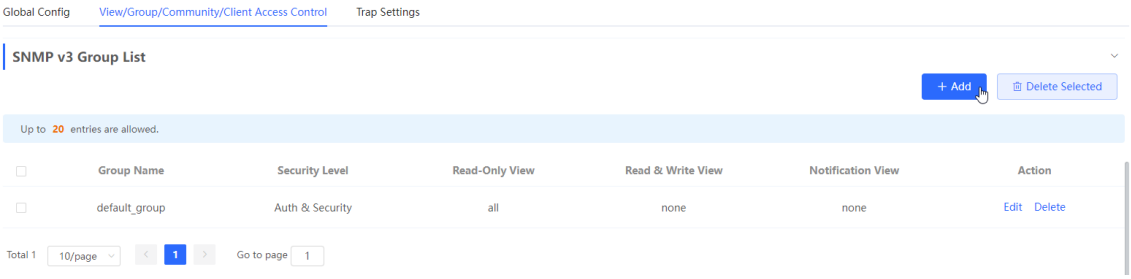
- configuration steps

Network Management > System > SNMP > View/Group/Group/User Access Control.

(1) Click <**Add**> in the " SNMP v3 Group List " area to create a v3 group.



(2) Set v 3 groups of related parameters.



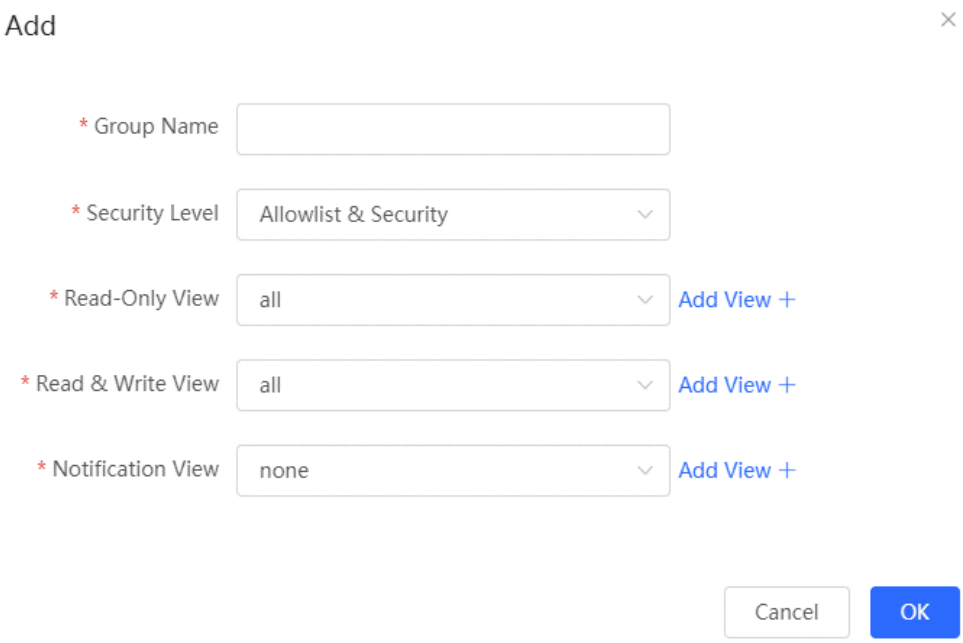


Table 20-4 V3 group configuration parameters

Parameter	Description
Group Name	rule group name 1-32 characters, a single Chinese accounted for three characters Cannot contain Chinese, full-width characters, question marks and spaces
Security Level	The minimum security level of the rule group (Auth & Security Auth & Open Allowlist & Security authentication with encryption, authentication without encryption, no authentication encryption)
Read-Only View	The options in the drop-down box are configured views (default views all, none)

Parameter	Description
Read & Write View	The options in the drop-down box are configured views (default views all, none)
Notification View	The options in the drop-down box are configured views (default views all, none)

Notice

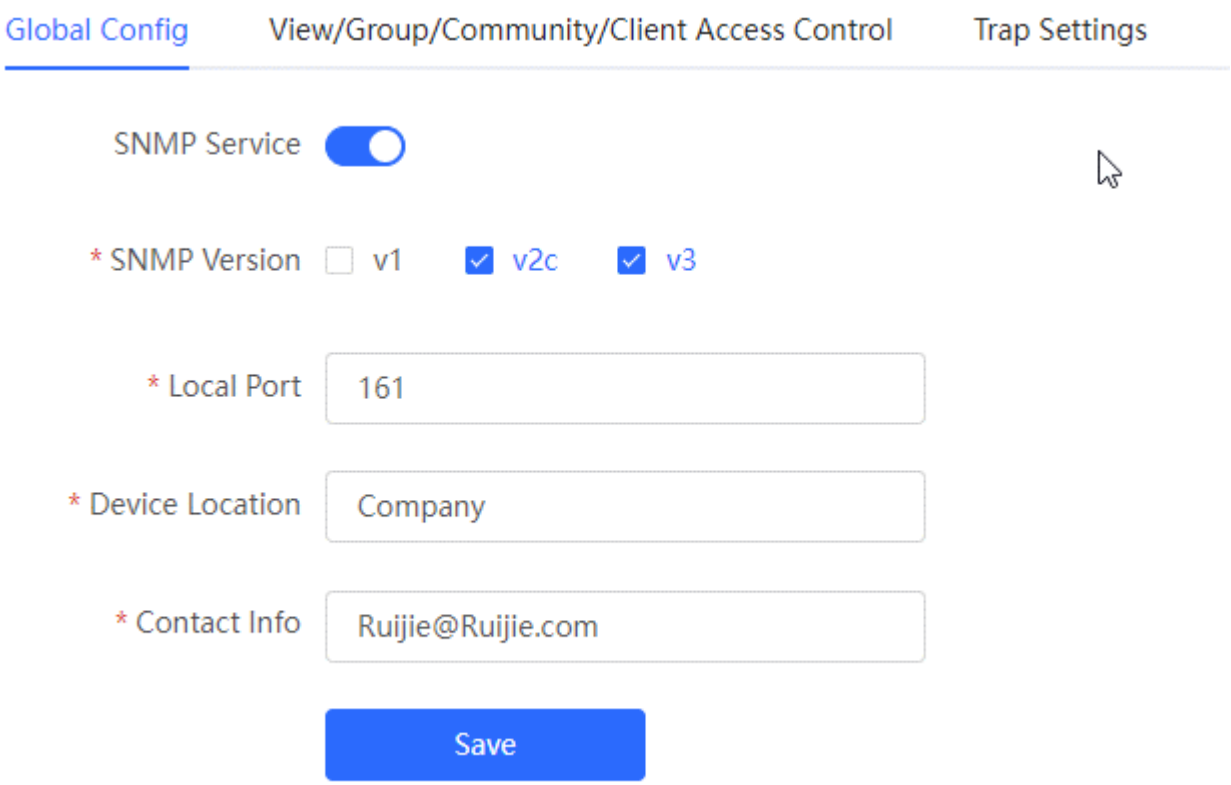
- Groups limit the minimum security level, read and write permissions and scope of users in the group.
- The group name cannot be repeated. If you need to add a view, click < **Add View** >.

(3) Click <**OK**>.

4. v 3 user configuration

- Introduction
- prerequisite

When the SNMP protocol version is set to v3, the v3 group configuration needs to be completed.



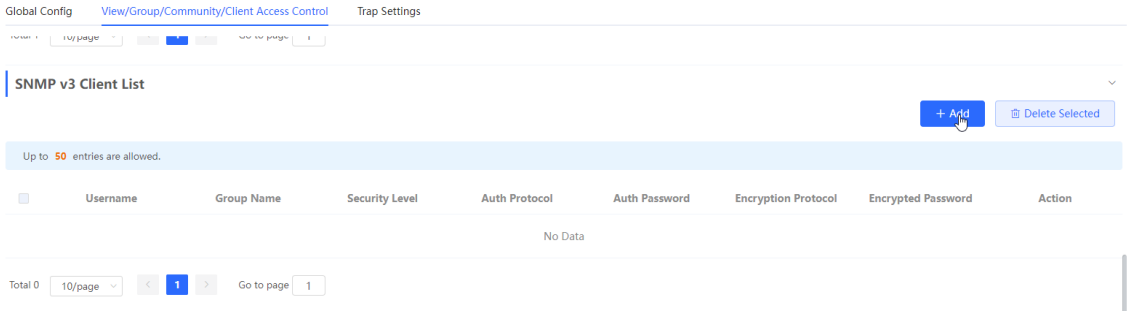
Note

Select the SNMP protocol version, click <**Save**>, and the corresponding configuration options will appear on the view/group/group/user access control interface.

- configuration steps

Network Management > System > SNMP > View/Group/Group/User Access Control >.

(1) In the " SNMP v3 Client List " area, click <**Add**> to create a v3 user.



(2) Set v3 user related parameters.

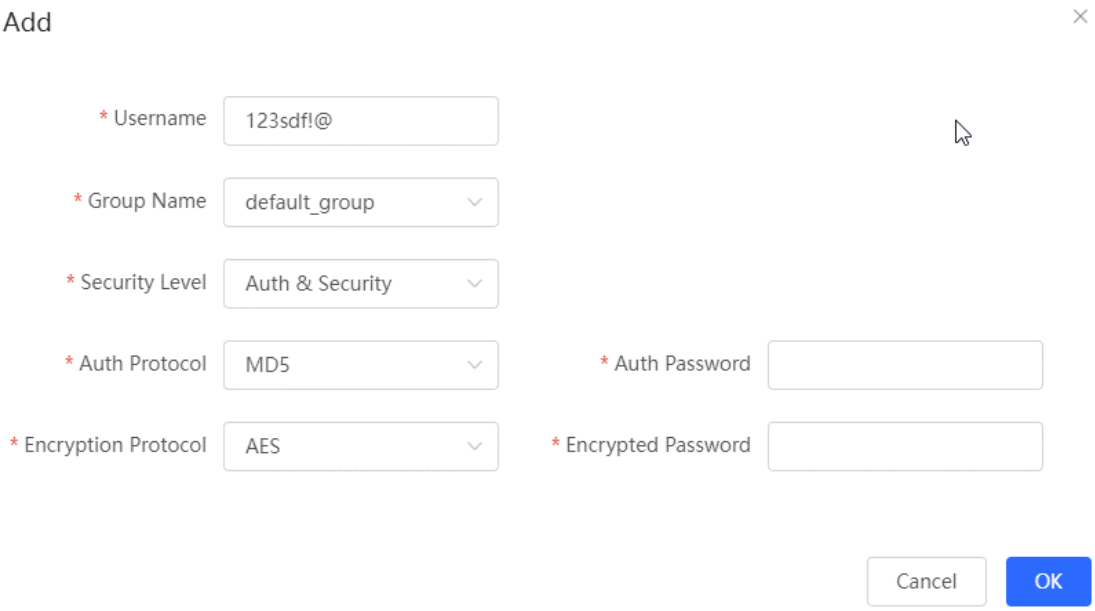


Table 20-5 v3 user configuration parameters

parameter	Description
Username	username at least 8 characters Contains three types of uppercase letters, lowercase letters, numbers, and special characters Does not contain admin/public/private Does not contain question marks, spaces and Chinese

parameter	Description
Group Name	user's group
Security Level	User security level (authentication and encryption, authentication without encryption, no authentication and encryption)
Auth Protocol, Auth Password	Authentication protocols include: MD5/SHA/SHA224/SHA256/SHA384/SHA512 Authentication password: 8~31 characters in length, cannot contain Chinese characters, full-width characters, question marks, and spaces, and must contain at least 3 types of uppercase and lowercase letters, numbers, or special characters. Note: This parameter needs to be set when the "Security Level" is "authentication and encryption" or "authentication without encryption".
Encryption Protocol, Encrypted Password	Encryption protocols include: DES/AES/AES192/AES256 Encrypted password: the length is 8~ 31 characters, and cannot contain Chinese, full-width characters, question marks and spaces format, containing at least 3 types of uppercase and lowercase letters, numbers, or special characters. Note: When the "Security Level" is "Authentication and Encryption", this parameter needs to be set.

Notice

- The security level of the v3 user must be greater than or equal to the security level of this group.
- There are three security levels. For authentication and encryption, you need to configure the authentication protocol, authentication password, encryption protocol, and encryption password. For authentication without encryption, you only need to configure the authentication protocol and encryption protocol. Without authentication and encryption, no configuration is required.

20.4.4 Typical Configuration Examples of SNMP Service

1. v2c version SNMP service configuration

- scenes to be used

The user only needs to monitor the information of the device, and does not need to set and issue, and uses the v2c version to monitor the data information of nodes such as 1.3.6.1.2.1.1 through the third-party software.

- configuration list

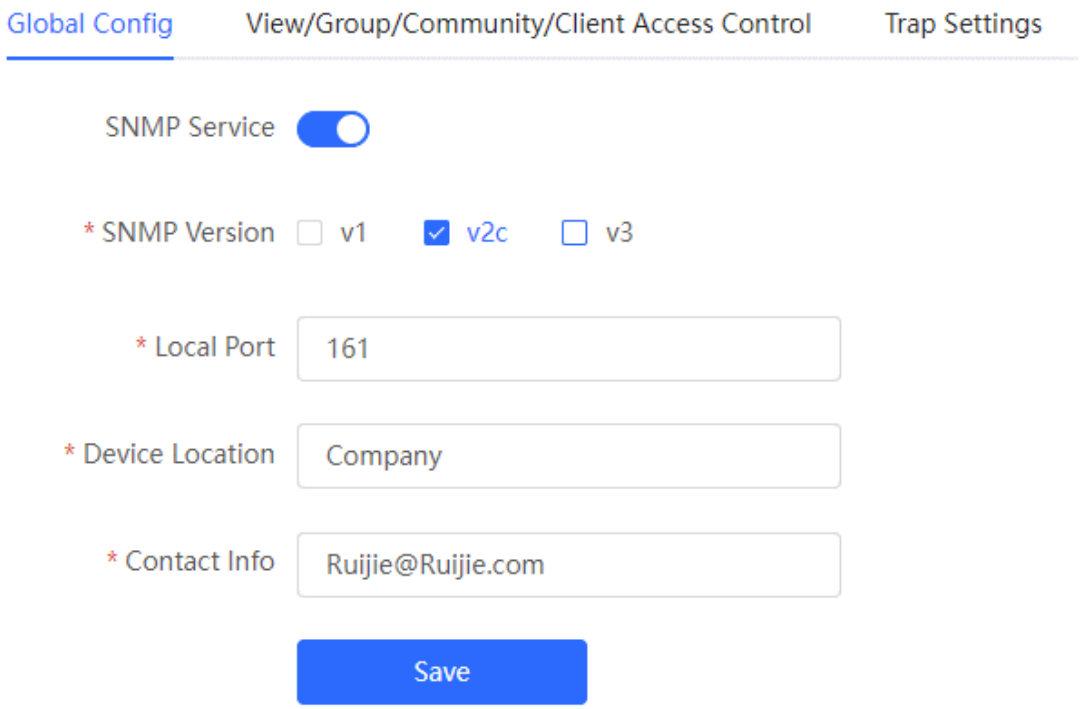
According to the analysis of the user's usage scenario, the requirements are shown in the table:

Table 20-6 User Requirements Description Form

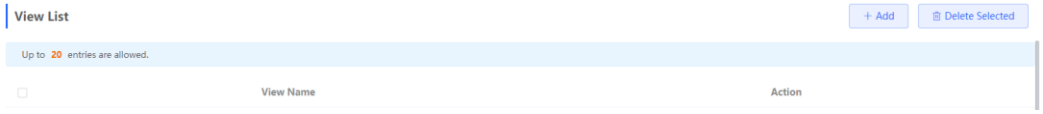
description item	Description
view range	Inclusion rule: OID is.1.3.6.1.2.1.1, custom view named " system "
use version number	v2c version The custom community name is " public ", and the default port number is 161
Read and write permissions	Read permission

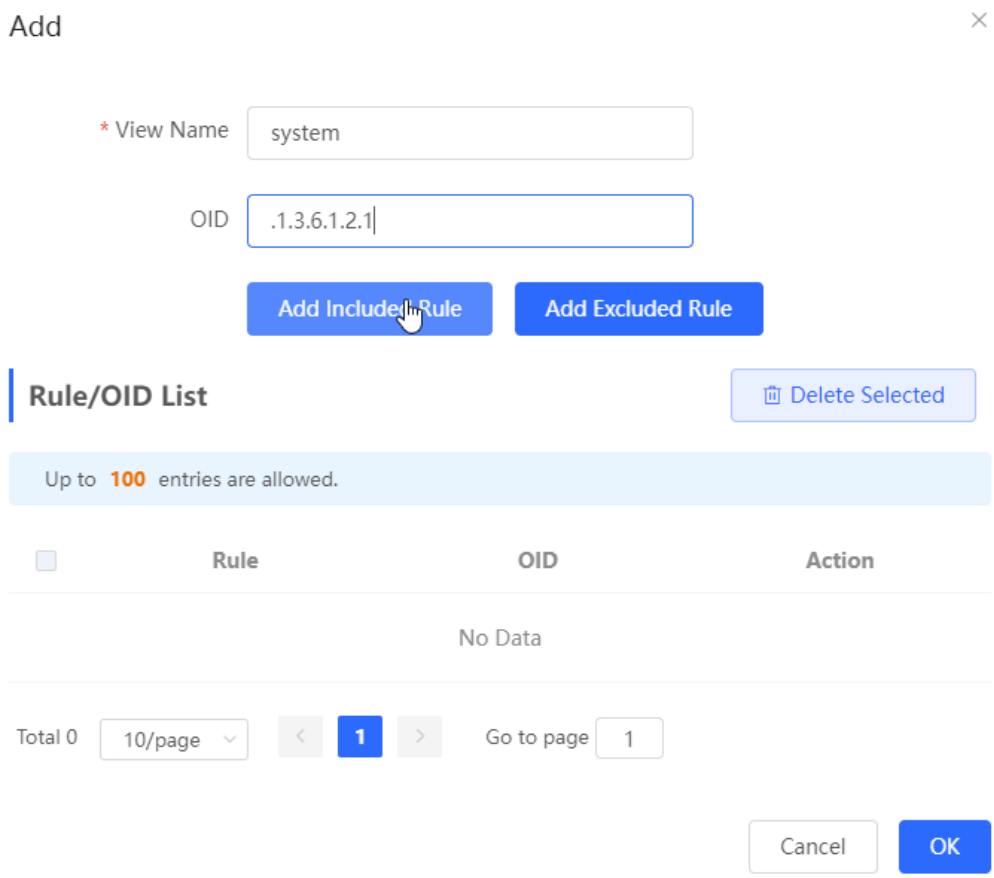
- configuration steps

(1) On the global configuration interface, select the v2c version, and leave other settings as default. After the operation is complete, click <**Save**>.

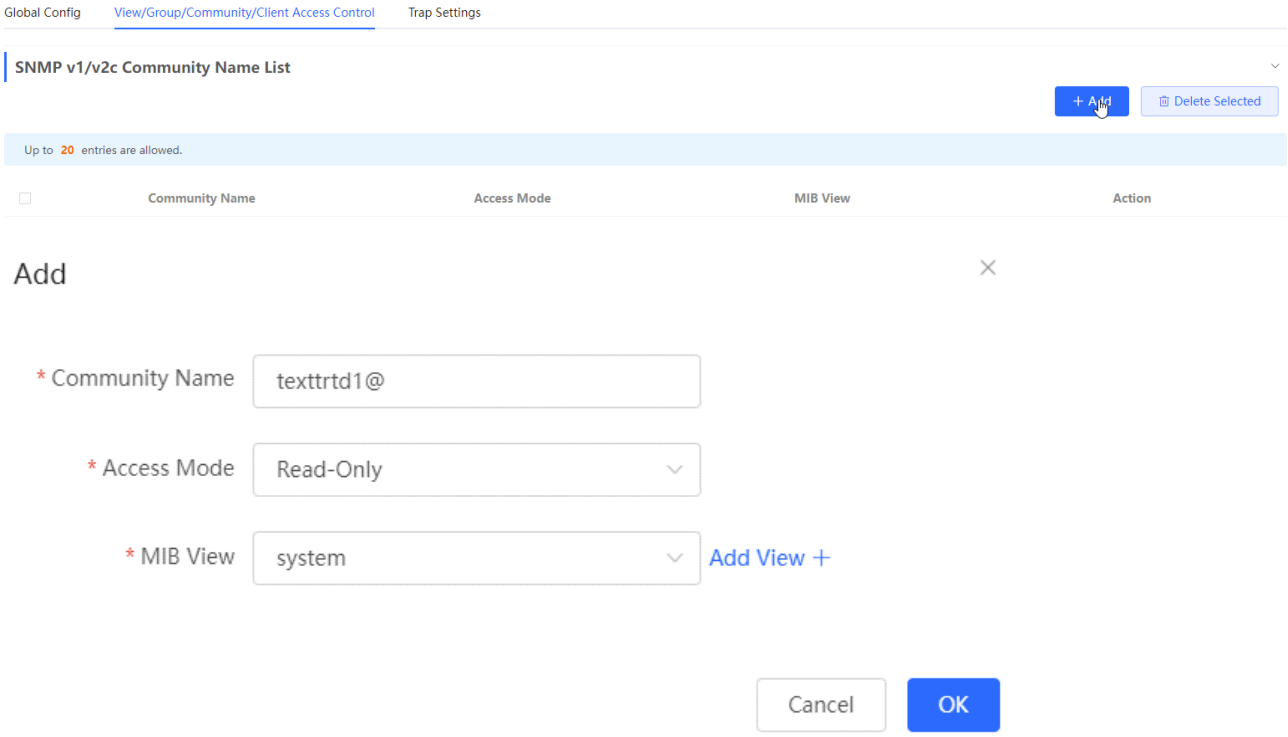


(1) On the view/group/group/user access control interface, click <**Add**> in the view list, fill in the view name and O ID in the pop-up window and click <**Add inclusion rule**>, and click <**OK**> after the operation is complete.





(2) view /group/group/user access control interface, click <**Add**> in the SNMP v1/v2c community name list, fill in the community name, access mode and view in the pop-up window, and click <**OK**> after the operation is completed.



2. v 3 version SNMP service configuration

- scenes to be used

Users need to monitor and control the equipment, and use the v3 version of the third-party software to monitor and send data to the public node (1.3.6.1.2.1) node. The security level of the v3 version adopts authentication and encryption.

- configuration list

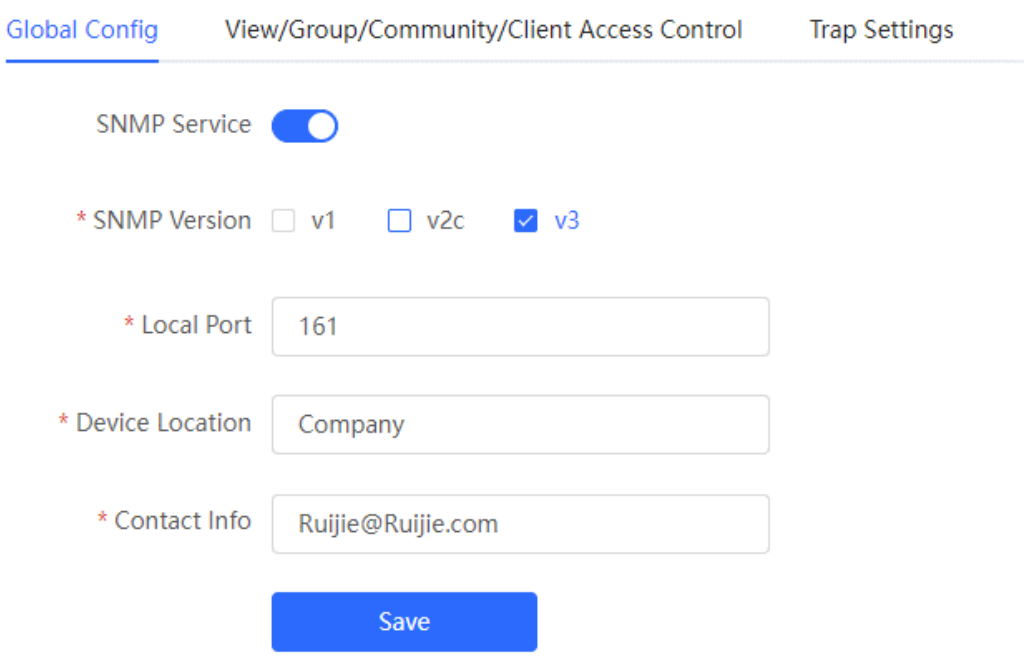
According to the analysis of the user's usage scenario, the requirements are shown in the table:

Table 20-7 User Requirements Description Form

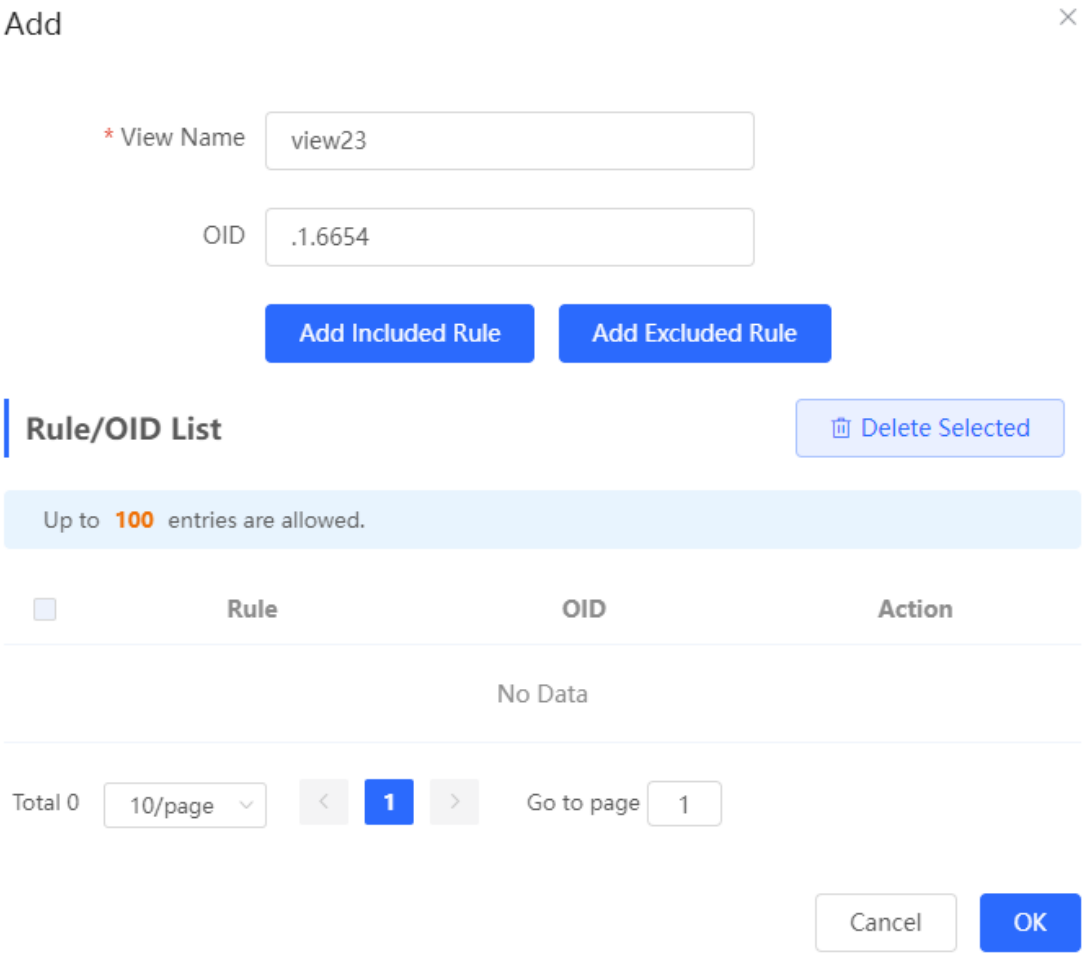
Parameter	Description
view range	Inclusion rule: OID is.1.3.6.1.2.1 and custom view is named " public_view "
group configuration	Group name: group Security level: authenticated and encrypted Readable view select " public_view " Writable view select " public_view " Notification view select " none "
v3 user configuration	Username: v3_user Group name: group Security level: authenticated and encrypted Authentication protocol / authentication password: MD5/Ruijie123 Encryption protocol / encryption password: AES/ Ruijie123
use version number	v3 version, default port 161

- configuration steps

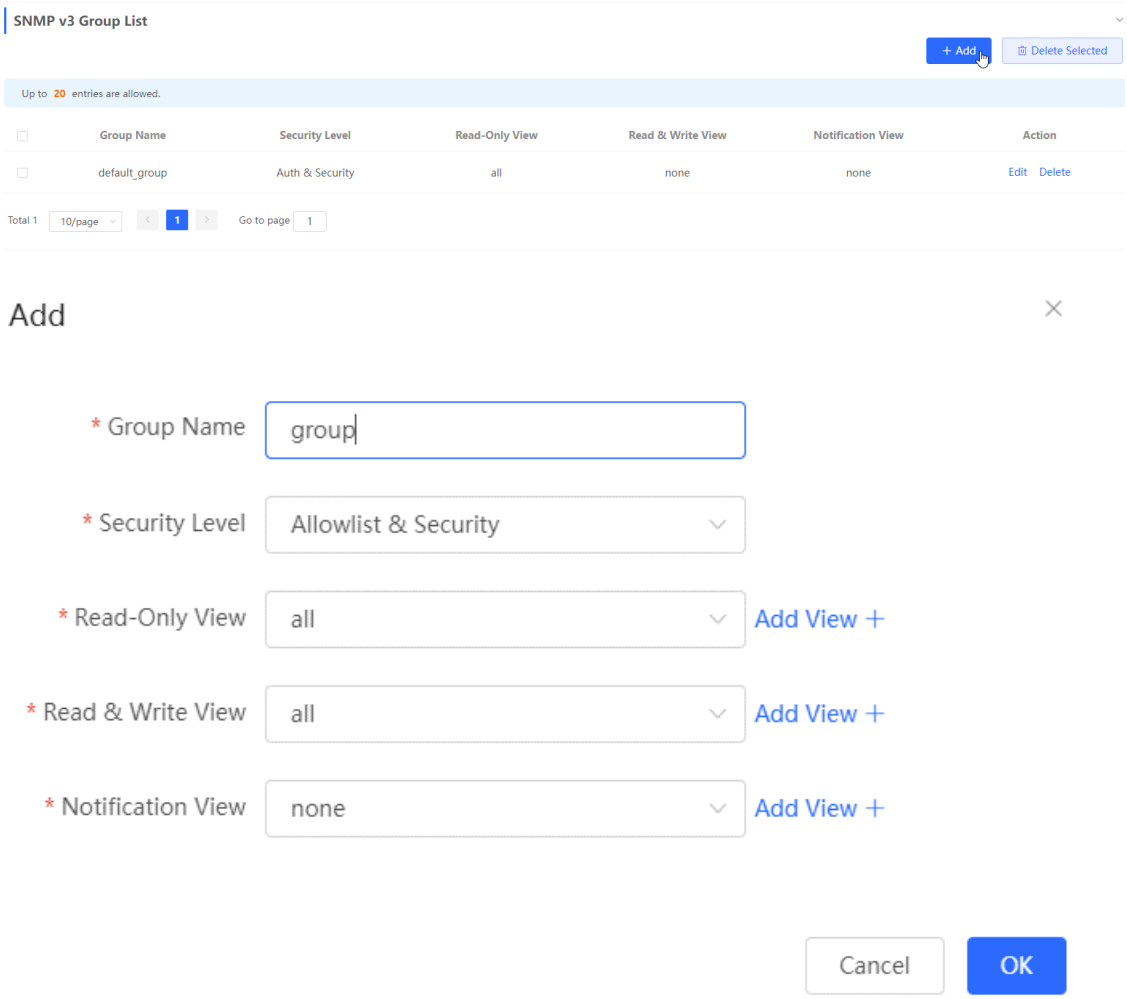
(2) Select the v3 version on the global configuration interface, change the port to 161, and set other settings to default. After the operation is complete, click <**Save**>.



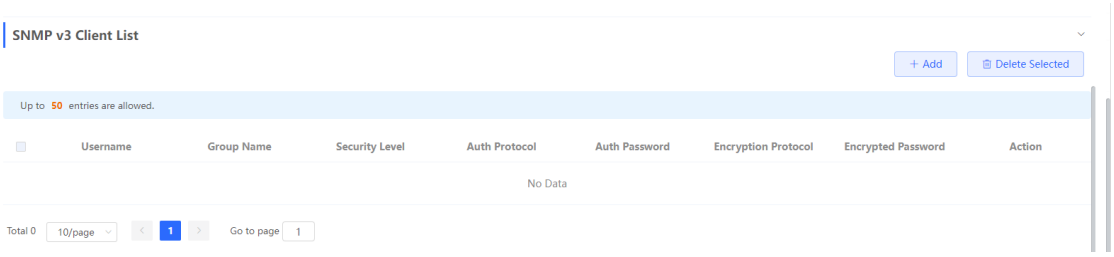
(1) On the view/group/group/user access control interface, click <Add> in the view list, fill in the view name and OID in the pop-up window, click <Add Inclusion Rule>, and click <OK> after the operation is complete.

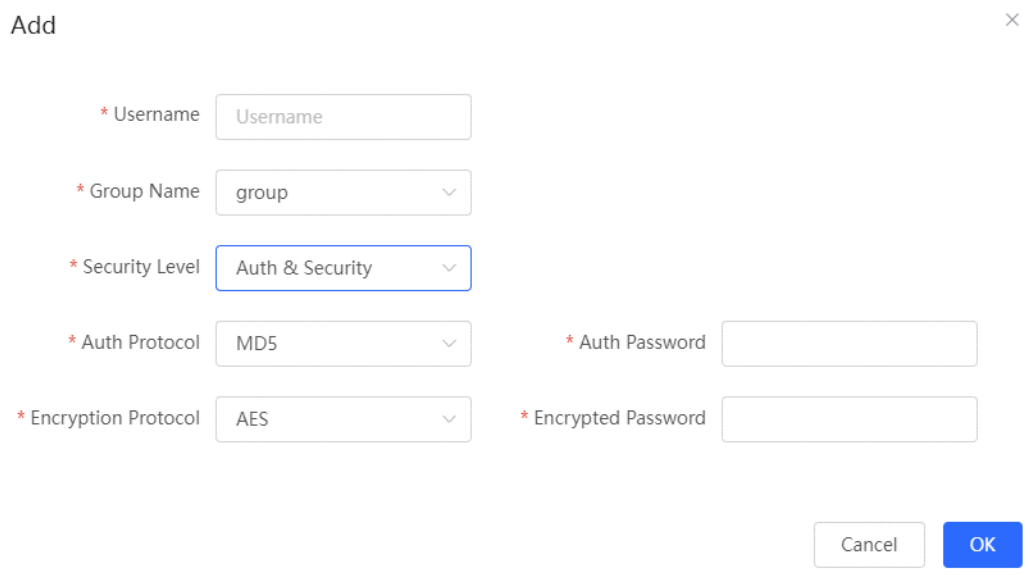


(2) Click <**Add**> in the SNMP v3 group list, fill in the group name and security level in the pop-up window, the user has read and write permissions, select " public _view " for the readable view and read and write view, and set the notification view to none. After the operation is complete, click < **OK**>.



(3) Click <Add> in the SNMP v3 user list, fill in the user name and group name in the pop-up window, the user security level adopts authentication and encryption mode, fill in the corresponding authentication protocol, authentication password, encryption protocol, and encryption password, and click < OK>.





20.4.5 trap service configuration

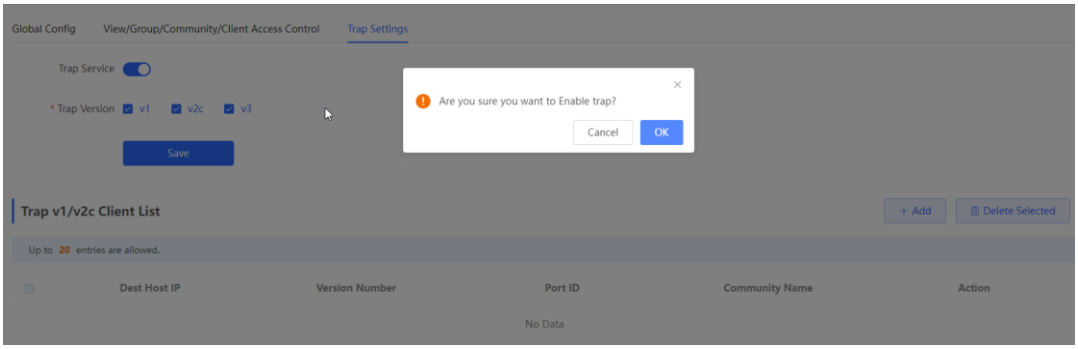
trap is a notification mechanism of the SNMP (Simple Network Management Protocol) protocol, which is used to report the status and events of network devices to managers, including device status reports, fault reports, performance reports, configuration reports and security management. Trap can provide real-time network monitoring and fault diagnosis to help administrators find and solve network problems in time.

1. trap open settings

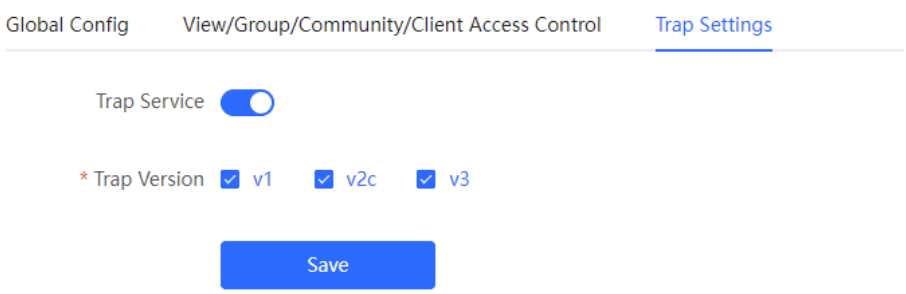
Enable the trap service and select the effective trap protocol version, including v1, v2c, and v3.

Network Management > System > SNMP > trap setting

(1) Enable the trap service switch.



When the first open is turned on, the system pops up a prompt message. Click <**OK**>.



(2) Set the trap version.

The trap protocol version number includes v1 version, v2c version, and v3 version.

(3) Click <**OK**>.

After the trap service is enabled, you need to click <Save>, and the configuration of the trap protocol version number will take effect.

2. trap v1/v2c user configuration

- Introduction

A trap is a notification mechanism used to send an alert to administrators when important events or failures occur on a device or service. Trap v1/v2c are two versions of SNMP protocol, used for network management and monitoring.

trap v1 is the first version in the SNMP protocol, which supports basic alarm notification functions. trap v2c is the second version in the SNMP protocol, which supports more alarm notification options and more advanced security.

By using trap v1/v2c, the administrator can know the problems in the network in time and take corresponding measures.

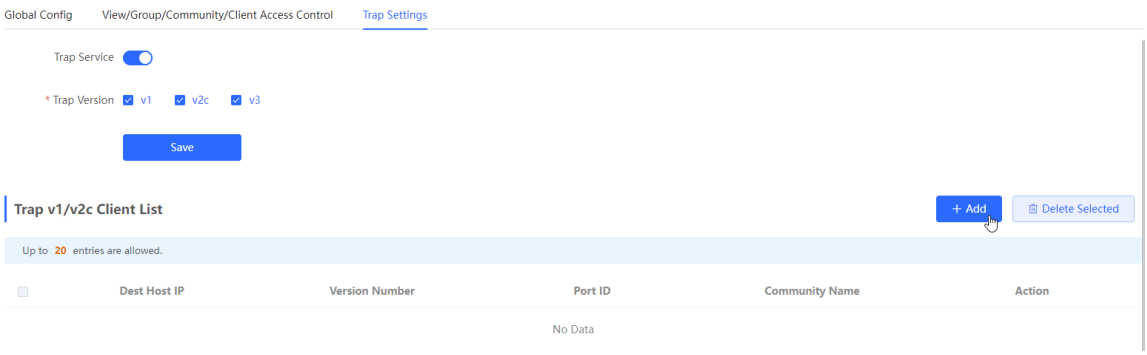
- prerequisite

  When the trap service version selects v1 or v2c, a trap v1v2c user needs to be created.

- configuration operation

Network Management >System > SNMP > trap setting

(1) Click <**Add**> in the Trap v1v2c User list to create a trap v1v2c user.



(2) Configure trap v1v2c user-related parameters.

set up

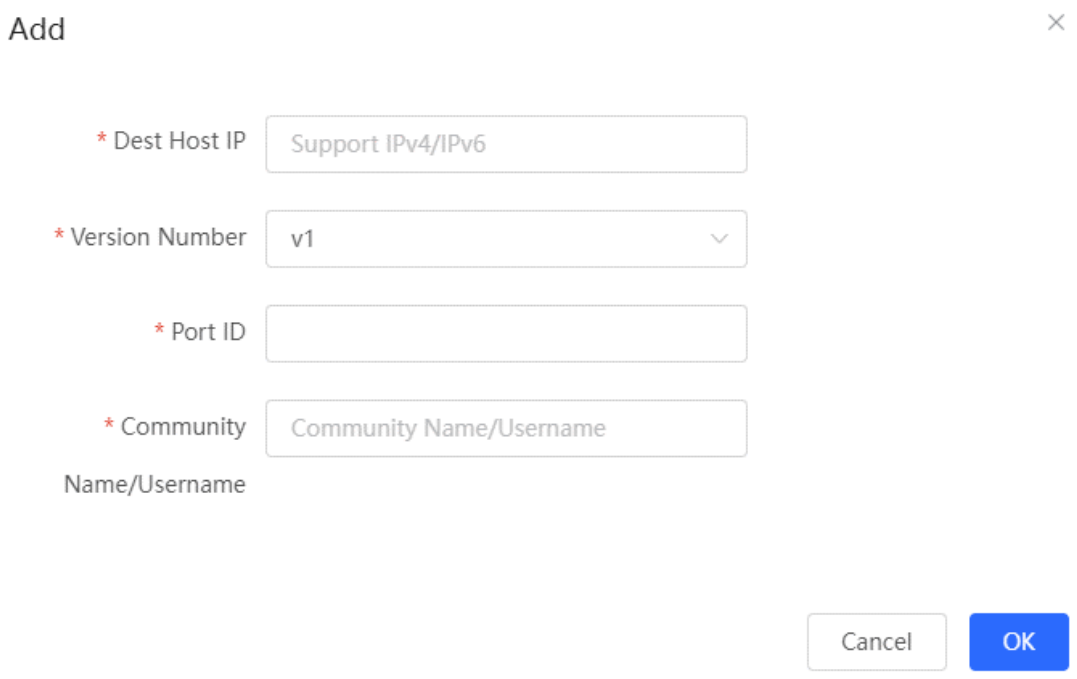


Table 20-8 t rap v1/v2c user information description table

Parameter	Description
destination ip	Trap peer device IP, support IPv4 / IPv6 address
version number	Trap version number, including v1|v2c
The port number	trap peer device port [1, 65535]
Group Name/User Name	The community name of the trap user at least 8 characters Contains three types of uppercase letters, lowercase letters, numbers, and special characters Does not contain admin/public/private Do not contain question marks, spaces and Chinese

Notice

- IP address of trap v1/v2c /v3 users cannot be repeated.
- Trap v1/v2c user names cannot be repeated.

(3) Click <OK>.

3. trap v 3 user configuration

- Introduction

Trap v3 is a network management mechanism based on SNMP protocol, which is used to send alarm notifications to management personnel. Unlike previous versions, trap v3 provides more secure and flexible configuration options, including authentication and encryption.

Trap v3 can be customized to choose the conditions and methods to send alerts, as well as who receives alerts and how to be notified. This enables administrators to understand the status of network devices more accurately and take timely measures to ensure network security and reliability.

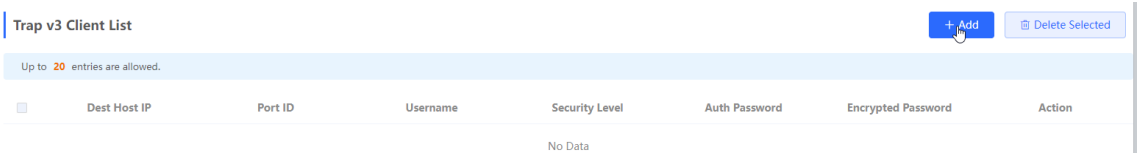
- prerequisite

When v3 is selected as the trap service version, a trap v3 user needs to be created.

- configuration steps

[Network Management**] System > SNMP** > trap setting

(1) Click <Add> in the "trap v3 user " list to create a trap v3 user.



(2) Configure parameters related to t rap v3 users.

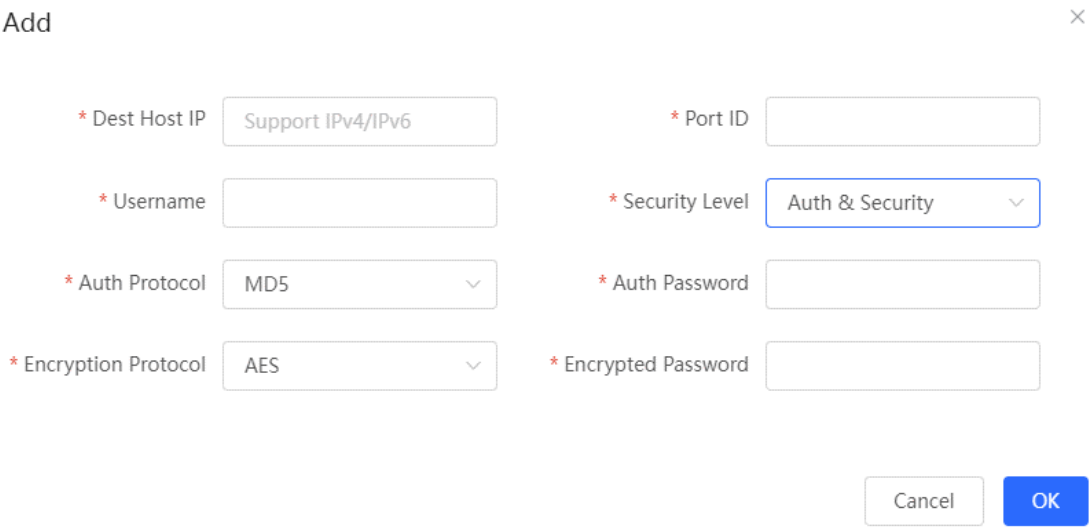


Table 20-9 trap v3 user information description table

Parameter	Description
target host ip	trap peer device IP, support IPv4/IPv6 address
The port number	trap peer device port [1, 65535]

Parameter	Description
username	username of the trap v3 user at least 8 characters Contains three types of uppercase letters, lowercase letters, numbers, and special characters Does not contain admin/public/private Do not contain question marks, spaces and Chinese
Security Level	Trap user security level, including three levels of authentication and encryption, authentication and encryption, and authentication and no encryption
Authentication protocol, authentication password	Authentication protocols include: MD5/SHA/SHA224/SHA256/SHA384/SHA512 Authentication password: 8~ 31 characters in length, cannot contain Chinese characters, full-width characters, question marks, and spaces, and must contain at least 3 types of uppercase and lowercase letters, numbers, or special characters. Note: This parameter needs to be set when the "Security Level" is "authentication and encryption" or "authentication without encryption".
encryption protocol, encryption password	Encryption protocols include: DES/AES/AES192/AES256 Encrypted password: the length is 8~ 31 characters, and cannot contain Chinese, full-width characters, question marks and spaces format, containing at least 3 types of uppercase and lowercase letters, numbers, or special characters. Note: When the "Security Level" is "Authentication and Encryption", this parameter needs to be set.

Notice

IP of t rap v1/v2c/v3 users cannot be repeated.

20.4.6 Typical configuration examples of the trap service

1. v2c version trap configuration

- scenes to be used

When the user is monitoring the device, if the device is suddenly interrupted or abnormal, the third-party monitoring software cannot detect and deal with the abnormal situation in time, so configure the device with the destination ip 1 92.1 68.110.85 and port number 1 66, so that the device sends a trap of the v2c version in case of an exception.

- configuration list

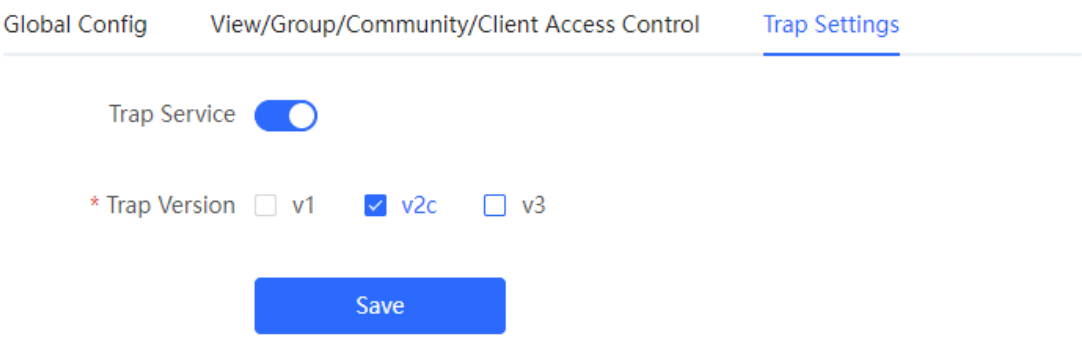
According to the analysis of the user's usage scenario, the requirements are shown in the table:

Table 4-1 **User Requirements Description Form**

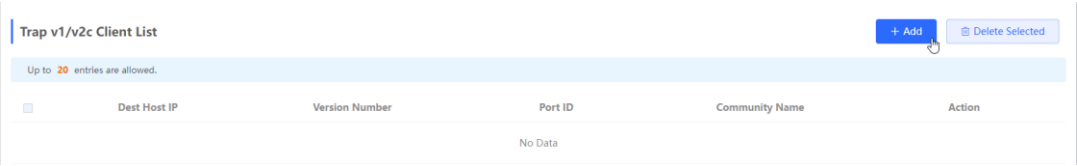
description item	Description
IP and port number	The target host IP is "192.168.110.85", and the port number is "166".
use version number	Select v2 version
Group Name / User Name	Trap_public

- configuration steps

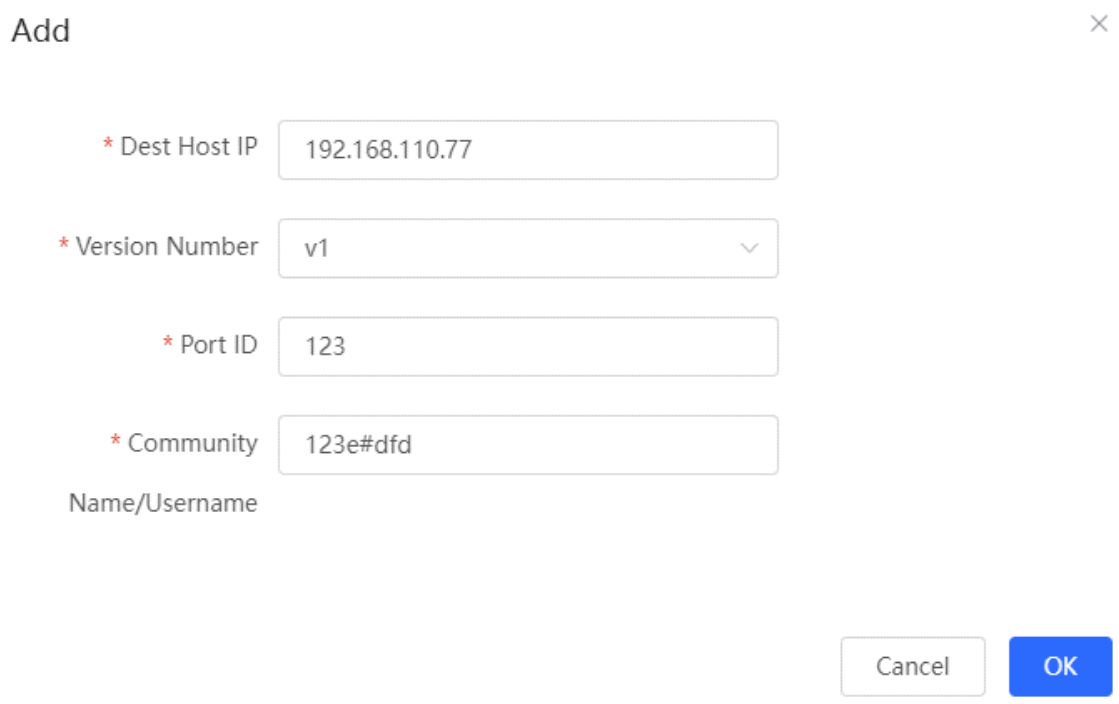
(3) Select the v2c version on the trap setting interface, click <**Save**>.



(2) Click <**Add**> in the " trap v1 / v2c user list ".



(3) Fill in the target host IP, version number, port number, user name and other information, and click <OK> after the configuration is complete.



2. V3 version trap configuration

- scenes to be used

When the user is monitoring the device, if the device is suddenly interrupted or abnormal, the third-party monitoring software cannot detect and deal with the abnormal situation in time, and the device with the destination ip of 1 92.1 68.110.87 and the port number of 1 67 is configured, and use the more secure v3 version to send traps.

- configuration list

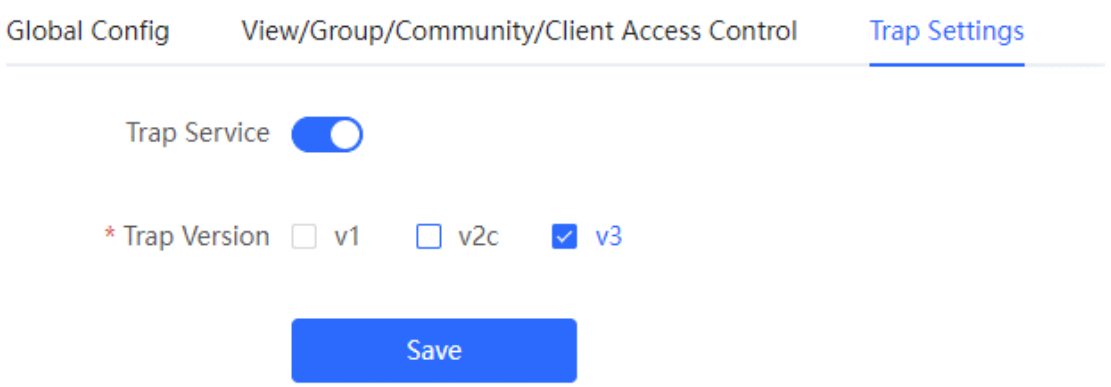
According to the analysis of the user's usage scenario, the requirements are shown in the table:

Table 4-1 **User Requirements Description Form**

description item	Description
IP and port number	The target host IP is "192.168.110.87", and the port number is "167".
Use version number, username	Select the v3 version, the user name is "trapv3_public"
Authentication Protocol / Encryption Protocol Encryption Protocol / Encryption Cipher	Authentication protocol / authentication password: MD5/Ruijie123 Encryption protocol / encryption password: AES/ Ruijie123

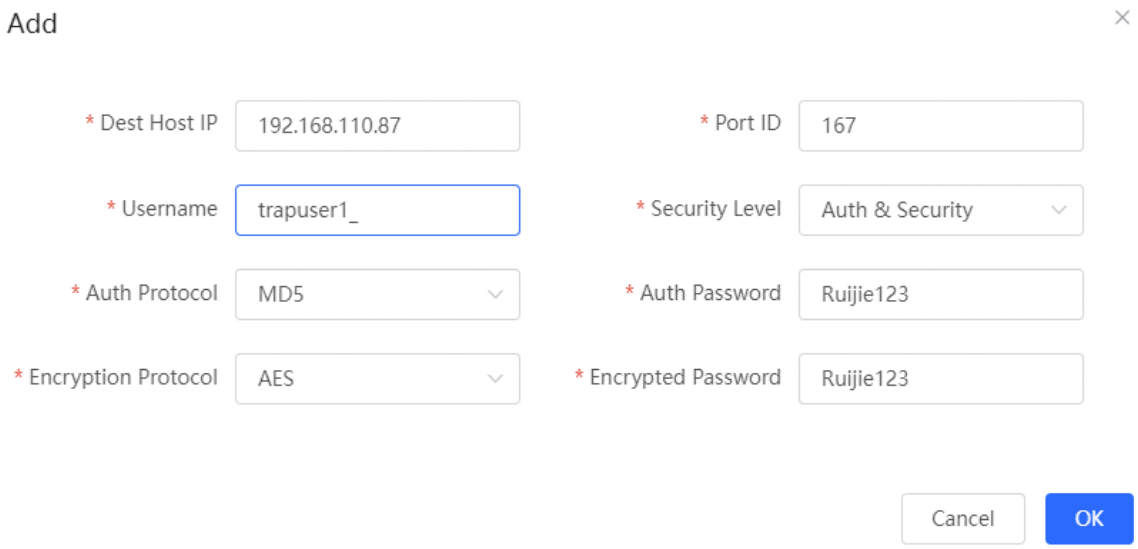
- configuration steps

(4) Select the v3 version on the trap setting interface, and click <Save>.



(2) Click <**Add**> in the trap v3 user list.

(3) Fill in the target host IP, port number, user name and other information, and click <**OK**> after the configuration is complete.

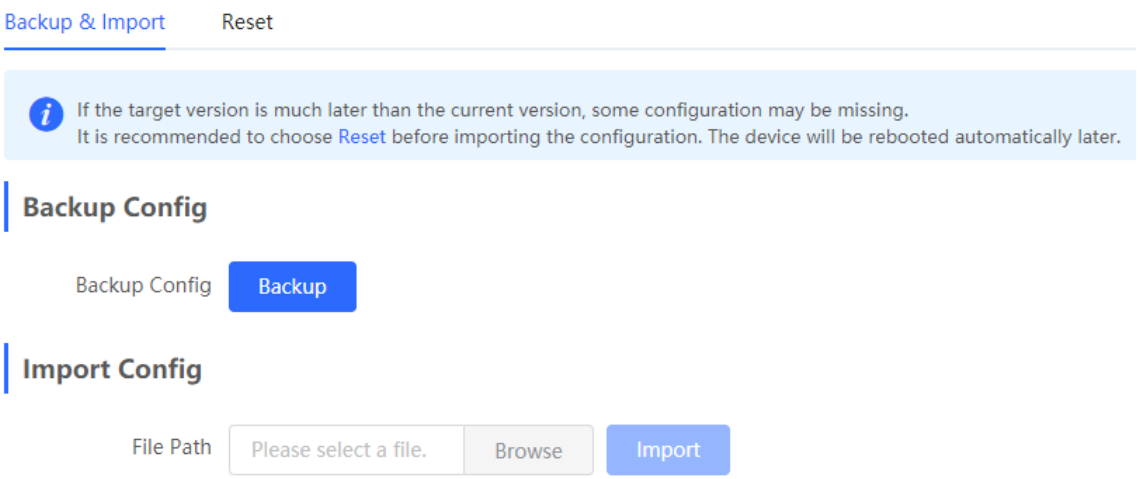


20.5 Configuration Backup and Import

Choose **Local Device** > **System** > **Backup** > **Backup&Import**.

Configure backup: Click **Backup** to generate the backup configuration and download it locally.

Configure import: Click **Browse,** select a backup configuration file locally, and click **Import** to apply the configuration specified by the file to the device After importing the configuration, the device will restart.

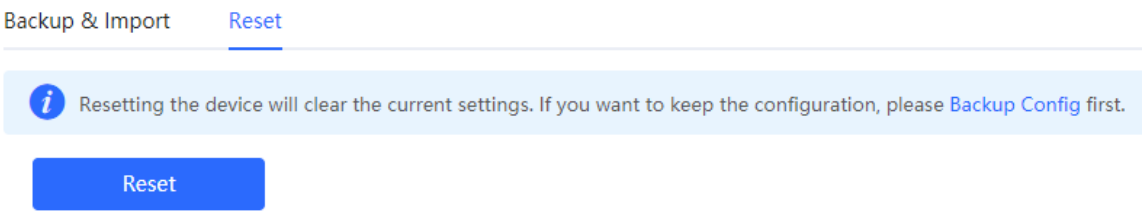


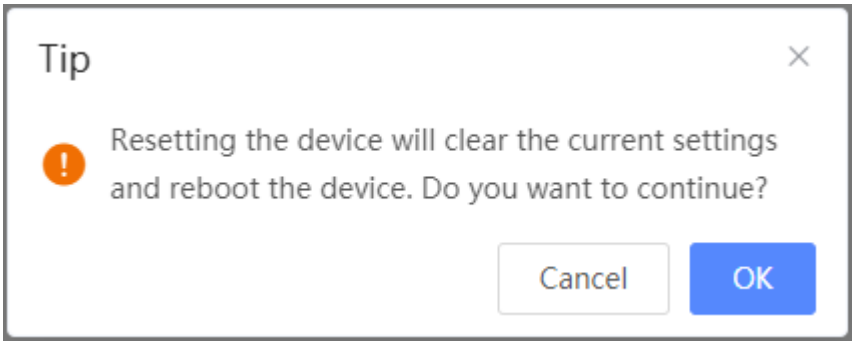
20.6 Reset

20.6.1 Resetting the Device

Choose **Local Device** > **System** > **Backup** > **Reset**.

Click **Reset**, and click **OK** to restore factory settings.





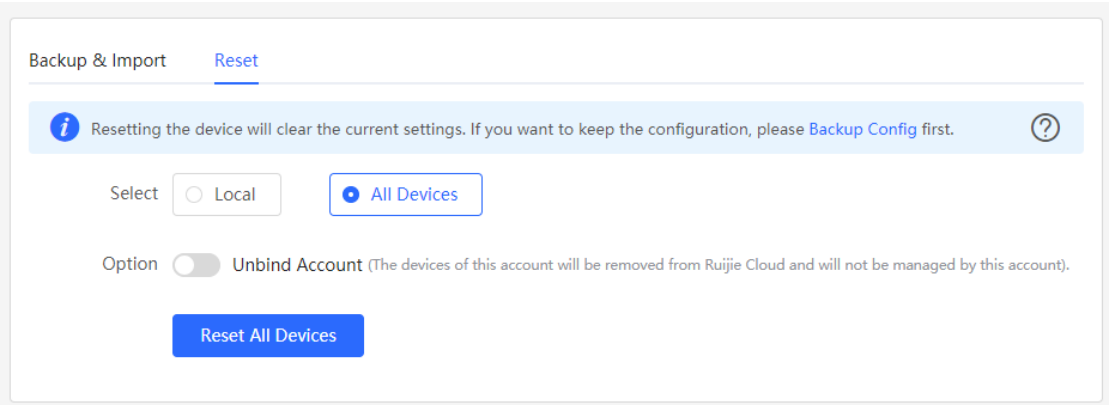
Caution

Resetting the device will clear current settings and reboot the device. If a useful configuration exists in the current system, you can export the current configuration (see 20.4 Configuring SNMP) before restoring the factory settings. Exercise caution when performing this operation.

20.6.2 Resetting the Devices in the Network

Choose **Network Management** > **System** > **Backup** > **Reset**.

Select **All Devices** and choose whether to **Unbind Account**, click **Reset All Devices** and all devices in the current network will be restored to their factory settings.



Caution

Resetting the network will clear current settings of all devices in the network and reboot the devices. Exercise caution when performing this operation.

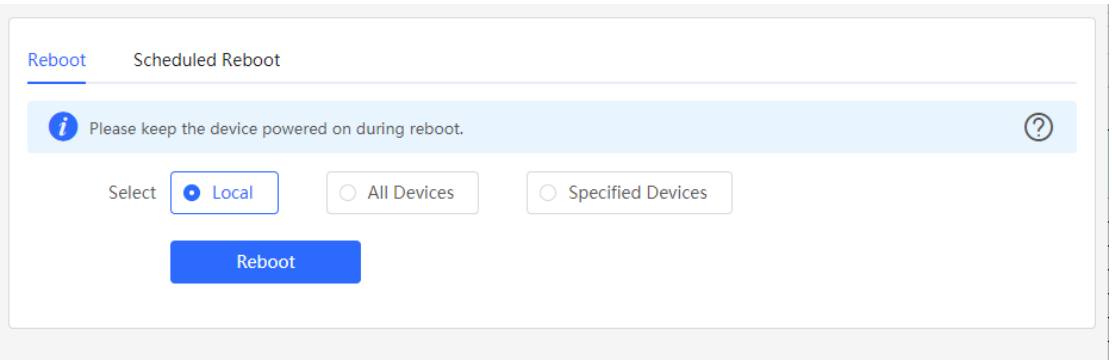
20.7 Rebooting the Device

20.7.1 Rebooting the Device

Choose **Self-Organizing Mode** > **Network Management** > **System** > **Reboot**

Choose **Standalone Mode** > **System** > **Reboot**.

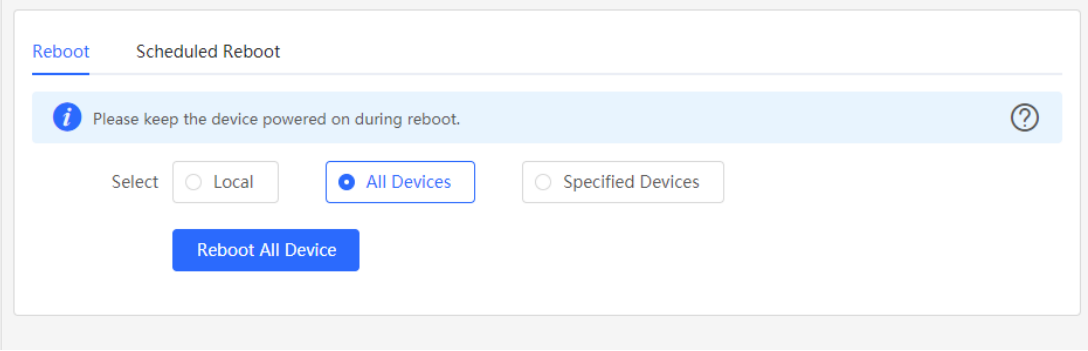
Select **Local** and click **All Devices**. The device will restart. Do not refresh the page or close the browser during the reboot. After the device is successfully rebooted and the Web service becomes available, the device automatically jumps to the login page.



20.7.2 Rebooting the Devices in the Network

Choose **Network Management** > **System** > **Reboot** > **Reboot**.

Select **All Devices**, and click **Reboot All Device** to reboot all devices in the current network.



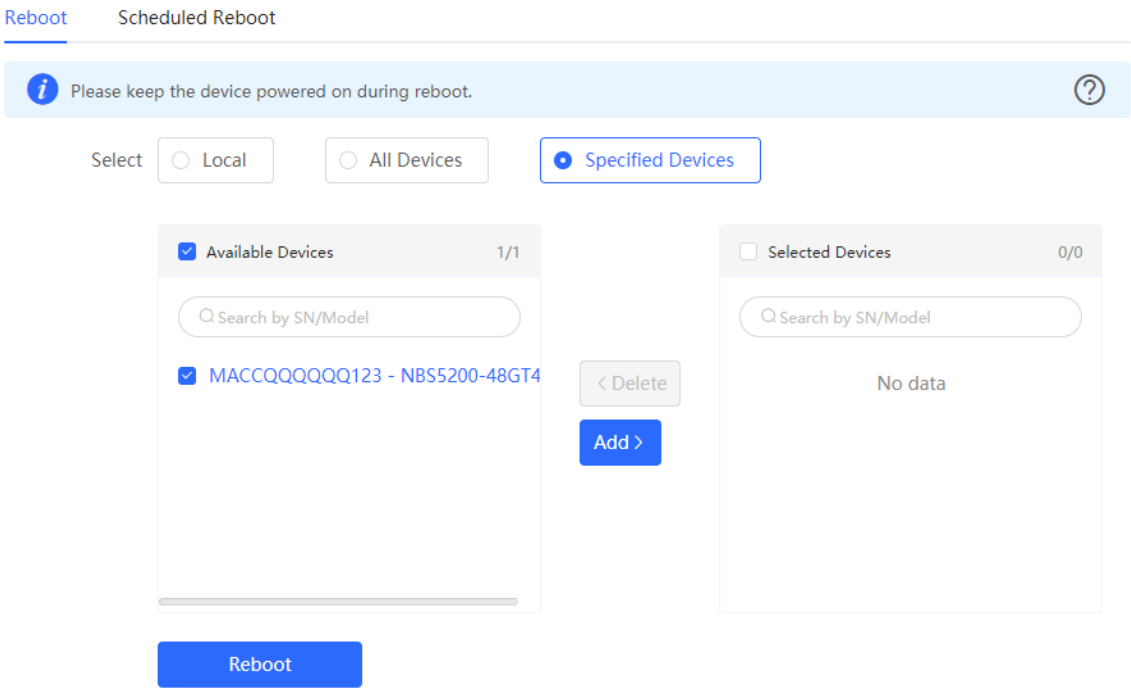
Caution

It will take some time for the network to reboot, please be patient. The network operation will affect the entire network. Therefore, exercise caution when performing this operation.

20.7.3 Rebooting Specified Devices in the Network

Choose **Network Management** > **System** > **Reboot** > **Reboot**.

Click **Specified Devices**, select desired devices from the **Available Devices** list, and click **Add** to add devices to the **Selected Devices** list on the right. Click **Reboot**. Specified devices in the **Selected Devices** list will be rebooted.



20.8 Configuring Scheduled Reboot

Confirm that the system time is accurate. For details about how to configure the system time, see 20.1 Setting the System Time. To avoid network interruption caused by device reboot at wrong time.

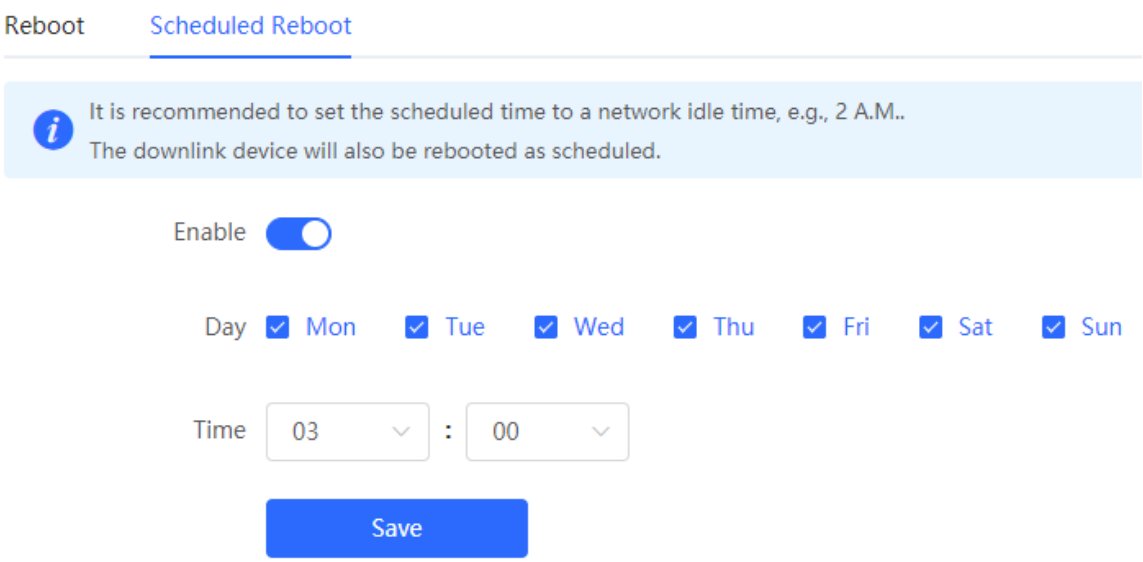
Choose **Self-Organizing Mode** > **Network Management** > **System**> **Reboot** > **Scheduled Reboot**.

Choose **Standalone Mode** > **System** > **Reboot** > **Scheduled Reboot**.

Click **Enable**, and select the date and time of scheduled reboot every week. Click **Save**. When the system time matches the scheduled reboot time, the device will restart.

Caution

Once enable scheduled reboot in the network mode, all devices in the network will reboot when the system time matches to the timed time. Therefore, exercise caution when performing this operation.



20.9 Upgrade

Caution

- It is recommended to backup the configuration before software upgrade.
- Version upgrade will restart the device. Do not refresh or close the browser during the upgrade process.

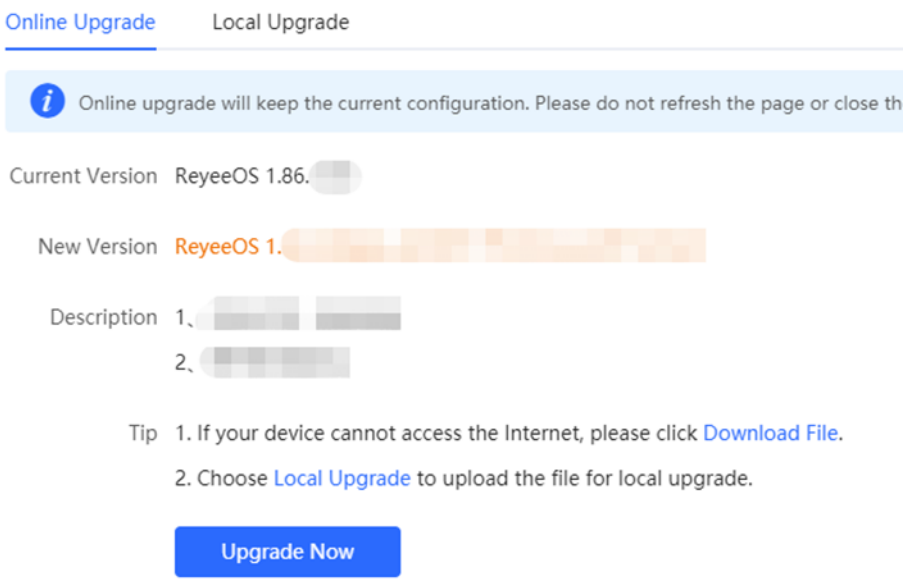
20.9.1 Online Upgrade

Choose **Local Device** > **System** > **Upgrade** > **Online Upgrade**.

The current page displays the current system version and allows you to detect whether a later version is available. If a new version is available, click **Upgrade Now** to perform online upgrade. If the network environment does not support online upgrade, click **Download File** to download the upgrade installation package locally and then perform local upgrade.

Note

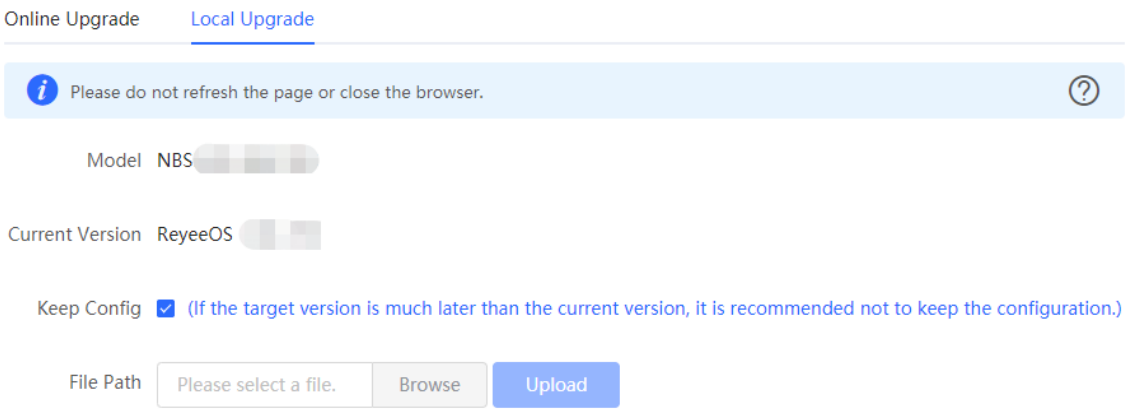
- Online upgrade will retain the current configuration.
- Do not refresh the page or close the browser during the upgrade process. After successful upgrade, you will be redirected to the login page automatically.



20.9.2 Local Upgrade

Choose **Local Device** > **System** > **Upgrade** > **Local Upgrade**.

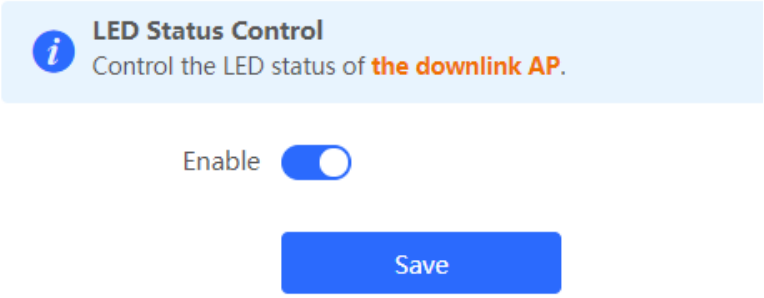
Displays the device model and current software version. You can choose whether to keep the configuration upgrade or not. Click **Browse** to select the local software installation package, click **Upload** to upload the installation package and upgrade.



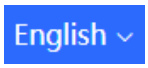
20.10 LED

Choose **Network Management**> **Network** > **LED**.

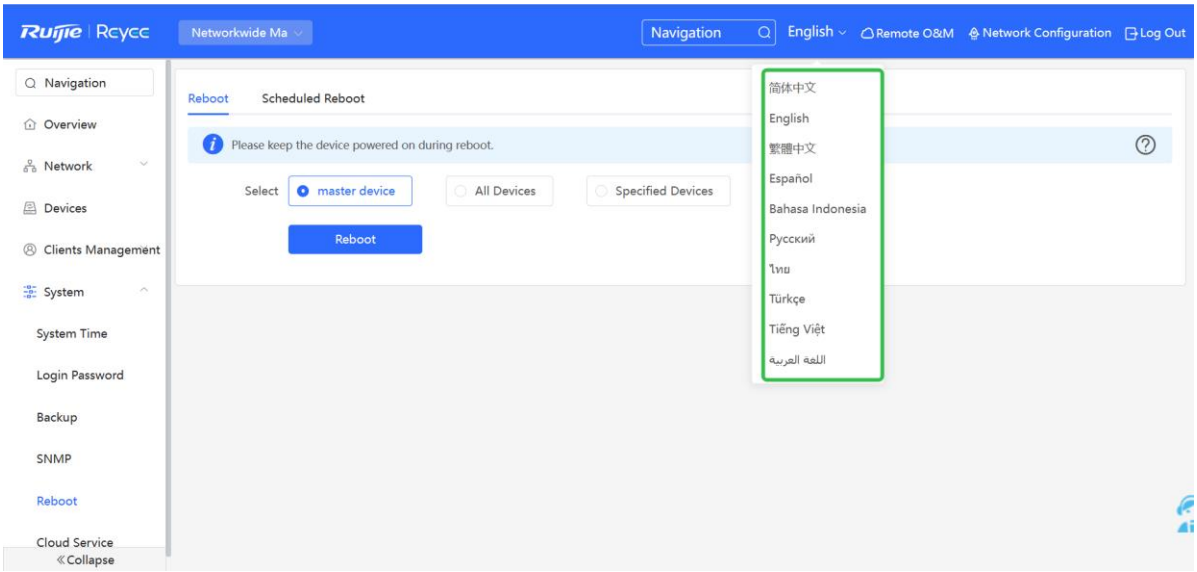
Click the button to control the LED status of the downlink AP. Click **Save** to deliver the configuration and make it take effect.



20.11 Switching the System Language

Click  in the upper-right corner of the Web page.

Click a required language to switch the system language.



21 NBS and NIS Series Switches Wi-Fi Network Setup

Note

- To manage other devices in the self-organizing network, enable the self-organizing network discovery function. (See 11.1.1 2. Switching the Work Mode)The wireless settings are synchronized to all wireless devices in the network by default. You can configure groups to limit the device scope under wireless management. For details, see 21.1 Configuring AP Groups.
- The device itself does not support transmitting wireless Wi-Fi signals, and the wireless settings need to be synchronized to the wireless devices in the network to take effect.

21.1 Configuring AP Groups

21.1.1 Overview

After self-organizing network discovery is enabled, the device can function as the master AP/AC to batch configure and manage its downlink APs by group. Before you configure the APs, divide them to different groups.

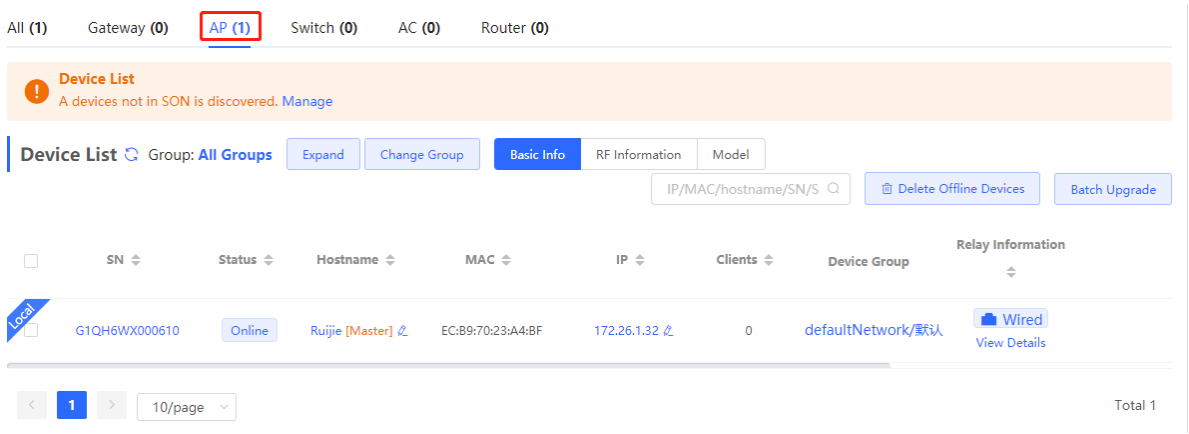
Note

If you specify groups when configuring the wireless network, the configuration takes effect on wireless devices in the specified groups.

21.1.2 Procedure

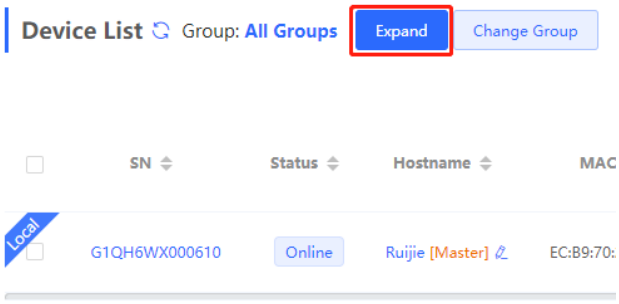
Choose **Network** > **Devices** > **AP**.

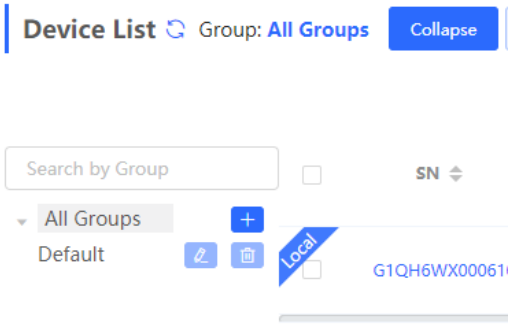
(1) View the information of all APs in the current network, including the basic information, RF information, and model. Click the SN of an AP to configure the AP separately.



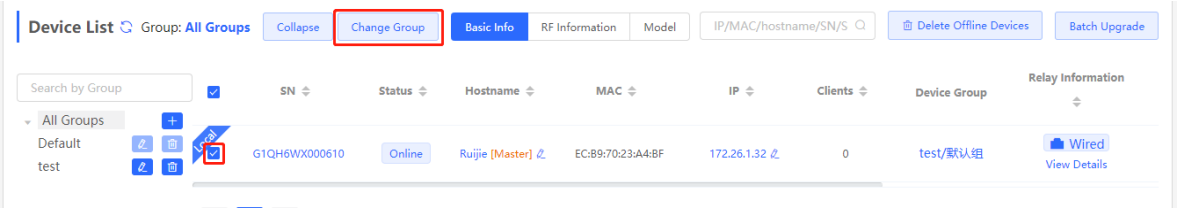
(2) Click **Expand**. Information of all the current groups is displayed to the left of the list. Click to create a group. You can create a maximum of eight groups. Select the target group and click to modify the group

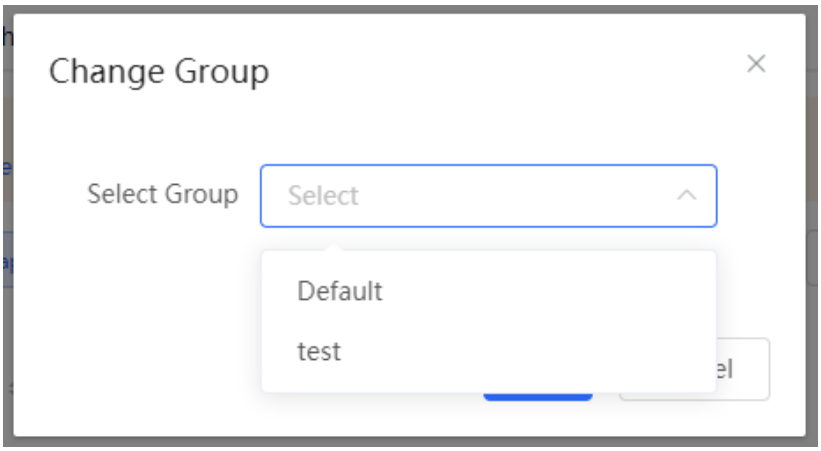
name or click to delete the group. You cannot modify the name of the default group or delete the default group.





(3) Click a group name in the left. All APs in the group are displayed. One AP can belong to only one group. By default, all APs belong to the default group. Select a record in the device list and click **Change Group** to migrate the selected device to the specified group. After a device is moved to the specified group, the device will use the configuration for the new group. Click **Delete Offline Devices** to remove offline devices from the list.





21.2 Configuring Wi-Fi

Choose **Network** > **Wi-Fi** > **Wi-Fi Settings**.

Enter the Wi-Fi name and Wi-Fi password, select the frequency band used by the Wi-Fi signal, and click **Save**.

Click **Advanced Settings** to configure more Wi-Fi parameters.

Caution

Modification will cause restart of the wireless configuration, resulting in logout of connected clients. Exercise caution when performing this operation.

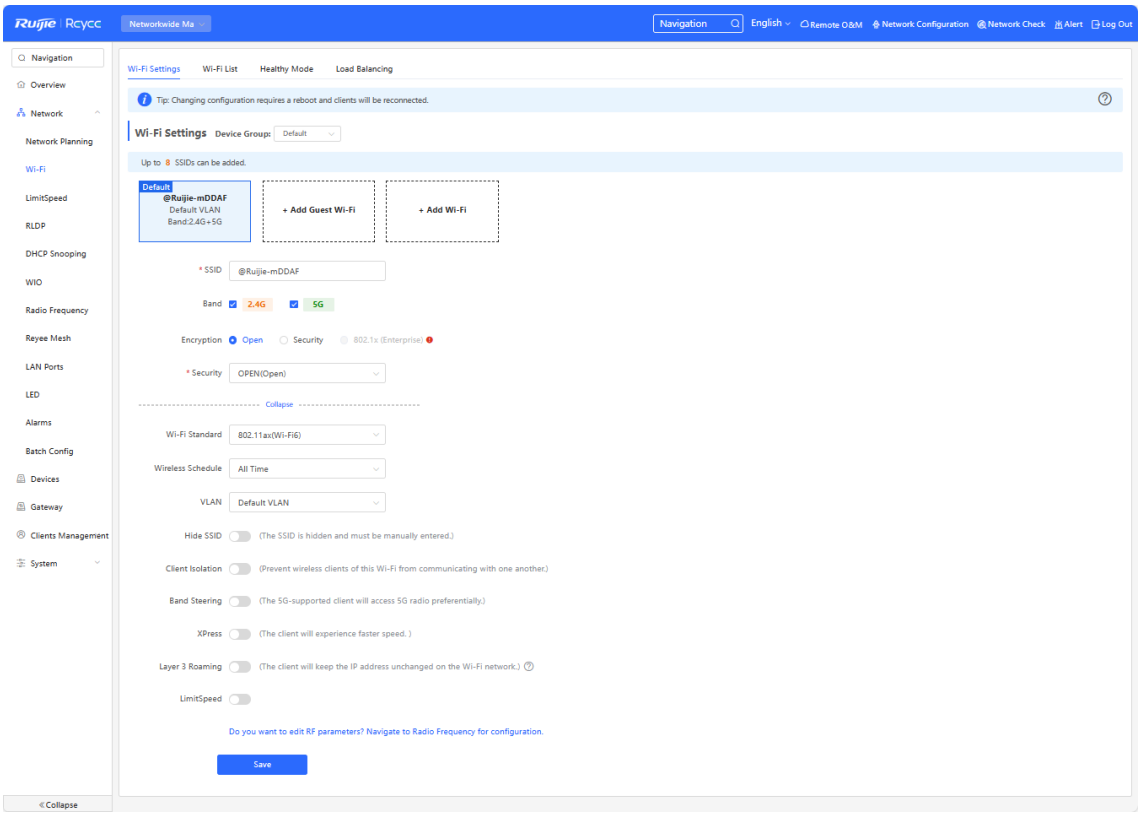


Table 11-1 Wireless Network Configuration

Parameter	Description
SSID	Enter the name displayed when a wireless client searches for a wireless network.
SSID Encoding	If the SSID does not contain Chinese, this item will be hidden. If the SSID contains Chinese, this item will be displayed. You can select UTF-8 or GBK.

Parameter	Description
Band	Set the band used by the Wi-Fi signal. The options are 2.4 GHz and 5 GHz. The 5 GHz band provides faster network transmission rate and less interference than the 2.4 GHz band, but is inferior to the 2.4 GHz band in terms of signal coverage range and wall penetration performance. Select a proper band based on actual needs. The default value is **2.4G + 5G**, indicating that the device provides signals at both 2.4 GHz and 5 GHz bands.
Security	Select an encryption mode for the wireless network connection. The options are as follows: Open: The device can associate with Wi-Fi without a password. WPA-PSK/WPA2-PSK: Wi-Fi Protected Access (WPA) or WPA2 is used for encryption. WPA_WPA2-PSK (recommended): WPA2-PSK or WPA-PSK is used for encryption.
Wi-Fi Password	Specify the password for connection to the wireless network. The password is a string of 8 to 16 characters.
Wi-Fi Standard	Refers to the wireless communication protocol version, such as Wi-Fi 4 (802.11n), Wi-Fi 5 (802.11ac), Wi-Fi 6 (802.11ax), determining speed, frequency, and other wireless features.
Wireless Schedule	Specify the time periods during which Wi-Fi is enabled. After you set this parameter, users cannot connect to Wi-Fi in other periods.
VLAN	Set the VLAN to which the Wi-Fi signal belongs.
Hide SSID	Enabling the hide SSID function can prevent unauthorized user access to Wi-Fi, improving security. However, mobile phones or computers cannot find the Wi-Fi name after this function is enabled. You must manually enter the correct name and password to connect to Wi-Fi. Record the current Wi-Fi name before you enable this function.
Client Isolation	After you enable this parameter, clients associated with the Wi-Fi are isolated from one other, and end users connected to the same AP (in the same network segment) cannot access each other. This improves security.

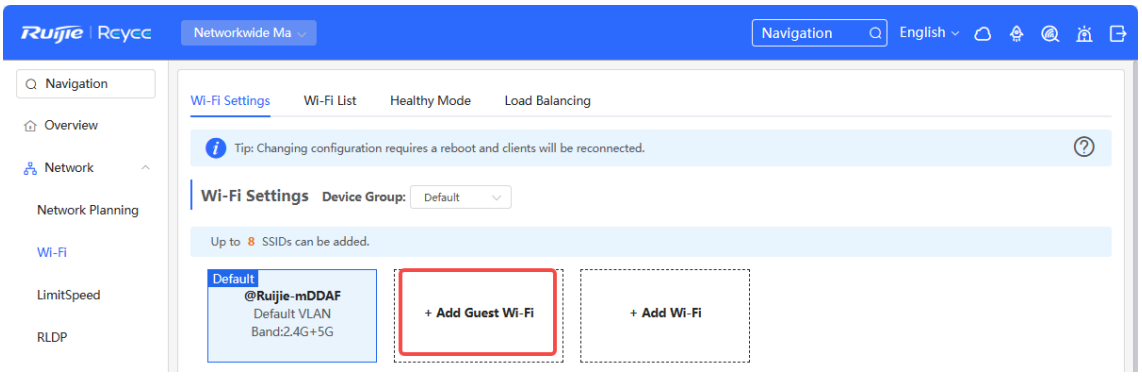
Parameter	Description
Band Steering	After this function is enabled, 5G-capable clients select 5G Wi-Fi preferentially. You can enable this function only when **Band** is set to **2.4G + 5G**.
XPress	After this function is enabled, the device sends game packets preferentially, providing more stable wireless network for games.
Layer-3 Roaming	After this function is enabled, clients keep their IP addresses unchanged when associating with the same Wi-Fi. This function improves the roaming experience of users in the cross-VLAN scenario.
Wi-Fi6	After this function is enabled, wireless users can have faster network access speed and optimized network access experience. This function is valid only on APs and routers supporting 802.11ax. Clients must also support 802.11ax to experience high-speed network access empowered by Wi-Fi 6. If clients do not support Wi-Fi 6, disable this function.
LimitSpeed	Specifies the maximum data transfer rate allowed for a device or user on the Wi-Fi network, often set to manage bandwidth allocation or ensure fair usage among connected devices.

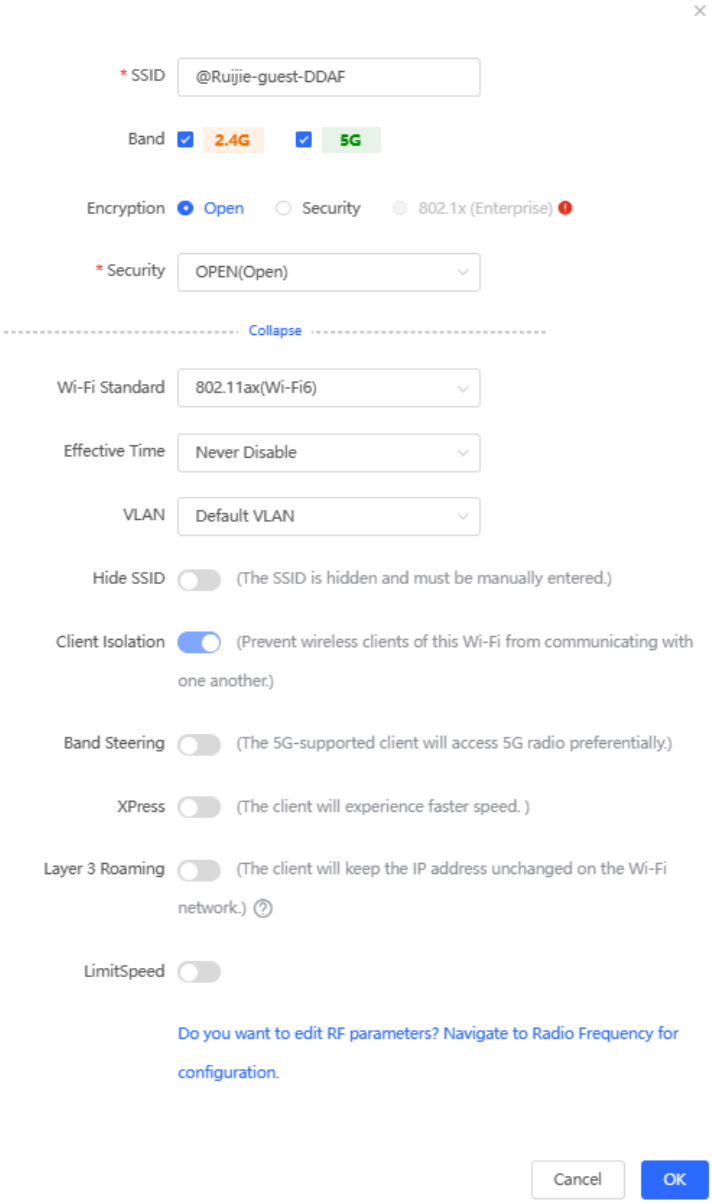
21.3 Configuring Guest Wi-Fi

Choose **Network** > **Wi-Fi** > **Guest Wi-Fi**.

Guest Wi-Fi is a wireless network provided for guests, and is disabled by default. **Client Isolation** is enabled for guest Wi-Fi by default, and it cannot be disabled. In this case, users associating with guest Wi-Fi are mutually isolated, and they can only access the Internet through Wi-Fi. This improves network access security. You can configure a wireless schedule for the guest network. After the specified schedule expires, the guest network will become unreachable.

Click **+Add Guest Wi-Fi** and set the guest Wi-Fi name and password. Click **Expand** to configure the wireless schedule of the guest Wi-Fi and more Wi-Fi parameters. (For details, see 21.2 Configuring Wi-Fi.) Click **Save**. Guests can access the Internet through Wi-Fi after entering the Wi-Fi name and password.

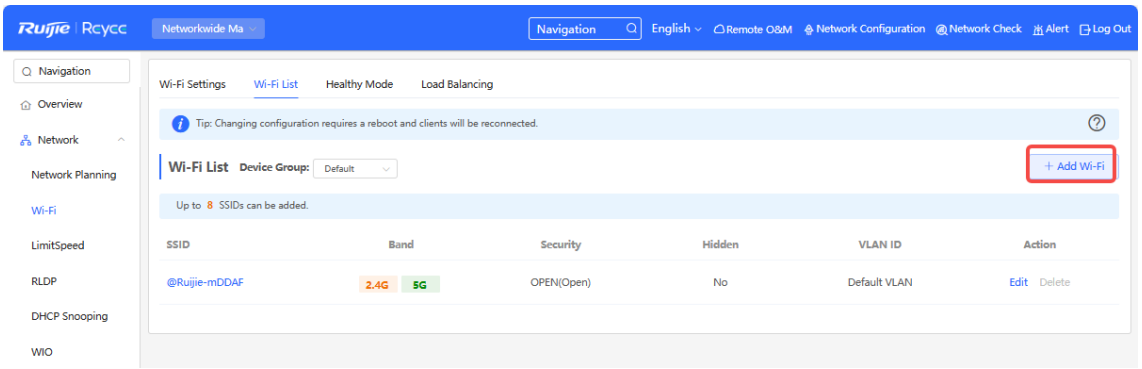


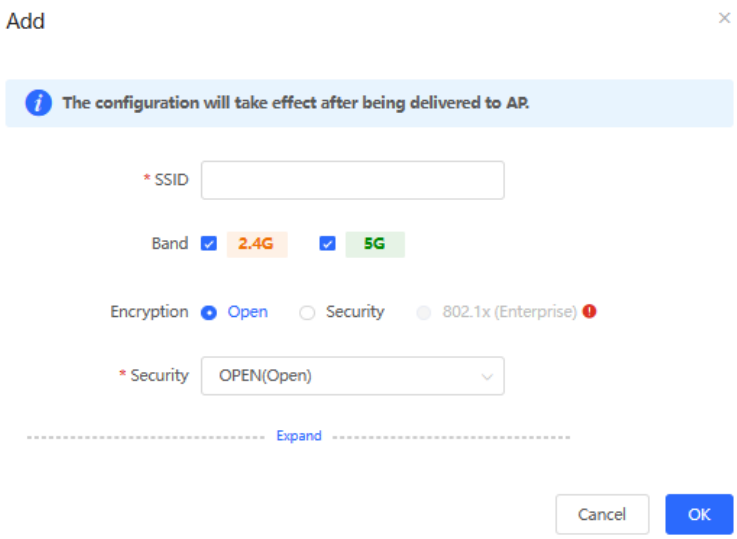


21.4 Adding a Wi-Fi

Choose **Network** > **Wi-Fi** > **Wi-Fi List**.

Click **Add**, enter the Wi-Fi name and password, and click **OK** to create a Wi-Fi. Click **Expand** to configure more Wi-Fi parameters. For details, see 21.2 Configuring Wi-Fi. After a Wi-Fi is added, clients can find this Wi-Fi, and the Wi-Fi information is displayed in the Wi-Fi list.



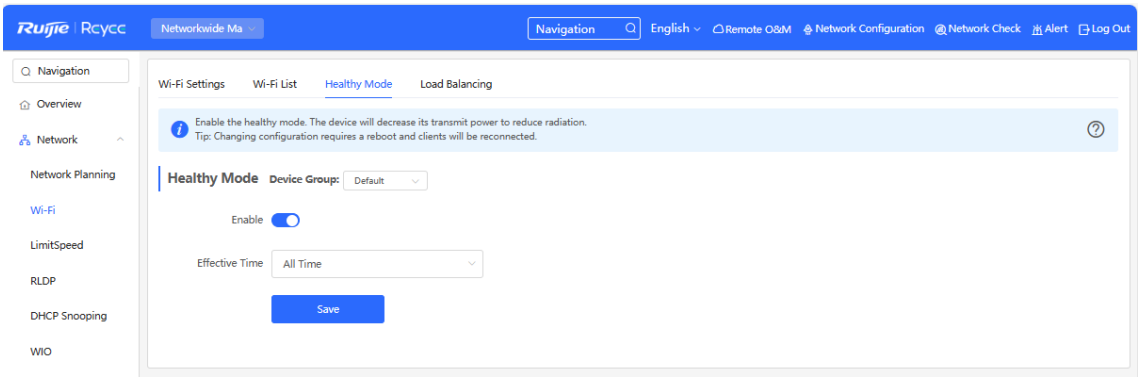


21.5 Healthy Mode

Choose **Network** > **Wi-Fi** > **Healthy Mode**.

Turn on healthy mode and select a wireless schedule for the mode.

After the healthy mode is enabled, the RF transmit power and Wi-Fi coverage range of the wireless device are reduced in the schedule. This may lead to weak signals and network freezing. You are advised to disable healthy mode or set the wireless schedule to the idle periods.



21.6 RF Settings

Choose **Networkwide Management** > **Network** > **Radio Frequency**.

The wireless device can detect the surrounding wireless environment upon power-on and select proper configuration. However, network freezing caused by wireless environment changes cannot be prevented. You can analyze the wireless environment around the APs and routers and manually select proper parameters.

Caution

Modification will cause restart of the wireless configuration, resulting in logout of connected clients. Exercise caution when performing this operation.

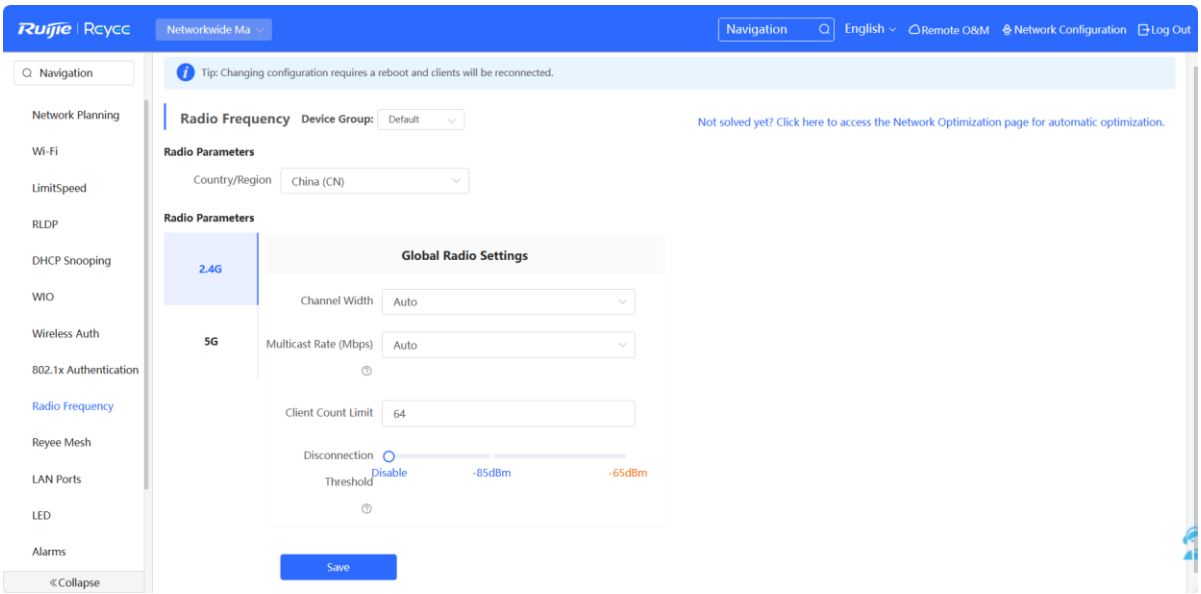


Table 11-2 RF Configuration

Parameter	Description
Country/Region	The Wi-Fi channels stipulated by each country may be different. To ensure that clients can find the Wi-Fi signal, select the country or region where the device is located.
2.4G/5G	A lower bandwidth indicates more stable network, and a higher bandwidth indicates easier interference. In case of severe interference, select a relatively low bandwidth to prevent network freezing to certain extent. The 2.4 GHz band supports the 20 MHz and 40 MHz bandwidths. The 5 GHz band supports the 20 MHz, 40 MHz, and 80 MHz bandwidths. By default, the value is **Auto**, indicating that the bandwidth is selected automatically based on the environment.
Client Count Limit	If a large number of users access the AP or router, the wireless network performance of the AP or router may be degraded, affecting users' Internet access experience. After you set this parameter, new user access is prohibited when the number of access users reaches the specified value. If the clients require high bandwidth, you can adjust this parameter to a smaller value. You are advised to keep the default value unless otherwise specified.
Disconnection Threshold	When multiple Wi-Fi signals are available, you can set this parameter to optimize the wireless signal quality to some extent. When a client is far away from the wireless device, the Wi-Fi connection is disconnected when the wireless signal strength of the end user is lower than the kick-off threshold. In this case, the client has to select a nearer wireless signal. The client is prone to be kicked off if the kick-off threshold is high. To ensure that the client can normally access the Internet, you are advised to set this parameter to **Disable** or a value smaller than -75 dBm.

Note

- Wireless channels available for your selection are determined by the country code. Select the country code based on the country or region of your device.
- Channel, transmit power, and roaming sensitivity cannot be set globally, and the devices should be configured separately.

21.7 Configuring Wi-Fi Blocklist or Allowlist

21.7.1 Overview

You can configure the global or SSID-based blocklist and allowlist. The MAC address supports full match and OUI match.

Wi-Fi blocklist: Clients in the Wi-Fi blocklist are prevented from accessing the Internet. Clients that are not added to the Wi-Fi blocklist are free to access the Internet.

Wi-Fi allowlist: Only clients in the Wi-Fi allowlist can access the Internet. Clients that are not added to the Wi-Fi allowlist are prevented from accessing the Internet.

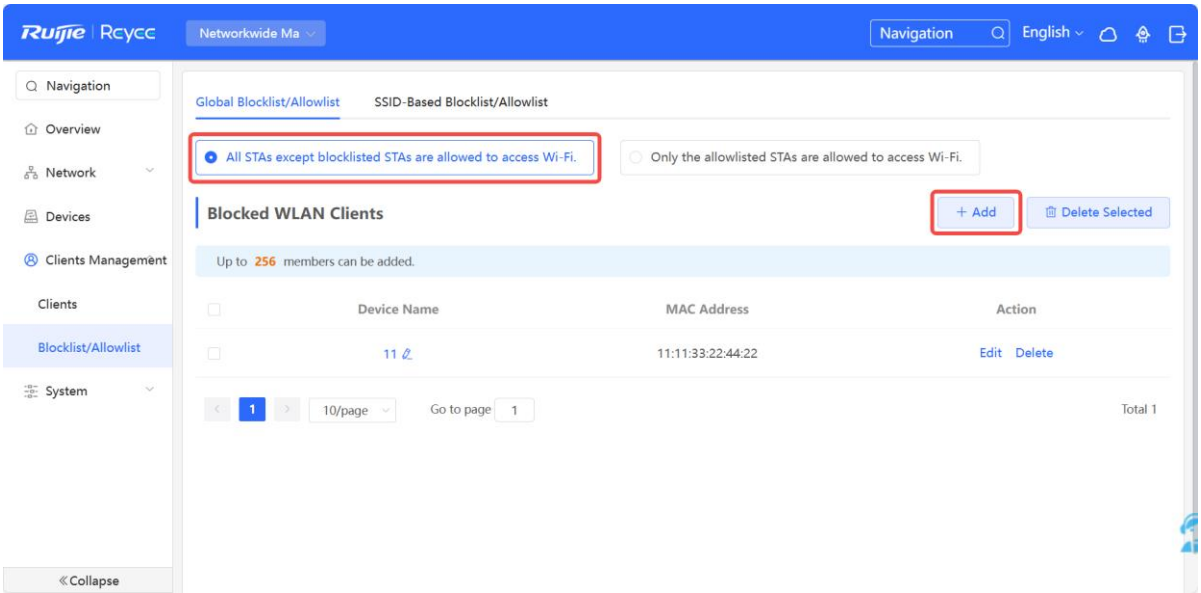
Caution

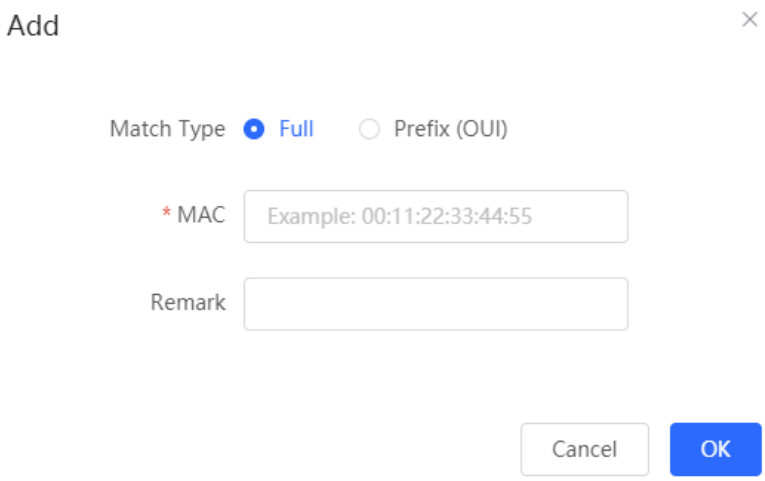
If the allowlist is empty, the allowlist does not take effect. In this case, all clients are allowed to access the Internet.

21.7.2 Configuring a Global Blocklist/Allowlist

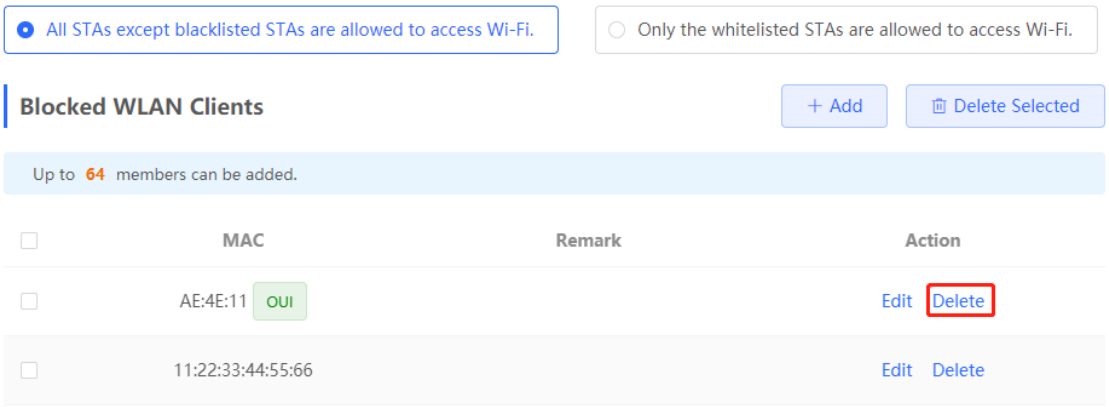
Choose **Clients Management** > **Blocklist/Allowlist** > **Global Blocklist/Allowlist**.

Select the blocklist or allowlist mode and click **Add** to configure a blocklist or allowlist client. In the **Add** window, enter the MAC address and remark of the target client and click **OK**. If a client is already associated with the access point, its MAC address will pop up automatically. Click the MAC address directly for automatic input. All clients in the blocklist will be forced offline and not allowed to access the Wi-Fi network. The global blocklist and allowlist settings take effect on all Wi-Fi networks of the access point.





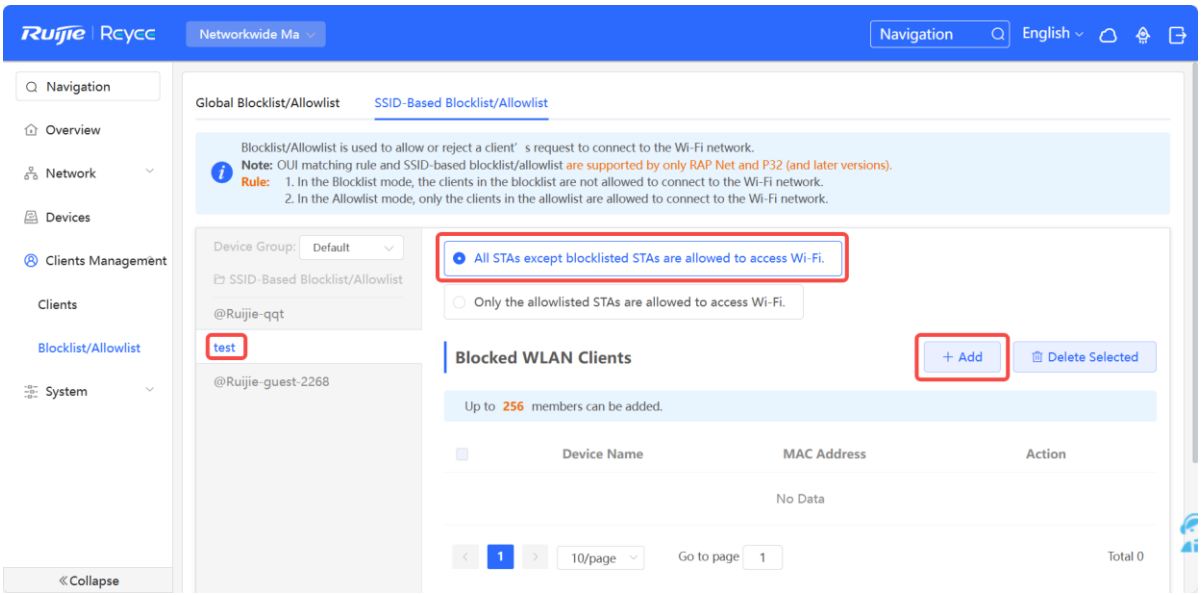
If you click **Delete** in black list mode, the corresponding client can reconnect to Wi-Fi; if you click **Delete** in allowlist mode and the allowlist list is not empty after deletion, the corresponding client will be disconnected and prohibited from connecting to Wi-Fi.



21.7.3 Configuring an SSID-based Blocklist/Allowlist

Choose **Clients** > **Blocklist/Allowlist** > **SSID-Based Blocklist/Allowlist**.

Select a target Wi-Fi network from the left column, select the blocklist or allowlist mode, and click **Add** to configure a blocklist or allowlist client. The SSID-based blocklist and allowlist will restrict the client access to the specified Wi-Fi.



21.8 Wireless Network Optimization with One Click

Caution

- WIO is supported only in the self-organizing network mode.
- The client may be offline during the optimization process. The configuration cannot be rolled back once optimization starts. Therefore, exercise caution when performing this operation.

21.8.1 Network Optimization

Choose **Networkwide Management > Network** > **WIO** > **Network Optimization**.

(1) Select the optimization mode. Then, click **OK** to optimize the wireless network.

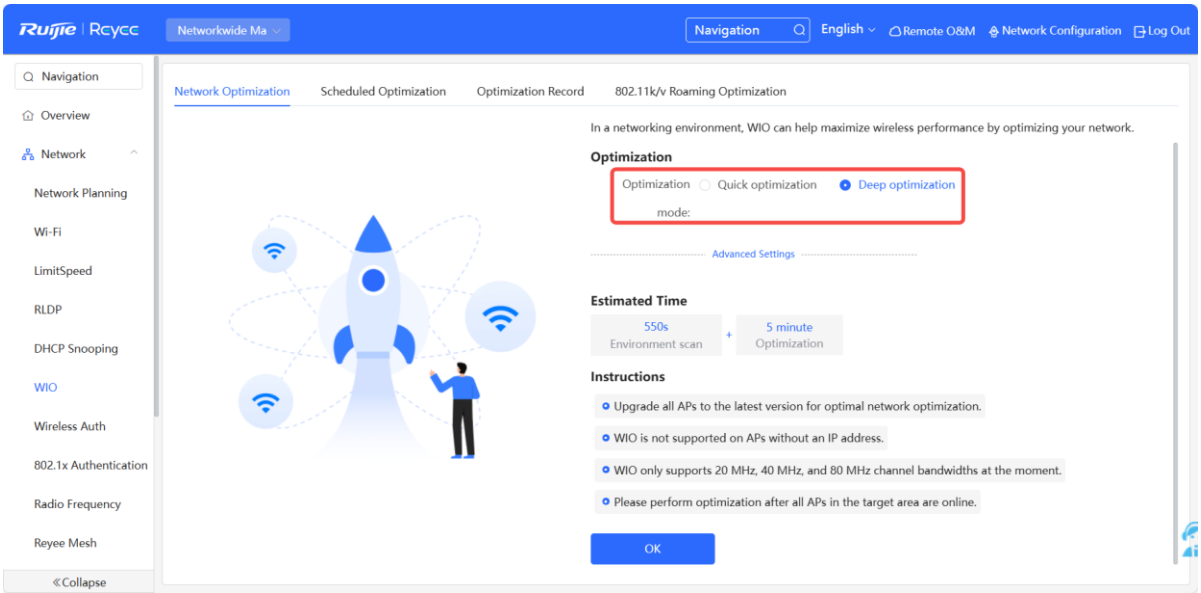
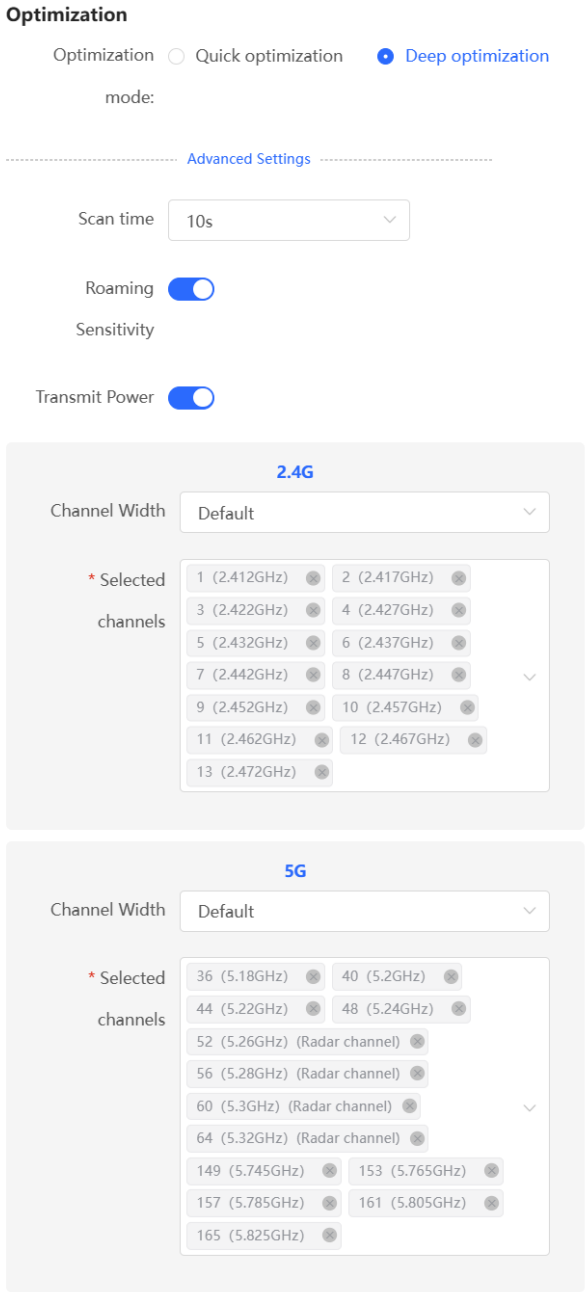


Table 21-1 Description of Optimization Mode

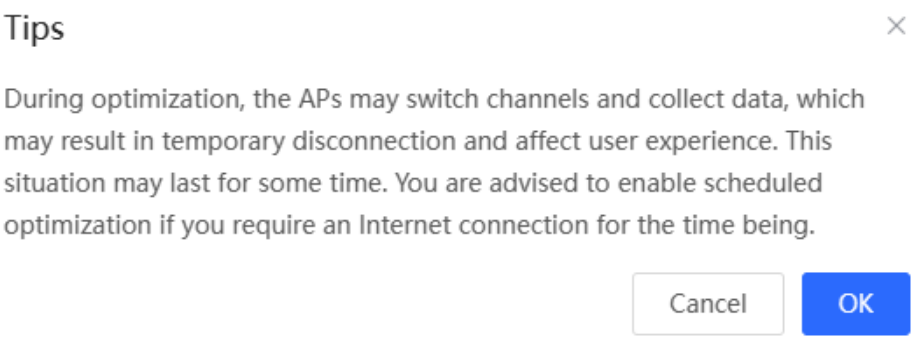
Parameter	Description
Quick optimization	In this mode, external interference and bandwidth are not considered. A quick optimization is performed to optimize channel, power, and management frame power.

Deep optimization	In this mode, external interference and bandwidth are considered. A deep optimization is performed to optimize channel, power, and management frame power. Click to expand Advanced Settings to configure the scanning time, channel bandwidth and channels.
	● Scan time: Indicates the time for scanning channels during the optimization.
	● Roaming Sensitivity: The roam sensitivity can be optimized based on the actual environment to ensure fast roaming of wireless devices.
	● Transmit power: Increasing the transmit power enhances both the strength and coverage of the wireless signal, but it may also introduce interference to surrounding wireless networks. With this feature enabled, the AP will automatically adjust the transmit power based on the environment.
	● 2.4G
	  ○ Channel bandwidth: Indicates the channel bandwidth. The channel bandwidth will be calculated by the system if Default is selected.
	  ○ Selected channels: Indicates the channels to be optimized.
	● 5G
	  ○ Channel bandwidth: Indicates the channel bandwidth. The channel bandwidth will be calculated by the system if Default is selected.
	  ○ Selected channels: Indicates the channels to be optimized.

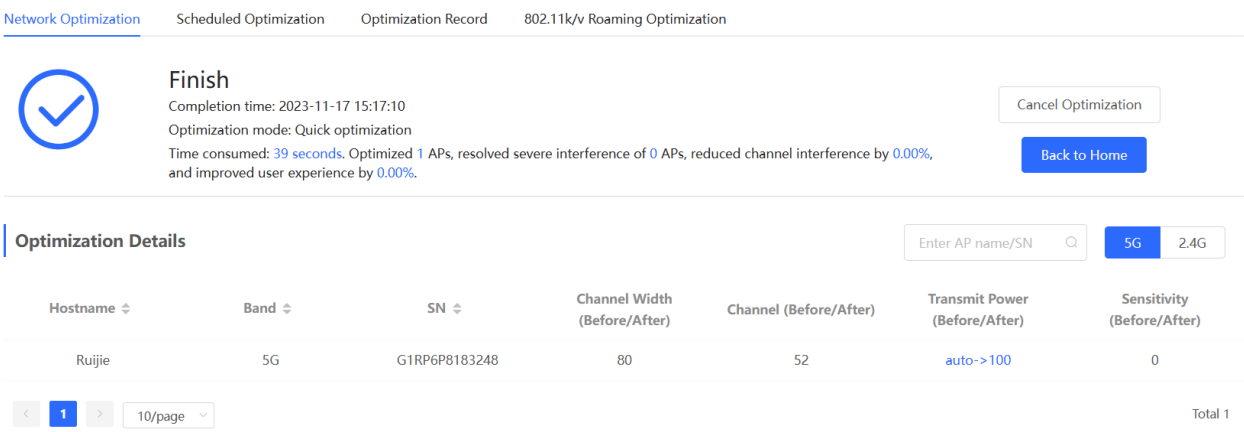
When the **Optimization mode** is configured as **Deep optimization**, expand the **Advanced Settings** to set the scanning time, channel bandwidth and selected channels.



(2) Confirm the tips, and Click **OK**.



After optimization starts, please wait patiently until optimization is complete. After optimization ends, click **Cancel Optimization** to restore optimized RF parameters to default values.



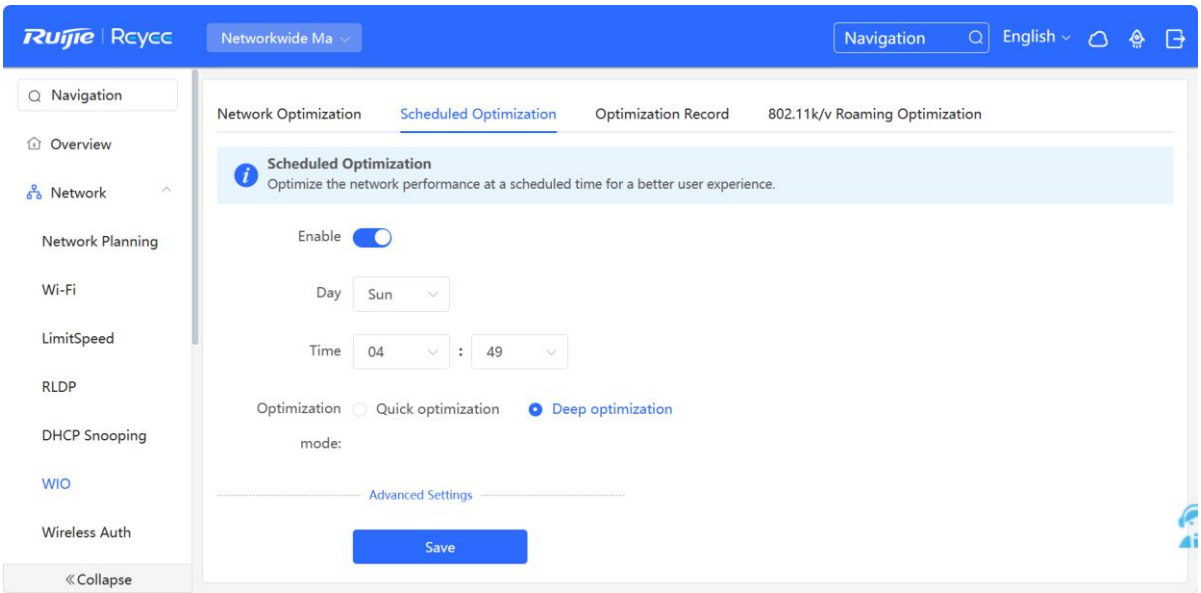
21.8.1 Scheduled Wireless Optimization

You can configure scheduled optimization to optimize the network at the specified time. You are advised to set the scheduled optimization time to daybreak or the idle periods.

⚠ Caution

Clients may be kicked offline during optimization and the configuration cannot be rolled back after optimization starts. Exercise caution when performing this operation.

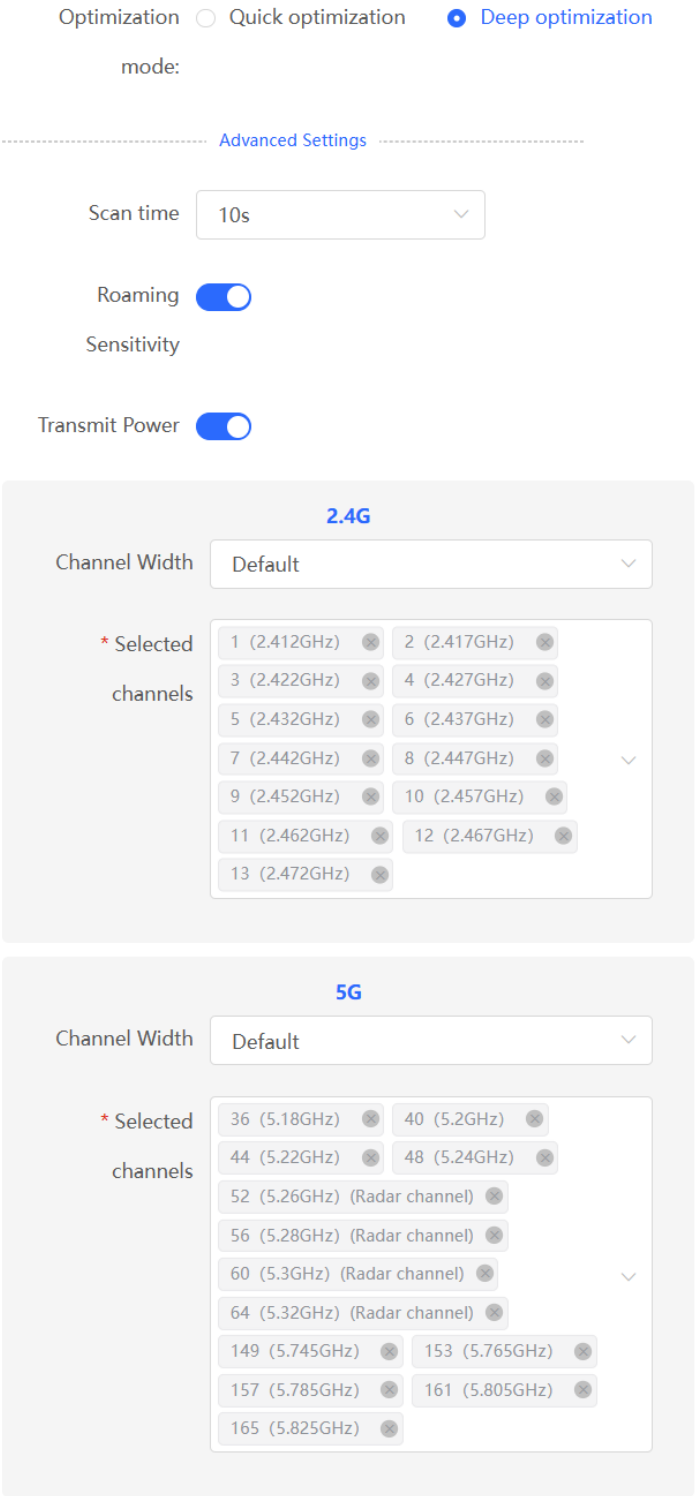
Choose **Networkwide Management > Network** > **WIO** > **Scheduled Optimization**.



(1) Configure the scheduled time.

(2) Select the optimization mode.

(3) (Optional) When the **Optimization Mode** is configured as **Deep optimization**, expand the **Advanced Settings** to set the scanning time, channel bandwidth and selected channels.



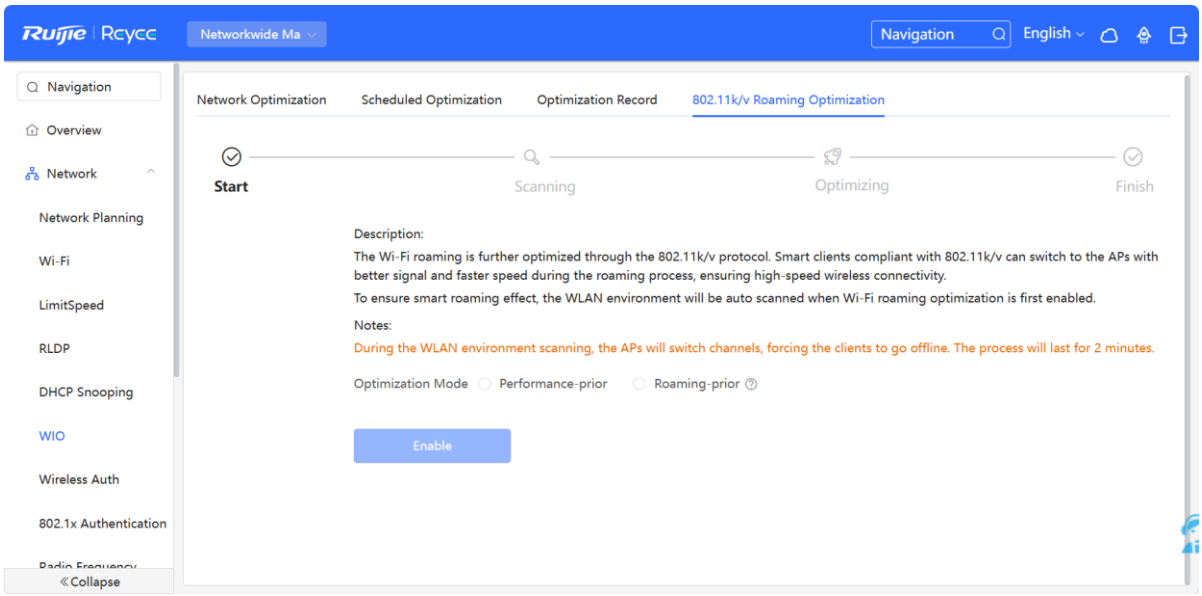
(4) Click **Save**.

21.8.2 Wi-Fi Roaming Optimization (802.11k/v)

Wi-Fi roaming is further optimized through the 802.11k/802.11v protocol. Smart endpoints compliant with IEEE 802.11k/v can switch association to the access points with better signal and faster speed, thereby ensuring high-speed wireless connectivity.

To ensure high quality of smart roaming service, the WLAN environment will be automatically scanned when Wi-Fi roaming optimization is first enabled.

Choose **Networkwide Management > Network** > **WIO** > **Wi-Fi Roaming Optimization (802.11k/v)**.



Caution

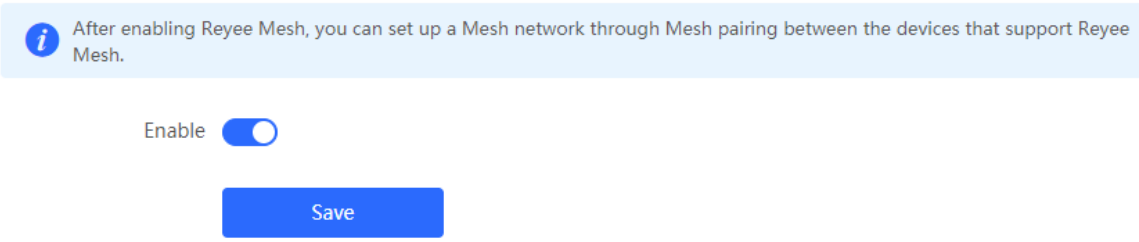
During the optimization, the clients may be forced offline. Please proceed with caution.

Select the **Optimization Mode**. Click **Enable** and the optimization starts.

21.9 Enabling the Reyee Mesh Function

Choose **Network** > **Reyee Mesh**.

After the Reyee Mesh function is enabled, the devices that support EasyLink can be paired to form a mesh network. Devices can automatically search for new routers around them and pair with each other via the **Mesh** button, or log in to the router management page to search and select a new router for pairing.



21.10 Configuring the AP Ports

Caution

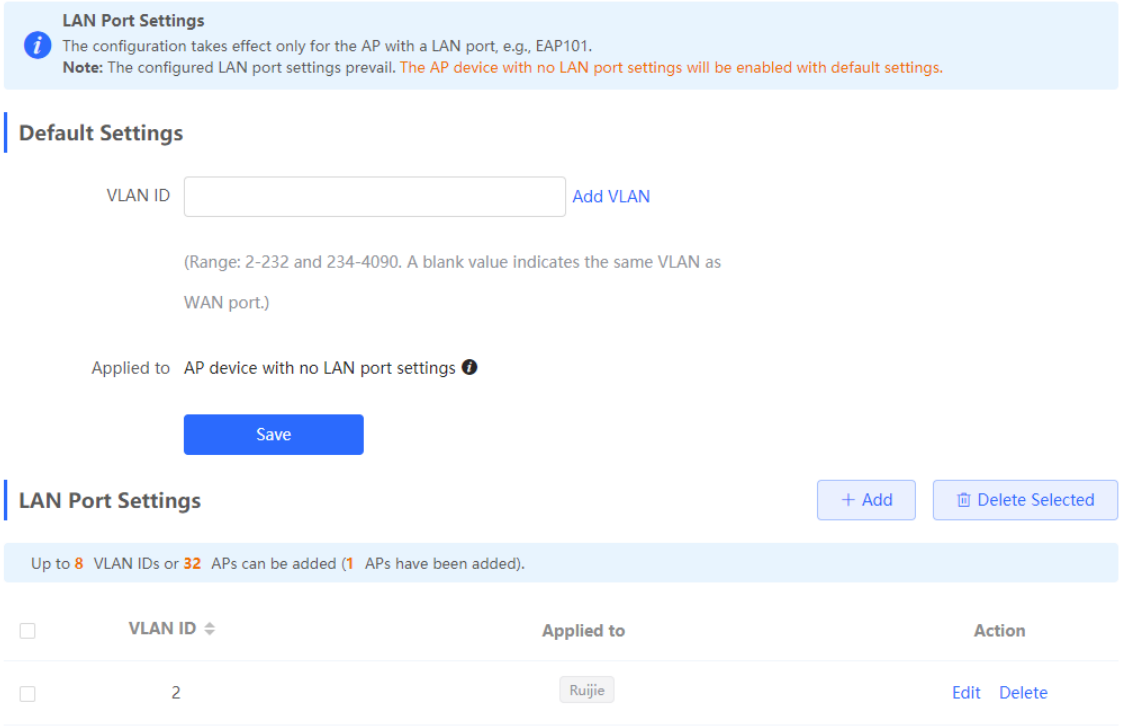
The configuration takes effect only on APs having wired LAN ports.

Choose **Network** > **LAN Ports**.

Choose **Network** > **LAN Ports**.

Enter the VLAN ID and click **Save** to configure the VLAN, to which the AP wired ports belong. If the VLAN ID is null, the wired ports and WAN port belong to the same VLAN.

In self-organizing network mode, the AP wired port configuration applies to all APs having wired LAN ports on the current network. The configuration applied to APs in **LAN Port Settings** takes effect preferentially. Click **Add** to add the AP wired port configuration. For APs, to which no configuration is applied in **LAN Port Settings**, the default configuration of the AP wired ports will take effect on them.



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