Tenda

User Guide

2.5G Enterprise Router

www.tendacn.com

Copyright statement

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Preface

Thank you for choosing Tenda. This guide is a complement to Quick Installation Guide. The Quick Installation Guide provides instructions for quick internet setup, while this guide contains details of each function and demonstrates how to configure them.

Applicable product

This user guide is applicable to Tenda 2.5G Enterprise Routers. All screenshots herein, unless otherwise specified, are taken from G300-FV1.0.

Conventions

This guide is for reference only and does not imply that the product supports all functions in the guide. The functions may differ with different product models or different versions of the same model. The actual product prevails.

The product figures and screenshots in this guide are for illustration only. They may be different from the actual products you purchased, but do not affect the normal use.

If the function or parameter is displayed in gray on the product web interface, the product model is not supported or cannot be modified.

The typographical elements that may be found in this document are defined as follows.

Item	Presentation	Example
Cascading menus	>	Internet Settings > LAN Setup
Parameter and value	Bold	Set **SSID** to **Tom**.
Variable	Italic	Format: *XX:XX:XX:XX:XX:XX*
UI control	Bold	On the **Quick Setup** page, click the **Save** button.

The symbols that may be found in this document are defined as follows.

Symbol	Meaning
NOTE	This format is used to highlight information of importance or special interest. Ignoring this type of note may result in ineffective configurations, loss of data or damage to device.
TIP	This format is used to supplement or explain relevant operations.

For more documents

Go to our website at www.tendacn.com and search for the latest documents for this product.

Technical support

Contact us if you need more help. We will be glad to assist you as soon as possible.

Email: support@tenda.com.cn

Website: www.tendacn.com

Revision history

Tenda is constantly searching for ways to improve its products and documentation. The following table indicates any changes that might have been made since the user guide was released.

Version	Description	Date
V1.0	Original publication.	2024-11-03

Contents

1 Operating mode

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

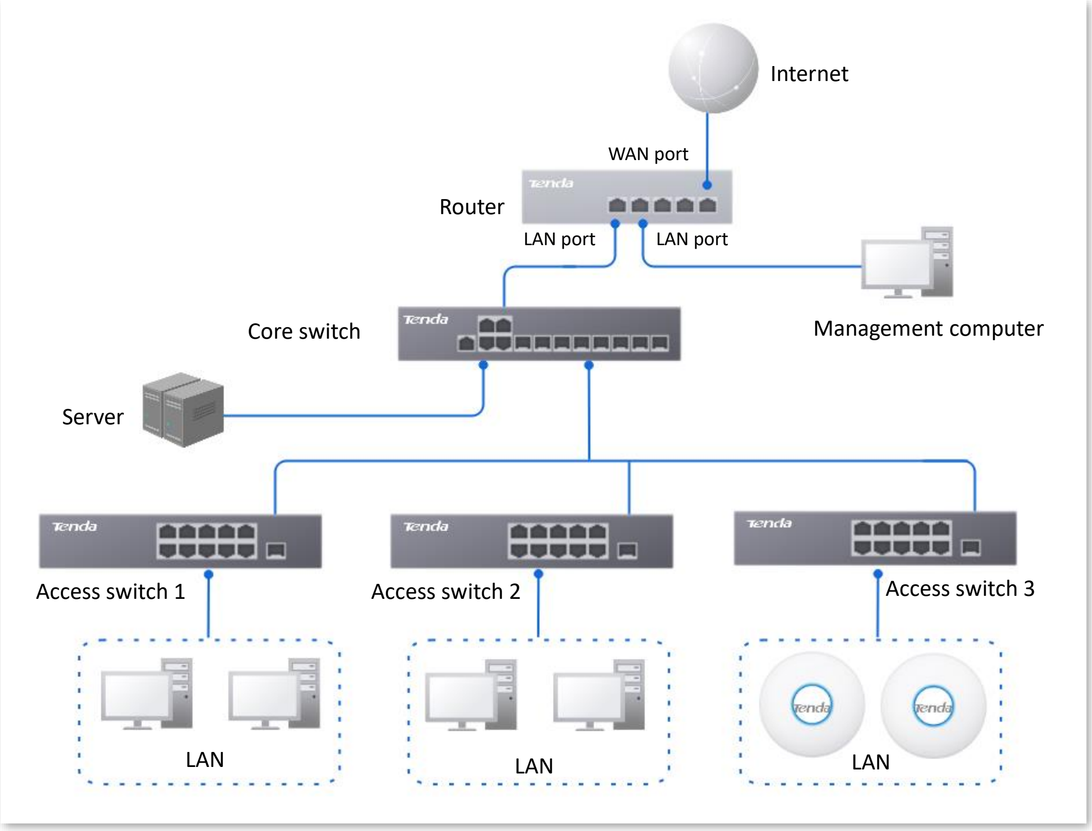
Choose the appropriate mode according to the actual situation. G300-F working in router mode is taken as an example.

- Router Mode: The device is used as a router and wireless controller, providing internet access, routing forward, AP management, behavioral audit and more. In this mode, the device needs to process both control packets and data packets.
- Pure AC Mode: The device is used as a wireless controller to provide functions such as AP management and behavioral audit. In this mode, data packets no longer pass through the device, and the device only needs to process control packets.

1.1 Router mode

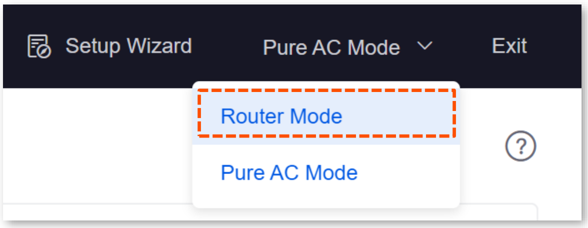
1.1.1 Overview

In router mode, the device is used as a router and wireless controller, which is generally deployed at the egress gateway to proxy the LAN to access the internet. The application scenario is as follows.

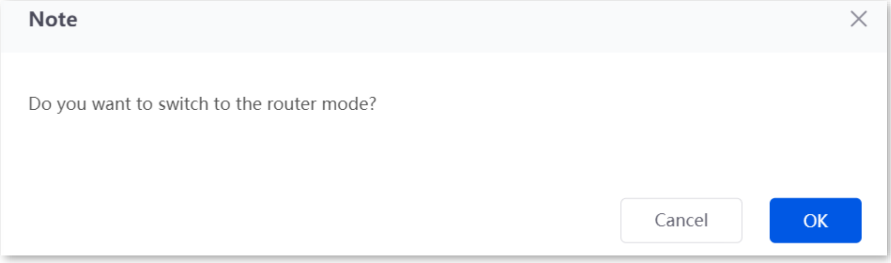


1.1.2 Set the router to router mode

Step 1 Log in to the web UI of the router, and select **Router Mode** from the mode selection drop-down menu at the top right of the page.



Step 2 Confirm the prompt information and click **OK**.


Note

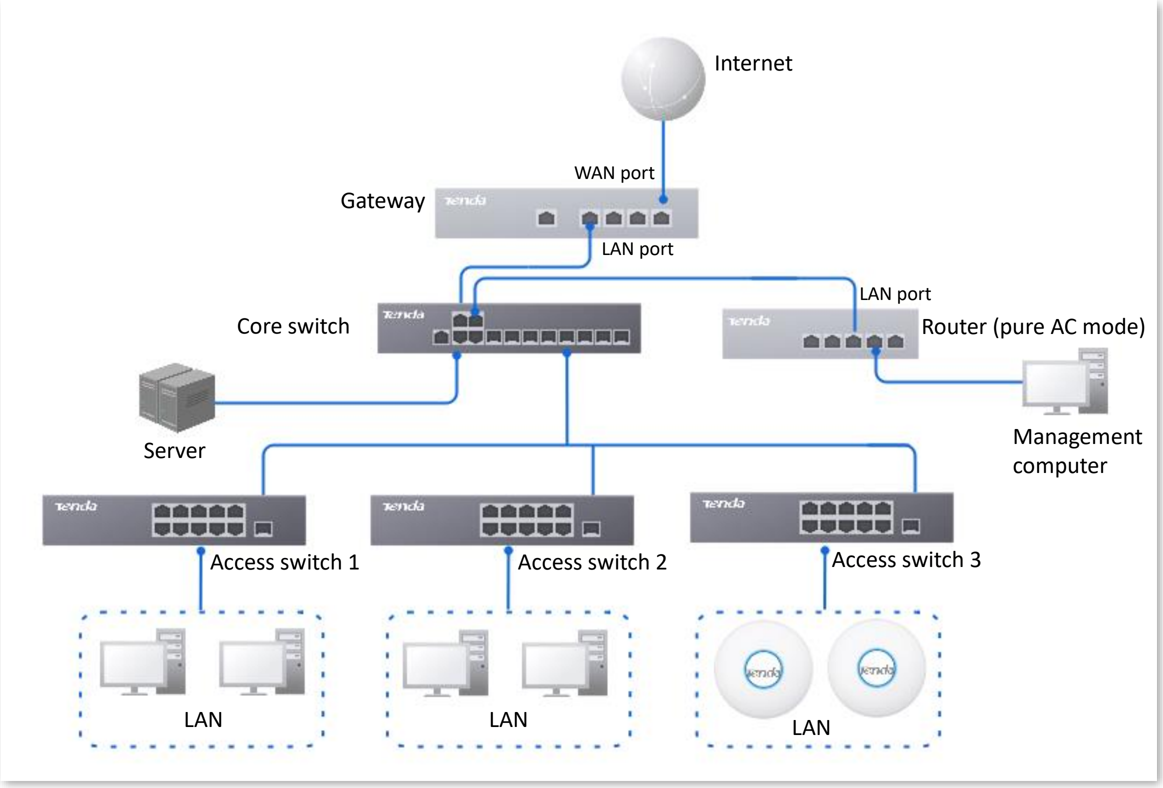
Do you want to switch to the router mode?

----End

1.2 Pure AC mode

1.2.1 Overview

In pure AC mode, the device is used as a wireless controller, which can be deployed under the managed switch. The application scenario is as follows.

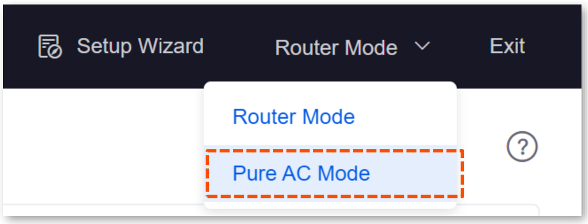


TIP

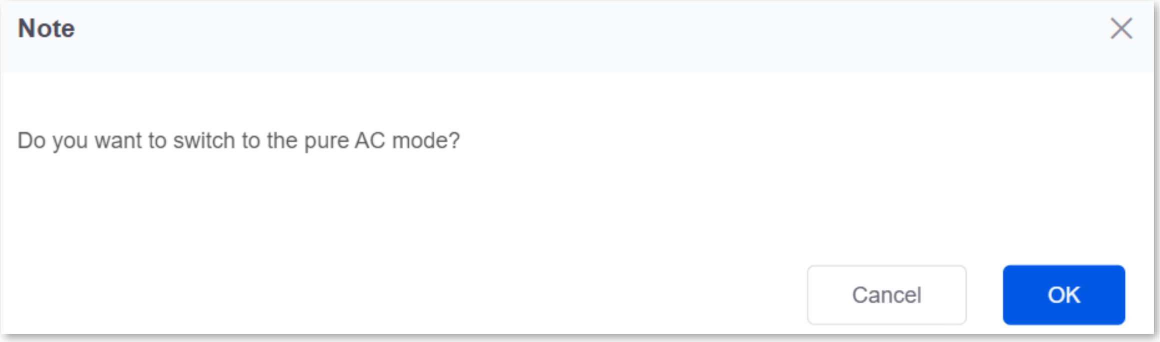
In pure AC mode, if you want to use the remote web management, cloud maintenance and remote debugging functions of the router, connect the router to the internet first. For details, refer to Connect the router to the internet in Pure AC mode.

1.2.2 Set the router to pure AC mode

Step 1 Log in to the web UI of the router, and select **Pure AC Mode** from the mode selection drop-down menu at the top right of the page.



Step 2 Confirm the prompt information and click **OK**.



Note

Do you want to switch to the pure AC mode?

---End

2 Login and logout

2.1 Login

Upon your first use or reset of the router, please set up the router by referring to the router's quick installation guide (visit www.tendacn.com to download).

If you want to log in to the web UI of the router, follow the procedures below.

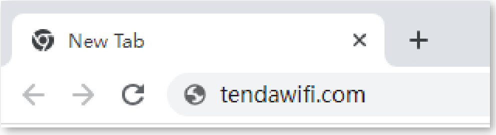
2.1.1 LAN login

Log in to the web UI in router mode

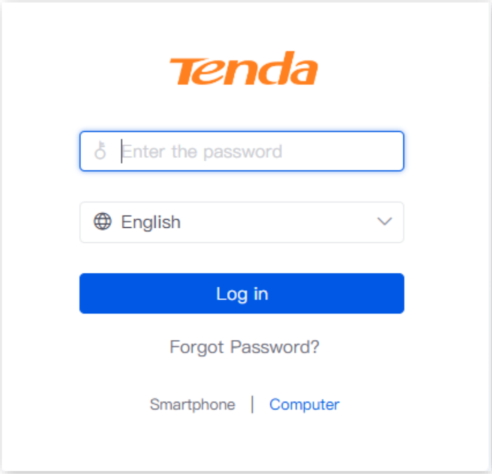
Login with computer

Step 1 Use an Ethernet cable to connect the management computer to the LAN port of the router, or a switch connected to the LAN port of the router.

Step 2 Start a web browser (such as Chrome) on your computer, and enter **tendawifi.com** in the address bar to log in to the web UI of the router.



Step 3 Enter the login password, and click **Log in**.

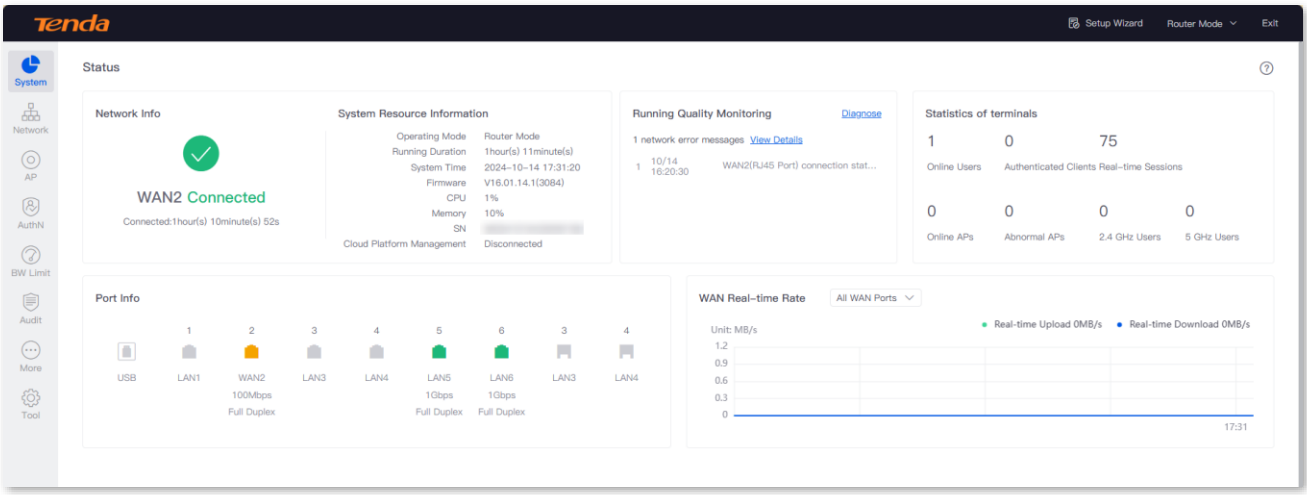


----End

TIP

- **If the wrong password error is displayed on the page, try the following solutions:**
  - When you set up the router for the first time, the system will use the same password for both wireless network and login by default. If you are not sure whether the login password has been set, enter the wireless password and try again.
  - Restore the router to factory settings and retry. Note that the router must be connected to the internet again after restoration.
- **If the login page does not appear, try the following solutions:**
  - Ensure that the Ethernet port of the router is properly connected and the Ethernet cable is not loose.
  - Set your computer to **Obtain an IP address automatically** and **Obtain DNS server address automatically**.
  - Ensure that you have entered **tendawifi.com** in the browser address bar (not the search bar).
  - Try to log in to the web UI of the router with the LAN port IP address. It is **192.168.0.252** by default. If the router detects an IP address conflict, it will automatically change its LAN port IP address. In this case, the default gateway of the management computer is the new LAN port IP address of the router.
  - Restore the router to factory settings and retry. Note that the router needs to be connected to the internet again after the reset.

If the following page is displayed, you have logged in to the web UI successfully.



Status

Network Info

WAN2 Connected

Connected:1hour(s) 10minute(s) 52s

System Resource Information

Operating Mode Router Mode
Running Duration 1hour(s) 11minute(s)
System Time 2024-10-14 17:31:20
Firmware V16.01.14.1(3084)
CPU 1%
Memory 10%
SN [redacted]
Cloud Platform Management Disconnected

Running Quality Monitoring

1 network error messages

1 10/14 16:20:30 WAN2(RJ45 Port) connection stat...

Statistics of terminals

1	0	75	
Online Users	Authenticated Clients	Real-time Sessions	
0	0	0	0
Online APs	Abnormal APs	2.4 GHz Users	5 GHz Users

Port Info

	1	2	3	4	5	6	3	4
USB	LAN1	WAN2 100Mbps Full Duplex	LAN3	LAN4	LAN5 1Gbps Full Duplex	LAN6 1Gbps Full Duplex	LAN3	LAN4

WAN Real-time Rate

Unit: MB/s

● Real-time Upload 0MB/s ● Real-time Download 0MB/s

Login with smartphone

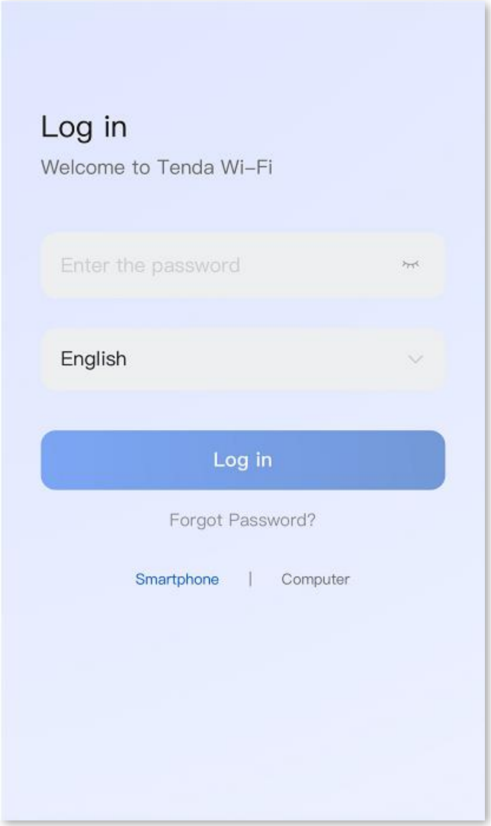
It is suitable for the router LAN port is connected to the AP or the PoE switch on the LAN side of the router is connected to the AP.

Step 1 Connect a WiFi-enabled device such as a smartphone to the AP’s wireless network.

- APs that have been managed by the router: The SSID (wireless name) and wireless password have been set by you. If not, the default SSID is Tenda_*XXXXXX* (*XXXXXX* is the last six digits of the router's MAC address on the label of the router. No password by default).
- APs that have not been managed by the router: The SSID and wireless password is the existing SSID and wireless password of the AP.

Step 2 Start a browser on your smartphone, and enter **tendawifi.com** in the address bar to log in to the web UI.

Step 3 Enter the login password, and click **Log in**. The following figure is for reference.



Log in

Welcome to Tenda Wi–Fi

TIP

– **If the wrong password error is displayed on the page, try the following solutions:**

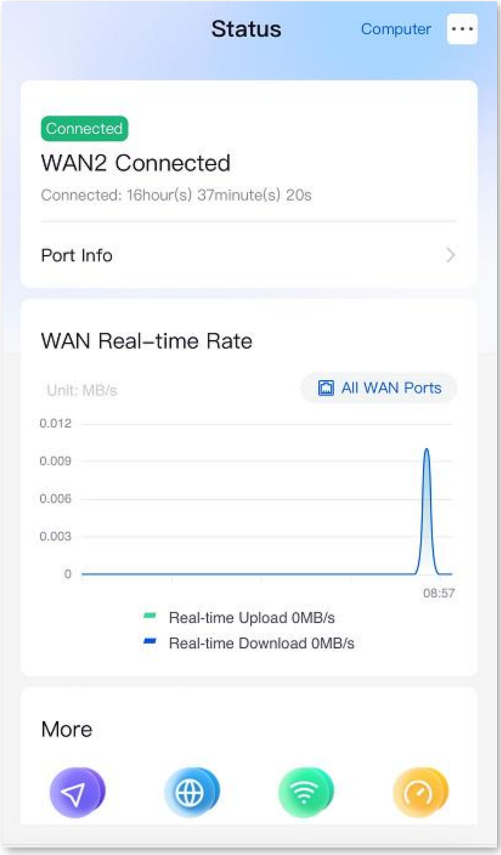
- When you set up the router for the first time, the system will use the same password for both wireless network and login by default. If you are not sure whether the login password has been set, enter the wireless password and try again.
- Restore the router to factory settings and retry. Note that the router must be connected to the internet again after restoration.

– **If the login page does not appear, try the following solutions:**

- Ensure that the AP is working properly and the smartphone is connected to the correct wireless network.
- Ensure that you have entered **tendawifi.com** in the browser address bar (not the search bar).
- Restore the router to factory settings and retry. Note that the router must be connected to the internet again after restoration.

----End

If the following page is displayed, you have logged in to the web UI successfully. The following figure is for reference.



Status

Computer

Connected

WAN2 Connected

Connected: 16hour(s) 37minute(s) 20s

Port Info

WAN Real-time Rate

Unit: MB/s

All WAN Ports

Real-time Upload 0MB/s

Real-time Download 0MB/s

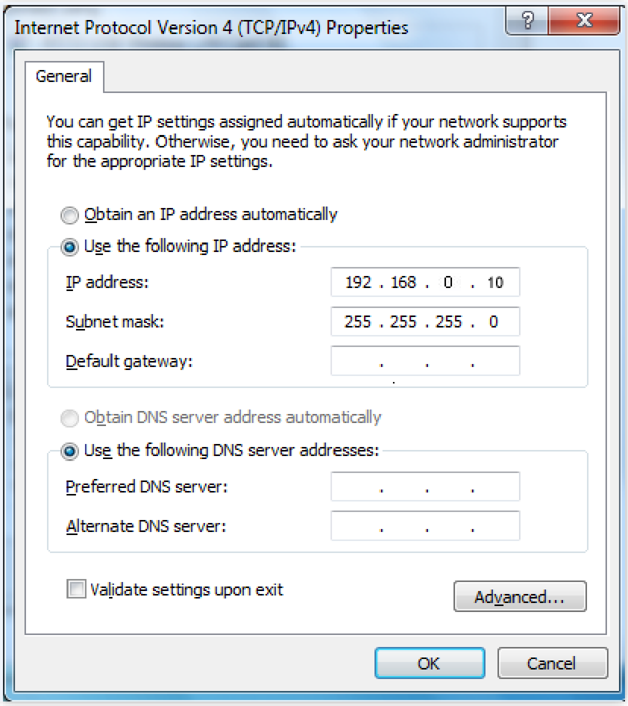
More

Log in to the web UI in pure AC mode

Step 1 Use an Ethernet cable to connect the management computer to the LAN port of the router, or a switch connected to the LAN port of the router.

Step 2 Configure the IP address of the management computer to the same network segment as the IP address of the router.

For example, if the IP address of the router is **192.168.0.252**, you can set the IP address of the computer to **192.168.0.*X*** (*X* ranges from 2 - 251 and is not occupied by other devices), and the subnet mask to **255.255.255.0**.



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 0 . 10

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

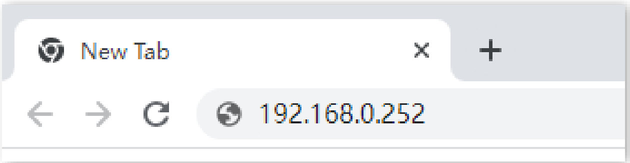
● Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

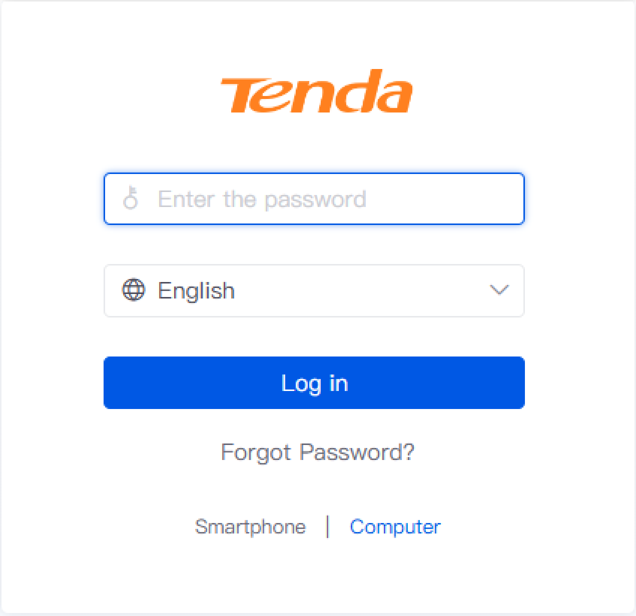
□ Validate settings upon exit

Step 3 Start a browser on the computer and visit the IP address (**192.168.0.252** by default) of the router.



192.168.0.252

Step 4 Enter the login password, and click **Log in**.

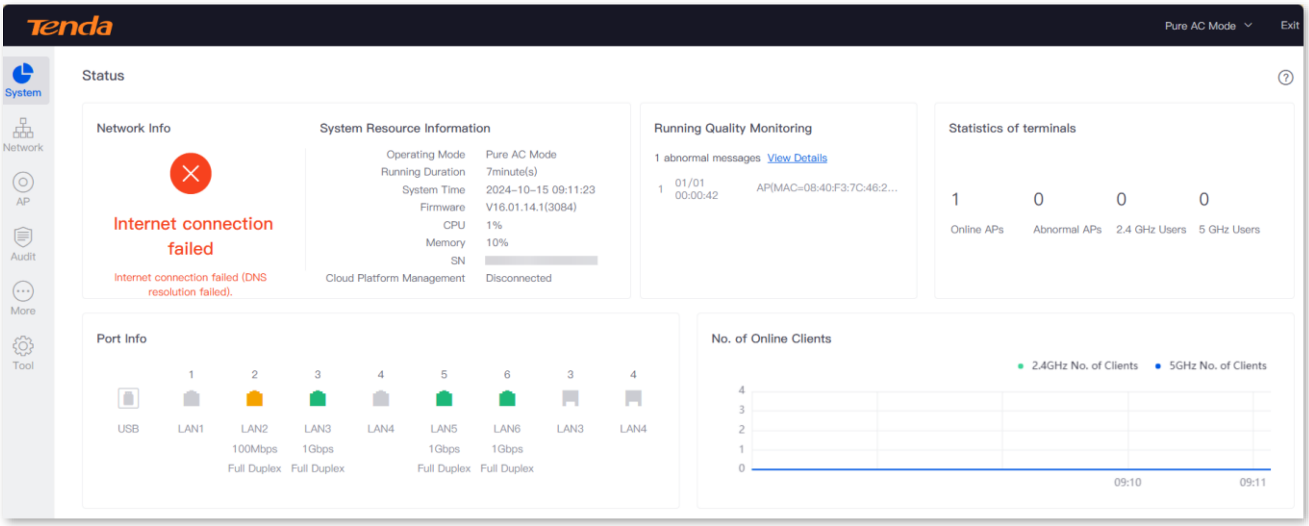


---End

TIP

If the above page does not appear, ensure that the Ethernet port of the router is connected to the computer correctly and securely.

If the following page is displayed, you have logged in to the web UI successfully.



Internet connection failed

Internet connection failed (DNS resolution failed).

Operating Mode	Pure AC Mode
Running Duration	7minute(s)
System Time	2024-10-15 09:11:23
Firmware	V16.01.14.1(3084)
CPU	1%
Memory	10%
SN	[redacted]
Cloud Platform Management	Disconnected

1 abnormal messages View Details

1 01/01 00:00:42 AP(MAC=08:40:F3:7C:46:2...

1	0	0	0
Online APs	Abnormal APs	2.4 GHz Users	5 GHz Users

	1	2	3	4	5	6	3	4
USB	LAN1	LAN2	LAN3	LAN4	LAN5	LAN6	LAN3	LAN4
		100Mbps	1Gbps		1Gbps	1Gbps		
		Full Duplex	Full Duplex		Full Duplex	Full Duplex		

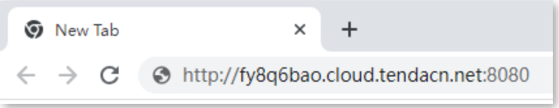
2.1.2 Remote login

The login mode is applicable when the router has enabled the remote web management function.

TIP

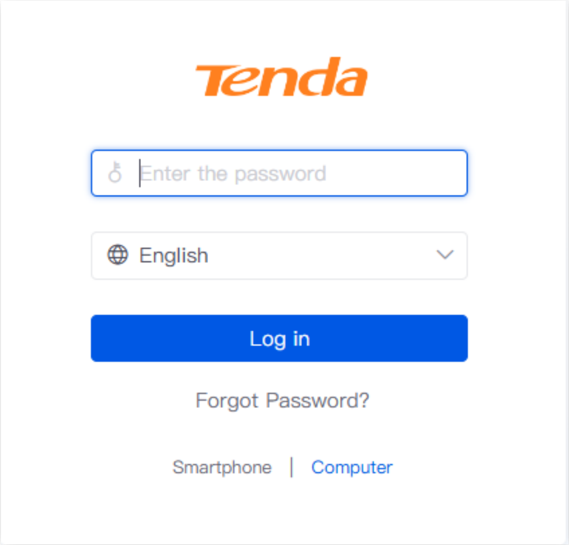
Before using this mode to log in, ensure that your client device has been allowed to remotely access the router.

Step 1 Start a web browser (such as Chrome) on a client connected to the internet, and access the router's remote management address. The following figure is for reference only.



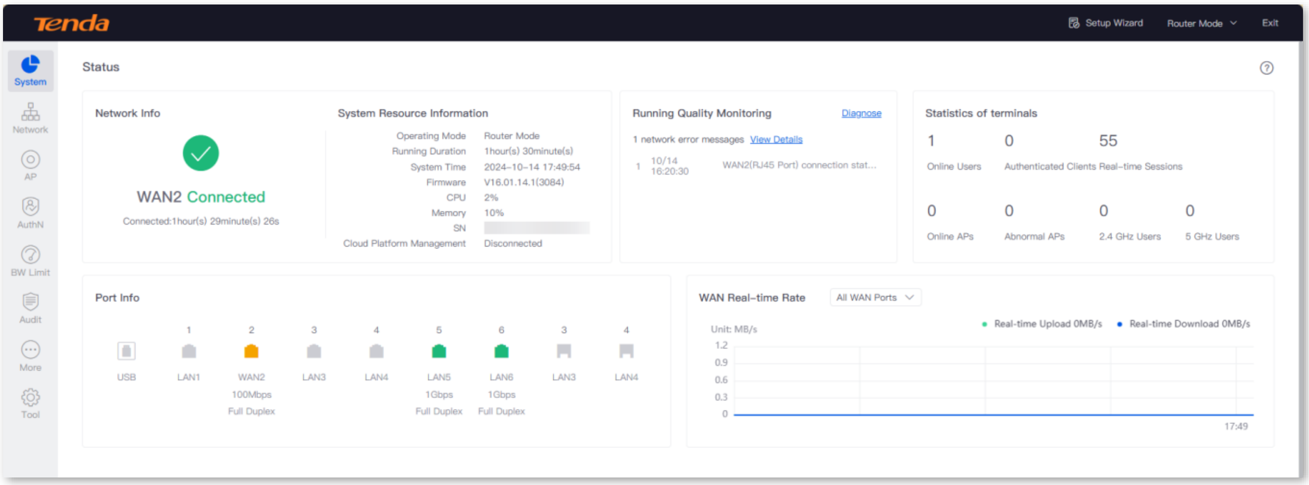
http://fy8q6bao.cloud.tendacn.net:8080

Step 2 Enter the login password, and click **Log in**.



----End

If the following page is displayed, you have logged in to the web UI successfully.



Network Info

WAN2 Connected

Connected:1hour(s) 29minute(s) 26s

System Resource Information

Operating Mode: Router Mode
Running Duration: 1hour(s) 30minute(s)
System Time: 2024-10-14 17:49:54
Firmware: V16.01.14.1(3084)
CPU: 2%
Memory: 10%
SN:
Cloud Platform Management: Disconnected

Running Quality Monitoring

1 network error messages

1 10/14 16:20:30 WAN2(RJ45 Port) connection stat...

Statistics of terminals

1	0	55	
Online Users	Authenticated Clients	Real-time Sessions	
0	0	0	0
Online APs	Abnormal APs	2.4 GHz Users	5 GHz Users

Port Info

	1	2	3	4	5	6	3	4
USB	LAN1	WAN2 100Mbps Full Duplex	LAN3	LAN4	LAN5 1Gbps Full Duplex	LAN6 1Gbps Full Duplex	LAN3	LAN4

WAN Real-time Rate

● Real-time Upload 0MB/s ● Real-time Download 0MB/s

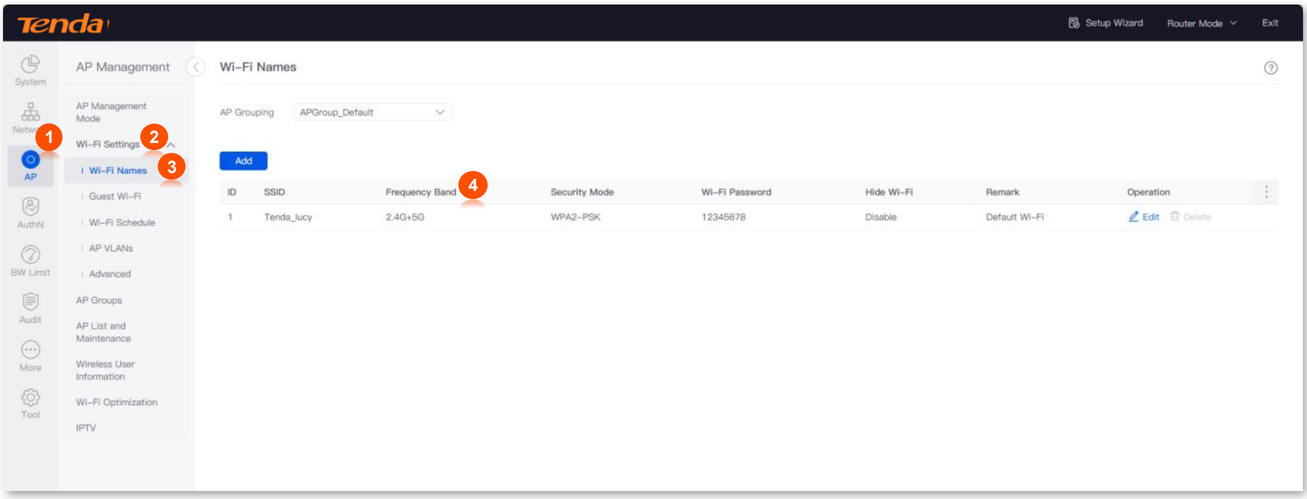
2.2 Logout

After you log in to the web UI of the router, the system will automatically log you out if there is no operation within the Login Timeout. Alternatively, you can directly click **Exit** on the upper right corner to exit the web UI.

3 Web UI

3.1 Web layout

The web UI of the router consists of four sections, including the level-1 navigation bar, level-2 navigation bar, level-3 navigation bar and the configuration area. See the following figure.



AP Grouping: APGroup_Default

ID	SSID	Frequency Band	Security Mode	Wi-Fi Password	Hide Wi-Fi	Remark	Operation
1	Tenda_lucy	2.4G+5G	WPA2-PSK	12345678	Disable	Default Wi-Fi	Edit Delete

TIP

Features and parameters in gray indicate that they are not available or cannot be modified under the current condition.

No.	Name	Description
1	Level-1 navigation bar	Used to display the function menu of the router. Users can select functions in the navigation bars and the configuration appears in the configuration area.
2	Level-2 navigation bar	
3	Level-3 navigation bar	
4	Configuration area	Used to modify or view your configuration.

3.2 Common elements

The common elements used on the web UI are as follows.

Button	Description
Add	Used to add new rules on the current page.
Save	Used to save the configuration on the current page and enable the configuration to take effect.
Cancel	Used to restore the original configuration without saving the configuration on the current page.
Edit	Used to edit the rules, policies or information.
Delete	Used to delete the rules on the current page.
(?)	Used to view the help information for the current page.
(!)	Used to view the help information of the corresponding setting.
⋮	Used to customize the list parameters to be displayed, or restore the list parameters display to the default state.

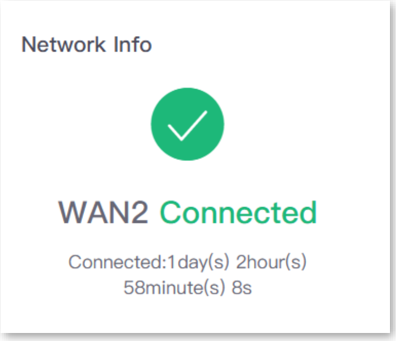
4 System status

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

4.1 View network information

Log in to the web UI of the router, and click **System** to enter the page.

In the **Network Info** module, you can quickly view the WAN port network status and connection duration of the router. For details, refer to Check connection status.

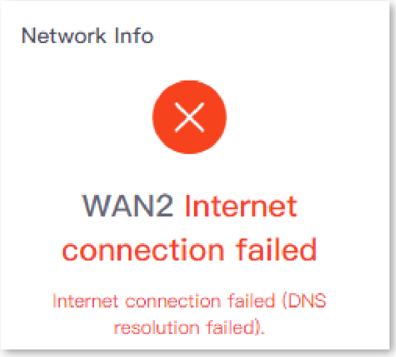


Network Info

WAN2 Connected

Connected:1day(s) 2hour(s) 58minute(s) 8s

If an error message is displayed, you can click ✕ to redirect to the Internet Settings page and check it. The following figure is for reference only.



Network Info

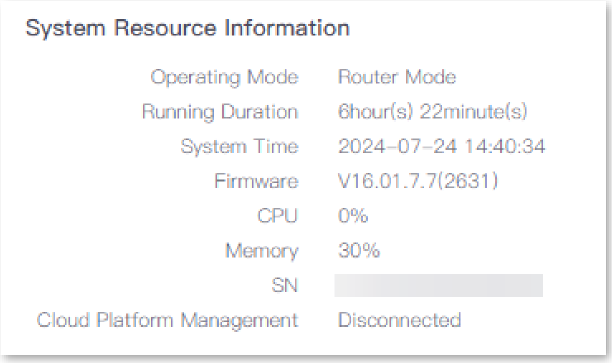
WAN2 Internet connection failed

Internet connection failed (DNS resolution failed).

4.2 View system resource information

Log in to the web UI of the router, and click **System** to enter the page.

In the **System Resource Information** module, you can view the system information of the router. The following figure is for reference only.



System Resource Information

Operating Mode	Router Mode
Running Duration	6hour(s) 22minute(s)
System Time	2024-07-24 14:40:34
Firmware	V16.01.7.7(2631)
CPU	0%
Memory	30%
SN	
Cloud Platform Management	Disconnected

Parameter description

Parameter	Description
Operating Mode	Specifies the operating mode of the router.
Running Duration	Specifies the time during which this router is operating since the last reboot.
System Time	Specifies the system time of the router.
Firmware	Specifies the firmware version of the router.
CPU	Specifies the CPU usage of the router.
Memory	Specifies the memory usage of the router.
SN	Specifies the serial number of the router, which is a unique identifier of the router. It can generally be found on the label of the router.
Cloud Platform Management	Specifies whether the router is connected to the Tenda CloudFi cloud platform.

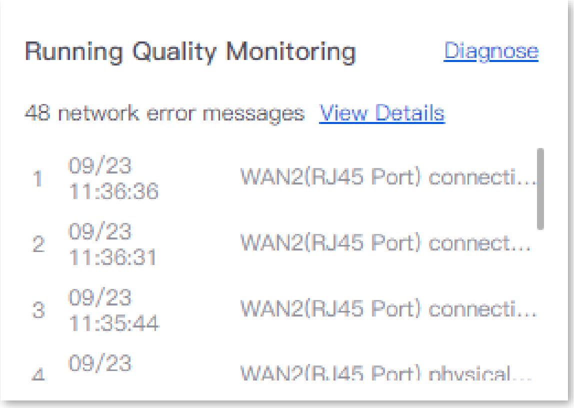
4.3 View running quality monitoring

Log in to the web UI of the router, and click **System** to enter the page.

In the **Running Quality Monitoring** module, you can view the error logs of the router. A maximum of 10 latest logs will be displayed. For details, click **View Details** to redirect to Network Monitoring Logs page.

TIP

If you need to detect the network status of the router, click **Diagnose** to redirect to Network Diagnosis page.



Running Quality Monitoring Diagnose

48 network error messages View Details

1	09/23 11:36:36	WAN2(RJ45 Port) connecti...
2	09/23 11:36:31	WAN2(RJ45 Port) connect...
3	09/23 11:35:44	WAN2(RJ45 Port) connecti...
4	09/23	WAN2(RJ45 Port) physical...

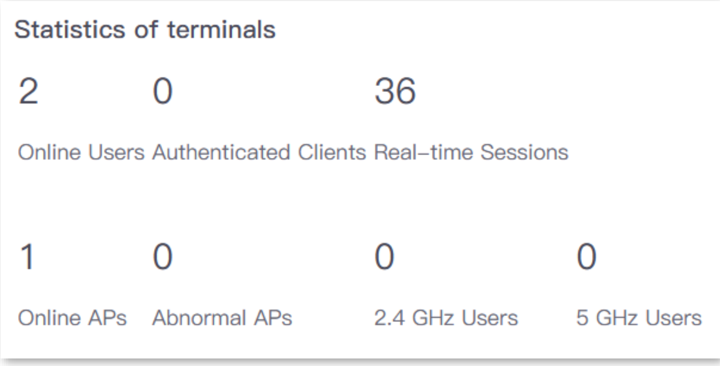
4.4 View statistics of terminals

Log in to the web UI of the router, and click **System** to enter the page.

In the **Statistics of terminals** module, you can view the statistics of terminals.

Router mode

Include basic information of the number of users and sessions connected to the router, the number of online and offline APs managed by the router, the number of users currently connected to the 2.4 GHz and 5 GHz network.



Statistics of terminals

2 Online Users

0 Authenticated Clients

36 Real-time Sessions

1 Online APs

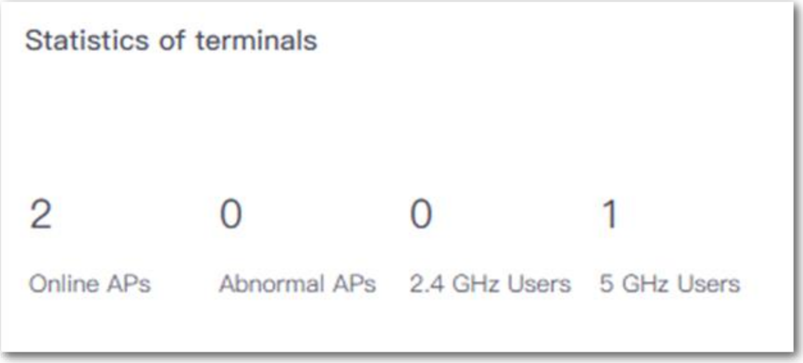
0 Abnormal APs

0 2.4 GHz Users

0 5 GHz Users

Pure AC mode

Include the number of online and offline APs managed by the router and the number of users currently connected to the 2.4 GHz and 5 GHz network.



Statistics of terminals

2 Online APs

0 Abnormal APs

0 2.4 GHz Users

1 5 GHz Users

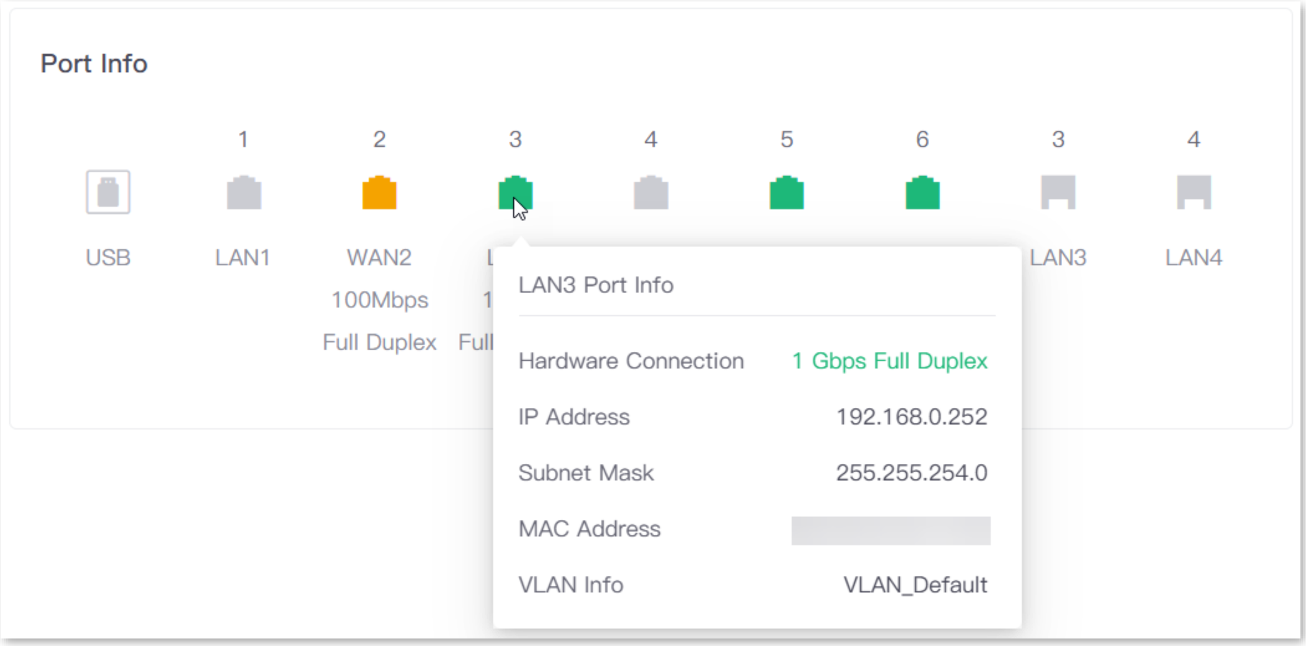
Parameter description

Parameter	Description
Online Users	Specifies the total number of online users.
Authenticated Clients	Specifies the number of online devices that have been authenticated and connected to the router.
Real-time Sessions	Specifies the number of concurrent connections of the router.
Online APs	Specifies the number of online APs. For details, refer to AP list and maintenance.
Abnormal APs	Specifies the number of offline APs. For details, refer to AP list and maintenance.
2.4 GHz Users	Specifies the number of users connected to the 2.4 GHz network. For details, refer to Wireless user information.
5 GHz Users	Specifies the number of users connected to the 5 GHz network. For details, refer to Wireless user information.

4.5 View port information

Log in to the web UI of the router, and click **System** to enter the page.

In the **Port Info** module, you can view the basic status of each port of the router. Hover the mouse over the port icon to view the physical connection status, IP address and other information of each port.



LAN3 Port Info

Hardware Connection	1 Gbps Full Duplex
IP Address	192.168.0.252
Subnet Mask	255.255.254.0
MAC Address	[redacted]
VLAN Info	VLAN_Default

Parameter description

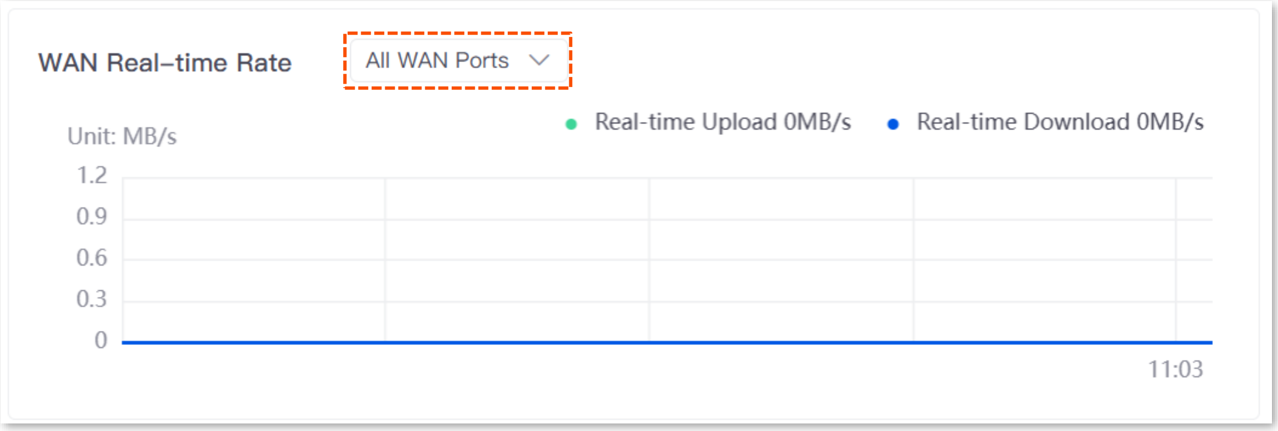
Parameter		**Description**
Ports		Specifies the roles and connection status of all ports of the router. – Green means the port is connected at 10 Gbps/1 Gbps. – Orange means the port is connected at 100 Mbps/10 Mbps. – Grey means the port is disconnected.
LAN Port Info	Hardware Connection	Specifies the connection status of the LAN port. – **Connection not detected** in red indicates that the Ethernet cable is not properly connected. – **Connected** indicates that the Ethernet cable is properly connected and the rate is being negotiated.
	IP Address	Specifies the IPv4 address of the LAN port.
	Subnet Mask	Specifies the subnet mask of the LAN port.
	MAC Address	Specifies the MAC address of the LAN port.
	VLAN Info	Specifies the VLAN of the LAN port.
WAN Port Info		Specifies the connection status of the WAN port.

4.6 View WAN real-time rate

Log in to the web UI of the router, and click **System** to enter the page.

In the **WAN Real-time Rate** module, you can view the upload and download rates of all WAN ports or a certain WAN port of the router.

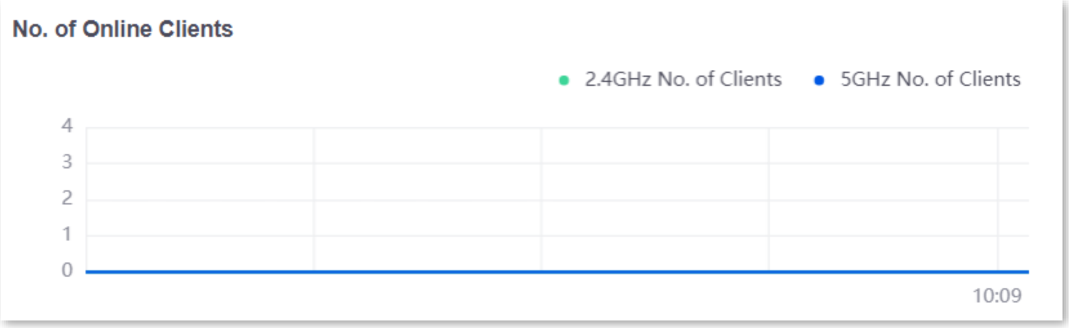
Click the drop-down box next to **WAN Real-time Rate** to select a certain WAN port of the router.



4.7 View online clients (Pure AC mode)

Log in to the web UI of the router, and click **System** to enter the page.

In the **No. of Online Clients** module, you can view the real-time changes in the number of users connected to the AP's 2.4 GHz and 5 GHz network.



5 Network

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

5.1 Internet settings

Here, you can configure the internet access parameters of the WAN port of the router, so that multiple devices in the LAN can share the broadband service.

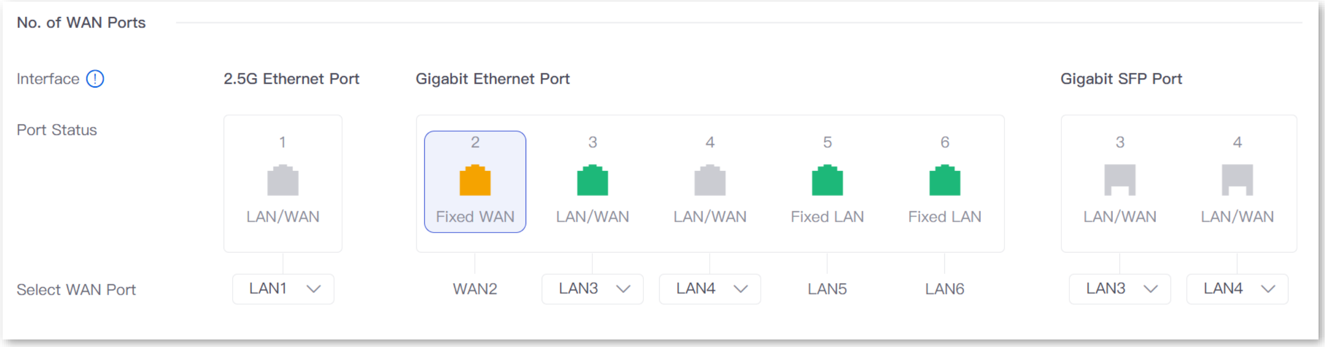
5.1.1 Number of WAN ports

Log in to the web UI of the router, and navigate to **Network** > **Internet Settings** to enter the page.

In the **No. of WAN Ports** module, you can view the rate type of the WAN port and set the number of WAN ports. You can also view the connection status and the properties of each Ethernet port. The following figure is for reference only.

If the router supports SFP, the port type of SFP port is the same as the RJ45 port with the same number.

- If the RJ45 port with the same number is used after the connection of SFP port, the SFP port takes priority.
- If the SFP port with the same number is used within 30 seconds after the connection of RJ45 port, the SFP port take priority. Otherwise, the RJ45 port takes priority.



No. of WAN Ports

Interface	2.5G Ethernet Port	Gigabit Ethernet Port					Gigabit SFP Port	
Port Status	1 LAN/WAN	2 Fixed WAN	3 LAN/WAN	4 LAN/WAN	5 Fixed LAN	6 Fixed LAN	3 LAN/WAN	4 LAN/WAN
Select WAN Port	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6	LAN3	LAN4

Parameter description

Parameter	Description
Interface	Specifies the rate type of the port.

Parameter	Description
Port Status	Specifies the port type and the connection status. – The port is connected properly. – The port is disconnected or not connected properly.
Select WAN Port	Specifies the current type of port. You can change the port type as required.

5.1.2 Set the internet

Log in to the web UI of the router, and navigate to **Network** > **Internet Settings** to enter the page.

In the **Connection Settings** module, you can set the internet parameters of the WAN port. Connection types of the router include PPPoE, Dynamic IP Address and Static IP Address.

TIP

- The number of default WAN ports varies with different router models. WAN1 is used as an example, and configurations for other WAN ports are similar.
- All internet parameters for accessing the internet are provided by your ISP. If you are not sure, contact your ISP for help.

PPPoE

If the ISP provides you with a PPPoE user name and password, you can choose this connection type to access the internet.

Configuration procedure

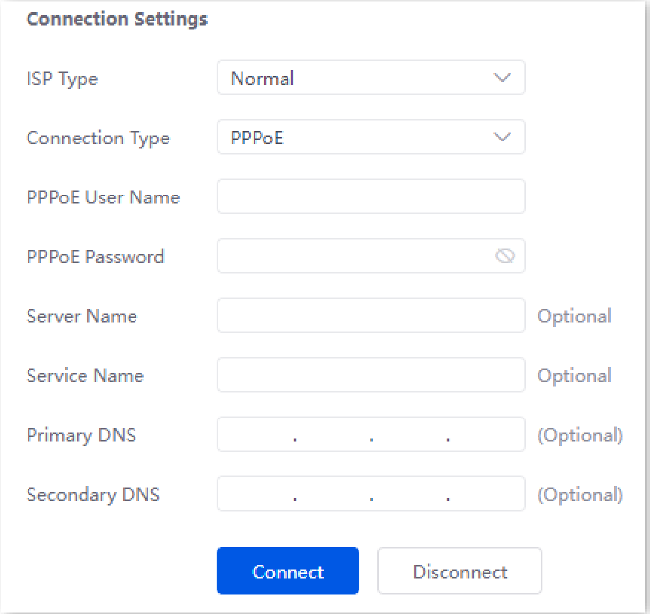
Step 1 Log in to the web UI of the router, and navigate to **Network** > **Internet Settings.**

Step 2 Set the **ISP Type**, which is **Normal** in this example.

Step 3 Select **PPPoE** for **Connection Type**.

Step 4 Enter the PPPoE user name and password provided by the ISP.

Step 5 Click **Connect**.



Connection Settings

ISP Type	Normal	
Connection Type	PPPoE	
PPPoE User Name		
PPPoE Password		
Server Name		Optional
Service Name		Optional
Primary DNS	. . .	(Optional)
Secondary DNS	. . .	(Optional)

----End

Wait for a moment. You can view related internet information in the Connection Status module.

Parameter description

Parameter	Description
ISP Type	Specifies the type of your ISP, such as **Normal**, **Russia**, **Unifi**, **Maxis** and **Manual**. Parameters required for each option may differ. Choose your connection type for your needs: – **Normal:** Default option. Select this option when your services are provided by a common ISP. – **Unifi**, **Maxis**: Select this option when your ISP provides specific parameters such as Internet VLAN ID and IPTV VLAN ID. Internet VLAN ID and IPTV VLAN ID cannot be changed. – **Russia:** Select this option when your dual access information is provided by an ISP in Russia. – **Manual**: Select this option when your ISP provides VLAN ID information. Internet VLAN ID and IPTV VLAN ID are editable. If you are not sure, contact your ISP for help. TIP Port function changes based on the ISP type: – For **Unifi** or **Manual**, LAN6 changes to an IPTV port. – For **Maxis**, all LAN ports that connect network devices support IPTV services.

Parameter	Description
Connection Type	Specifies how your router connects to the internet, including: - **PPPoE**: Select this type if you access the internet using the PPPoE user name and PPPoE password. - **Dynamic IP Address**: Select this type if you can access the internet by simply plugging in an Ethernet cable. - **Static IP Address**: Select this type if you want to access the internet using fixed IP information. - **Russia PPPoE**, **Russia PPTP** and **Russia L2TP**: They are available only when you set **ISP Type** to **Russia**. The specific configuration is completed according to the requirements of the ISP.
PPPoE User name	Specify the PPPoE user name and password provided by the ISP.
PPPoE Password	
Server Name	Specifies the name of the PPPoE server, also called the AC name. Used by the router to verify the validity of the PPPoE server. The **Server Name** is optional. NOTE To avoid dialing failures, do not set this parameter if your ISP does not provide the server name.
Service Name	Specifies the name of the PPPoE service. Used by the PPPoE server to verify the validity of the router. The **Service Name** is optional. NOTE To avoid dialing failures, do not set this parameter if your ISP does not provide the service name.
Primary DNS	Manually enter primary or secondary DNS servers. When the DNS server obtained automatically cannot resolve the URL, you can enter a correct primary or secondary DNS server here. The **Primary DNS** and **Secondary DNS** are optional.
Secondary DNS	

Dynamic IP address

If the ISP dynamically assigns you the IP address information, you can choose this connection type to access the internet.

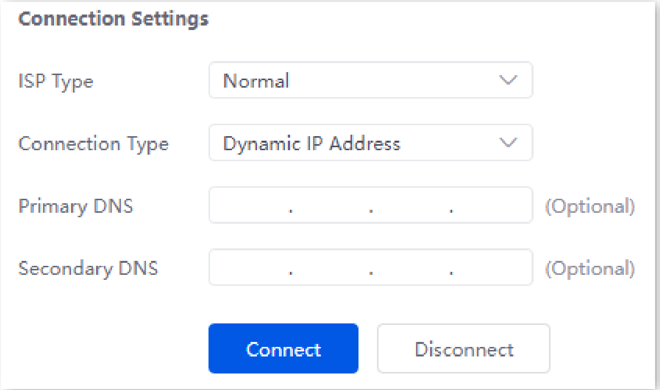
Configuration procedure

Step 1 Log in to the web UI of the router, and navigate to **Network** > **Internet Settings.**

Step 2 Set the **ISP Type**, which is **Normal** in this example.

Step 3 Select **Dynamic IP Address** for **Connection Type**.

Step 4 Click **Connect**.



Connection Settings

ISP Type: Normal

Connection Type: Dynamic IP Address

Primary DNS: . . . (Optional)

Secondary DNS: . . . (Optional)

----End

Wait for a moment. You can view related internet information in the Connection Status module.

Parameter description

Parameter	Description
ISP Type	Specifies the type of your ISP, such as **Normal**, **Russia**, **Unifi**, **Maxis** and **Manual**. Parameters required for each option may differ. Refer to the following to choose your connection type: – **Normal:** It specifies a common ISP type. Select this option by default. – **Unifi** and **Maxis**: Select these options when your ISP provides specific parameters such as Internet VLAN ID and IPTV VLAN ID. Internet VLAN ID and IPTV VLAN ID cannot be changed. – **Russia:** It is the access type provided by Russia. Select this option when your ISP provides dual access information. – **Manual**: Select this option when your ISP provides VLAN ID information. You can configure the Internet VLAN ID and IPTV VLAN ID as required. If you are not sure, contact your ISP for help. TIP Port function changes based on the ISP type: – For **Unifi** or **Manual**, LAN6 changes to an IPTV port. – For **Maxis**, all LAN ports that connect network devices support IPTV services.

Parameter	Description
Connection Type	Specifies how your router connects to the internet, including: – **PPPoE**: Select this type if you access the internet using the PPPoE user name and PPPoE password. – **Dynamic IP Address**: Select this type if you can access the internet by simply plugging in an Ethernet cable. – **Static IP Address**: Select this type if you want to access the internet using fixed IP information. – **Russia PPPoE**, **Russia PPTP** and **Russia L2TP**: They are available only when you set **ISP Type** to **Russia**. The specific configuration is completed according to the requirements of the ISP.
Primary DNS	Manually enter primary or secondary DNS servers. When the DNS server obtained automatically cannot resolve the URL, you can enter a correct primary or secondary DNS server here. The **Primary DNS** and **Secondary DNS** are optional.
Secondary DNS	

Static IP address

If the ISP provides you with the fixed IP address, subnet mask, default gateway and DNS server information, you can choose this connection type to access the internet.

Configuration procedure

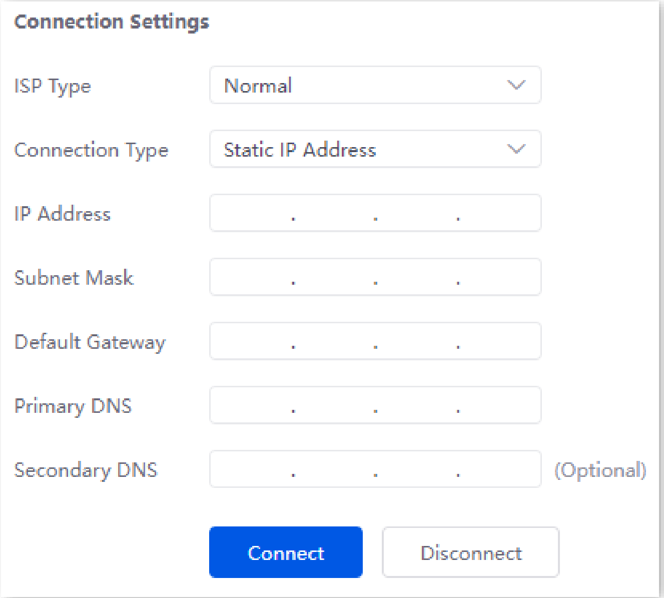
Step 1 Log in to the web UI of the router, and navigate to **Network** > **Internet Settings.**

Step 2 Set the **ISP Type**, which is **Normal** in this example.

Step 3 Select **Static IP Address** for **Connection Type**.

Step 4 Enter the **IP Address**, **Subnet Mask**, **Default Gateway**, **Primary DNS** and **Secondary DNS** provided by the ISP.

Step 5 Click **Connect**.



Connection Settings

ISP Type: Normal

Connection Type: Static IP Address

IP Address: . . .

Subnet Mask: . . .

Default Gateway: . . .

Primary DNS: . . .

Secondary DNS: . . . (Optional)

----End

Wait for a moment. You can view related internet information in the Connection Status module.

Parameter description

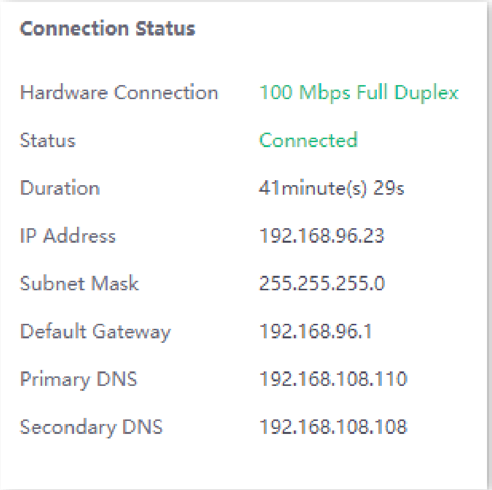
Parameter	Description
ISP Type	Specifies the type of your ISP, such as **Normal**, **Russia**, **Unifi**, **Maxis** and **Manual**. Parameters required for each option may differ. Refer to the following to choose your connection type: – **Normal:** It specifies a common ISP type. Select this option by default. – **Unifi** and **Maxis**: Select these options when your ISP provides specific parameters such as Internet VLAN ID and IPTV VLAN ID. Internet VLAN ID and IPTV VLAN ID cannot be changed. – **Russia:** It is the access type provided by Russia. Select this option when your ISP provides dual access information. – **Manual**: Select this option when your ISP provides VLAN ID information. You can configure the Internet VLAN ID and IPTV VLAN ID as required. If you are not sure, contact your ISP for help. TIP Port function changes based on the ISP type: – For **Unifi** or **Manual**, LAN6 changes to an IPTV port. – For **Maxis**, all LAN ports that connect network devices support IPTV services.

Parameter	Description
Connection Type	Specifies how your router connects to the internet, including: – **PPPoE**: Select this type if you access the internet using the PPPoE user name and PPPoE password. – **Dynamic IP Address**: Select this type if you can access the internet by simply plugging in an Ethernet cable. – **Static IP Address**: Select this type if you want to access the internet using fixed IP information. – **Russia PPPoE**, **Russia PPTP** and **Russia L2TP**: They are available only when you set **ISP Type** to **Russia**. The specific configuration is completed according to the requirements of the ISP.
IP Address	Enter the **IP Address**, **Subnet Mask**, **Default Gateway**, **Primary DNS** and **Secondary DNS** provided by the ISP. TIP If the ISP only provides one DNS address, the **Secondary DNS** is not required.
Subnet Mask	
Default Gateway	
Primary DNS	
Secondary DNS	

5.1.3 Check connection status

Log in to the web UI of the router, and navigate to **Network** > **Internet Settings** to enter the page.

In the **Connection Status** module, you can view the network status of the corresponding WAN port IPv4, including the Ethernet port connection rate and duplex mode, connection status, duration and IP address. The following figure is for reference only.



Connection Status

Hardware Connection	100 Mbps Full Duplex
Status	Connected
Duration	41minute(s) 29s
IP Address	192.168.96.23
Subnet Mask	255.255.255.0
Default Gateway	192.168.96.1
Primary DNS	192.168.108.110
Secondary DNS	192.168.108.108

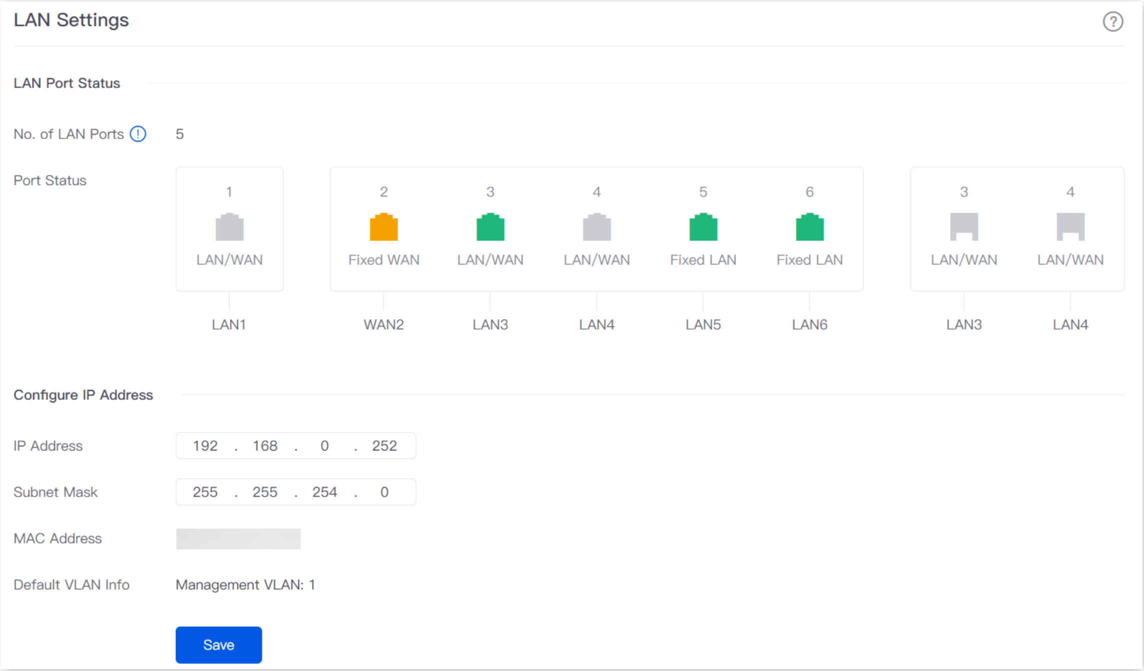
Parameter description

Parameter	Description
Hardware Connection	Specifies the negotiation rate and duplex mode of the WAN port. If the display is abnormal, you can troubleshoot based on the information on the page and the current environment.
Status	Specifies the connection status of the WAN port of the router. – **Connected**: The WAN port of the router has been plugged into the Ethernet cable, and the IPv4 address information has been obtained. – **Connecting...**: The router is connecting to the upstream network device. – **Disconnected**: If it is not connected or fails to connect, check the Ethernet cable connection status and internet settings, or contact the ISP for help. If other status information is displayed, take corresponding measures according to the network status prompt information.
Duration	Specifies the latest duration of the WAN port access to the network.
IP Address	Specifies the IPv4 address of the WAN port.
Subnet Mask	Specifies the subnet mask of the WAN port.
Default Gateway	Specifies the IPv4 gateway address of the WAN port.
Primary DNS	Specify the primary or secondary DNS server address of the WAN port.
Secondary DNS	

5.2 LAN settings

Log in to the web UI of the router, and navigate to **Network** > **LAN Settings** to enter the page.

You can view the router's LAN port connection status and configuration information on this page. And you can also set the IPv4 address information of the router's **VLAN_Default**.



LAN Settings

LAN Port Status

No. of LAN Ports 5

Port Status

Configure IP Address

IP Address 192 . 168 . 0 . 252

Subnet Mask 255 . 255 . 254 . 0

MAC Address

Default VLAN Info Management VLAN: 1

Parameter description

Parameter		Description
LAN Port Status	No. of LAN Ports	Specifies the number of current LAN ports.
	Port Status	Specifies the connection status of the port. – Green/Orange means the port is connected properly. – Grey means the port is disconnected.
Configure IP Address	IP Address	Specifies the IPv4 address of the VLAN_Default. Devices connected to the **VLAN_Default** can access the IPv4 address to log in to the web UI of the router through the **http** (default) or **https** protocol. The default IP address is **192.168.0.252**. TIP You need to disable the network adapter of the computer first and then enable the network adapter to obtain the IP address again.
	Subnet Mask	Specifies the subnet mask of the VLAN_Default.
	MAC Address	Specifies the MAC address of the VLAN_Default.
	Default VLAN Info	Specifies the VLAN ID of the VLAN_Default of the router.

5.3 VLAN settings

5.3.1 Overview

VLAN, abbreviated for Virtual Local Area Network, is a technology which divides LAN devices into different network segments logically rather than physically to create virtual work groups. It is used to divide the work stations in the switch-formed network into logical groups among which broadcast is isolated. Work stations in a group belong to a same VLAN and can communicate like they are connected to a same network segment no matter where they physically are. However, due to the isolation of broadcast packets, the VLAN cannot communicate with each other and packets must be forwarded by a router or other layer 3 packet forwarding devices.

This router supports 802.1Q VLAN and can communicate with devices that support 802.1Q VLAN in VLAN as well. 802.1Q VLAN is defined by IEEE 802.1q protocol. With 802.1Q VLAN, the router can process packets by identifying the tags in packets.

This router supports two 802.1Q VLAN port types:

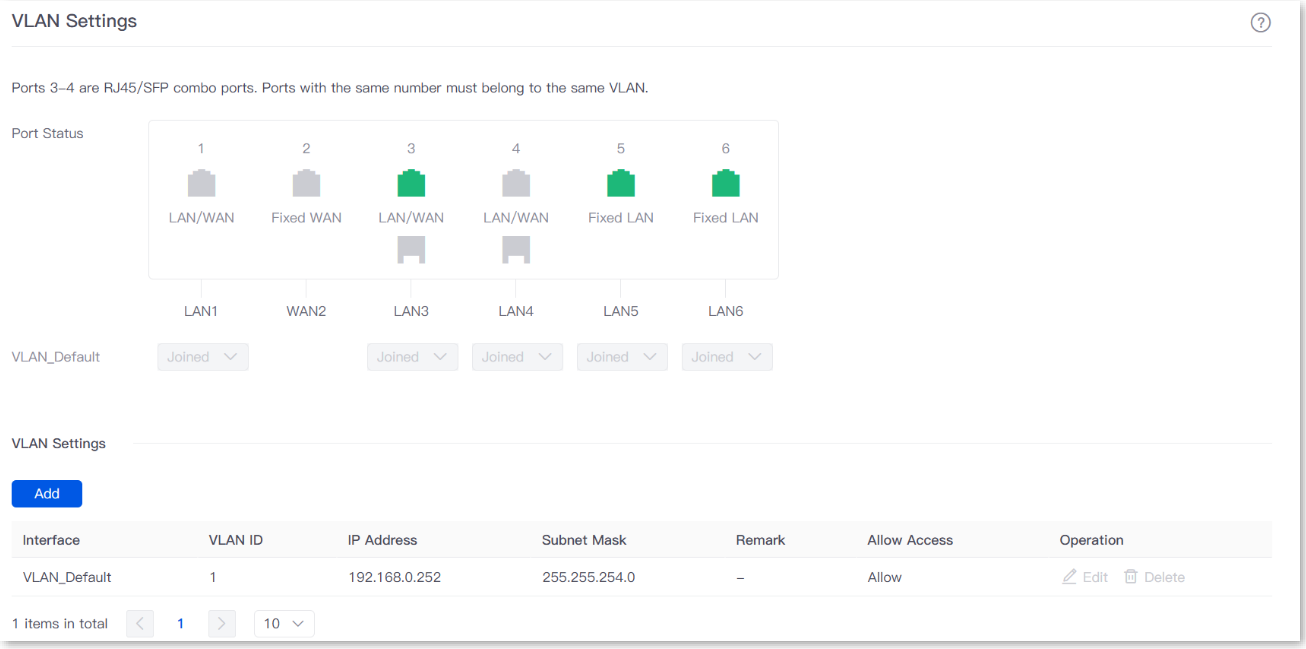
- Access: An access port can join only one VLAN. This type of port is used for connecting the computer.
- Trunk: A trunk port can receive and send packets belonging to multiple VLANs. This type of port is used for connection between switches.

Methods of each port type to process packets are shown as follows.

Port type	Receiving tagged data	Receiving untagged data	Sending data
Access port	Forward data to the ports with VLANs assigned based on the VLAN ID	Forward data to the ports with VLANs assigned based on the PVID	Strip the tag from the packet and then forward it
Trunk port			VLAN ID = PVID of the port, strip the tag from the packet and then forward it VLAN ID ≠ PVID of the port, retain the tag in the packet and then forward it

Log in to the web UI of the router, and navigate to **Network** > **VLAN Settings** to enter the page. On this page, you can configure VLAN rules.

By default, the router has created a VLAN named VLAN_Default, and its VLAN ID is **1**, which cannot be deleted. If VLAN=1, there is no VLAN information, only the data of the LAN port without VLAN is processed. If VLAN≠1, only the data of the LAN port with VLAN is processed.



VLAN Settings

Ports 3–4 are RJ45/SFP combo ports. Ports with the same number must belong to the same VLAN.

Port Status

	1	2	3	4	5	6
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN
	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6
VLAN_Default	Joined		Joined	Joined	Joined	Joined

VLAN Settings

Add

Interface	VLAN ID	IP Address	Subnet Mask	Remark	Allow Access	Operation
VLAN_Default	1	192.168.0.252	255.255.254.0	–	Allow	Edit Delete

1 items in total < 1 > 10

Parameter description

Parameter	Description
Port Status	Specifies the connection status of the port. – Green/Orange means the port is connected properly. – Grey means the port is disconnected.
VLAN Setting	By default, the router has created a VLAN named VLAN_Default, and adds all ports to that VLAN. You can click **Add** to add a new VLAN policy, and select ports to join this VLAN as needed. – Not Join: Forbid the port to join the VLAN to send or receive packets with VLAN ID. – TAG: Allow the port to join multiple VLANs as a trunk port with PVID=1. A trunk port is used for connection between router and switch, or router and AP. For details about packet processing, refer to Methods of each port type to process packets. – UNTAG: Allow the port to join only one VLAN as an access port. An access port is used for connecting the computer. For details about packet processing, refer to Methods of each port type to process packets. TIP If a port contains both tagged and untagged VLANs, it works as a trunk port and uses the VLAN ID of the untagged VLAN as PVID.
Interface	Specifies the name of each added VLAN ID.

Parameter	Description
VLAN ID	Specifies the identifier of VLAN and is used to separate subordinate LANs inside a LAN. Each ID represents a LAN. TIP If the VLAN ID is **1**, it means that there is no VLAN information, and only data without Tag is processed.
IP Address	Specifies the VLAN IP address. Devices connecting to the port can log in to the web UI of the router using the IP address.
Subnet Mask	Specifies the subnet mask of the VLAN.
Remark	Specifies the description of the VLAN.
Allow Access	Specifies whether clients from other VLANs can access services of this VLAN. – **Allow** indicates that clients from other VLANs can access services of this VLAN. – **Forbid** indicates that clients from other VLANs cannot access services of this VLAN.
Operation	Used to edit or delete the VLAN. Edit: Used to modify the VLAN. Delete : Used to delete the VLAN.

5.3.2 Example of allowing single VLAN on the router

Networking requirements

An enterprise uses the enterprise router and fat AP to set up a network. The enterprise has the following requirements:

Guests, departments and staff are required to access networks that are isolated from each other and have different network permissions.

- Guests can only access the internet via wireless connections.
- Staff of the Finance Department can only access the intranet via both wired and wireless connections.
- Staff of the R&D Department can only access the intranet via both wired and wireless connections.

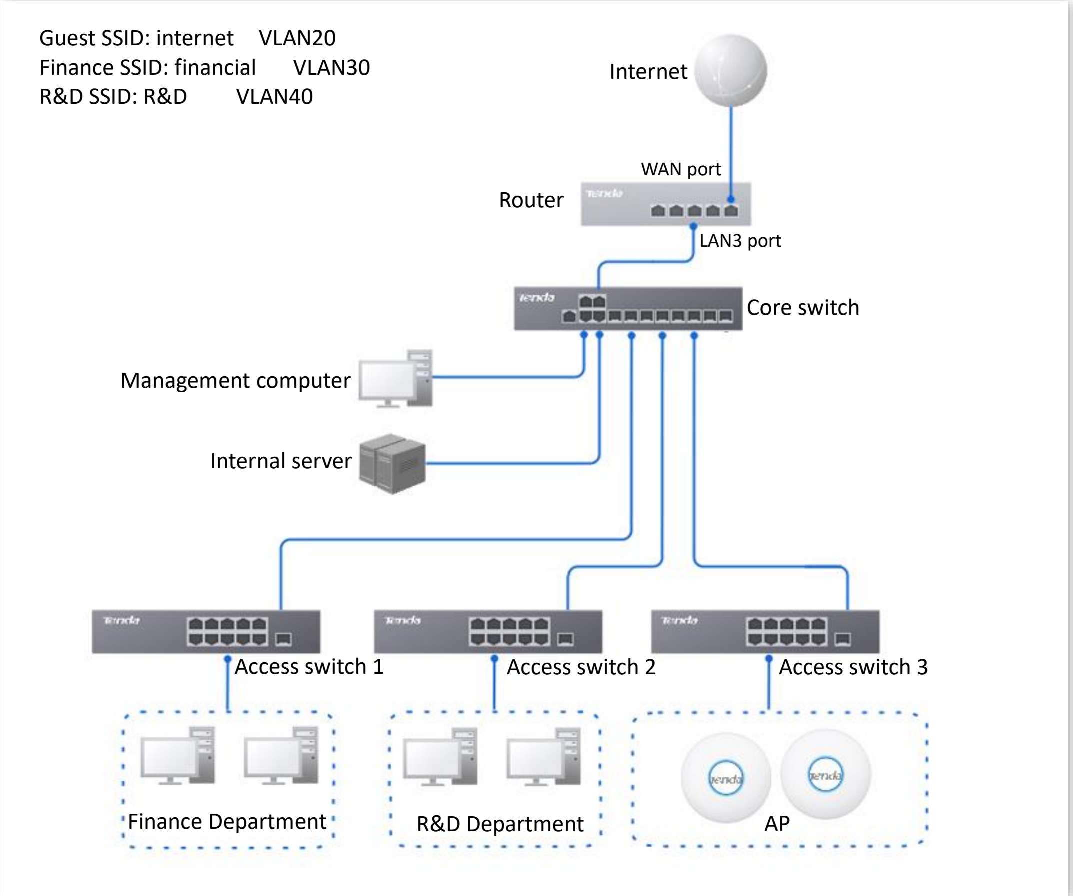
Solution

- Successfully manage the AP on the router, and deliver different wireless policies to the AP.

- Configure the SSID policy for guest connection. The SSID is **internet**. The wireless password is **UmXmL9UK**, and the VLAN ID is **20**.
- Configure the SSID policy for staff of the Finance Department. The SSID is **Financial**. The wireless password is **CetTLb8T**, and the VLAN ID is **30**.
- Configure the SSID policy for staff of the R&D Department. The SSID is **R&D**. The wireless password is **ZeFtub6m**, and the VLAN ID is **40**.

- Divide the wired network connected by the staff of the Finance Department into **VLAN30**.
- Divide the wired network connected by the staff of the R&D Department into **VLAN40**.
- Configure VLAN forwarding rules on the switch.
- Configure VLAN forwarding rules on the router and the internal server.

The network topology is as follows.



Configuration procedure

Configure the router

Configure the core switch

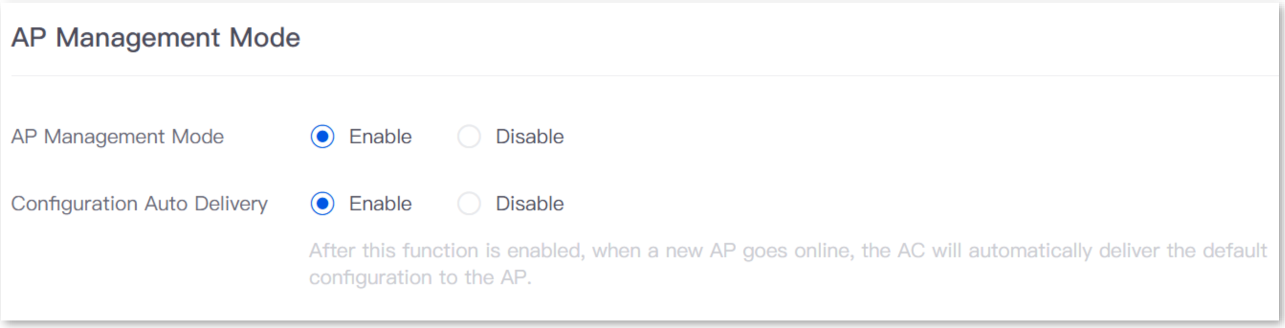
Configure the internal server

I. Configure the router.

Step 1 Log in to the web UI of the router.

Step 2 (Skip if performed) Manage the AP.

1. Navigate to **AP** > **AP Management Mode**.
2. Enable the **AP Management Mode** and **Configuration Auto Delivery** function.

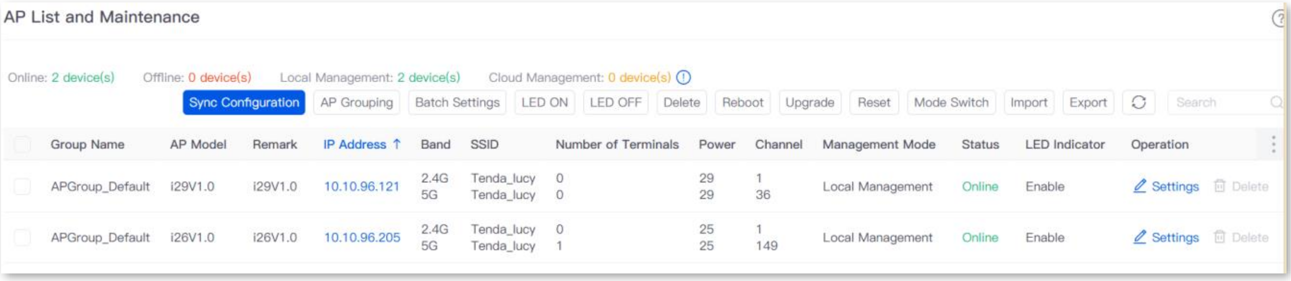

AP Management Mode

AP Management Mode ● Enable ○ Disable

Configuration Auto Delivery ● Enable ○ Disable

After this function is enabled, when a new AP goes online, the AC will automatically deliver the default configuration to the AP.

Navigate to **AP** > **AP List and Maintenance,** you can view whether the router successfully manages the AP.


AP List and Maintenance

Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

□	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
□	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0	29 29	1 36	Local Management	Online	Enable	Settings Delete
□	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1	25 25	1 149	Local Management	Online	Enable	Settings Delete

Step 3 Add the VLAN and configure the DHCP server.

Examples of VLAN parameters are shown in the table below.

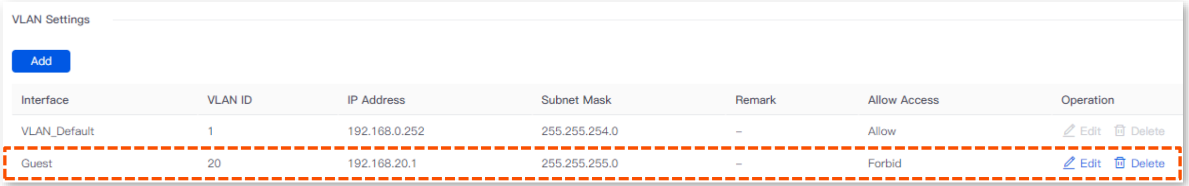
Interface	VLAN ID	IP Address/Subnet Mask	Allow Access	Port
Guest	20	192.168.20.1/24	Forbid	LAN3 (TAG)

Examples of DHCP server parameters for the VLAN are shown in the following table.

Policy Name	Application Interface	DHCP Type	DHCP Configuration
Guest	Guest	User DHCP	IP Address: 192.168.20.100 - 192.168.20.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.20.1 Primary DNS: 192.168.20.1

1. Add the VLAN.

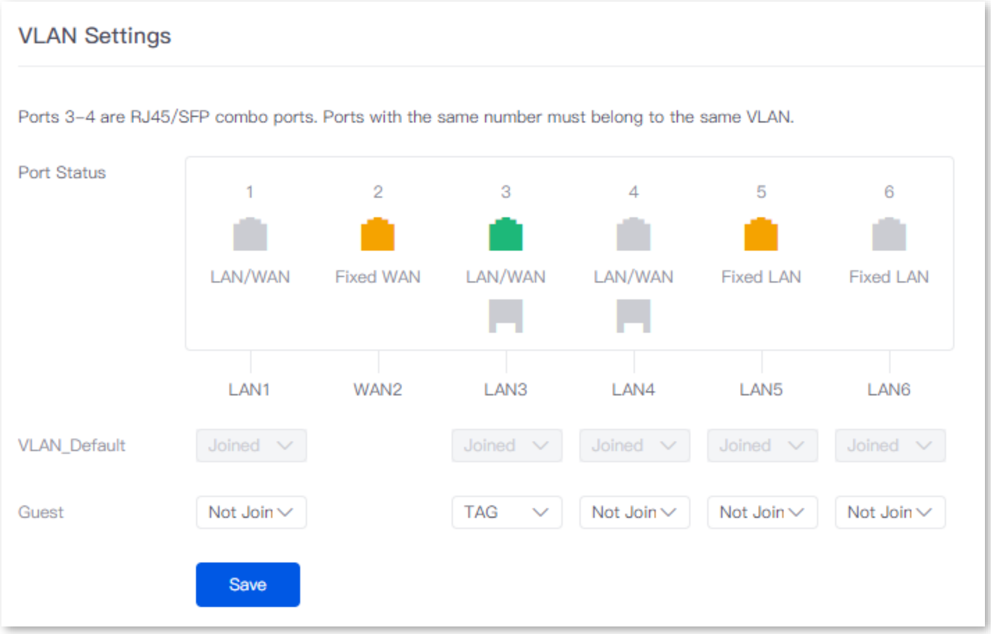
   – Navigate to **Network** > **VLAN Settings,** click **Add** to configure related parameters of the VLAN, and click **Save**.



VLAN Settings

Interface	VLAN ID	IP Address	Subnet Mask	Remark	Allow Access	Operation
VLAN_Default	1	192.168.0.252	255.255.254.0	–	Allow	Edit Delete
Guest	20	192.168.20.1	255.255.255.0	–	Forbid	Edit Delete

   – Select a LAN port for the **Guest** VLAN, which is **LAN3** in this example, set the VLAN policy to **TAG**. Then click **Save**.



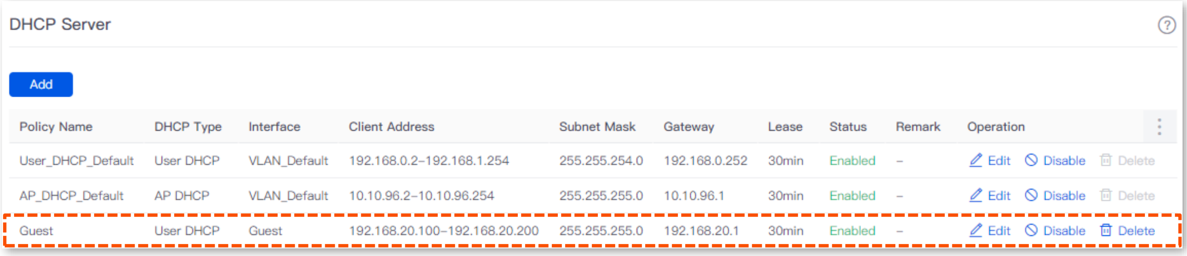
VLAN Settings

Ports 3–4 are RJ45/SFP combo ports. Ports with the same number must belong to the same VLAN.

Port Status	1	2	3	4	5	6
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN
	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6
VLAN_Default	Joined		Joined	Joined	Joined	Joined
Guest	Not Join		TAG	Not Join	Not Join	Not Join

2. Configure the DHCP server for the VLAN.

   Navigate to **Network** > **DHCP Settings** > **DHCP Server**, and click **Add** to configure related parameters of the user DHCP server for the VLAN Guest, and click **Save**.



DHCP Server

Policy Name	DHCP Type	Interface	Client Address	Subnet Mask	Gateway	Lease	Status	Remark	Operation
User_DHCP_Default	User DHCP	VLAN_Default	192.168.0.2–192.168.1.254	255.255.254.0	192.168.0.252	30min	Enabled	–	Edit Disable Delete
AP_DHCP_Default	AP DHCP	VLAN_Default	10.10.96.2–10.10.96.254	255.255.255.0	10.10.96.1	30min	Enabled	–	Edit Disable Delete
Guest	User DHCP	Guest	192.168.20.100–192.168.20.200	255.255.255.0	192.168.20.1	30min	Enabled	–	Edit Disable Delete

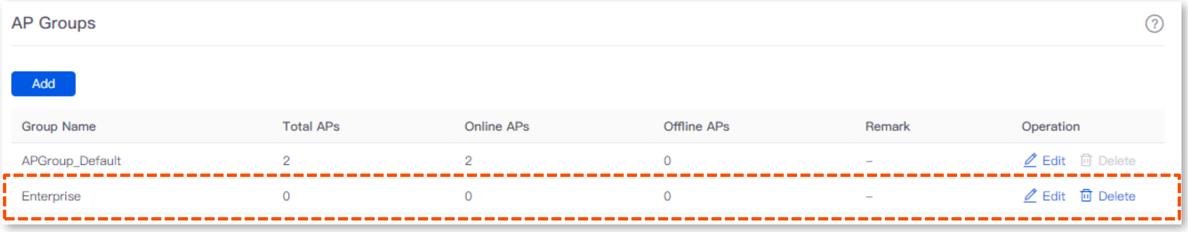
Step 4 Configure the AP policy.

The following table provides examples of AP policy parameters. Retain default values for other parameters that are not mentioned.

AP Group	Wi-Fi	AP VLAN
Enterprise	AP Grouping: Enterprise SSID: internet Security Mode: WPA2-PSK Wi-Fi Password: UmXmL9UK VLAN ID: 20 Maximum Number of Clients: 40	AP Grouping: Enterprise AP VLAN: Enable Trunk port: LAN0
	AP Grouping: Enterprise SSID: Financial Security Mode: WPA2-PSK Wi-Fi Password: CetTLb8T VLAN ID: 30 Maximum Number of Clients: 40	
	AP Grouping: Enterprise SSID: R&D Security Mode: WPA2-PSK Wi-Fi Password: ZeFtub6m VLAN ID: 40 Maximum Number of Clients: 40	

1. Configure the AP group policy.

   Navigate to **AP** > **AP Groups**, click **Add** to configure related parameters of the AP group policy, and click **Save**.



AP Groups

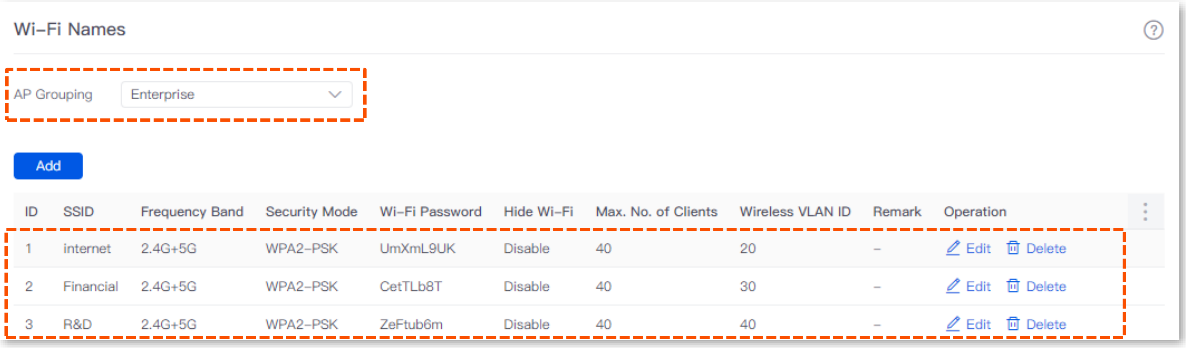
Group Name	Total APs	Online APs	Offline APs	Remark	Operation
APGroup_Default	2	2	0	–	Edit Delete
Enterprise	0	0	0	–	Edit Delete

2. Configure the Wi-Fi policy.

   Navigate to **AP** > **Wi-Fi Settings** > **Wi-Fi Names**, select **Enterprise** for **AP Grouping**. Click **Add** to configure related parameters of the Wi-Fi policy, and click **Save**.

TIP

The maximum number of clients supported by the AP is 128. If multiple SSID policies need to be delivered to the same AP, you should plan the maximum number of clients appropriately to ensure that the maximum number of clients for each SSID policy does not exceed 128.



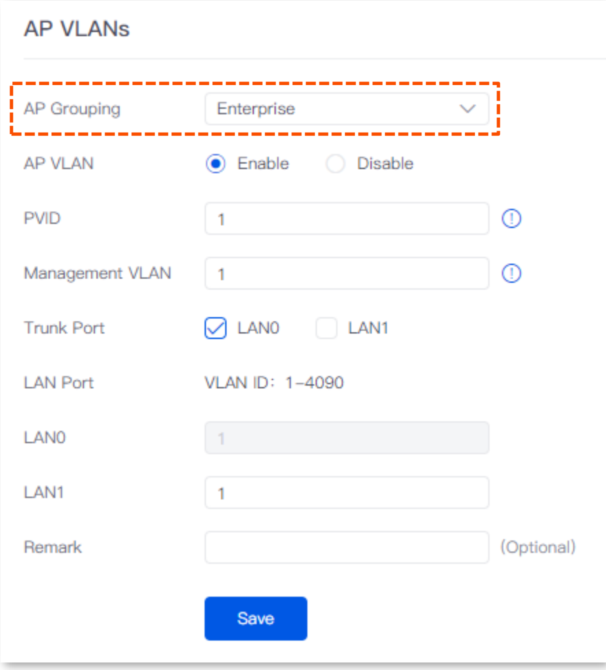
Wi-Fi Names

AP Grouping: Enterprise

ID	SSID	Frequency Band	Security Mode	Wi-Fi Password	Hide Wi-Fi	Max. No. of Clients	Wireless VLAN ID	Remark	Operation
1	internet	2.4G+5G	WPA2-PSK	UmXmL9UK	Disable	40	20	–	Edit Delete
2	Financial	2.4G+5G	WPA2-PSK	CetTLb8T	Disable	40	30	–	Edit Delete
3	R&D	2.4G+5G	WPA2-PSK	ZeFtub6m	Disable	40	40	–	Edit Delete

3. Configure the VLAN policy.

Navigate to **AP** > **Wi-Fi Settings** >**AP VLANs**, select **Enterprise** for **AP Grouping**. Enable the **AP VLAN** function and set **Trunk Port** to **LAN0**, and click **Save**.



AP VLANs

AP Grouping: Enterprise

AP VLAN: ● Enable ○ Disable

PVID: 1

Management VLAN: 1

Trunk Port: ☑ LAN0 □ LAN1

LAN Port: VLAN ID：1–4090

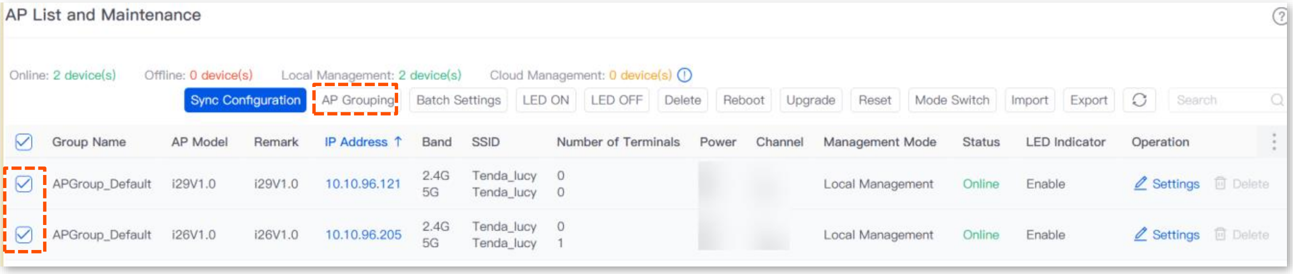
LAN0: 1

LAN1: 1

Remark: (Optional)

Step 5 Deliver the AP group policy.

1. Navigate to **AP** > **AP List and Maintenance**, select the AP to which the AP group policy is to be delivered, and click **AP Grouping**.

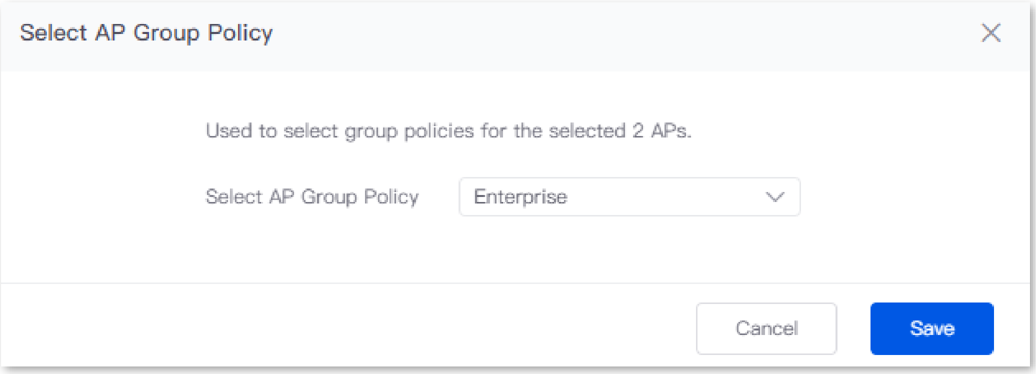


AP List and Maintenance

Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0	[redacted]	[redacted]	Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1	[redacted]	[redacted]	Local Management	Online	Enable	Settings Delete

2. Select the AP group policy, and click **Save.**



Used to select group policies for the selected 2 APs.

Select AP Group Policy: Enterprise

II. Configure the core switch.

Divide the IEEE 802.1q VLAN on the core switch as follows.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Router	20	Trunk	1
Internal Server	30,40	Trunk	1
Switch1 (Finance Department)	30	Access	30
Switch2 (R&D Department)	40	Access	40
Switch3 (AP)	20,30,40	Trunk	1

Retain the default settings for other ports that are not mentioned. For details about how to configure the switch, see the user guide of the switch.

III. Configure the internal server.

Add VLANs for ports connected to the switch and configure the DHCP server.

Step 1 Add VLANs. The parameters in the following table are for reference only.

Interface	VLAN ID	IP Address/Subnet Mask	Physical Port
Financial	30	192.168.30.1/24	LAN
R&D	40	192.168.40.1/24	LAN

Step 2 Configure the user DHCP server for the VLAN. The parameters in the following table are for reference only.

Policy Name	User DHCP
Financial	Client Address: 192.168.30.100 - 192.168.30.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.30.1 Primary DNS: 192.168.30.1
R&D	Client Address: 192.168.40.100 - 192.168.40.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.40.1 Primary DNS: 192.168.40.1

Step 3 Set the VLAN of the port connected to the switch.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Switch	30,40	Trunk	1

For details about how to configure the device, see the user guide of the device.

----End

Verification

- When the guests connect to the wireless network **internet**, enter the wireless password **UmXmL9UK** to access the internet and be isolated from other networks.
- When the staff of the Finance Department connect to the wireless network **Financial**, enter the wireless password **CetTLb8T** to access the intranet and be isolated from other networks.
- When the staff of the R&D Department connect to the wireless network **R&D**, enter the wireless password **ZeFtub6m** to access the intranet and be isolated from other networks.
- When the staff of the Finance Department access the wired network, they can access the intranet and are isolated from other networks.
- When the staff of the R&D Department access the wired network, they can access the intranet and are isolated from other networks.

5.3.3 Example of allowing multiple VLANs on the router

Networking requirements

An enterprise uses the enterprise router and fat AP to set up a network. The enterprise has the following requirements:

Guests, departments and staff are required to access networks that are isolated from each other and have different network permissions.

- Guests can only access the internet via wireless connections.
- Staff of the Sales Department can only access the internet via both wired and wireless connections.
- Staff of the R&D Department can only access the intranet via both wired and wireless connections.
- To facilitate management, the APs on the second floor are assigned to VLAN2, and the APs on the third floor are assigned to VLAN3.

Solution

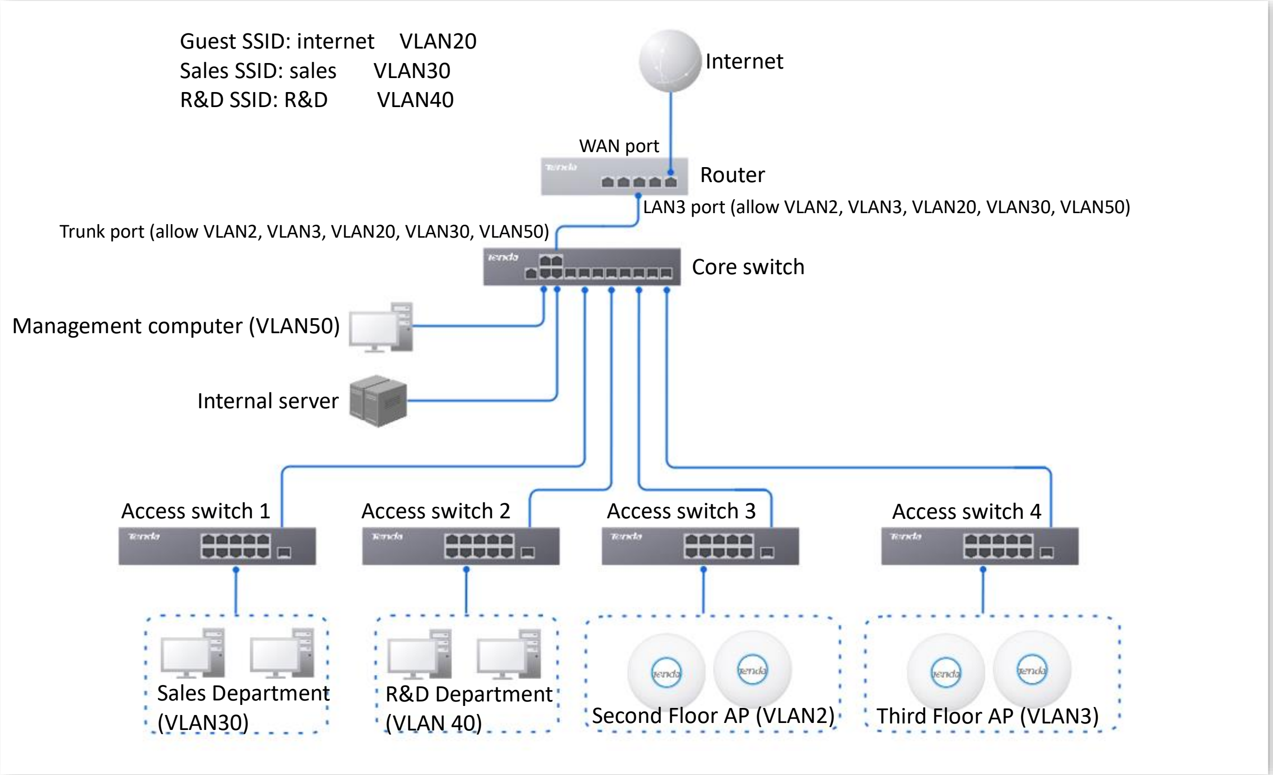
- Successfully manage the AP on the router, and deliver different wireless policies to the AP.
  - Configure the SSID policy for guest connection. The SSID is **internet**. The wireless password is **UmXmL9UK**, and the VLAN ID is **20**.
  - Configure the SSID policy for staff of the Sales Department. The SSID is **Sales**. The wireless password is **CetTLb8T**, and the VLAN ID is **30**.
  - Configure the SSID policy for staff of the R&D Department. The SSID is **R&D**. The wireless password is **ZeFtub6m**, and the VLAN ID is **40**.
- Divide the wired network connected by the staff of the Sales Department into **VLAN30**.
- Divide the wired network connected by the staff of the R&D Department into **VLAN40**.
- Divide the APs on the second floor into **VLAN2**, and the APs on the third floor into **VLAN3**.
- Divide the management computer into **VLAN50**.
- Configure VLAN forwarding rules on the switch.
- Configure VLAN forwarding rules on the router and the internal server.

Assume that the information between the ports of the managed switch and other devices is as follows:

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property
Router	2,3,20,30,50	Trunk
Management Computer	50	Access
Internal Server	40	Access
Switch1	30	Access

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property
Switch2	40	Access
Switch3, 4	20,30,40	Trunk

The network topology is as follows.



Configuration procedure

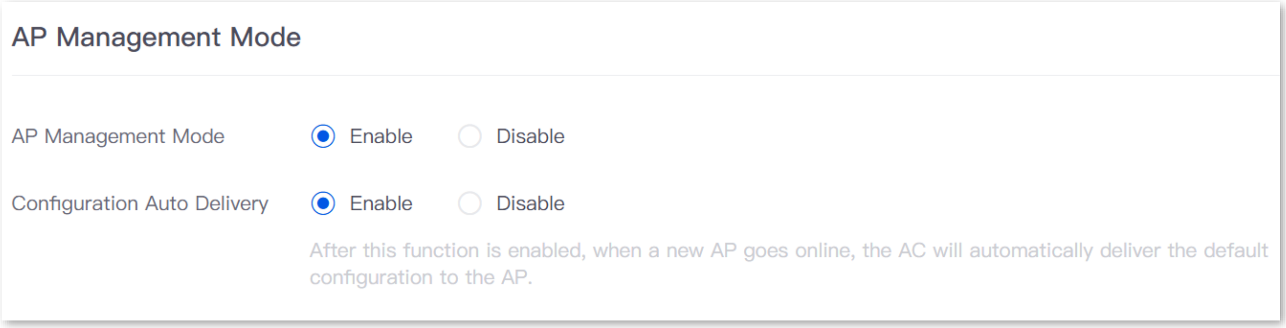
Configure the router → Configure the core switch → Configure the internal server

I. Configure the router.

Step 1 Log in to the web UI of the router.

Step 2 Manage the AP (Skip if performed).

1. Navigate to **AP** > **AP Management Mode**.
2. Enable the **AP Management Mode** and **Configuration Auto Delivery** function.



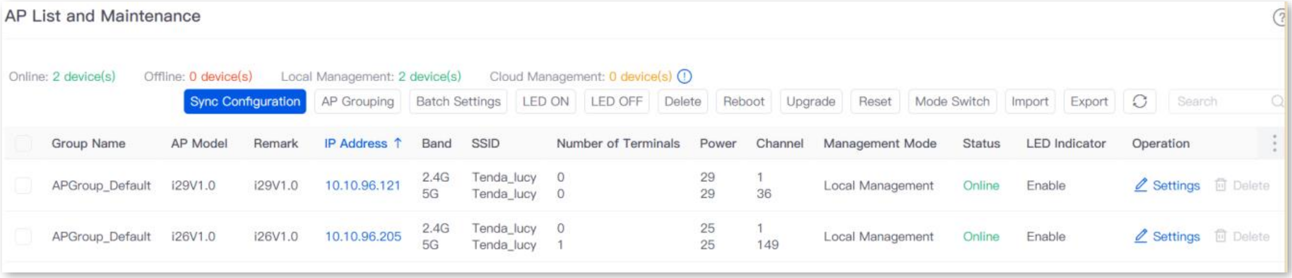
AP Management Mode

AP Management Mode ● Enable ○ Disable

Configuration Auto Delivery ● Enable ○ Disable

After this function is enabled, when a new AP goes online, the AC will automatically deliver the default configuration to the AP.

Navigate to **AP** > **AP List and Maintenance,** you can view whether the router successfully manages the AP.



Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0	29 29	1 36	Local Management	Online	Enable	Settings Delete
APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1	25 25	1 149	Local Management	Online	Enable	Settings Delete

Step 3 Add the VLAN and configure the DHCP server.

Examples of VLAN parameters are shown in the table below.

Interface	VLAN ID	IP Address/Subnet Mask	Allow Access	Port
Guest	20	192.168.20.1/24	Forbid	LAN3 (TAG)
Sales Department	30	192.168.30.1/24	Forbid	LAN3 (TAG)
Management Computer	50	192.168.50.1/24	Forbid	LAN3 (TAG)
Second Floor AP	2	192.168.2.1/24	Forbid	LAN3 (TAG)
Third Floor AP	3	192.168.3.1/24	Forbid	LAN3 (TAG)

Examples of User DHCP server parameters for the VLAN are shown in the following table.

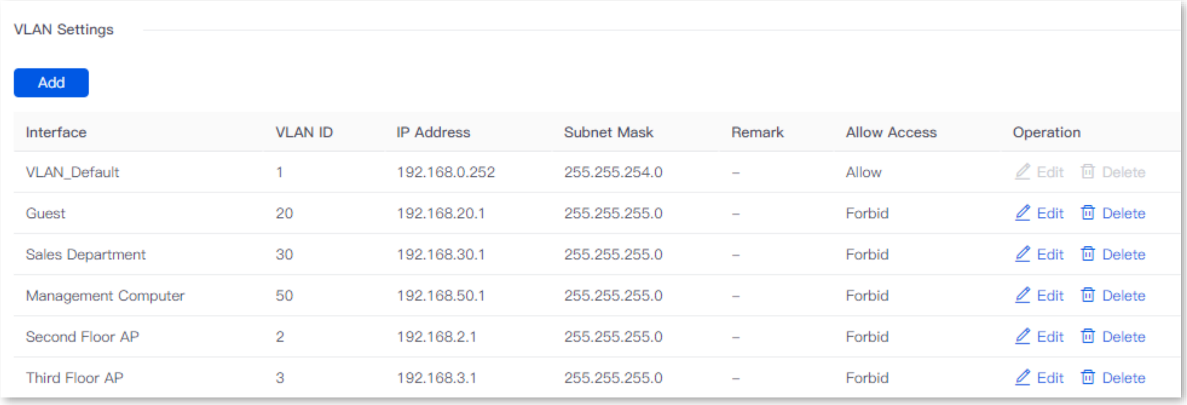
Policy Name	Application Interface	DHCP Type	DHCP Configuration
Guest-User	Guest	User DHCP	Client Address: 192.168.20.100 - 192.168.20.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.20.1 Primary DNS: 192.168.20.1
Sales-User	Sales Department	User DHCP	Client Address: 192.168.30.100 - 192.168.30.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.30.1 Primary DNS: 192.168.30.1
Management VLAN-User	Management Computer	User DHCP	Client Address: 192.168.50.100 - 192.168.50.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.50.1 Primary DNS: 192.168.50.1

Examples of AP DHCP server parameters for the VLAN are shown in the following table.

Policy Name	Application Interface	DHCP Type	DHCP Configuration
2F AP VLAN	Second Floor AP	AP DHCP	Client Address: 172.10.20.100 - 172.10.20.200 Subnet Mask: 255.255.255.0 Gateway: 172.10.20.1 Primary DNS: 172.10.20.1
3F AP VLAN	Third Floor AP	AP DHCP	Client Address: 172.10.30.100 - 172.10.30.200 Subnet Mask: 255.255.255.0 Gateway: 172.10.30.1 Primary DNS: 172.10.30.1

1. Add the VLAN.

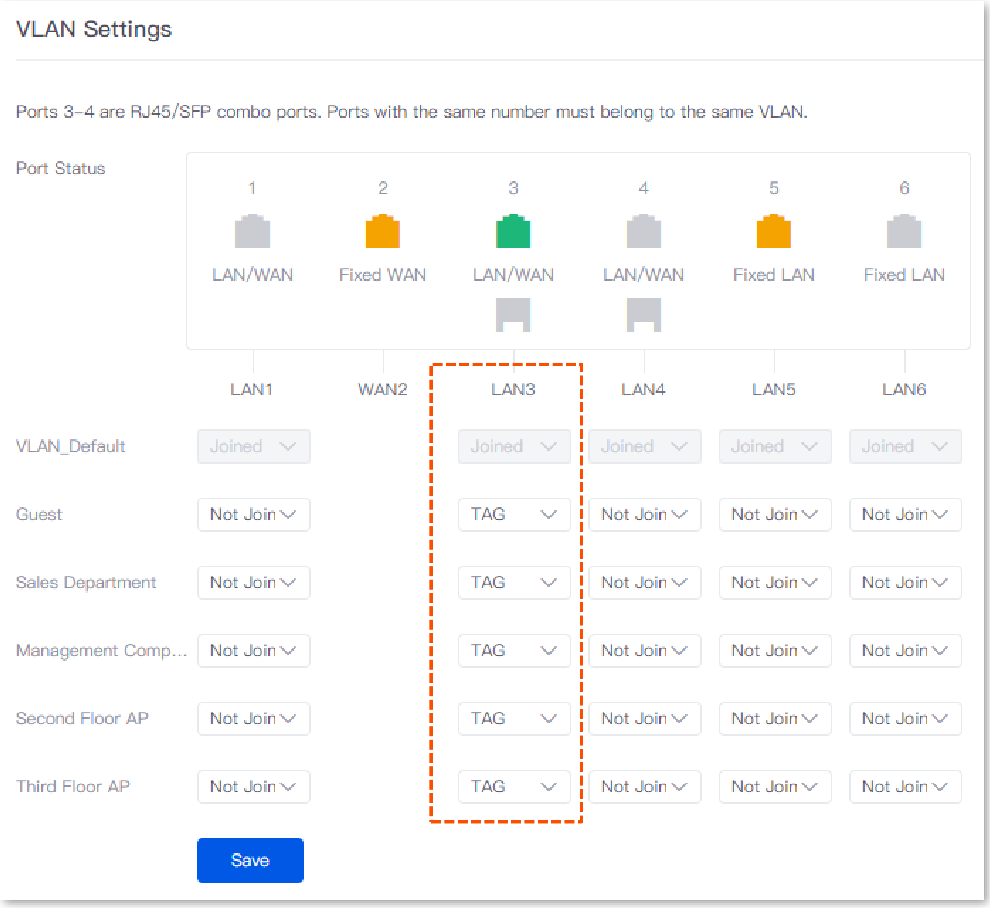
   – Navigate to **Network** > **VLAN Settings,** click **Add** to configure related parameters of the VLAN, and click **Save**.



VLAN Settings

Interface	VLAN ID	IP Address	Subnet Mask	Remark	Allow Access	Operation
VLAN_Default	1	192.168.0.252	255.255.254.0	–	Allow	Edit Delete
Guest	20	192.168.20.1	255.255.255.0	–	Forbid	Edit Delete
Sales Department	30	192.168.30.1	255.255.255.0	–	Forbid	Edit Delete
Management Computer	50	192.168.50.1	255.255.255.0	–	Forbid	Edit Delete
Second Floor AP	2	192.168.2.1	255.255.255.0	–	Forbid	Edit Delete
Third Floor AP	3	192.168.3.1	255.255.255.0	–	Forbid	Edit Delete

   – Select a LAN port for the VLAN, which is **LAN3** in this example, set the VLAN policy to **TAG**. Then click **Save**.



VLAN Settings

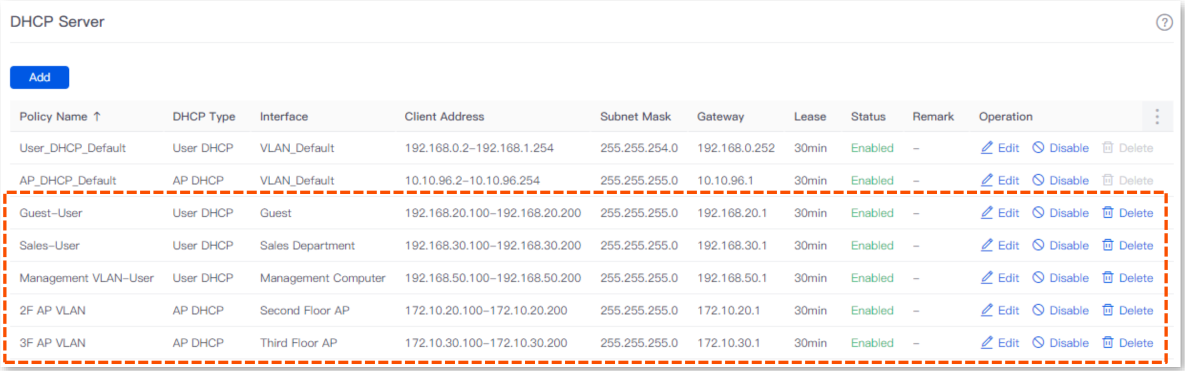
Ports 3–4 are RJ45/SFP combo ports. Ports with the same number must belong to the same VLAN.

Port Status

	1	2	3	4	5	6
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN
	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6
VLAN_Default	Joined		Joined	Joined	Joined	Joined
Guest	Not Join		TAG	Not Join	Not Join	Not Join
Sales Department	Not Join		TAG	Not Join	Not Join	Not Join
Management Comp…	Not Join		TAG	Not Join	Not Join	Not Join
Second Floor AP	Not Join		TAG	Not Join	Not Join	Not Join
Third Floor AP	Not Join		TAG	Not Join	Not Join	Not Join

2. Configure the DHCP server for the VLAN.

Navigate to **Network** > **DHCP Settings** > **DHCP Server**, and click **Add** to configure related parameters of the DHCP server for the VLAN, and click **Save**.



DHCP Server

Policy Name ↑	DHCP Type	Interface	Client Address	Subnet Mask	Gateway	Lease	Status	Remark	Operation
User_DHCP_Default	User DHCP	VLAN_Default	192.168.0.2–192.168.1.254	255.255.254.0	192.168.0.252	30min	Enabled	–	Edit Disable Delete
AP_DHCP_Default	AP DHCP	VLAN_Default	10.10.96.2–10.10.96.254	255.255.255.0	10.10.96.1	30min	Enabled	–	Edit Disable Delete
Guest-User	User DHCP	Guest	192.168.20.100–192.168.20.200	255.255.255.0	192.168.20.1	30min	Enabled	–	Edit Disable Delete
Sales-User	User DHCP	Sales Department	192.168.30.100–192.168.30.200	255.255.255.0	192.168.30.1	30min	Enabled	–	Edit Disable Delete
Management VLAN-User	User DHCP	Management Computer	192.168.50.100–192.168.50.200	255.255.255.0	192.168.50.1	30min	Enabled	–	Edit Disable Delete
2F AP VLAN	AP DHCP	Second Floor AP	172.10.20.100–172.10.20.200	255.255.255.0	172.10.20.1	30min	Enabled	–	Edit Disable Delete
3F AP VLAN	AP DHCP	Third Floor AP	172.10.30.100–172.10.30.200	255.255.255.0	172.10.30.1	30min	Enabled	–	Edit Disable Delete

Step 4 Configure the AP policy.

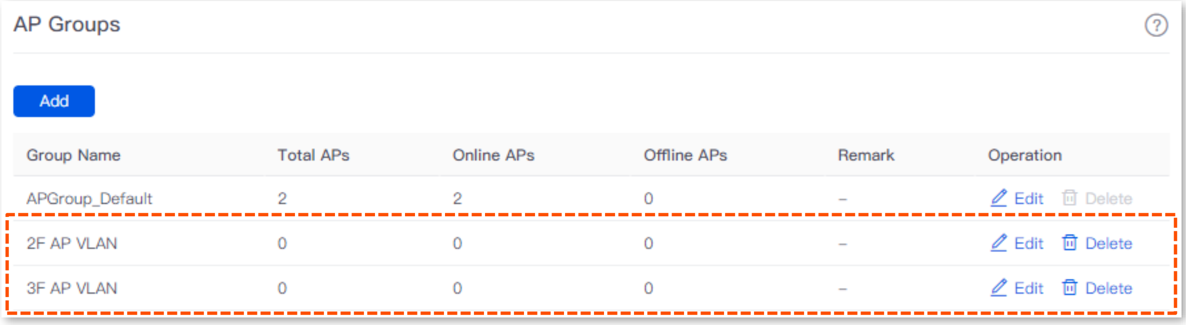
The following table provides the examples of AP policy parameters. Retain default values for other parameters that are not mentioned.

AP Group	Wi-Fi	AP VLAN
2F AP VLAN	AP Grouping: 2F AP VLAN SSID: internet Security Mode: WPA2-PSK Wi-Fi Password: UmXmL9UK VLAN ID: 20 Maximum Number of Clients: 40	AP Grouping: 2F AP VLAN AP VLAN: Enable Management VLAN ID: 2 Trunk port: LAN0
	AP Grouping: 2F AP VLAN SSID: Sales Security Mode: WPA2-PSK Wi-Fi Password: CetTLb8T VLAN ID: 30 Maximum Number of Clients: 40	
	AP Grouping: 2F AP VLAN SSID: R&D Security Mode: WPA2-PSK Wi-Fi Password: ZeFtub6m VLAN ID: 40 Maximum Number of Clients: 40	
3F AP VLAN	AP Grouping: 3F AP VLAN SSID: internet Security Mode: WPA2-PSK Wi-Fi Password: UmXmL9UK VLAN ID: 20 Maximum Number of Clients: 40	AP Grouping: 3F AP VLAN AP VLAN: Enable Management VLAN ID: 3 Trunk port: LAN0
	AP Grouping: 3F AP VLAN SSID: Sales Security Mode: WPA2-PSK Wi-Fi Password: CetTLb8T VLAN ID: 30 Maximum Number of Clients: 40	

AP Group	Wi-Fi	AP VLAN
	AP Grouping: 3F AP VLAN SSID: R&D Security Mode: WPA2-PSK Wi-Fi Password: ZeFtub6m VLAN ID: 40 Maximum Number of Clients: 40	

1. Configure the AP group policy.

   Navigate to **AP** > **AP Group Policy**, click **Add** to configure related parameters of the AP group policy, and click **Save**.



AP Groups

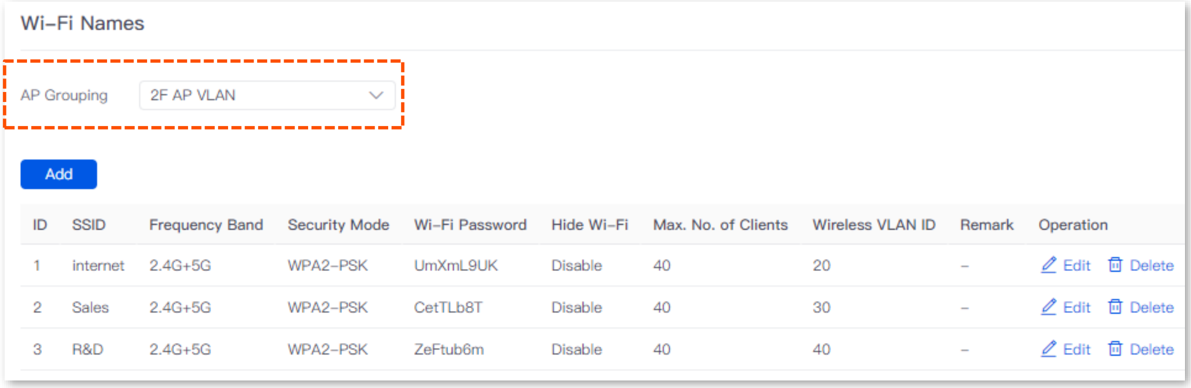
Group Name	Total APs	Online APs	Offline APs	Remark	Operation
APGroup_Default	2	2	0	–	Edit Delete
2F AP VLAN	0	0	0	–	Edit Delete
3F AP VLAN	0	0	0	–	Edit Delete

2. Configure the Wi-Fi policy.

TIP

The maximum number of clients supported by the AP is 128. If multiple SSID policies need to be delivered to the same AP, you should plan the maximum number of clients appropriately to ensure that the maximum number of clients for each SSID policy does not exceed 128.

– Navigate to **AP** > **Wi-Fi Settings** > **Wi-Fi Names**, select **2F AP VLAN** for **AP Grouping**. Click **Add** to configure related parameters of the Wi-Fi policy, and click **Save**.

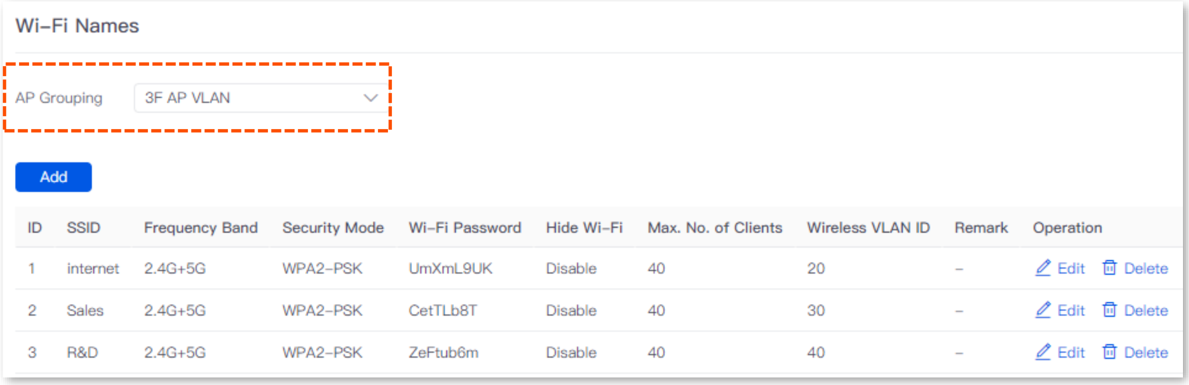


Wi-Fi Names

AP Grouping: 2F AP VLAN

ID	SSID	Frequency Band	Security Mode	Wi-Fi Password	Hide Wi-Fi	Max. No. of Clients	Wireless VLAN ID	Remark	Operation
1	internet	2.4G+5G	WPA2-PSK	UmXmL9UK	Disable	40	20	–	Edit Delete
2	Sales	2.4G+5G	WPA2-PSK	CetTLb8T	Disable	40	30	–	Edit Delete
3	R&D	2.4G+5G	WPA2-PSK	ZeFtub6m	Disable	40	40	–	Edit Delete

– Navigate to **AP** > **Wi-Fi Settings** > **Wi-Fi Names**, select **3F AP VLAN** for **AP Grouping**. Click **Add** to configure related parameters of the Wi-Fi policy, and click **Save**.



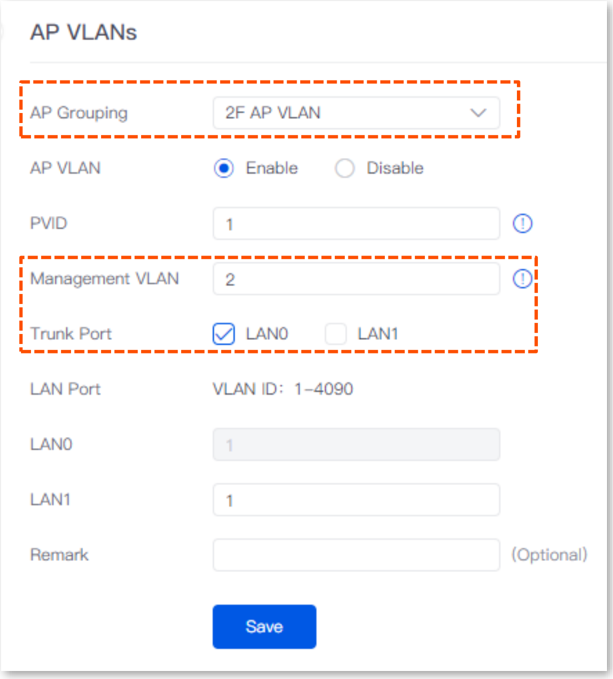
Wi-Fi Names

AP Grouping: 3F AP VLAN

ID	SSID	Frequency Band	Security Mode	Wi-Fi Password	Hide Wi-Fi	Max. No. of Clients	Wireless VLAN ID	Remark	Operation
1	internet	2.4G+5G	WPA2-PSK	UmXmL9UK	Disable	40	20	–	Edit Delete
2	Sales	2.4G+5G	WPA2-PSK	CetTLb8T	Disable	40	30	–	Edit Delete
3	R&D	2.4G+5G	WPA2-PSK	ZeFtub6m	Disable	40	40	–	Edit Delete

3. Configure the VLAN policy.

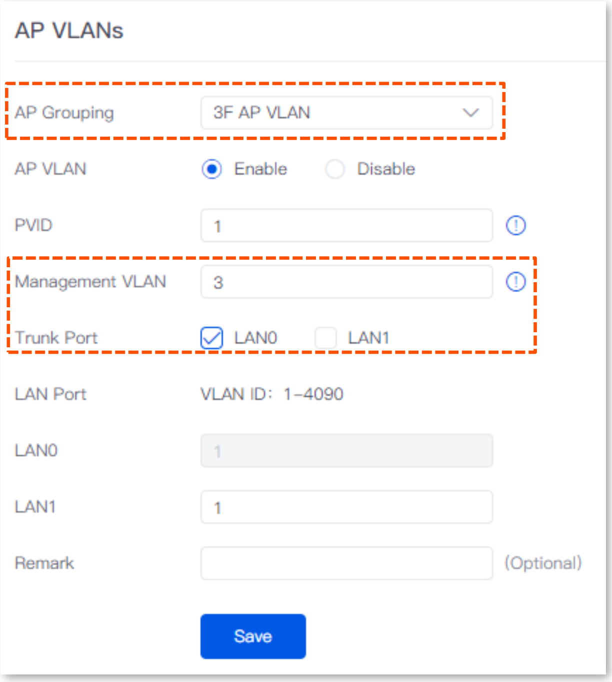
– Navigate to **AP** > **Wi-Fi Settings** > **AP VLANs**, select **2F AP VLAN** for **AP Grouping**. Enable the **AP VLAN** function, set **Management VLAN** to **2**, and set **Trunk Port** to **LAN0**. Then click **Save**.



AP VLANs

AP Grouping	2F AP VLAN
AP VLAN	● Enable ○ Disable
PVID	1
Management VLAN	2
Trunk Port	☑ LAN0 □ LAN1
LAN Port	VLAN ID：1–4090
LAN0	1
LAN1	1
Remark	(Optional)

– Navigate to **AP** > **Wi-Fi Settings** > **AP VLANs**, select **3F AP VLAN** for **AP Grouping**. Enable the **AP VLAN** function, set **Management VLAN** to **3**, and set **Trunk Port** to **LAN0**. Then click **Save**.



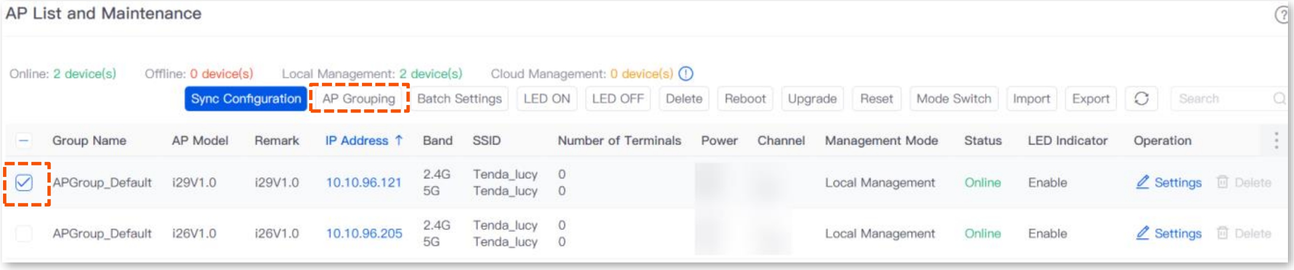
AP VLANs

AP Grouping	3F AP VLAN
AP VLAN	● Enable ○ Disable
PVID	1
Management VLAN	3
Trunk Port	☑ LAN0 □ LAN1
LAN Port	VLAN ID: 1–4090
LAN0	1
LAN1	1
Remark	(Optional)

Step 5 Deliver the AP group policy.

1. Deliver the AP group policy to the APs on the second floor.

   – Navigate to **AP** > **AP List and Maintenance**, select the AP to which the AP group policy is to be delivered, and click **AP Grouping**.

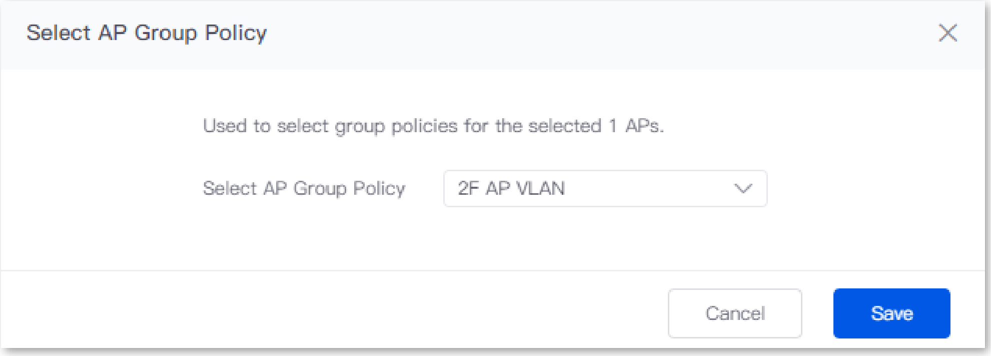


AP List and Maintenance

Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
□	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete

   – Select the AP group policy, and click **Save.**



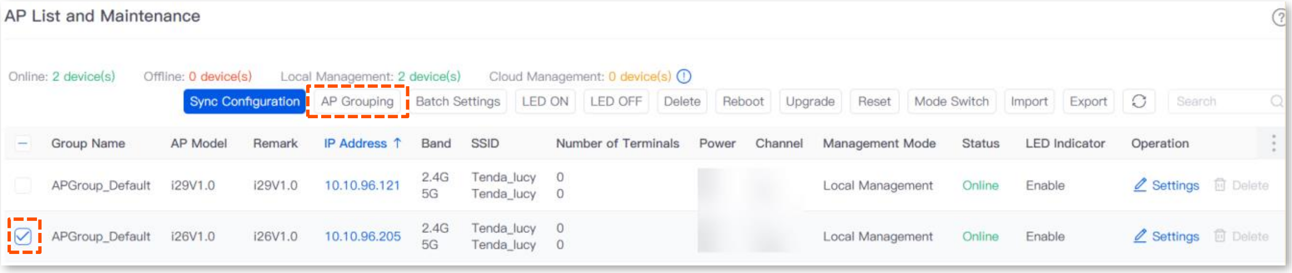
Select AP Group Policy

Used to select group policies for the selected 1 APs.

Select AP Group Policy: 2F AP VLAN

2. Deliver the AP group policy to the APs on the third floor.

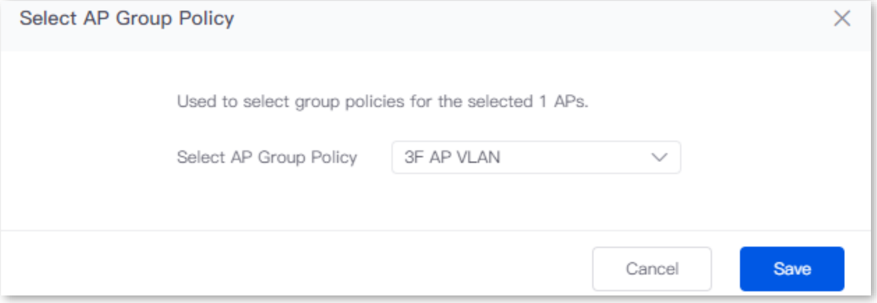
   – Navigate to **AP** > **AP List and Maintenance**, select the AP to which the AP group policy is to be delivered, and click **AP Grouping**.



Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
□	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete

– Select the AP group policy, and click **Save.**



Used to select group policies for the selected 1 APs.

Select AP Group Policy: 3F AP VLAN

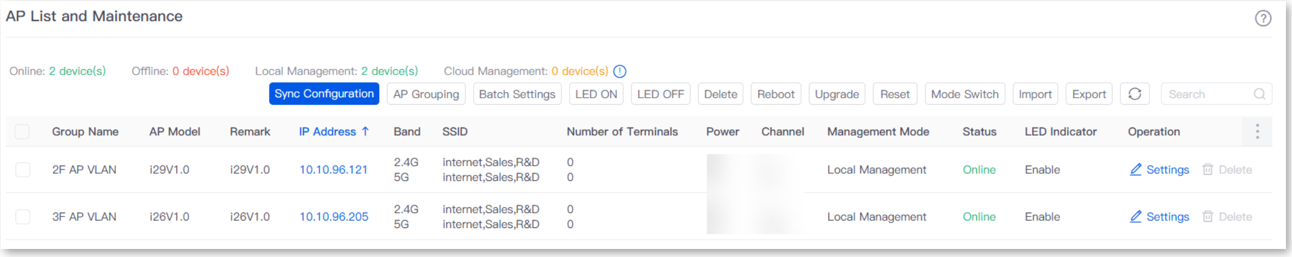
II. Configure the managed switch.

Divide the IEEE 802.1q VLAN on the managed switch as follows.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Router	2,3,20,30,50	Trunk	1
Management computer	50	Access	50
Internal Server	40	Access	40
Switch1 (Sales Department)	30	Access	30
Switch2 (R&D Department)	40	Access	40
Switch3 (2F AP)	2,20,30,40	Trunk	1
Switch4 (3F AP)	3,20,30,40	Trunk	1

Retain the default settings for other ports that are not mentioned. For details about how to configure the switch, see the user guide of the switch.

On the **AP** > **AP List and Maintenance** page of the router, you can find that the AP will go offline, and then go online again.



Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
□	2F AP VLAN	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	internet,Sales,R&D internet,Sales,R&D	0 0			Local Management	Online	Enable	Settings Delete
□	3F AP VLAN	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	internet,Sales,R&D internet,Sales,R&D	0 0			Local Management	Online	Enable	Settings Delete

III. Configure the internal server.

Add VLANs for ports connected to the switch and configure the DHCP server.

Step 1 Add VLANs. The parameters in the following table are for reference only.

Interface	VLAN ID	IP Address/Subnet Mask	Physical Port
R&D	40	192.168.40.1/24	LAN

Step 2 Configure the user DHCP server for the VLAN. The parameters in the following table are for reference only.

Policy Name	User DHCP
R&D	Client Address: 192.168.40.100 - 192.168.40.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.40.1 Primary DNS: 192.168.40.1

Step 3 Set the VLAN of the port connected to the switch.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Switch	40	Access	40

For details about how to configure the device, see the user guide of the device.

----End

Verification

- When the guests connect to the wireless network **internet**, enter the wireless password **UmXmL9UK** to access the internet and be isolated from other networks.
- When the staff of the Sales Department connect to the wireless network **Sales**, enter the wireless password **CetTLb8T** to access the internet and be isolated from other networks.
- When the staff of the R&D Department connect to the wireless network **R&D**, enter the wireless password **ZeFtub6m** to access the intranet and be isolated from other networks.
- When the staff of the Sales Department access the wired network, they can access the internet and are isolated from other networks.
- When the staff of the R&D Department access the wired network, they can access the intranet and are isolated from other networks.
- The management computer uses the IP address of the VLAN (one that has been added) to log in to the web UI of the router.

5.4 DHCP settings

5.4.1 Overview

When users have the following network requirements, the IP address configuration of the network device can be completed through the DHCP server.

- The network scale is large, and the workload of manually configuring network parameters for each network device is also large.
- The number of devices on the network is far greater than the number of IP addresses that can be used by the network, while the number of devices accessing the internet at the same time is less.
- Only a few hosts in the network need fixed IP addresses.

The router provides a DHCP server, which can automatically assign IP address information to DHCP clients.

DHCP server

The IP address allocation mechanism is as follows:

1. When the router receives an IP address allocation request sent by the DHCP client, it queries the DHCP static allocation table according to the MAC address of the DHCP client. If the DHCP client is in the static allocation table, the corresponding IP address is assigned to the DHCP client; otherwise, the router will take the next step.
2. The router identifies the DHCP client type (user or AP) and the VLAN to which it belongs from the request message, and then selects the type of DHCP server policy corresponding to the VLAN according to the identified information to assign an IP address.

DHCP reservation

With the DHCP Reservation function, you can make the specified client always obtain the preset IP address, and avoid the functions such as **Internet Speed Control** and **Port Mapping** that take effect based on the IP address from becoming invalid due to the change of the client IP address.

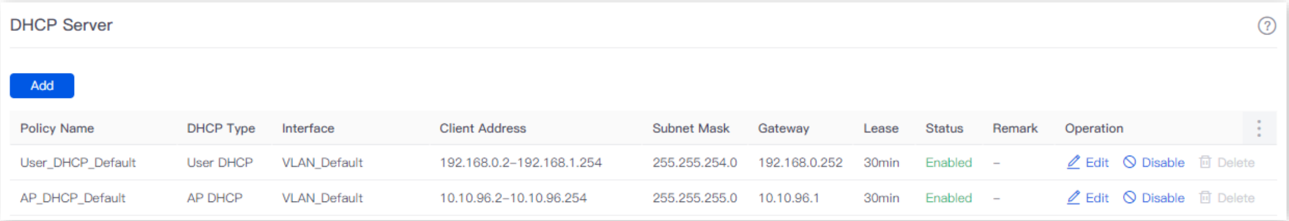
NOTE

The DHCP Reservation function is mainly for users. If the AP is added to the DHCP reservation, the AP may obtain an IP address abnormally. To ensure the normal operation of the AP, do not add the AP to the DHCP reservation.

5.4.2 DHCP server

Log in to the web UI of the router, and navigate to **Network** > **DHCP Settings** > **DHCP Server** to enter the page.

On this page, you can configure the DHCP server based on the VLAN. You can click ⋮ to select parameters to be displayed.

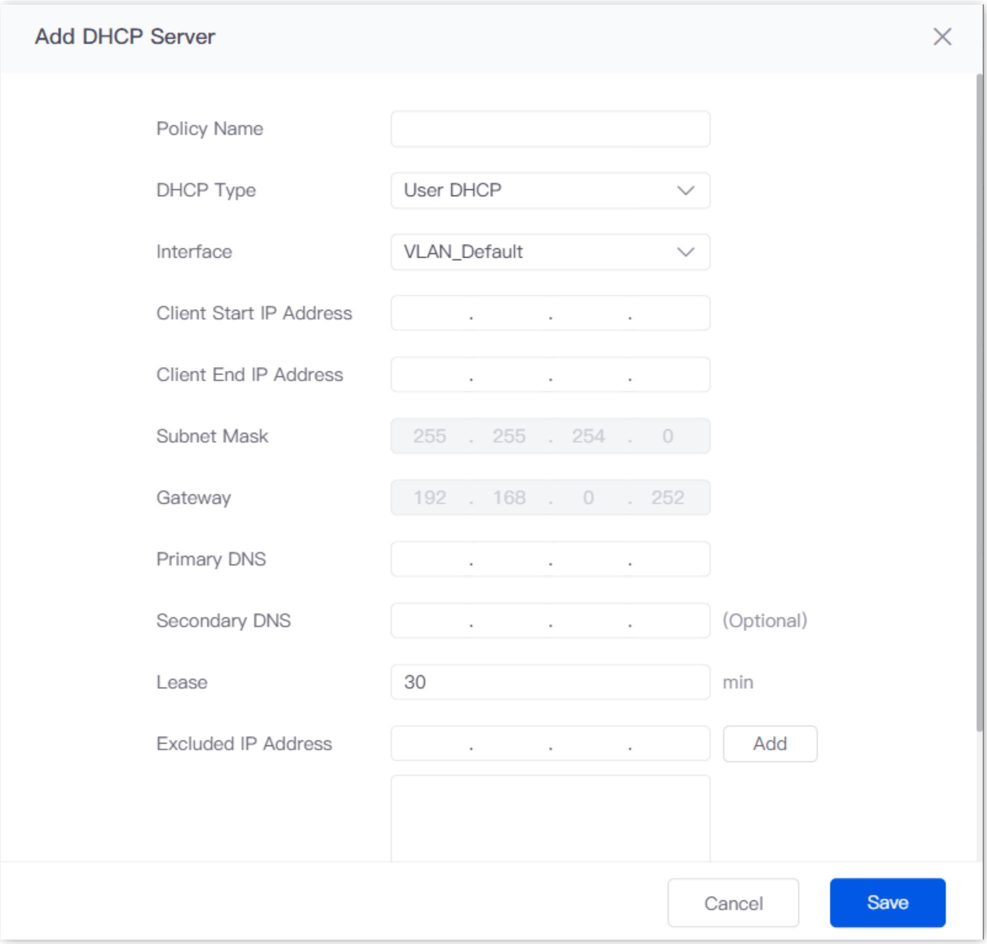


DHCP Server

Add

Policy Name	DHCP Type	Interface	Client Address	Subnet Mask	Gateway	Lease	Status	Remark	Operation
User_DHCP_Default	User DHCP	VLAN_Default	192.168.0.2–192.168.1.254	255.255.254.0	192.168.0.252	30min	Enabled	–	Edit Disable Delete
AP_DHCP_Default	AP DHCP	VLAN_Default	10.10.96.2–10.10.96.254	255.255.255.0	10.10.96.1	30min	Enabled	–	Edit Disable Delete

By default, the router has created two DHCP server policies named **User_DHCP_Default** and **AP_DHCP_Default**. You can click **Add** to add a new DHCP server policy.



Add DHCP Server

Policy Name	
DHCP Type	User DHCP
Interface	VLAN_Default
Client Start IP Address	. . .
Client End IP Address	. . .
Subnet Mask	255 . 255 . 254 . 0
Gateway	192 . 168 . 0 . 252
Primary DNS	. . .
Secondary DNS	. . . (Optional)
Lease	30 min
Excluded IP Address	. . . Add

Cancel Save

Parameter description

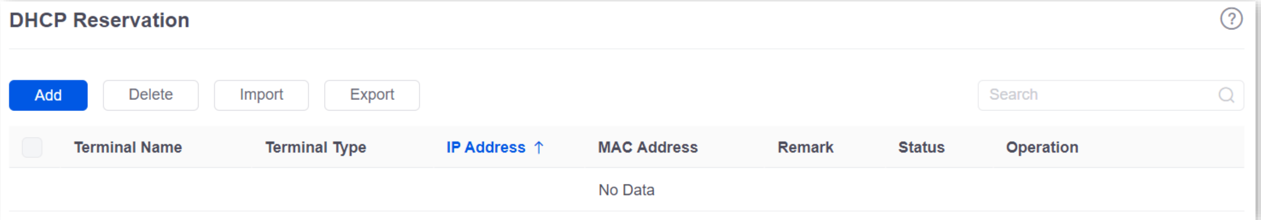
Parameter	Description
Policy Name	Specifies the name of the DHCP policy.

Parameter	Description
DHCP Type	Specifies the DHCP type of the router. The router supports two types of DHCP: User DHCP and AP DHCP. – **User DHCP**: Used to assign IP address to clients. – **AP DHCP**: Used to assign IP addresses to Tenda APs.
Interface	Specifies the VLAN for which the DHCP server rule takes effect. You can configure the VLAN on the VLAN settings page.
Client Address	Specifies the range of the DHCP address pool (range of IP addresses assigned by the DHCP server to its clients).
Client Start IP Address	Specifies the start IP address of the DHCP IP address pool.
Client End IP Address	Specifies the end IP address of the DHCP IP address pool.
Subnet Mask	Specifies the subnet mask that the DHCP server assigns to its clients.
Gateway	Specifies the gateway address that the DHCP server assigns to its clients.
Primary DNS	Specify the IP addresses of the primary and secondary DNS servers that are assigned to the device in the LAN by the DHCP server. NOTE For the LAN devices to access the internet properly, ensure that the primary or secondary DNS you entered is the correct IP address of the DNS server or proxy. Secondary DNS can be left blank.
Secondary DNS	
Lease	Specifies the validity period of the IP address the DHCP server assigns to clients. – When the IP address of a client expires but the client is still connected to the router, auto-renewal happens and the client continues to occupy that IP address. – If the client is disconnected (turned off, Ethernet cable disconnected or wireless network disconnected) from the router, the router will release the IP address and make it available for other clients in case they request IP address information as well.
Excluded IP Address	Specifies the IP address assigned to clients does not include the excluded address.
Status	Specifies the status of the DHCP server, including **Enabled**, **Disabled** and **Expired**.
Remark	Specifies the description of the DHCP server policy.

5.4.3 DHCP reservation

Log in to the web UI of the router, and navigate to **Network** > **DHCP Settings** > **DHCP Reservation** to enter the page.

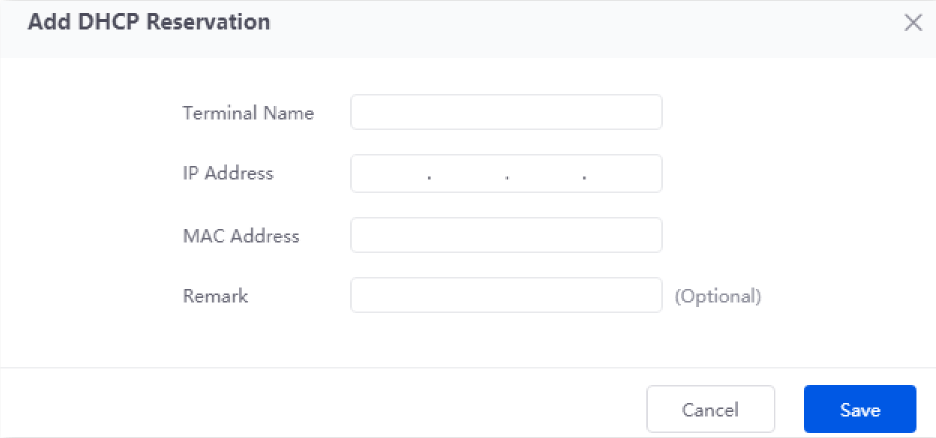
On this page, you can configure the DHCP static assignment rules and also import or export static IP address lists.



DHCP Reservation

	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Remark	Status	Operation
No Data							

You can click **Add** to add a new DHCP reservation policy.



Add DHCP Reservation

Terminal Name

IP Address . . .

MAC Address

Remark (Optional)

Parameter description

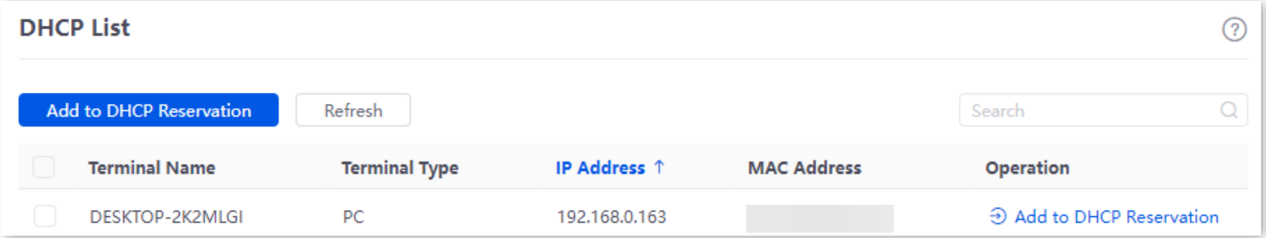
Parameter	Description
Terminal Name	Specifies the name of the client.
Terminal Type	Specifies the client types such as Mobile Phone, PAD and PC. If the client type is not recognized, **Others** will be displayed.
IP Address	Specifies the fixed IP address to be assigned to the client.
MAC Address	Specifies the MAC address of the client. A MAC address can be specified in the following format: 00:23:24:E8:14:5A, 00-23-24-E8-14-5A or 002324E8145A.
Remark	Specifies the description of the assigned static IP address.
Status	Specifies the status of the DHCP reservation, including **Enabled**, **Disabled** and **Expired**.
Import	Used to import CSV files for adding DHCP static assignment rules.
Export	Used to export DHCP static assignment rules to your local computer as a CSV file. TIP To modify the exported file, open the file as a txt file.

5.4.4 DHCP list

Log in to the web UI of the router, and navigate to **Network** > **DHCP Settings** > **DHCP List** to enter the page.

On this page, you can perform the following operations on the client that obtains the IP address from this router:

- To view device information such as the client name and obtained IP address of the device.
- The clients with assigned IP addresses can be added to the static allocation list individually or in batches, so that the DHCP server always assigns the same IP address to the clients.



DHCP List

Add to DHCP Reservation | Refresh | Search

□	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Operation
□	DESKTOP-2K2MLGI	PC	192.168.0.163	[redacted]	Add to DHCP Reservation

Parameter description

Parameter	Description
Terminal Name	Specifies the name of the client.
Terminal Type	Specifies the client types such as Mobile Phone, PAD and PC. If the client type is not recognized, **Others** will be displayed.
IP Address	Specifies the IP address of the client.
MAC Address	Specifies the MAC address of the client.
Operation	Used to add to DHCP reservation. Add to DHCP Reservation : Used to assign the current IP address as a static IP address to the client. After added successfully, the client will appear in the DHCP reservation list.

6 AP management

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

6.1 Overview

The router integrates the functions of wireless controller to manage Tenda fat APs, configure wireless networks for APs and maintain APs in batches. The workload of managing large-scale wireless networks can be greatly reduced.

To be managed by the router, the AP needs to be found and added to the router. When the router is used as the primary router, the AP can be added to the router as follows.

Step 1 Enable the AP to obtain its own IP address.

Tenda fat APs support the DHCP client function. When the AP is enabled, the AP automatically obtains its own IP address, gateway IP address and IP address of the DNS server.

Step 2 Enable the AP to obtain the IP address of the router.

The router periodically broadcasts its IP address on the network. By monitoring the broadcast, the AP can obtain the IP address of the router.

Step 3 Enable the AP to send a join request to the router.

After obtaining the IP address of the router, the AP sends a join request to the IP address.

Step 4 Enable the router to respond to the join request.

After the router responds to the join request, the AP joins the router successfully.

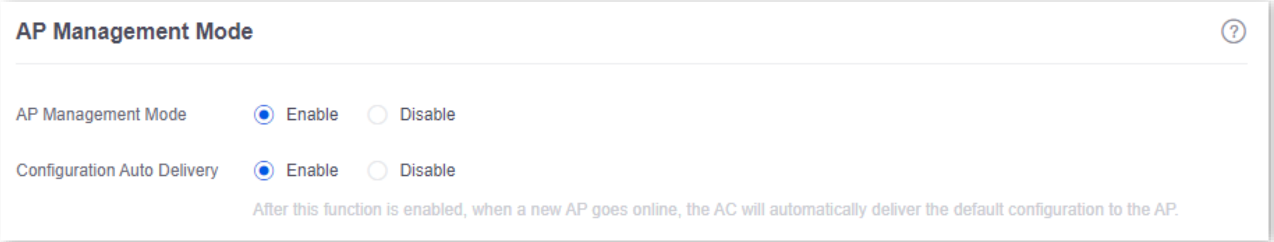
6.2 Configuration wizard

Procedure	Task	Description
1	Configure network	Optional. By default, the router has created a VLAN interface named VLAN_Default. The default IP address of this interface is **192.168.0.252**, and the User_DHCP_Default and AP_DHCP_Default policies are configured.
2	Set AP management mode	Optional. By default, the AP management mode and configuration auto delivery function of the router have been enabled.
3	Configure AP group	Optional. By default, the router has created an AP group policy named **APGroup_Default**.
4	Configure Wi-Fi	Optional. By default, the router has created a Wi-Fi named **APGroup_Default**.
5	Configure AP VLAN	Optional. Disable by default. Enable if you need to configure VLAN of AP.
6	Separate APs to AP groups	Optional. By default, the router has separated the managed APs to **APGroup_Default**. You can modify them based on actual situation.

6.3 AP management mode

Log in to the web UI of the router, and navigate to **AP** > **AP Management Mode** to enter the page.

On this page, you can set the AP management mode, configure auto delivery function and add AP DHCP policy for the VLAN. The router only supports Tenda fat APs.



AP Management Mode

AP Management Mode ● Enable ○ Disable

Configuration Auto Delivery ● Enable ○ Disable

After this function is enabled, when a new AP goes online, the AC will automatically deliver the default configuration to the AP.

Parameter description

Parameter	Description
AP Management Mode	Used to enable or disable the AP management function.
Configuration Auto Delivery	After this function is enabled, when a new AP goes online, or an offline AP goes online, the router will automatically add the AP to **APGroup_Default**, that is, deliver the default configuration to the AP.

6.4 Wi-Fi settings

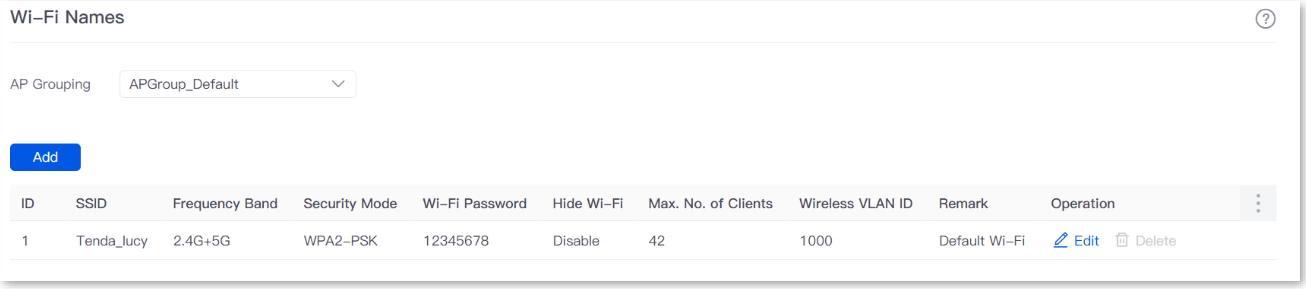
On this page, you can configure policies for APs to be used in AP Group Policy in advance. The policies include the SSID policy, RF policy, VLAN policy and advanced policy.

6.4.1 Wi-Fi names

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Settings**> **Wi-Fi Names** to enter the page.

Wi-Fi policy is used to configure the Wi-Fi-related parameters of the AP.

You can click ⋮ to select parameters to be displayed.



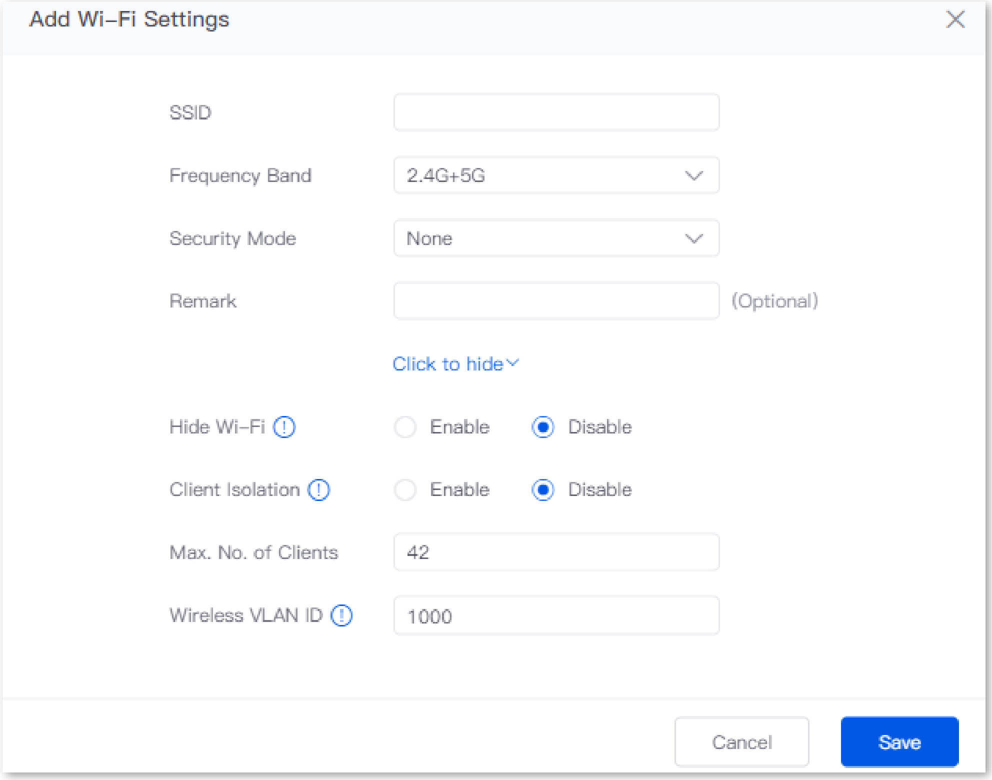
Wi–Fi Names

AP Grouping APGroup_Default

Add

ID	SSID	Frequency Band	Security Mode	Wi–Fi Password	Hide Wi–Fi	Max. No. of Clients	Wireless VLAN ID	Remark	Operation
1	Tenda_lucy	2.4G+5G	WPA2–PSK	12345678	Disable	42	1000	Default Wi–Fi	Edit Delete

By default, the router has created a Wi-Fi policy. You can click **Add** to add a new Wi-Fi policy.



Add Wi–Fi Settings

SSID

Frequency Band: 2.4G+5G

Security Mode: None

Remark: (Optional)

Click to hide

Hide Wi–Fi: ○ Enable ● Disable

Client Isolation: ○ Enable ● Disable

Max. No. of Clients: 42

Wireless VLAN ID: 1000

Parameter description

Parameter	Description
AP Grouping	Specifies the group to which the wireless network belongs. The AP group should be configured in AP Groups in advance.
SSID	Specifies the name of the wireless network.
Frequency Band	Specify the frequency band of the wireless network. TIP If the AP only supports one band (2.4GHz or 5GHz), when you select **2.4G+5G**, the other band is invalid.

Parameter	Description
Security Mode	Specifies the security modes of the SSID policy. – **None**: It indicates that the wireless network has no password. For the security of the network, this option is not recommended. – **WPA-PSK** and **WPA2-PSK:** They indicate that WPA pre-shared keys are used for network authentication, which is ideal for individual and domestic scenarios. – **WPA3-SAE** and **WPA3-SAE/WPA2-PSK:** They indicate that the wireless network is authenticated with a WPA pre-shared key, which is more secure than WPA2. Some smartphones do not support WPA3, so **WPA3-SAE/WPA2-PSK** is recommended. – **WPA** and **WPA2:** They indicate that 802.1x is used for network authentication and generating root keys to encrypt data, which is suitable for scenarios with high security requirements such as enterprises.
Encryption (Under Advanced >)	Specifies the encryption when the security mode is WPA-PSK, WPA2-PSK, WPA3-SAE, WPA3-SAE/WPA2-PSK, WPA and WPA2. – **AES**: Specifies the Advanced Encryption Standard. – **TKIP**: Specifies the Temporal Key Integrity Protocol. Under **TKIP** mode, the AP can only use a lower rate (maximum 54 Mbps) than under **AES** mode. – **TKIP&AES**: Specifies that both the **AES** and **TKIP** are compatible. TIP **WPA3-SAE** only supports **AES**.
Wi-Fi Password	Specifies the pre-shared keys when the security modes are WPA-PSK, WPA2-PSK, WPA3-SAE and WPA3-SAE/WPA2-PSK. The users need to enter the wireless password when connecting to the SSID.
Key Update Interval	Specifies the key update interval when the security mode is WPA-PSK, WPA2-PSK, WPA3-SAE and WPA3-SAE/WPA2-PSK. A short key update interval can enhance the security of WPA data.
Radius Server Address	Specify the IP address, shared key and authentication port of RADIUS Server. They are required only when **Security Mode** is set to **WPA** or **WPA2**.
Authentication Key	
Authentication Port	
Hide Wi-Fi (Under Advanced >)	Used to enable or disable the hide SSID function. After this function is enabled, the SSID will be hidden and the wireless network will not appear in the available network list of wireless clients (such as smartphones), enhancing the security of the wireless network. If you want to connect to the hidden wireless network, manually enter the SSID on your wireless clients.

Parameter	Description
Client Isolation (Under Advanced >)	Used to enable or disable the client isolation function. With the **Client Isolation** enabled, clients cannot communicate with each other.
Max No. of Clients (Under Advanced >)	Specifies the maximum number of clients allowed to connect to the wireless network. TIP Generally, the maximum number of Tenda clients is **128**. If you want to deliver multiple SSID policies to the same AP, you need to plan the maximum number of clients of each policy in advance. Ensure the maximum number of clients of the SSID policies does not exceed 128.
Wireless VLAN ID (Under Advanced >)	Specifies the VLAN to which the SSID belongs. The value range is 1, 10 – 4094.
Remark	Specifies the description of the SSID policy. The remark is optional.
Operation	Used to edit or delete a Wi-Fi policy. ✎ Edit **:** Used to modify the policy. 🗑 Delete**:** Used to delete the policy. TIP Generally, keep at least one Wi-Fi policy, so the last policy cannot be deleted. The policy in use cannot be deleted. Remove the policy reference before deleting a policy in use.

6.4.2 Guest Wi-Fi

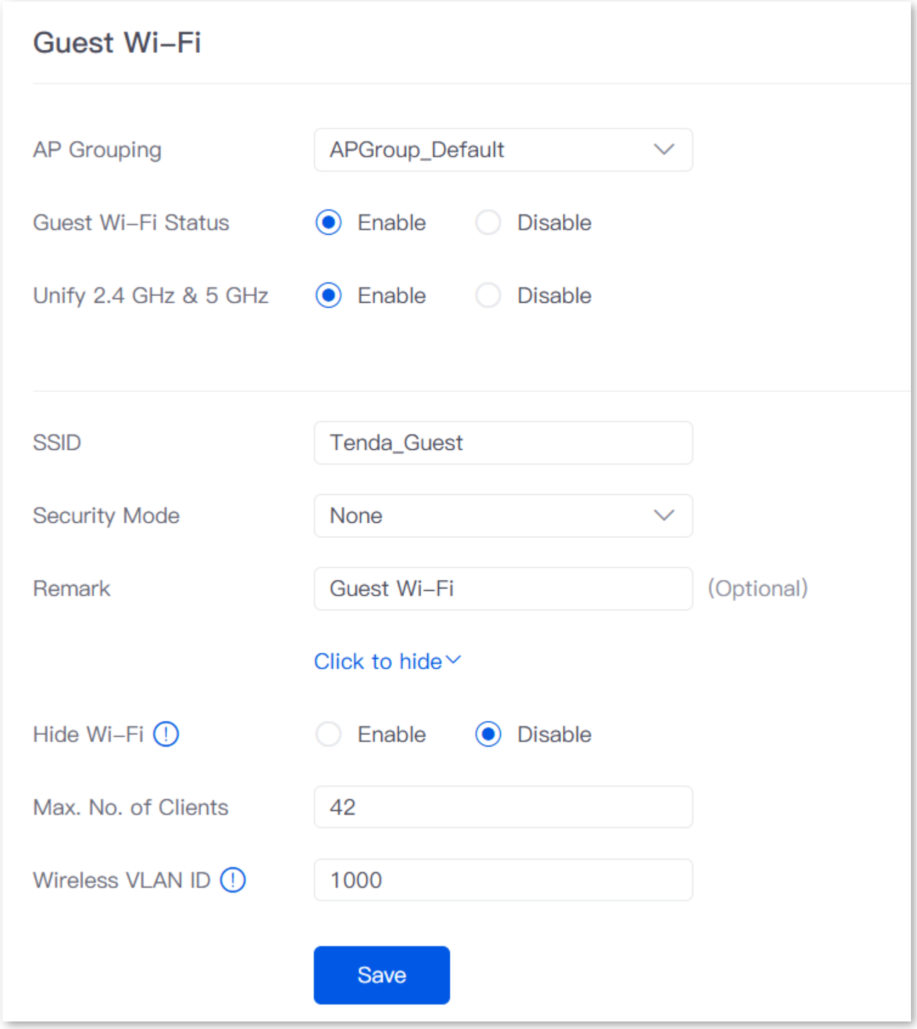
Guest Wi-Fi is isolated from other networks. The clients connected to the guest Wi-Fi can access the internet, but cannot access the router's web UI or other networks.

When you need to open a wireless network for guests, you can enable guest Wi-Fi to meet the internet requirements of guests. It protects the security of the main network to prevent personal information disclosure.

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Settings** > **Guest Wi-Fi** to enter the page.

By default, the router has created a Wi-Fi policy. You can click **Add** to add a new Wi-Fi policy.

This function is disabled by default. The following figure is for reference only.



Guest Wi–Fi

AP Grouping: APGroup_Default

Guest Wi–Fi Status: ● Enable ○ Disable

Unify 2.4 GHz & 5 GHz: ● Enable ○ Disable

SSID: Tenda_Guest

Security Mode: None

Remark: Guest Wi–Fi (Optional)

Hide Wi–Fi: ○ Enable ● Disable

Max. No. of Clients: 42

Wireless VLAN ID: 1000

Parameter description

Parameter	Description
AP Grouping	Specifies the group to which the guest Wi-Fi belongs. The AP group should be configured in AP Groups in advance.

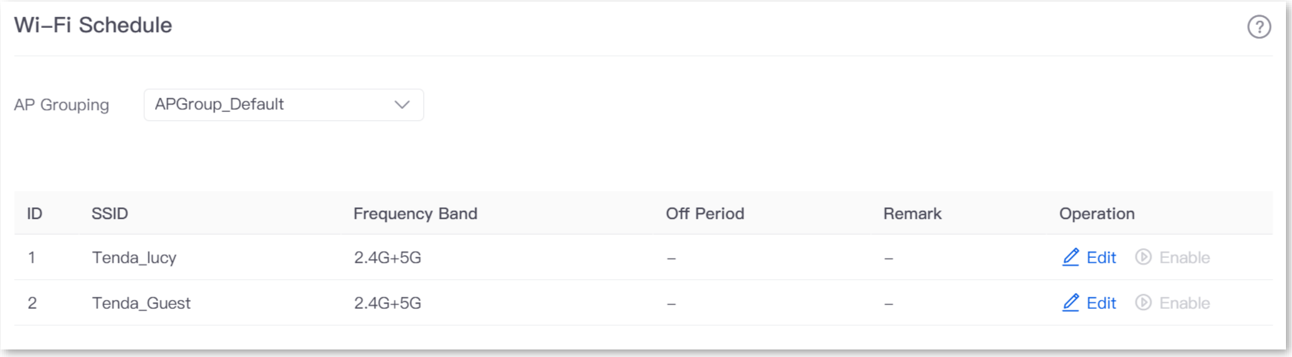
Parameter	Description
Guest Wi-Fi Status	Specifies the status of Guest Wi-Fi.
Unify 2.4 GHz & 5 GHz	Used to enable or disable the Unify 2.4 GHz & 5 GHz function. When this function is enabled, the 2.4 GHz and 5 GHz Wi-Fi networks share the same SSID and password. Wi-Fi-enabled clients connected to it will use the frequency with better connection quality.
SSID	Specifies the name of the guest wireless network. To identify your guest network, add a Wi-Fi name different from the primary network.
Security Mode	Specifies the security modes of the SSID policy. – **None**: It indicates that the wireless network has no password. For the security of the network, this option is not recommended. – **WPA-PSK** and **WPA2-PSK:** They indicate that WPA pre-shared keys are used for network authentication, which is ideal for individual and domestic scenarios. – **WPA3-SAE** and **WPA3-SAE/WPA2-PSK:** They indicate that the wireless network is authenticated with a WPA pre-shared key, which is more secure than WPA2. Some smartphones do not support WPA3, so **WPA3-SAE/WPA2-PSK** is recommended. – **WPA** and **WPA2:** They indicate that 802.1x is used for network authentication and generating root keys to encrypt data, which is suitable for scenarios with high-security requirements such as enterprises.
Encryption (Under Advanced >)	Specifies the encryption when the security mode is WPA-PSK, WPA2-PSK, WPA3-SAE, WPA3-SAE/WPA2-PSK, WPA and WPA2. – **AES**: Specifies the Advanced Encryption Standard. – **TKIP**: Specifies the Temporal Key Integrity Protocol. Under **TKIP** mode, the AP can only use a lower rate (maximum 54 Mbps) than under **AES** mode. – **TKIP&AES**: Specifies that both the **AES** and **TKIP** are compatible.
Wi-Fi Password	Specifies the pre-shared keys when the security modes are WPA-PSK, WPA2-PSK, WPA3-SAE and WPA3-SAE/WPA2-PSK. The users need to enter the wireless password when connecting to the SSID.
Key Update Interval (Under Advanced >)	Specifies the key update interval when the security mode is WPA-PSK, WPA2-PSK, WPA3-SAE and WPA3-SAE/WPA2-PSK. A short key update interval can enhance the security of WPA data. 0 means no update.
Radius Server Address	Specify the IP address, shared key and authentication port of the RADIUS Server. They are required only when **Security Mode** is set to **WPA** or **WPA2**.
Authentication Key	
Authentication Port	

Parameter	Description
Hide Wi-Fi (Under Advanced >)	Used to enable or disable the hide SSID function. After this function is enabled, the SSID will be hidden and the wireless network will not appear in the available network list of wireless clients (such as smartphones), enhancing the security of the wireless network. If you want to connect to the hidden wireless network, manually enter the SSID on your wireless clients.
Client Isolation (Under Advanced >)	Used to enable or disable the client isolation function. With the **Client Isolation** enabled, clients cannot communicate with each other.
Max No. of Clients (Under Advanced >)	Specifies the maximum number of clients allowed to connect to the guest wireless network. TIP Generally, the maximum number of Tenda clients is **128**. If you want to deliver multiple SSID policies to the same AP, you need to plan the maximum number of clients of each policy in advance. Ensure the sum of maximum number of clients of the SSID policies does not exceed 128.
Wireless VLAN ID	Specifies the VLAN that the SSID belongs to. The value range is 1, 10 – 4094.
Remark	(Optional) Specifies the introduction to the guest Wi-Fi policy.

6.4.3 Wi-Fi schedule

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Settings** > **Wi-Fi Schedule** to enter the page.

With this function enabled, you can set the periods for the wireless network to be disabled. Within the period, the router will automatically disable the wireless network of the AP managed by the router.



Wi–Fi Schedule

AP Grouping: APGroup_Default

ID	SSID	Frequency Band	Off Period	Remark	Operation
1	Tenda_lucy	2.4G+5G	–	–	Edit Enable
2	Tenda_Guest	2.4G+5G	–	–	Edit Enable

Parameter description

Parameter	Description
AP Grouping	Specifies the group that the Wi-Fi schedule belongs to. The AP group should be configured in AP Groups in advance.

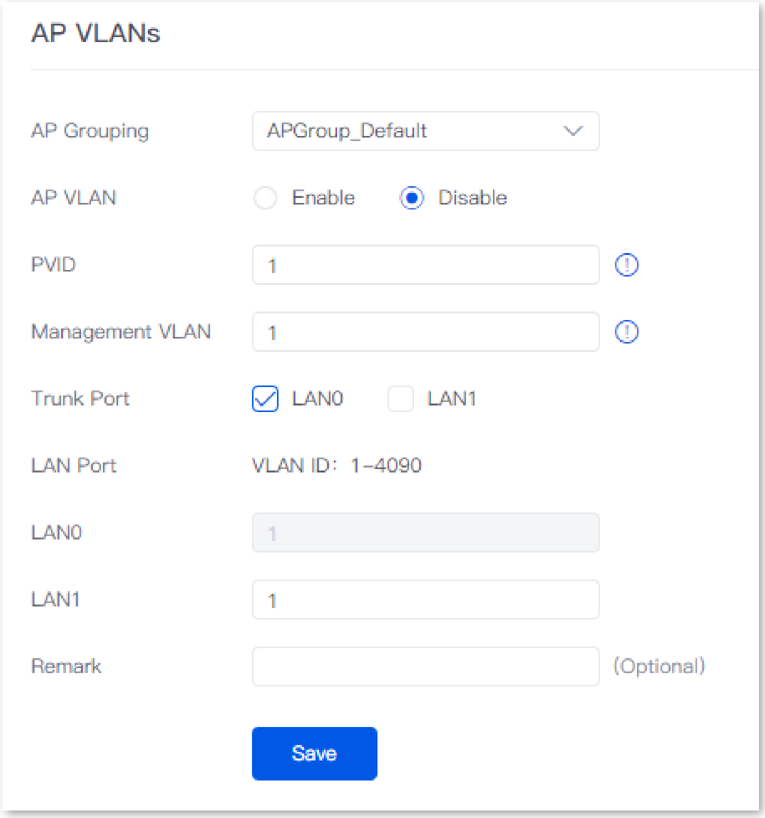
Parameter	Description
SSID	Specifies the name of the wireless network.
Frequency Band	Specify the frequency band of the wireless network.
Wi-Fi Schedule	Enable or disable the Wi-Fi schedule function.
Off Period	The periods for the wireless network to be disabled.
Remark	(Optional) Specifies the introduction to the Wi-Fi schedule policy.
Operation	Used to configure a Wi-Fi schedule policy. Edit : Used to modify the policy. Enable : Used to enable the policy. Disable : Used to disable the policy.

6.4.4 AP VLANs

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Settings** > **AP VLANs** to enter the page.

VLAN policy is used to configure the basic VLAN parameters of the AP.

You can configure the VLAN policy to associate the VLAN-related settings of the AP (such as the enabling status of the AP VLAN, management VLAN and Trunk port).



AP VLANs

AP Grouping	APGroup_Default
AP VLAN	○ Enable ● Disable
PVID	1
Management VLAN	1
Trunk Port	☑ LAN0 □ LAN1
LAN Port	VLAN ID：1–4090
LAN0	1
LAN1	1
Remark	(Optional)

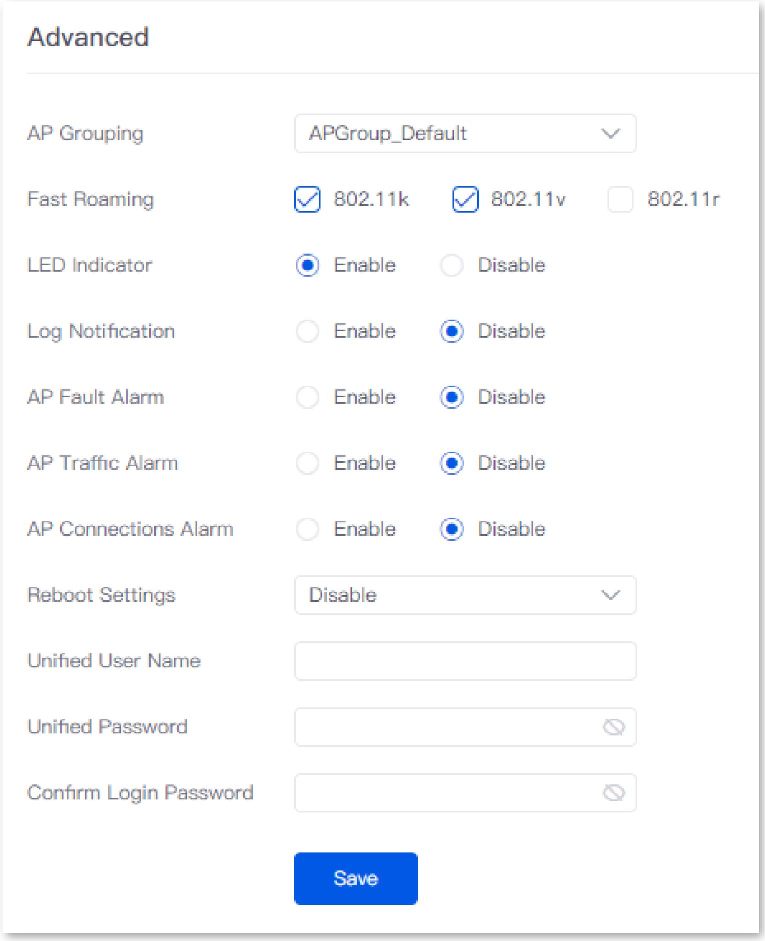
Parameter description

Parameter	Description
AP Grouping	Specifies the group that the AP VLAN policy belongs to. The AP group should be configured in AP Groups in advance.
AP VLAN	Used to enable or disable the AP VLAN function.
PVID	Specifies the ID of the default native VLAN of the trunk port of the AP.
Management VLAN	Specifies the ID of the management VLAN. The default value is 1. After changing the management VLAN, you can manage the AP only after connecting the router to the new management VLAN and you can log in to the web UI of the AP again only after connecting your client (such as the management computer) to the new management VLAN.
Trunk Port	Used to select the trunk ports that allow data of all VLANs to pass. TIP After the 802.1Q VLAN function is enabled, at least one LAN port needs to be selected as the Trunk port. If this policy is applied for only one LAN port, set LAN0 as the Trunk port. Otherwise, the configuration may fail.
LAN Port	Specifies the VLAN ID of the wired LAN port (non-Trunk port) of the AP. This parameter is required only when the AP that uses the current policy has two LAN ports. The wired LAN port that cannot be modified is the Trunk port. TIP After the 802.1Q VLAN function is enabled, the wired LAN port (non-Trunk port) and wireless port of the SSID are Access ports. Their PVIDs are the same as their own VLAN IDs.
Remark	(Optional) Specifies the introduction to the VLAN policy.

6.4.5 Advanced

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Settings** > **Advanced** to enter the page.

On this page, you can configure advanced policies for the AP.



Advanced

AP Grouping: APGroup_Default

Fast Roaming: ☑ 802.11k ☑ 802.11v □ 802.11r

LED Indicator: ● Enable ○ Disable

Log Notification: ○ Enable ● Disable

AP Fault Alarm: ○ Enable ● Disable

AP Traffic Alarm: ○ Enable ● Disable

AP Connections Alarm: ○ Enable ● Disable

Reboot Settings: Disable

Unified User Name:

Unified Password:

Confirm Login Password:

Parameter description

Parameter	Description
AP Grouping	Specifies the group to which the advanced belongs. The AP group should be configured in AP Groups in advance.
Fast Roaming	Specifies whether to enable the fast roaming function. Wireless roaming means that a client automatically connects to the AP with better signal and disconnects from the original AP when it moves to a critical area covered by two or more APs. The premise is that the SSID, security mode and key of these APs are the same. – 802.11k: Wireless spectrum resource measurement protocol. With the protocol enabled, the client will be assisted in scanning roamable target APs, solving the problem of whether you should roam and when you need to roam. – 802.11v: Wireless network management protocol. With the protocol enabled, the client will be assisted in selecting roamable target APs, solving the problem of which AP to roam to. – 802.11r: Specifies the fast BSS conversion protocol. With the protocol enabled, it will reduce roaming time without the handshake metric during wireless reconnection, solving the problem of how to roam quickly.
LED Indicator	Turn on or turn off the indicator of the AP.

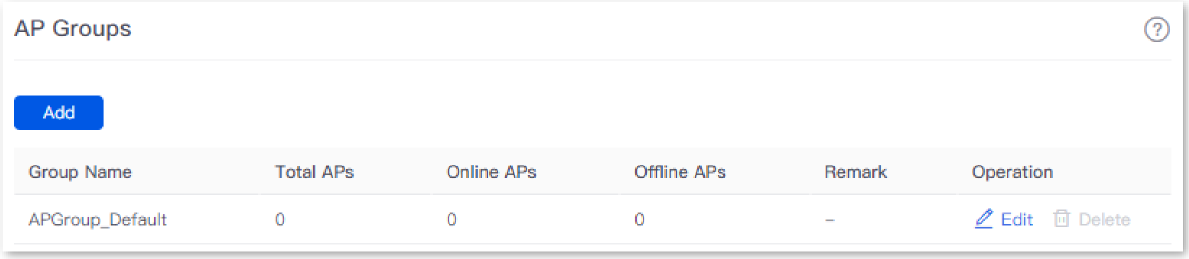
Parameter	Description
Log Notification	Used to enable or disable the log notification function. After it is enabled, the AP alarms will be displayed in **AP Alarm Log** and **AP Running Log** in Running Log.
AP Fault Alarm	Used to enable or disable the AP fault alarm function. When it is enabled, if the AP is faulty (such as reboot, offline, online), the AP will send an alarm through Log Notification.
AP Traffic Alarm	Used to enable or disable the AP traffic alarm function. With this function enabled, when the total traffic exceeds the specified threshold, an alarm notification will be triggered. The notification can be sent by Log Notification.
Traffic Alarm Threshold	Specifies the threshold of the AP traffic alarm. When the total AP traffic exceeds the threshold, an alarm notification will be triggered.
AP Connections Alarm	Used to enable or disable the AP connections alarm function. With this function enabled, when the number of AP connections exceeds the specified threshold, an alarm notification will be triggered. The notification can be sent by Log Notification.
Connections Alarm Threshold	Specifies the threshold of connections alarm. When the number of AP connections exceeds the threshold, an alarm notification will be triggered.
Reboot Settings	Specifies the type of maintenance policy. – **Scheduled Reboot**: The AP reboots once at the specified time point on the specified dates. – **Cyclic Reboot:** The AP reboots once at the interval specified by **Reboot Time Interval**.
Time	Specify the reboot time of the AP when **Reboot Settings** is set to **Scheduled Reboot**.
Repeat	
Reboot Time Interval	Specifies the interval at which the AP reboots when **Reboot Settings** is set to **Cyclic Reboot**.
Unified User Name	Specifies the login user name of the AP.
Unified Password	Specifies the login password of the AP.
Confirm Login Password	Used to confirm the login password of the AP.

6.5 AP groups

Log in to the web UI of the router, and navigate to **AP** > **AP Groups** to enter the page.

With AP group policies, Wi-Fi policies can be associated to different AP groups, making it easy to assign managed APs to different groups and deliver different policies.

By default, the router has created an AP group policy named **APGroup_Default**. You can click **Add** to add a new AP group policy.



AP Groups

Add

Group Name	Total APs	Online APs	Offline APs	Remark	Operation
APGroup_Default	0	0	0	–	Edit Delete

Parameter description

Parameter	Description
Group Name	Specifies the name of the AP group.
Total APs	Specifies the number of total APs of the AP group.
Online APs	Specifies the number of online APs of the AP group.
Offline APs	Specifies the number of offline APs of the AP group.
Remark	(Optional) Specifies the introduction to the AP group policy.
Operation	Used to edit or delete a Wi-Fi policy. Edit : Used to modify the policy. Delete: Used to delete the policy.

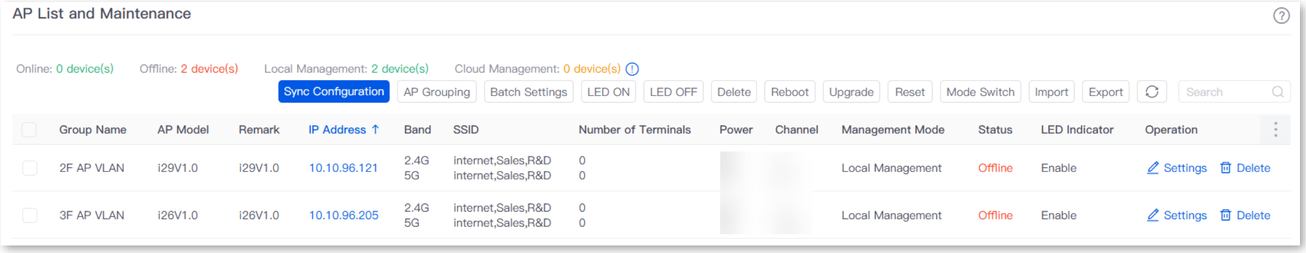
6.6 AP list and maintenance

6.6.1 Overview

Log in to the web UI of the router, and navigate to **AP** > **AP List and Maintenance** to enter the page.

On this page, you can scan the AP list, deliver the AP group policies to corresponding APs and configure the maintenance operations such as upgrading and restarting APs. Managed APs will be added to **APGroup_Default** by default.

You can click ⋮ to select parameters to be displayed.



Online: 0 device(s) Offline: 2 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

□	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
□	2F AP VLAN	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	internet,Sales,R&D internet,Sales,R&D	0 0	[redacted]	[redacted]	Local Management	Offline	Enable	Settings Delete
□	3F AP VLAN	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	internet,Sales,R&D internet,Sales,R&D	0 0	[redacted]	[redacted]	Local Management	Offline	Enable	Settings Delete

Button description

Button	Description
Sync Configuration	Used to synchronize the configuration of the selected APs.
AP Grouping	Specifies the AP group policy to be used on the selected APs. The AP group policy should be configured in AP Groups in advance.
Batch Settings	Used to deliver the configuration to the selected APs in batches.
LED ON	Used to turn on or off the LED indicator of the selected AP.
LED OFF	
Delete	Used to delete the information of offline APs that are selected.
Reboot	Used to reboot the selected APs.
Upgrade	Used to upgrade the firmware of the selected APs.
Reset	Used to reset the selected APs to factory settings.
Mode Switch	Used to enable or disable the cloud maintenance function of the AP or switch the management mode of cloud maintenance. For details, refer to set the AP cloud maintenance function. TIP The cloud maintenance function may be unavailable for some APs.

Button	Description
Import	Used to import the configuration information of the selected APs. After importing, only remarks of devices with the same MAC address are replaced. Other information will not synchronize.
Export	Used to export the configuration information of the selected APs.
⟳	Used to refresh the current list.

Parameter description

Parameter	Description
Online	Specifies the number of online devices.
Offline	Specifies the number of offline devices.
Group Name	Specifies the AP group name.
AP Model	Specifies the AP model.
Remark	Specifies the description of the AP.
IP Address	Specifies the IP address that the AP obtains from the AP DHCP server. It is also the login address of the AP.
MAC Address	Specifies the wireless MAC address of the AP.
Firmware	Specifies the current firmware version of the AP.
Band	Specifies the working frequency band of the AP, including **2.4 GHz** and **5 GHz**.
SSID	Specifies the current SSID of the AP.
Number of Terminals	Specifies the number of the clients that the AP connects to.
Power	Specifies the wireless transmission power of the AP. **Policy Delivery** indicates that the transmission power of the AP is consistent with the setting in the AP group selected. You can click **Settings** under **Operation** to modify it.
Channel	Specifies the wireless channel of the SSID that the client connects to. **Policy Delivery** indicates that the channel is consistent with the setting in the AP group selected. You can click **Settings** under **Operation** to modify it.

Parameter	Description
5G Preferred	If the client supports 2.4 GHz and 5 GHz, with this function enabled, 5 GHz is used in priority when the 5 GHz signal strength is not less than the RSSI value. TIP This function is only available for the 5 GHz band. To use this function, the 2.4 GHz and 5 GHz Wi-Fi of the AP must be enabled and the SSID, encryption mode and Wi-Fi passwords for the 2.4 GHz and 5 GHz Wi-Fi must be consistent.
Management Mode	Specifies the management mode of the AP. For details about the cloud maintenance function, refer to set the AP cloud maintenance function. TIP The cloud maintenance function may be unavailable for some APs.
Management VLAN	Specifies the management VLAN ID of the AP to differentiate it from data VLAN. If this parameter is not set, **-** is displayed by default.
Wired Port VLAN	Specifies the default VLAN ID of the wired port of the AP.
RF	Specifies the current RF status of the AP.
Online Duration	Specifies the online duration of the online AP.
Offline Duration	Specifies the offline duration of the offline AP.
Status	Specifies the current status of the AP.
LED Indicator	Specifies the current status of the LED indicator of the AP.
Operation	Used to edit or delete the AP group policy. Settings **:** Used to modify the AP group policy. Delete **:** Used to delete the AP group policy. TIP Generally, keep at least one AP group policy, so the last policy cannot be deleted. The policy in use cannot be deleted. Remove the policy reference before deleting a policy in use.

6.6.2 Deliver policies to APs

TIP

With the configuration auto delivery function enabled, when an AP goes online, it will be added to the **APGroup_Default** group by default.

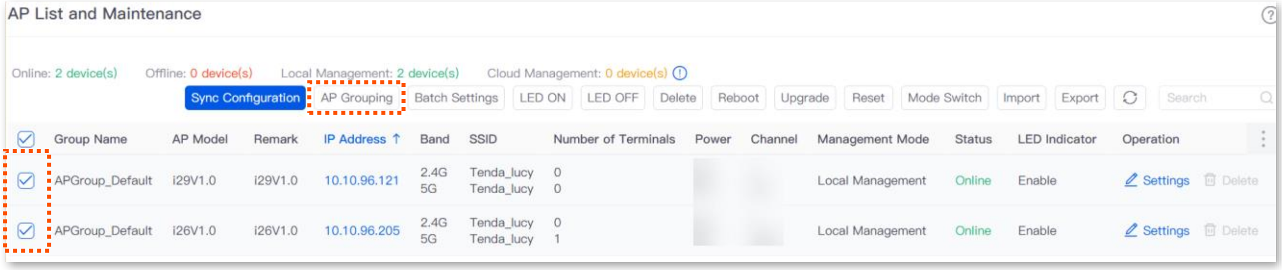
Step 1 Log in to the web UI of the router.

Step 2 (Skip if performed) Configure an AP group. For details, see AP groups.

Step 3 (Skip if performed) Configure a wireless policy to be delivered to APs. For details, see Wi-Fi settings.

Step 4 Deliver policies to APs.

1. Navigate to **AP** > **AP List and Maintenance**.
2. Select the APs to which the policies are to be delivered, and click **AP Grouping**. The following figure is for reference only.

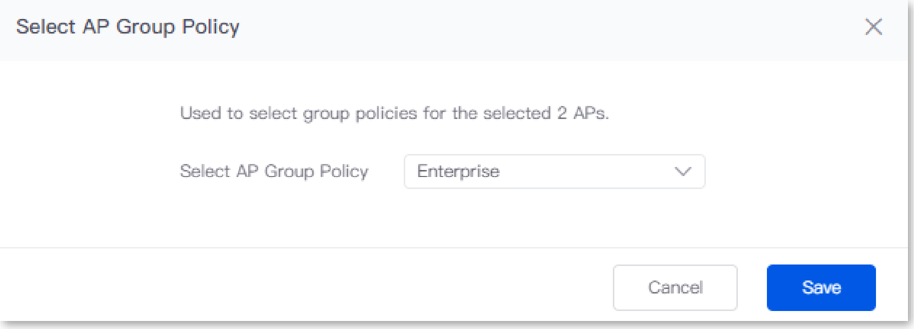


AP List and Maintenance

Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1			Local Management	Online	Enable	Settings Delete

3. Select an AP group from the **Select AP Group Policy** drop-down list box, and click **Save**. The following figure is for reference only.



Select AP Group Policy

Used to select group policies for the selected 2 APs.

Select AP Group Policy: Enterprise

---End

After the APs are added to an AP group, the policies associated to the AP group will be applied to the APs.

6.6.3 Batch settings

You can use **Batch Settings** to perform detailed settings for multiple selected APs in a unified manner.

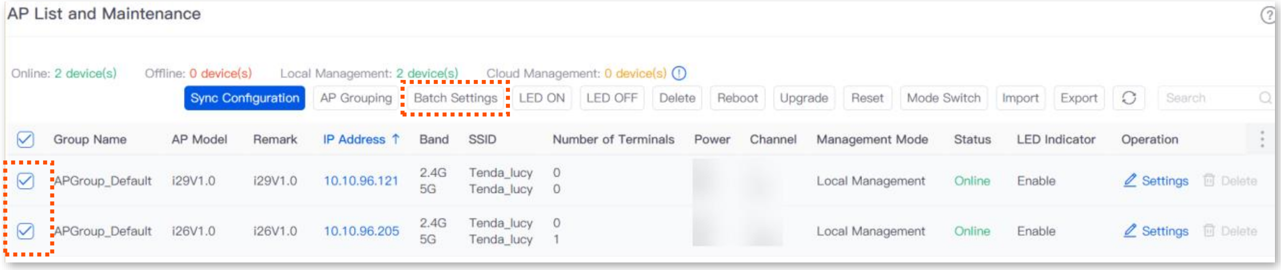
TIP

This operation can only be performed on non-offline devices.

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **AP** > **AP List and Maintenance**.

Step 3 Select the APs for which detailed settings are to be performed, and click **Batch Settings**. The following figure is for reference only.



AP List and Maintenance

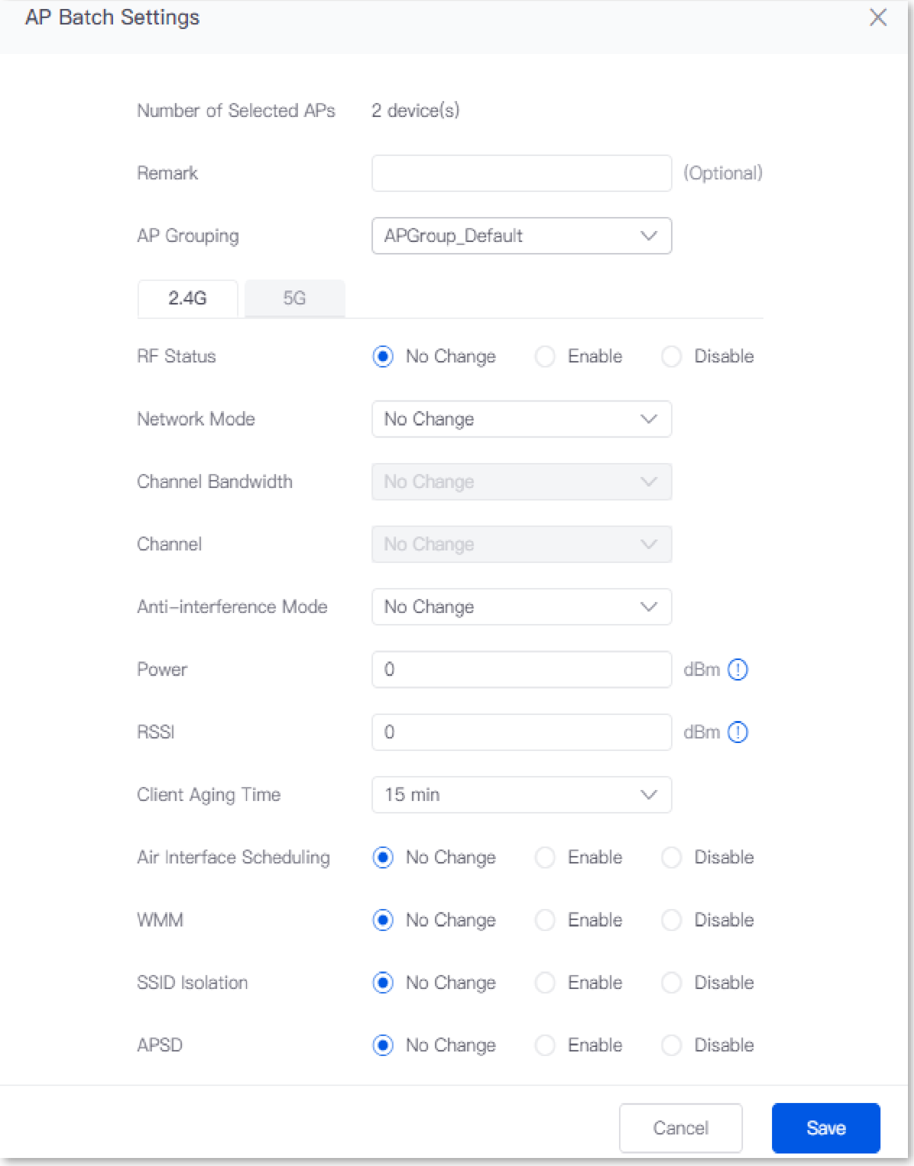
Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1			Local Management	Online	Enable	Settings Delete

Step 4 Set parameters as required, and click **Save**. The following figure is for reference only.

TIP

No change indicates that the configuration of the AP group to which the AP applies is not modified.



AP Batch Settings

Number of Selected APs: 2 device(s)

Remark: (Optional)

AP Grouping: APGroup_Default

RF Status: ● No Change ○ Enable ○ Disable

Network Mode: No Change

Channel Bandwidth: No Change

Channel: No Change

Anti-interference Mode: No Change

Power: 0 dBm

RSSI: 0 dBm

Client Aging Time: 15 min

Air Interface Scheduling: ● No Change ○ Enable ○ Disable

WMM: ● No Change ○ Enable ○ Disable

SSID Isolation: ● No Change ○ Enable ○ Disable

APSD: ● No Change ○ Enable ○ Disable

---End

Related configurations for the selected APs will be delivered again.

Parameter description

Parameter	Description
Number of Selected APs	Specifies the number of APs that are selected currently. It cannot be modified.
Remark	Specifies the introduction of the APs. The remark is optional.
AP Grouping	Specifies the AP group policy to be applied for the selected APs. The AP group policy must be configured in AP groups in advance.
2.4G	Used to configure parameters for 2.4 GHz and 5 GHz wireless networks.
5G	
RF Status	Specifies the status of the WiFi function. **No Change** indicates that the RF status of the corresponding frequency band of the AP is not modified. – **Enable**: Select it to enable the WiFi function of the frequency band. – **Disable:** Select it to disable the WiFi function of the frequency band.
Network Mode	Specifies the wireless network mode of the corresponding band. Network modes of the 2.4 GHz frequency band include **11b**, **11g**, **11b/g**, **11b/g/n** and **11b/g/n/ax**. – **11b**: The AP works in 802.11b wireless network mode. – **11g**: The AP works in 802.11g wireless network mode. – **11b/g**: The AP works in 802.11b/g wireless network mode. – **11b/g/n**: The AP works in 802.11b/g/n wireless network mode. – **11b/g/n/ax**: The AP works in 802.11b/g/n/ax wireless network mode. Network modes of the 5 GHz frequency band include **11a**, **11a/n**, **11ac**, and **11a/n/ac/ax**. – **11a**: The AP works in 802.11a wireless network mode. – **11a/n**: The AP works in 802.11a/n wireless network mode. – **11ac**: The AP works in 802.11ac wireless network mode. – **11a/n/ac/ax**: The AP works in 802.11a/n/ac/ax wireless network mode.
Channel Bandwidth	Specifies the bandwidth of the working channel. A high channel bandwidth means a higher transmission rate, but the penetration capability is reduced and the transmission distance is shortened. – **Automatic**: The AP automatically adjusts the channel bandwidth based on the surrounding environment. – **20M**: The AP uses the 20 MHz channel bandwidth. – **40M**: The AP uses the 40 MHz channel bandwidth. – **80M:** This channel bandwidth is available for the 5 GHz only. The AP uses the 80 MHz channel bandwidth. – **160M:** This channel bandwidth is available for the 5 GHz only. The AP uses the 160 MHz channel bandwidth. – **No Change**: The router does not deliver the channel bandwidth configuration to the AP. The AP uses the channel bandwidth configured on its web UI.

Parameter	Description
Channel	Specifies the channel in which the wireless data is transmitted and received. The available channels are determined by the current country/region and wireless band. – **No Change:** Retain the current configurations of the AP. – **Automatic**: The AP automatically detects the occupation rate of channels and selects the appropriate working channel accordingly. If the connection drops, freezes or slow internet occurs frequently when you are using the wireless network, you can try changing the working channel. You can check the channels with a low occupation rate and little interference using software tools (such as WiFi analyzer).
Anti-interference Mode	Interference mitigation mode of this device. Only supported in 2.4 GHz. – **0**: Interference suppression measures are disabled. – **1**: Suppress same frequency interference for weak radio environment, such as the same frequency interference caused by microwave ovens, smartphones and bluetooth devices. – **2**: Forcibly suppress moderate interference for bad radio environment when the number of wireless signal interference sources is less than 30. – **3**: Automatically suppress critical interference for heavy loading radio environment. – **4:** Automatically suppress critical interference and reduce noise when the number of wireless signal interference sources is more than 30, such as high-density scenarios. – **No Change**: The router does not deliver the anti- interference mode configuration to the AP. The AP uses the anti-interference mode configured on its web UI.
Power	Specifies the transmit power of the corresponding band. The higher the transmit power, the wider the WiFi coverage. However, an appropriate reduction of transmit power can improve the performance and security of the wireless network.
RSSI	Specifies the minimum wireless signal strength can be received by the band. Clients with a lower signal strength value cannot connect to the AP. When there are multiple APs in the surroundings, an appropriate **RSSI** value helps ensure wireless clients connect to the APs with a stronger signal.
Client Aging Time	If a client generates no data communication within this time after connecting to the wireless network, the AP will cut this client off.
Air Interface Scheduling	If this function is enabled, the same download time is assigned to users experiencing different download rates, ensuring a better experience for high-rate users.
WMM	Specifies the WiFi Multi-media, which provides basic solutions for wireless QoS. When this function is enabled, audio and video data are forwarded in priority. To improve the performance of AP in wireless multimedia data transmission (for example, online videos), this function is enabled by default.

Parameter	Description
SSID Isolation	Used to enable or disable the SSID isolation function. When it is enabled, devices under different SSIDs cannot communicate with each other.
APSD	Specifies the Automatic Power Save Delivery, which is the **WMM** power-saving certification protocol of the WiFi Alliance. Enabling **APSD** can reduce the power consumption of the AP.

6.6.4 Set AP cloud maintenance

You can use **Mode Switch** to enable the cloud maintenance function or switch to the cloud management mode for selected APs.

To add APs and the router to the same project, keep their **Unique Cloud Code** consistent when enabling the cloud maintenance function.

TIP

This operation can only be performed on non-offline devices.

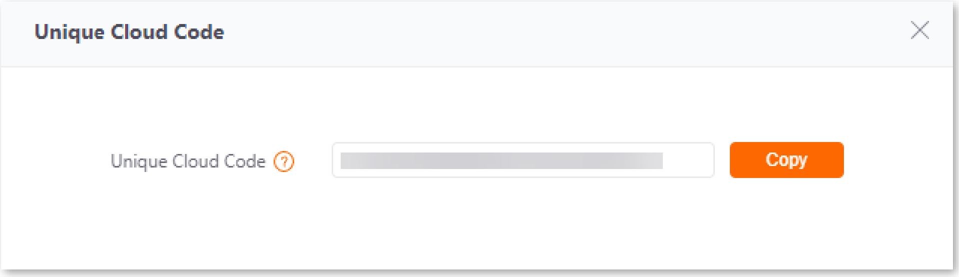
To enable the cloud maintenance function for APs:

Step 1 Obtain the unique cloud code.

TIP

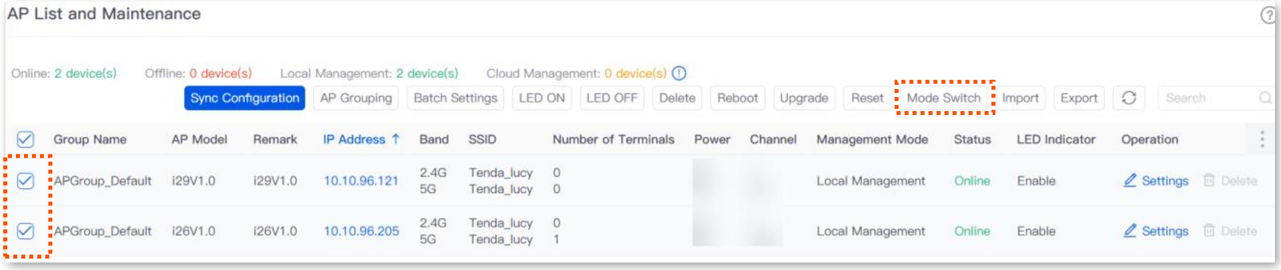
- If the cloud maintenance function has been enabled for the router and you need to add the AP and router to the same project, you can obtain the unique cloud code in Cloud Maintenance.
- Before enabling the cloud maintenance function of the AP, ensure that the AP is connected to the internet.

1. Access https://cloudfi.tendacn.com to enter the Tenda CloudFi cloud platform.
2. Click **Add** in the upper right corner and select **Unique Cloud Code**, and copy the unique cloud code.



Step 2 Enable the cloud maintenance function for the APs.

1. Log in to the web UI of the router, and navigate to **AP** > **AP List and Maintenance**.
2. Select the APs for which the cloud maintenance function is to be enabled, and click **Mode Switch**. The following figure is for reference only.



AP List and Maintenance

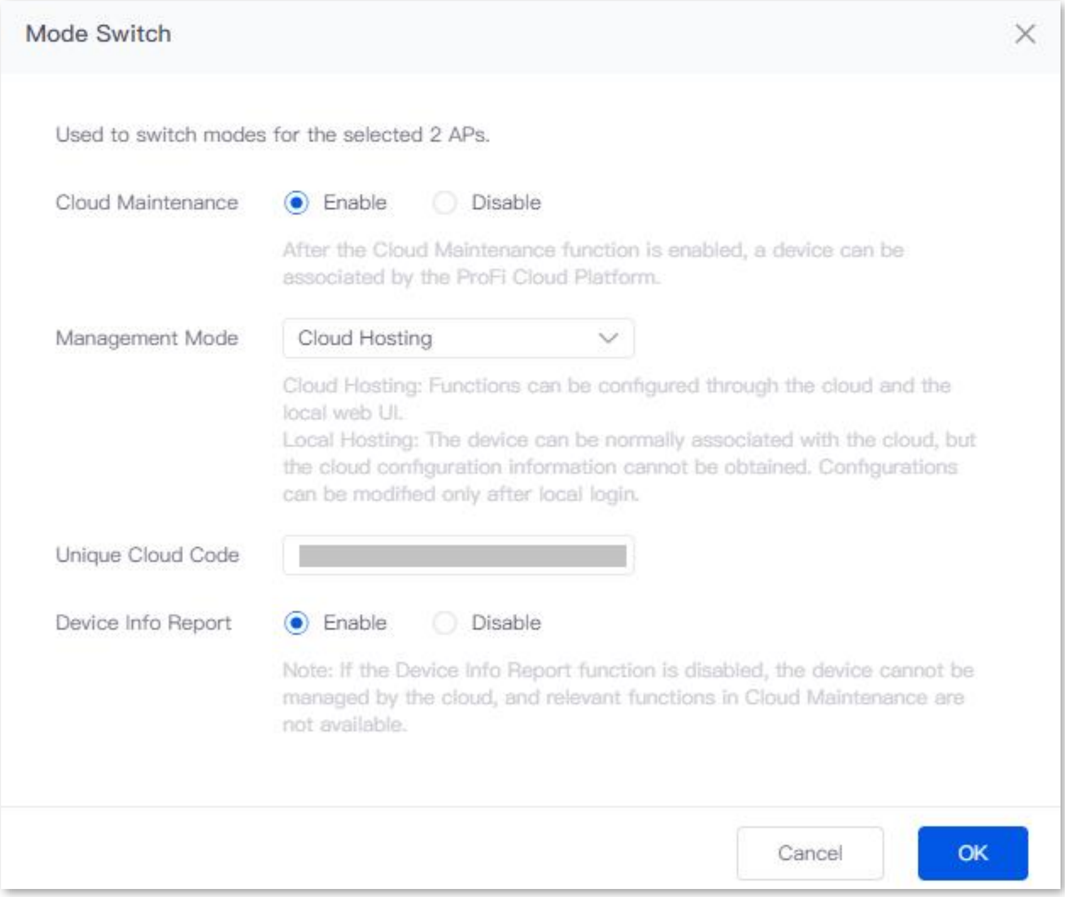
Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1			Local Management	Online	Enable	Settings Delete

3. Set **Cloud Maintenance** to Enable, and set **Management Mode** as required (**Cloud Hosting** used for illustration here).

4. Enter the unique cloud code obtained in **Unique Cloud Code** and set **Device Info Report** to **Enable**.

5. Click **OK**.



Mode Switch

Used to switch modes for the selected 2 APs.

Cloud Maintenance ● Enable ○ Disable

After the Cloud Maintenance function is enabled, a device can be associated by the ProFi Cloud Platform.

Management Mode: Cloud Hosting

Cloud Hosting: Functions can be configured through the cloud and the local web UI.

Local Hosting: The device can be normally associated with the cloud, but the cloud configuration information cannot be obtained. Configurations can be modified only after local login.

Unique Cloud Code: [redacted]

Device Info Report ● Enable ○ Disable

Note: If the Device Info Report function is disabled, the device cannot be managed by the cloud, and relevant functions in Cloud Maintenance are not available.

---End

After the cloud maintenance function is enabled for the APs, you can manage them on the Tenda CloudFi cloud platform (https://cloudfi.tendacn.com) or Tenda CloudFi App.

Parameter description

Parameter	Description
Cloud Maintenance	Used to enable or disable the cloud maintenance function.

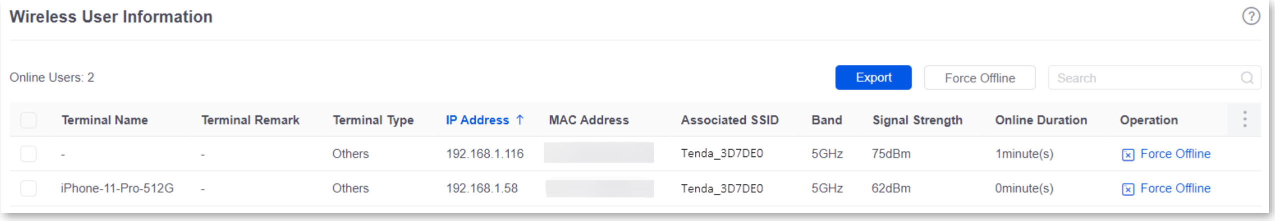
Parameter	Description
Management Mode	Specifies the cloud maintenance management mode. – **Cloud Hosting**: Allow to centrally manage and configure projects. In this mode, APs are managed and configured through Tenda CloudFi cloud platform or Tenda CloudFi App. – **Local Hosting**: Allow to centrally manage and view projects. In this mode, APs are managed in the Tenda CloudFi cloud platform or Tenda CloudFi App, but can only be configured on the web UI of the router or the APs.
Unique Cloud Code	Used to associate the device to the cloud management system. You can obtain it from web UI of the Tenda CloudFi cloud platform (https://cloudfi.tendacn.com) or Tenda CloudFi App.
Device Info Report	Used to enable or disable the device information report function. After this function is enabled, APs can be managed on the Tenda CloudFi cloud platform and the device configurations will be uploaded.

6.7 Wireless user information

Log in to the web UI of the router, and navigate to **AP** > **Wireless User Information** to enter the page.

On this page, you can view basic information about the users connected to the APs and configure the operations such as forcing users offline.

You can click ⋮ to select parameters to be displayed.



Wireless User Information

Online Users: 2

	Terminal Name	Terminal Remark	Terminal Type	IP Address ↑	MAC Address	Associated SSID	Band	Signal Strength	Online Duration	Operation
□	-	-	Others	192.168.1.116	[redacted]	Tenda_3D7DE0	5GHz	75dBm	1minute(s)	☒ Force Offline
□	iPhone-11-Pro-512G	-	Others	192.168.1.58	[redacted]	Tenda_3D7DE0	5GHz	62dBm	0minute(s)	☒ Force Offline

Parameter description

Parameter	Description
Online Users	Specifies the number of online devices.
Export	Used to export uses' information to the local computer.
Force Offline	Used to kick the online users offline.
Terminal Name	Specifies the name of the client.

Parameter	Description
Terminal Remark	Specifies the description of the client.
Terminal Type	Specifies the type of the client such as Mobile Phone, PAD and PC. If the client type is not recognized, **Others** will be displayed.
IP Address	Specifies the IP address of the client.
MAC Address	Specifies the MAC address of the client.
Associated Device	Specifies the information of the AP that the client connects to.
Associated Device Remark	Specifies the description of the AP that the client connects to.
Associated Device IP Address	Specifies the IP address of the wireless network belonging to the AP that the client connects to.
Associated Device MAC Address	Specifies the MAC address of the wireless network belonging to the AP that the client connects to.
Associated SSID	Specifies the name of the wireless network to which the client connects, or the SSID.
Band	Specifies the frequency band of the wireless network to which the client connects. – **2.4 GHz:** The frequency band of the AP is **2.4 GHz**. – **5 GHz:** The frequency band of the AP is **5 GHz**.
Real-time Upload	Specifies the real-time upload rate of the client.
Real-time Download	Specifies the real-time download rate of the client.
Total Traffic	Specifies the total download traffic during total client connection.
Signal Strength	Specifies the signal strength of the wireless network to which the client connects.
Online Duration	Specifies the duration during which the client is connected to the wireless network.
Operation	☒ Force Offline : Used to kick the online users offline.

6.8 Exmaple of configuring fat APs

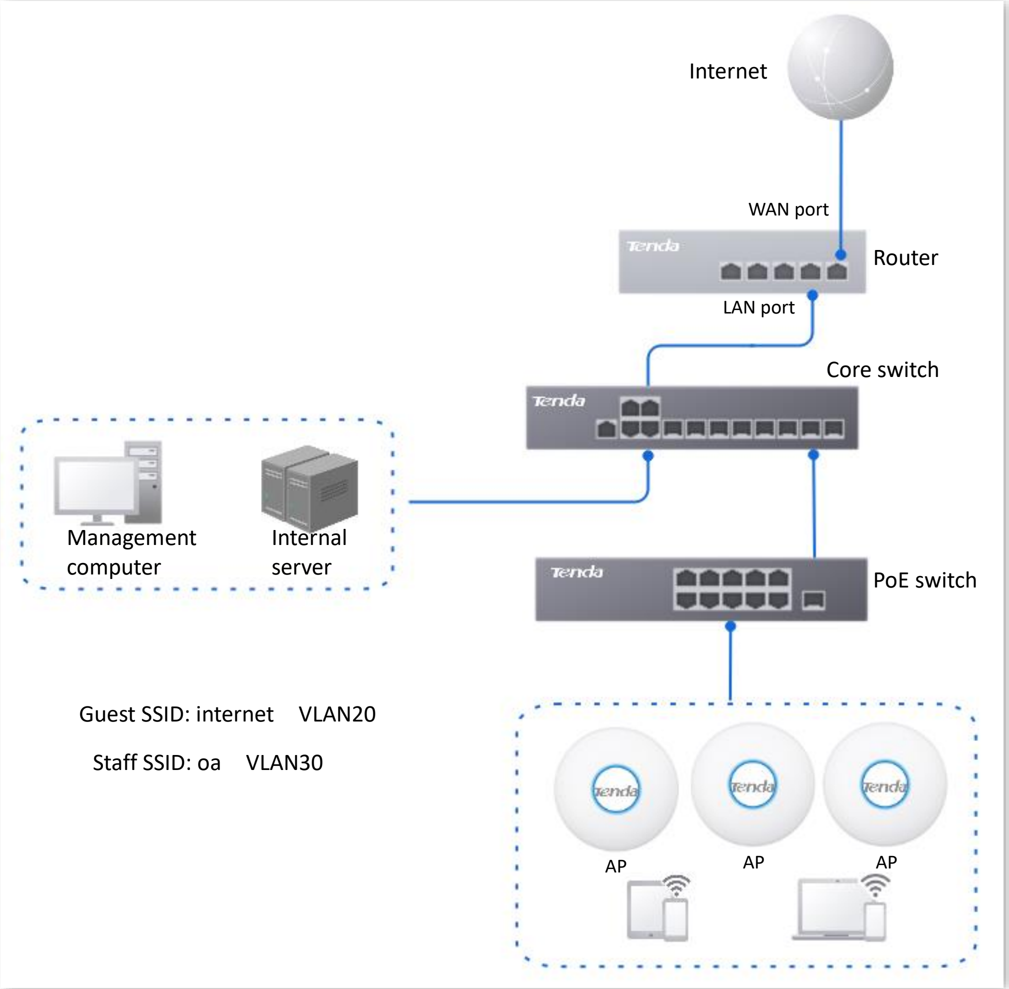
Networking requirements

A hotel uses the enterprise router and fat AP to construct networks, in which they require that the networks accessed by guests and staff are isolated. Guests can access only the internet and staff can access only the intranet.

Solution

- Successfully manage APs on the router and deliver different Wi-Fi policies to the APs.
  - Configure a Wi-Fi policy for guests. Assume that the SSID is **internet**, Wi-Fi password is **UmXmL9UK** and VLAN ID is **20**.
  - Configure a Wi-Fi policy for staff. Assume that the SSID is **oa**, Wi-Fi password is **CetTLb8T** and VLAN ID is **30**.
- Configure a VLAN forwarding rule on the switch.
- Configure a VLAN forwarding rule on the router and internal server.

The network topology is as follows.



Configuration procedure

Configure the router

Configure the core switch

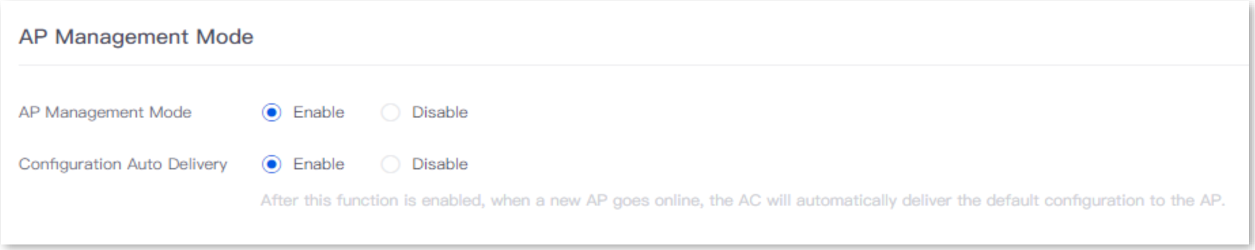
Configure the internal server

I. Configure the router.

Step 1 [Log in to the web UI of the router.]

Step 2 Manage APs (skip if performed).

1. Navigate to **AP** > **AP Management Mode**.
2. Enable the **AP Management Mode** and **Configuration Auto Delivery** functions.



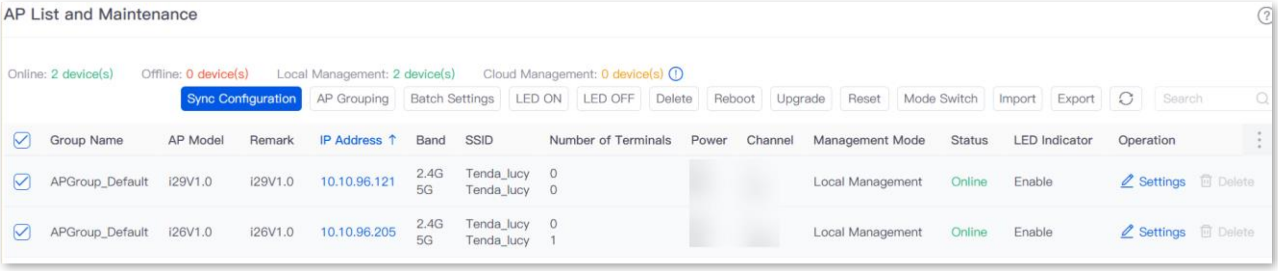
AP Management Mode

AP Management Mode ● Enable ○ Disable

Configuration Auto Delivery ● Enable ○ Disable

After this function is enabled, when a new AP goes online, the AC will automatically deliver the default configuration to the AP.

Navigate to **AP** > **AP List and Maintenance** to check whether the router manages the AP successfully.



AP List and Maintenance

Online: 2 device(s)   Offline: 0 device(s)   Local Management: 2 device(s)   Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1			Local Management	Online	Enable	Settings Delete

Step 3 Add the VLAN and configure the DHCP server.

The following table lists the VLAN parameters for illustration.

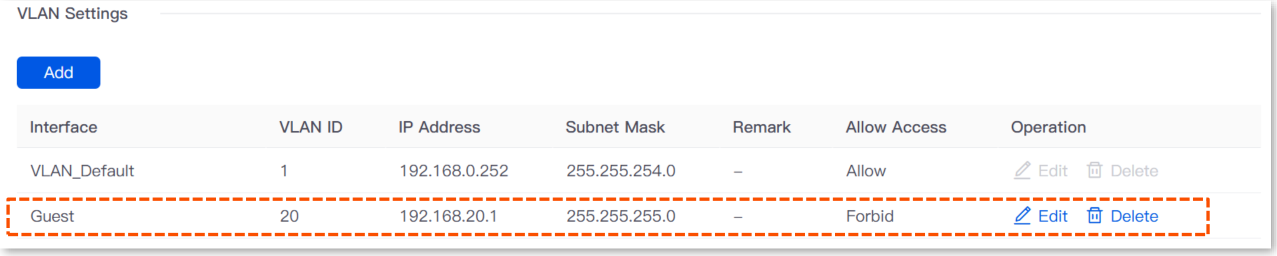
Interface	VLAN ID	IP Address/Subnet Mask	Allow Access	Physical Port
Guest	20	192.168.20.1/24	Forbid	LAN3 (TAG)

The following table lists the DHCP server parameters of the VLAN for illustration.

Policy Name	Application Interface	DHCP Type	DHCP Configuration
Guest	Guest	User DHCP	Client Address: 192.168.20.100 - 192.168.20.200 Subnet Mask: 255.255.255.0 Gateway: 192.168.20.1 Primary DNS: 192.168.20.1

1. Add VLANs.

   – Navigate to **Network** > **VLAN Settings**. Click **Add**, configure VLAN parameters and click **Save.**

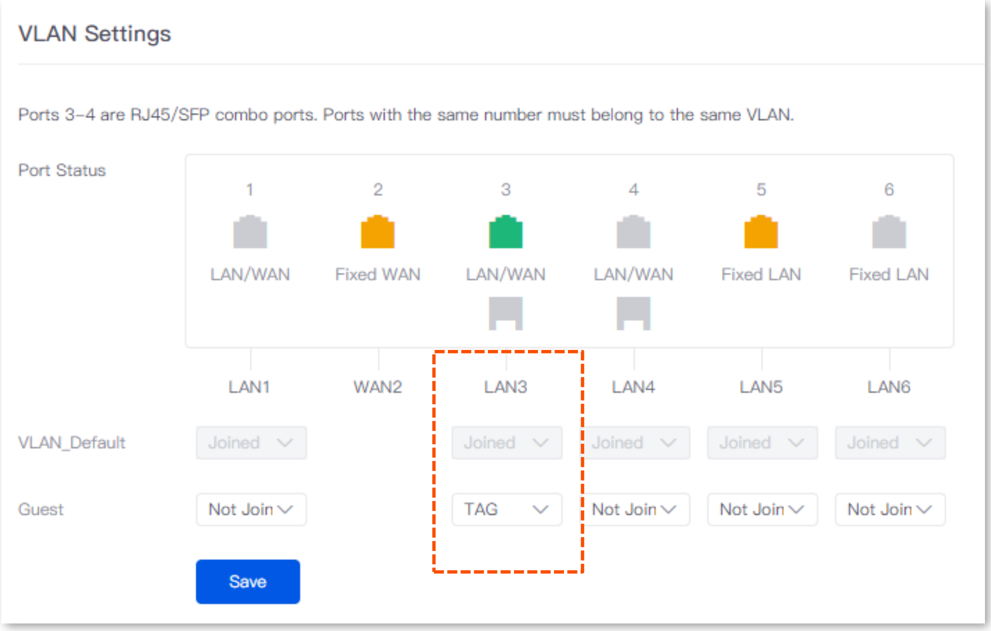


VLAN Settings

Add

Interface	VLAN ID	IP Address	Subnet Mask	Remark	Allow Access	Operation
VLAN_Default	1	192.168.0.252	255.255.254.0	–	Allow	Edit Delete
Guest	20	192.168.20.1	255.255.255.0	–	Forbid	Edit Delete

   – Select LAN port for the **Guest** VLAN, which is **LAN3** in this example, set VLAN policy to **TAG**. Then click **Save**.



VLAN Settings

Ports 3–4 are RJ45/SFP combo ports. Ports with the same number must belong to the same VLAN.

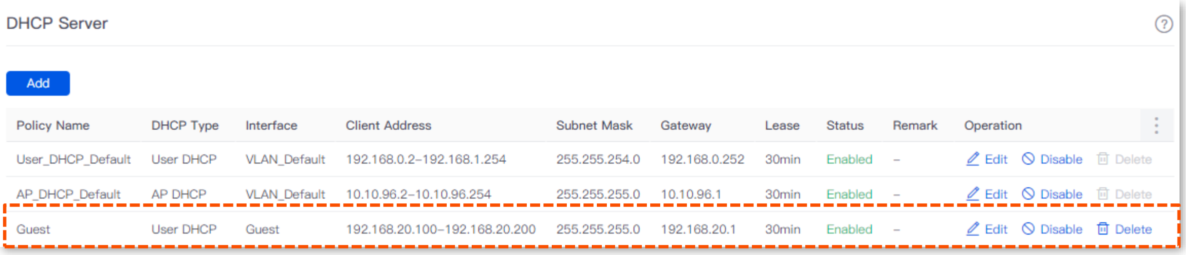
Port Status

	1	2	3	4	5	6
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN
	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6
VLAN_Default	Joined		Joined	Joined	Joined	Joined
Guest	Not Join		TAG	Not Join	Not Join	Not Join

Save

2. Configure the DHCP server for the VLAN.

   Navigate to **Network** > **DHCP Settings** > **DHCP Server**. Click **Add**, configure the user DHCP server for the Guest VLAN, and click **Save.**



DHCP Server

Add

Policy Name	DHCP Type	Interface	Client Address	Subnet Mask	Gateway	Lease	Status	Remark	Operation
User_DHCP_Default	User DHCP	VLAN_Default	192.168.0.2–192.168.1.254	255.255.254.0	192.168.0.252	30min	Enabled	–	Edit Disable Delete
AP_DHCP_Default	AP DHCP	VLAN_Default	10.10.96.2–10.10.96.254	255.255.255.0	10.10.96.1	30min	Enabled	–	Edit Disable Delete
Guest	User DHCP	Guest	192.168.20.100–192.168.20.200	255.255.255.0	192.168.20.1	30min	Enabled	–	Edit Disable Delete

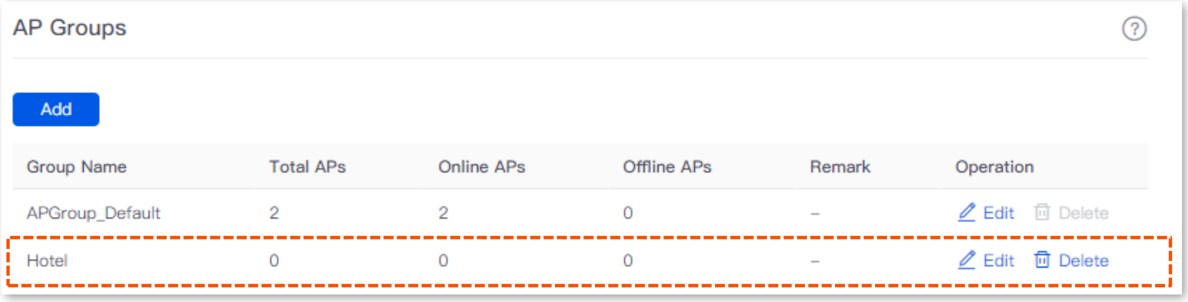
Step 4 Configure the AP policy.

The following table provides examples of AP policy parameters. Retain default values for other parameters that are not mentioned.

AP Group	Wi-Fi	AP VLAN
Hotel	AP Grouping: Hotel SSID: internet Security Mode: WPA2-PSK Wi-Fi Password: UmXmL9UK VLAN ID: 20	AP Grouping: Hotel AP VLAN: Enable Trunk port: LAN0
	AP Grouping: Hotel SSID: oa Security Mode: WPA2-PSK Wi-Fi Password: CetTLb8T VLAN ID: 30	

1. Configure the AP group policy.

   Navigate to **AP** > **AP Groups**, click **Add** to configure related parameters of the AP Group policy, and click **Save**.



AP Groups

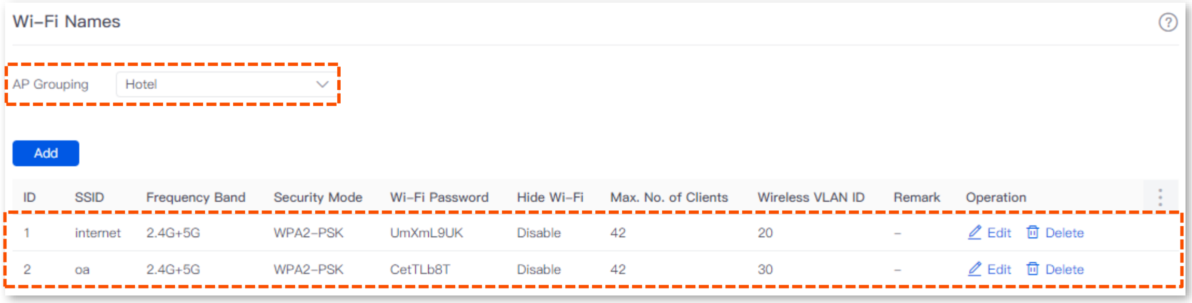
Group Name	Total APs	Online APs	Offline APs	Remark	Operation
APGroup_Default	2	2	0	–	Edit Delete
Hotel	0	0	0	–	Edit Delete

2. Configure the Wi-Fi policy.

   Navigate to **AP** > **Wi-Fi Settings** > **Wi-Fi Names**, select **Hotel** for **AP Grouping**. Click **Add** to configure related parameters of the Wi-Fi policy, and click **Save**.

TIP

The maximum number of clients supported by the AP is 128. If multiple SSID policies need to be delivered to the same AP, you should plan the maximum number of clients appropriately to ensure that the maximum number of clients for each SSID policy does not exceed 128.



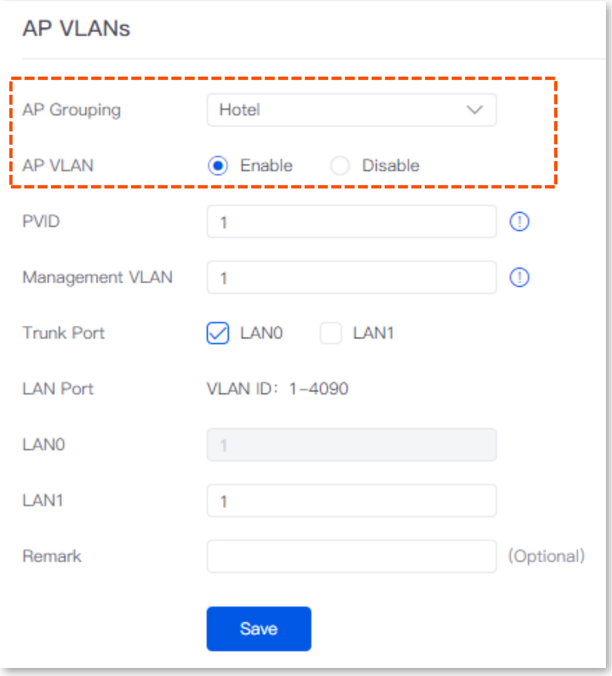
Wi-Fi Names

AP Grouping: Hotel

ID	SSID	Frequency Band	Security Mode	Wi-Fi Password	Hide Wi-Fi	Max. No. of Clients	Wireless VLAN ID	Remark	Operation
1	internet	2.4G+5G	WPA2-PSK	UmXmL9UK	Disable	42	20	–	Edit Delete
2	oa	2.4G+5G	WPA2-PSK	CetTLb8T	Disable	42	30	–	Edit Delete

3. Configure the VLAN policy.

Navigate to **AP** > **Wi-Fi Settings** > **AP VLANs**, select **Hotel** for **AP Grouping**. Enable the **AP VLAN** function and set **Trunk Port** to **LAN0**, and click **Save**.



AP VLANs

AP Grouping: Hotel

AP VLAN: ● Enable ○ Disable

PVID: 1

Management VLAN: 1

Trunk Port: ☑ LAN0 □ LAN1

LAN Port: VLAN ID: 1–4090

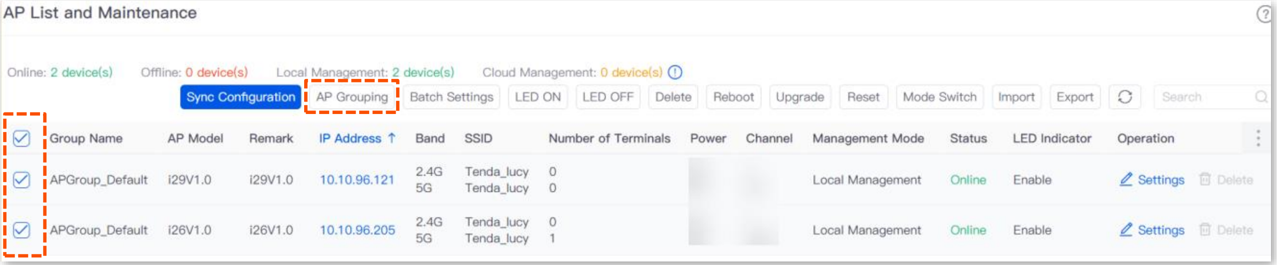
LAN0: 1

LAN1: 1

Remark: (Optional)

Step 5 Deliver the AP group policy.

1. Navigate to **AP** > **AP List and Maintenance**, select the AP to which the AP group policy is to be delivered, and click **AP Grouping**.

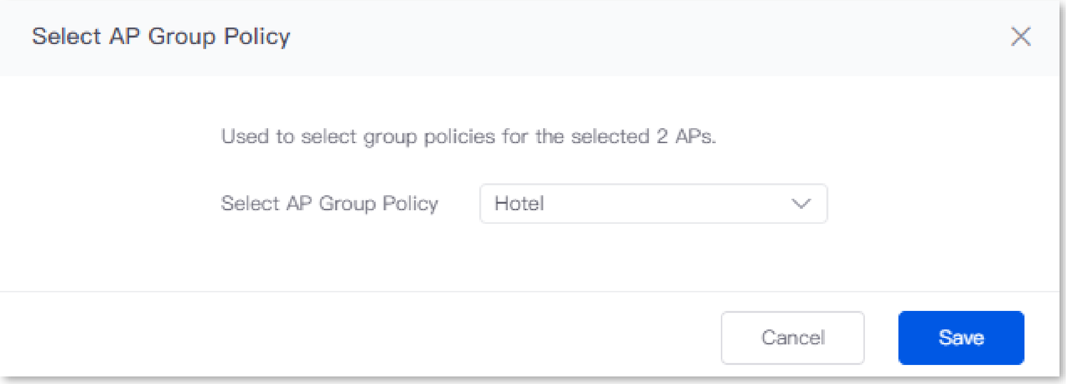


AP List and Maintenance

Online: 2 device(s) Offline: 0 device(s) Local Management: 2 device(s) Cloud Management: 0 device(s)

☑	Group Name	AP Model	Remark	IP Address ↑	Band	SSID	Number of Terminals	Power	Channel	Management Mode	Status	LED Indicator	Operation
☑	APGroup_Default	i29V1.0	i29V1.0	10.10.96.121	2.4G 5G	Tenda_lucy Tenda_lucy	0 0			Local Management	Online	Enable	Settings Delete
☑	APGroup_Default	i26V1.0	i26V1.0	10.10.96.205	2.4G 5G	Tenda_lucy Tenda_lucy	0 1			Local Management	Online	Enable	Settings Delete

2. Select the AP group policy, which is **Hotel** in this example. Then click **Save**.



Select AP Group Policy

Used to select group policies for the selected 2 APs.

Select AP Group Policy: Hotel

II. Configure the core switch.

Divide the IEEE 802.1q VLAN on the VLAN as follows.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
AP	20,30	Trunk	1
Router	20	Trunk	1
Internal server	30	Access	30

For other ports that are not mentioned, keep the default settings. For details about how to configure the switch, see the user guide of the switch.

III. Configure the internal server.

Add the VLAN for the port connected to the switch and configure the DHCP server.

Step 1 Add the VLAN. The parameters in the following table are for reference only.

Interface	VLAN ID	IP Address/Subnet Mask	Physical Port
Staff	30	192.168.30.1/24	LAN

Step 2 Configure the user DHCP server for the VLAN. The parameters in the following table are for reference only.

Policy Name	User DHCP
Staff	Client address: 192.168.30.100 - 192.168.30.200 Subnet mask: 255.255.255.0 Default gateway: 192.168.30.1 Primary DNS: 192.168.30.1

Step 3 Set the VLAN connected to the port of the switch.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Switch	30	Access	30

For details about how to configure the switch, see the user guide of the corresponding device.

---End

Verification

Users who connect to **internet** can access only the internet and users who connect to **oa** can access only the intranet.

6.9 IPTV

6.9.1 Overview

Internet Protocol Television (IPTV) is the technology integrating internet, multimedia, telecommunication and many other technologies to provide interactive services, including digital TV, for family users by internet broadband lines.

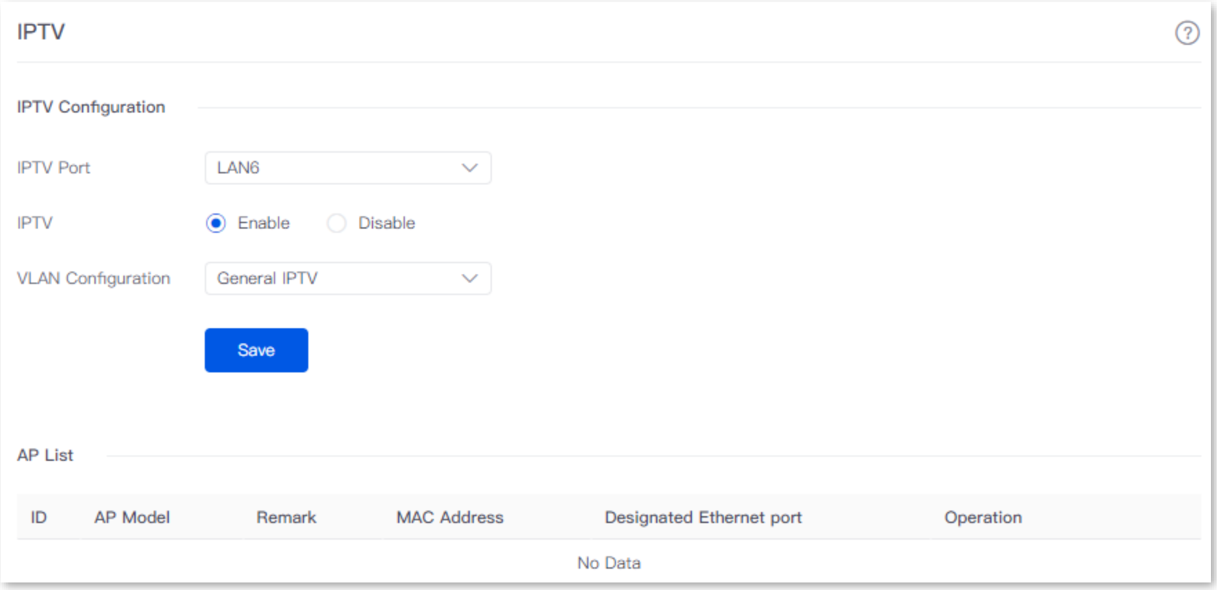
With the IPTV function, you can set up an IPTV data pass-through channel between the device and the AP to solve the difficult connection problem caused by the long distance between the IPTV set-top box and the optical modem.

If the IPTV service is included in your broadband service, you can enable the IPTV function of the router, then you can enjoy both internet access through the router and rich IPTV programs with a set-top box and TV.

TIP

This function needs to be used with Tenda APs that support IPTV function.

Log in to the web UI of the router, and navigate to **AP** > **IPTV** to enter the page. This function is disabled by default. The following displays the page when the function is enabled.



IPTV

IPTV Configuration

IPTV Port: LAN6

IPTV: ● Enable ○ Disable

VLAN Configuration: General IPTV

AP List

ID	AP Model	Remark	MAC Address	Designated Ethernet port	Operation

No Data

Parameter description

Parameter		Description
IPTV Configuration	IPTV Port	Used to designate a LAN port as the IPTV port to connect to the IPTV port of the modem. Refer to Port Information on the **System** page for the LAN port number.

Parameter		Description
	IPTV	Used to enable or disable the IPTV function of this device.
	VLAN Configuration	Specifies the VLAN ID of the IPTV service. – If the ISP does not provide VLAN information when activating the IPTV service, select **General IPTV** or **Customize VLAN** and **Without VLAN Tag**. – If the ISP provides the VLAN ID when activating the IPTV service, select **Customize VLAN** and **With VLAN Tag**, and enter the **VLAN ID**.
AP List	AP Model	Specifies the product model of the AP. Only APs that support IPTV are displayed in the AP list.
	Remark	Specifies the description of the AP.
	MAC Address	Specifies the MAC address of the AP.
	Designated Ethernet port	Specifies the wired Ethernet port on the AP to set up a transparent IPTV data transmission channel with the router. The designated Ethernet port needs to be connected to the IPTV set-top box. TIP The designated Ethernet port of the AP is **LAN1**.

6.9.2 Watch IPTV programs (scenario 1)

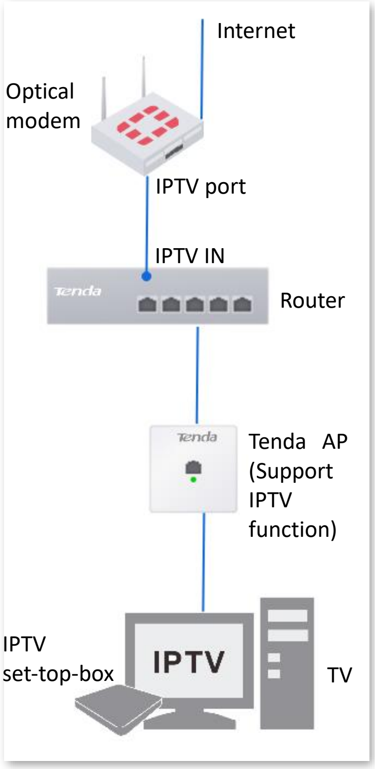
Networking requirements

The IPTV service is included in your broadband service. The ISP provides an IPTV user name and password, but no VLAN information.

Requirements: Watching IPTV programs.

Solution

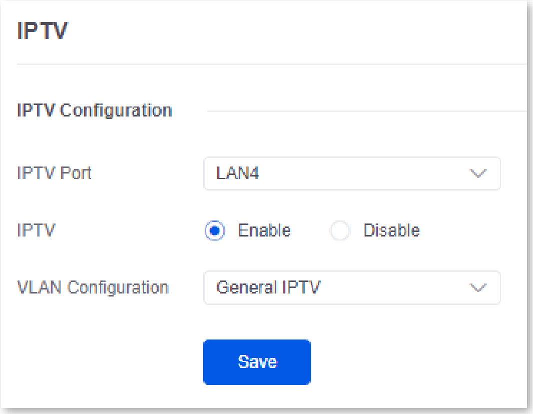
You can configure the IPTV function of the router to achieve the above requirements.



Configuration procedure

Step 1 Complete the router.

1. Navigate to **AP** > **AP List and Maintenance**, select the AP to which the AP group policy is to be delivered, and click **AP Grouping**.
2. Navigate to **AP** > **IPTV**.
3. Enable the IPTV function and designate IPTV port.
   - Select the router as the LAN port of IPTV, which is **LAN4** in this example.
   - Enable the **IPTV** function.
   - Set VLAN Configuration, which is **General IPTV** in this example.
   - Click **Save**.



IPTV

IPTV Configuration

IPTV Port: LAN4

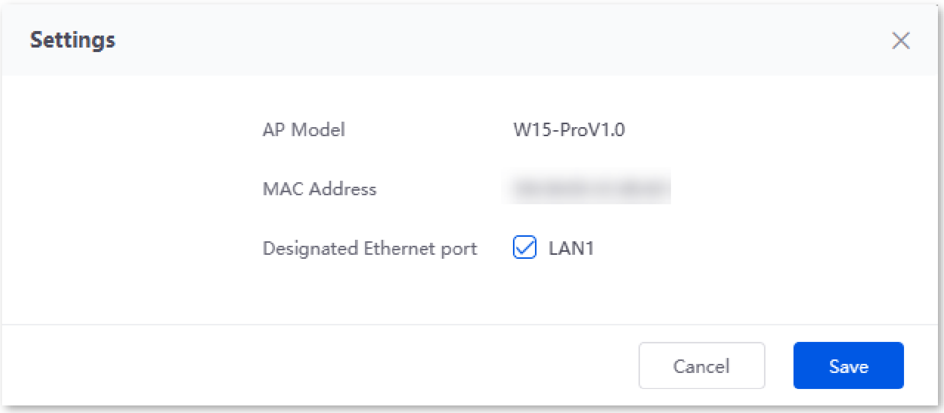
IPTV: ● Enable ○ Disable

VLAN Configuration: General IPTV

4. Designate AP as the wired Ethernet port of the IPTV port. The following figure is for reference only.

   – Choose the AP to be connected to the IPTV set-top box and click ✎ .

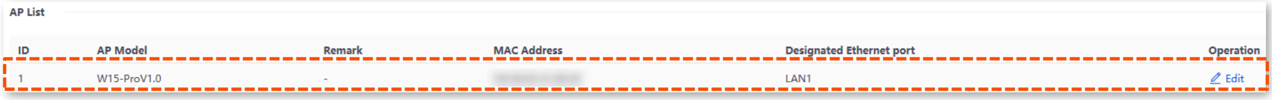
   – Tick the **Designated Ethernet Port** and click **Save**.



Settings

AP Model	W15-ProV1.0
MAC Address	[redacted]
Designated Ethernet port	☑ LAN1

The LAN1 port of the AP is designated successfully.



AP List

ID	AP Model	Remark	MAC Address	Designated Ethernet port	Operation
1	W15-ProV1.0	-	[redacted]	LAN1	✎ Edit

Step 2 Set your IPTV set-top box.

Use the IPTV user name and password provided by your ISP to dial up on your IPTV set-top box.

---End

Verification

After the configuration is completed, you can watch IPTV programs on your TV.

6.9.3 Watch IPTV programs (scenario 2)

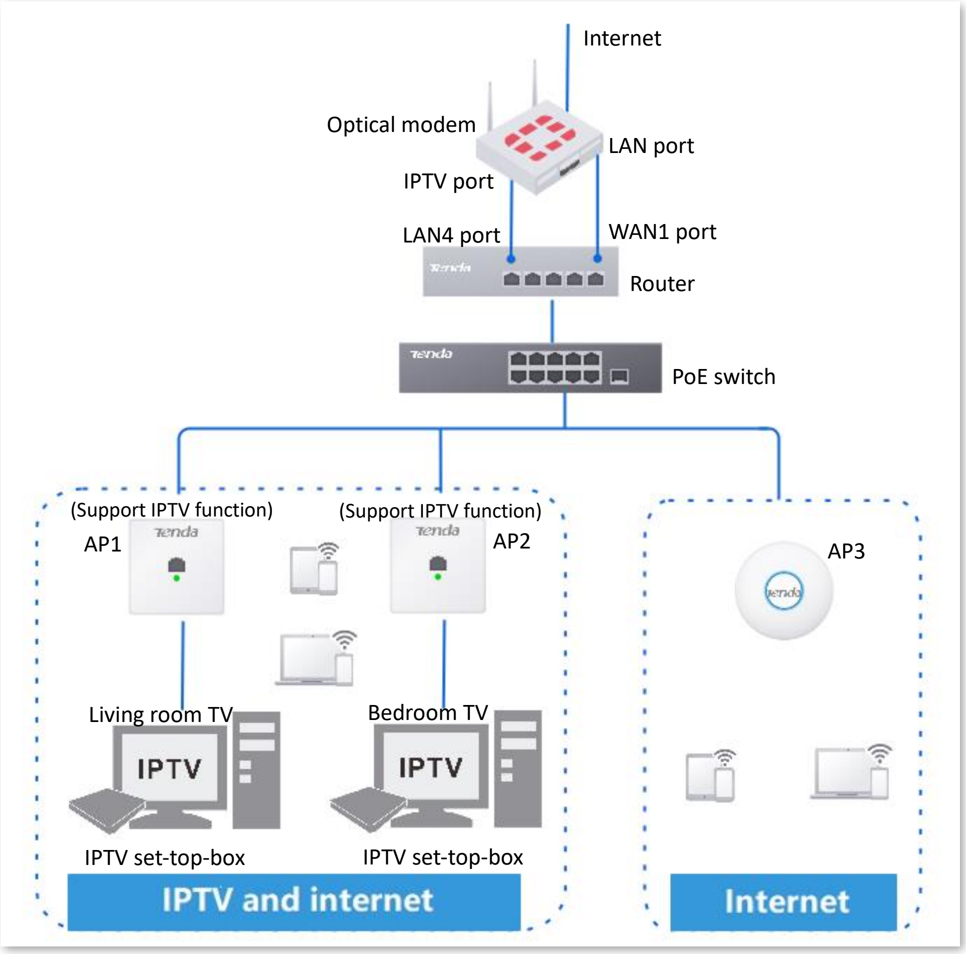
Networking requirements

The IPTV service is included in a hotel broadband service. The ISP provides an IPTV user name and password, and the VLAN ID of the IPTV service (VLAN ID 10 is taken as an example here).

Requirements: Watching IPTV programs and accessing the internet at the same time.

Solution

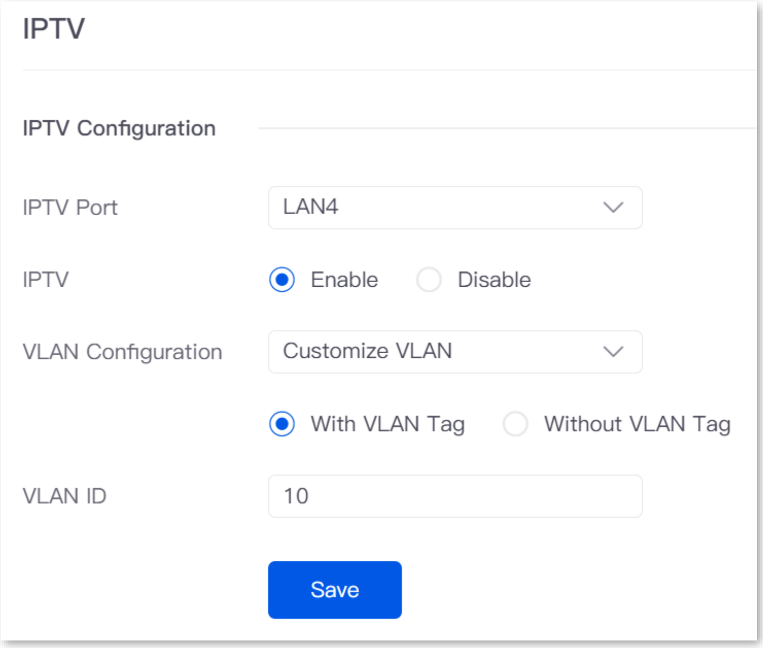
You can configure the IPTV function of the router, and VLAN function of the switch to achieve the above requirements.



Configuration procedure

Step 1 Configure the router.

1. Log in to the web UI of the router.
2. Navigate to **AP** > **IPTV**.
3. Enable the IPTV function and designate the IPTV IN port.
   - Select the router as the LAN port of IPTV IN port, which is **LAN4** in this example.
   - Enable the **IPTV** function.
   - Select **Customize VLAN** for **VLAN Configuration**, select **With VLAN Tag** and enter **10** on **VLAN ID**.
   - Click **Save**.



IPTV

IPTV Configuration

IPTV Port: LAN4

IPTV: ● Enable ○ Disable

VLAN Configuration: Customize VLAN

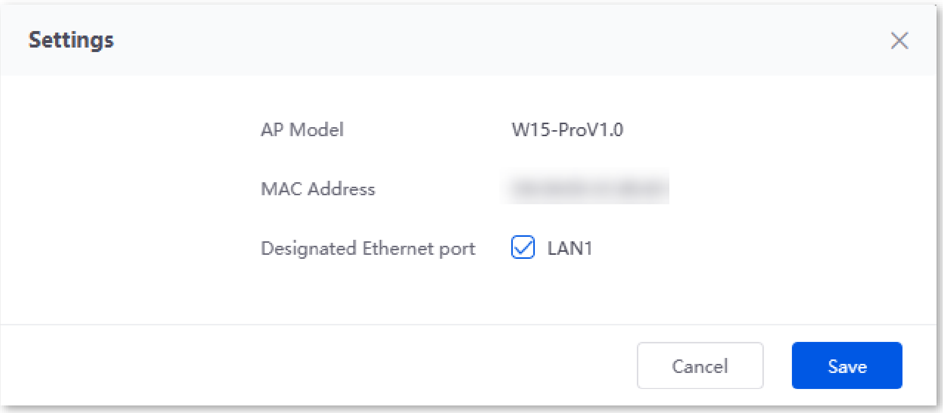
● With VLAN Tag ○ Without VLAN Tag

VLAN ID: 10

4. Designate a wired Ethernet port of the AP1 (support IPTV function).

   – Choose the AP1 to be connected to the IPTV set-top box and click 🖉 .

   – Check the **Designated Ethernet Port** and click **Save**.



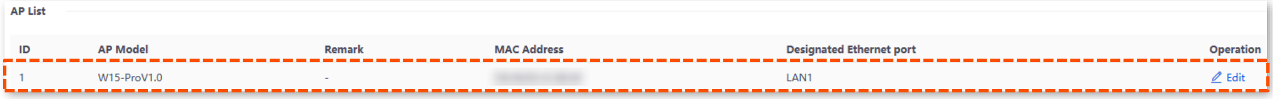
Settings

AP Model: W15-ProV1.0

MAC Address: [redacted]

Designated Ethernet port: ☑ LAN1

LAN1 port of the AP is designated successfully.



AP List

ID	AP Model	Remark	MAC Address	Designated Ethernet port	Operation
1	W15-ProV1.0	-	[redacted]	LAN1	🖉 Edit

5. Repeat 4 of **Step 1** to designate other uplink port of AP2 (support IPTV function).

Step 2 Set your IPTV set-top box.

Use the IPTV user name and password provided by your ISP to configure network settings on your IPTV set-top box.

---End

Verification

You can watch IPTV programs and access the internet at the same time.

6.10 Wi-Fi optimization

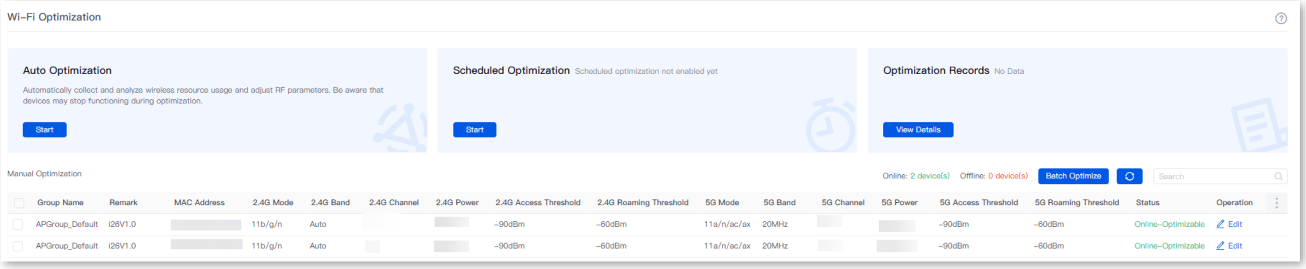
6.10.1 Overview

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Optimization** to enter the page.

On this page, you can improve wireless network performance for an AP either by adjusting its power, channel and band or enabling auto/scheduled optimization.

TIP

- There must be at least 2 APs in the AP group that support the Wi-Fi optimization function.
- During optimization, wireless connection may be interrupted. Operate when APs are idle.



Wi-Fi Optimization

Auto Optimization

Automatically collect and analyze wireless resource usage and adjust RF parameters. Be aware that devices may stop functioning during optimization.

Start

Scheduled Optimization Scheduled optimization not enabled yet

Start

Optimization Records No Data

View Details

Manual Optimization

Online: 2 device(s) Offline: 0 device(s) Batch Optimize

Search

□	Group Name	Remark	MAC Address	2.4G Mode	2.4G Band	2.4G Channel	2.4G Power	2.4G Access Threshold	2.4G Roaming Threshold	5G Mode	5G Band	5G Channel	5G Power	5G Access Threshold	5G Roaming Threshold	Status	Operation
□	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit
□	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit

Parameter description

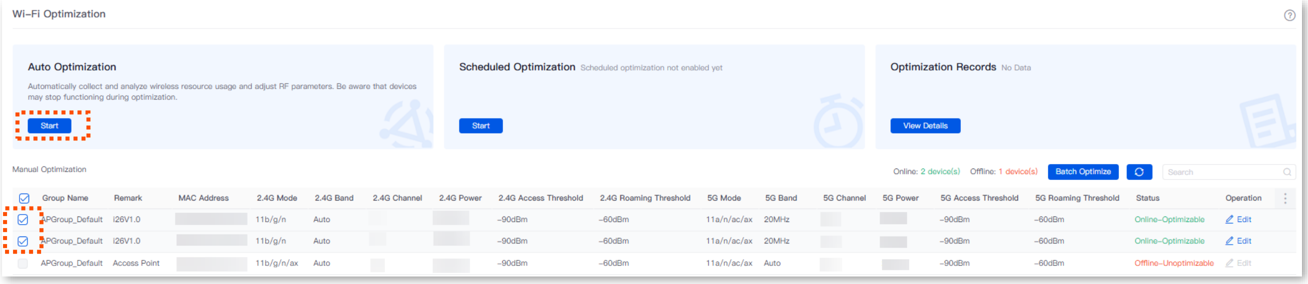
Parameter	Description
Group Name	Specifies the name of the AP group.
AP Model	Specifies the model of the AP.
Remark	Specifies the introduction of the AP.
IP Address	Specifies the IP address of the AP. You can access the web UI of the AP using this address.
MAC Address	Specifies the LAN MAC address of the AP.
2.4G Mode	Specifies the network mode of 2.4GHz band for the AP.
2.4G Band	Specifies the working frequency of 2.4GHz band for the AP.
2.4G Channel	Specifies the working channel in 2.4GHz band for the AP.
2.4G Power	Specifies the transmit power of 2.4GHz band for the AP.
2.4G Access Threshold	Specifies the access threshold of 2.4GHz band for the AP.

Parameter	Description
2.4G Roaming Threshold	Specifies the roaming threshold of 2.4GHz band for the AP.
5G Mode	Specifies the network mode of 5GHz band for the AP.
5G Band	Specifies the working frequency of 5GHz band for the AP.
5G Channel	Specifies the working channel in 5GHz band for the AP.
5G Power	Specifies the transmit power of 5GHz band for the AP.
5G Access Threshold	Specifies the access threshold of 5GHz band for the AP.
5G Roaming Threshold	Specifies the roaming threshold of 5GHz band for the AP.
Status	Specifies the current status of the AP.

6.10.2 Run instant auto optimization on wireless networks

Auto optimization allows network administrators to assess the performance of the wireless network and employ optimization strategies accordingly.

In the **Auto Optimization** module, click **Start**.



Wi-Fi Optimization

Auto Optimization

Automatically collect and analyze wireless resource usage and adjust RF parameters. Be aware that devices may stop functioning during optimization.

Scheduled Optimization Scheduled optimization not enabled yet

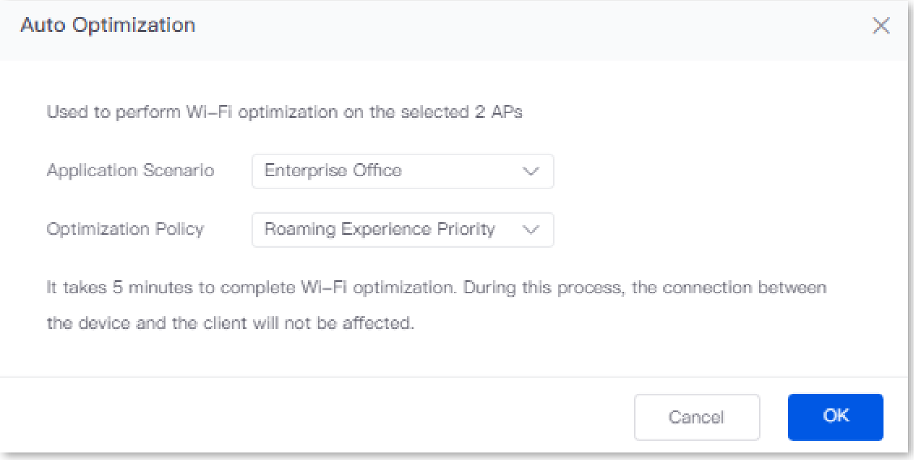
Optimization Records No Data

Manual Optimization

Online: 2 device(s) Offline: 1 device(s)

☑	Group Name	Remark	MAC Address	2.4G Mode	2.4G Band	2.4G Channel	2.4G Power	2.4G Access Threshold	2.4G Roaming Threshold	5G Mode	5G Band	5G Channel	5G Power	5G Access Threshold	5G Roaming Threshold	Status	Operation
☑	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit
☑	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit
□	APGroup_Default	Access Point	[redacted]	11b/g/n/ax	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	Auto	[redacted]	[redacted]	-90dBm	-60dBm	Offline-Unoptimizable	Edit

Configure **Application Scenario** and **Optimization Policy**, click **OK**.



Auto Optimization

Used to perform Wi-Fi optimization on the selected 2 APs

Application Scenario: Enterprise Office

Optimization Policy: Roaming Experience Priority

It takes 5 minutes to complete Wi-Fi optimization. During this process, the connection between the device and the client will not be affected.

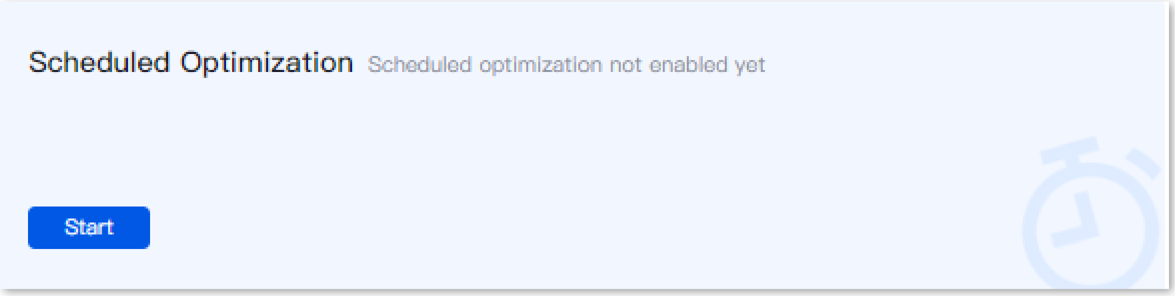
Parameter description

Parameter	Description
Application Scenario	Select the application scenario as required.
Optimization Policy	Used to select an appropriate optimization policy. – **Roaming Experience Priority**: Prioritize roaming experience. It can be used in scenarios with high AP deployment density, maximizing the roaming experience and ensuring that clients connect to APs with good signals, which may reduce the maximum coverage of the wireless network. – **Coverage Priority**: Prioritize Wi-Fi coverage. It can be used in scenarios with low AP deployment density, maximizing coverage and ensuring that clients successfully connect to APs as much as possible, which may reduce the roaming sensitivity.

6.10.3 Run scheduled auto optimization on wireless networks

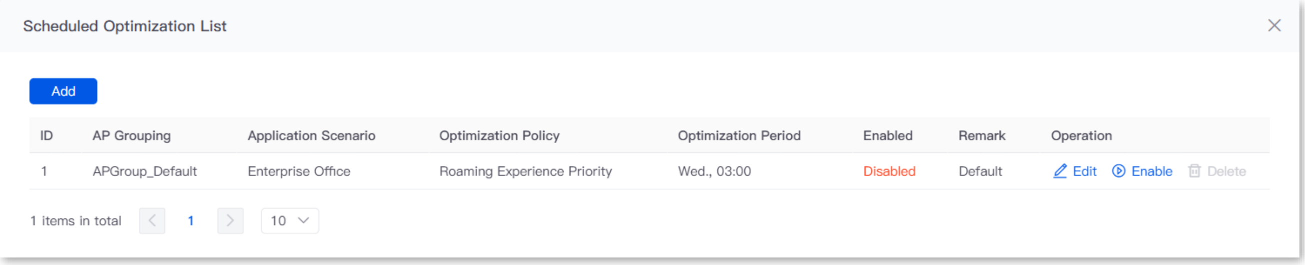
Scheduled optimization allows network administrators to perform wireless network optimization at the scheduled time.

In the **Scheduled Optimization** module, click **Start**.



Scheduled Optimization Scheduled optimization not enabled yet

By default, the router has created an optimization policy named **APGroup_Default** that is disabled. You can click **Add** to add a new policy.



Scheduled Optimization List

Add

ID	AP Grouping	Application Scenario	Optimization Policy	Optimization Period	Enabled	Remark	Operation
1	APGroup_Default	Enterprise Office	Roaming Experience Priority	Wed., 03:00	Disabled	Default	Edit Enable Delete

1 items in total < 1 > 10

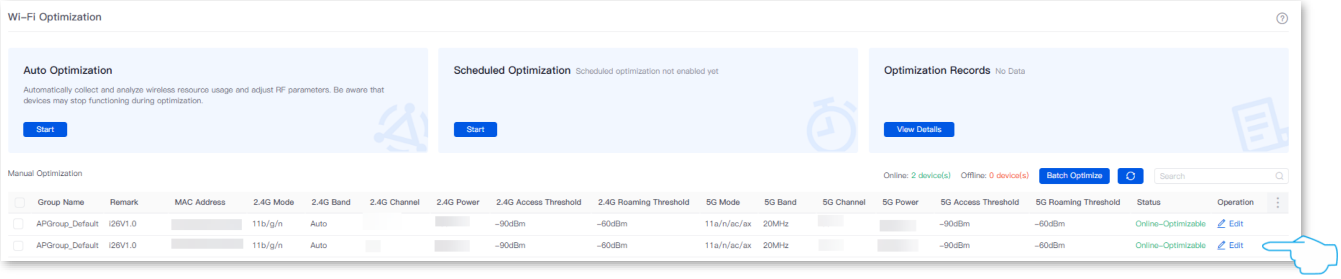
Parameter description

Parameter	Description
AP Grouping	Specifies the name of the AP group.
Application Scenario	Specifies the application scenario of the scheduled optimization policy.
Optimization Policy	Specifies the optimization policy of the scheduled optimization policy. – **Roaming Experience Priority**: Prioritize roaming experience. It can be used in scenarios with high AP deployment density, maximizing the roaming experience and ensuring that clients connect to APs with good signals, which may reduce the maximum coverage of the wireless network. – **Coverage Priority**: Prioritize Wi-Fi coverage. It can be used in scenarios with low AP deployment density, maximizing coverage and ensuring that clients successfully connect to APs as much as possible, which may reduce the roaming sensitivity.
Optimization Period	Specifies the time and date of the scheduled optimization.
Enabled	Specifies the status of the scheduled optimization policy.
Remark	Specifies the description of the scheduled optimization policy.
Operation	Edit : Used to edit the scheduled optimization policy. Delete : Used to delete the scheduled optimization policy. Enable : Used to enable the scheduled optimization policy. Disable : Used to disable the scheduled optimization policy.

6.10.4 Enable manul optimization on wireless networks

Log in to the web UI of the router, and navigate to **AP** > **Wi-Fi Optimization** to enter the page.

On this page, you can manually configure wireless parameters such as channel, bandwidth and transmit power to optimize wireless network.



Wi-Fi Optimization

Auto Optimization

Automatically collect and analyze wireless resource usage and adjust RF parameters. Be aware that devices may stop functioning during optimization.

Scheduled Optimization Scheduled optimization not enabled yet

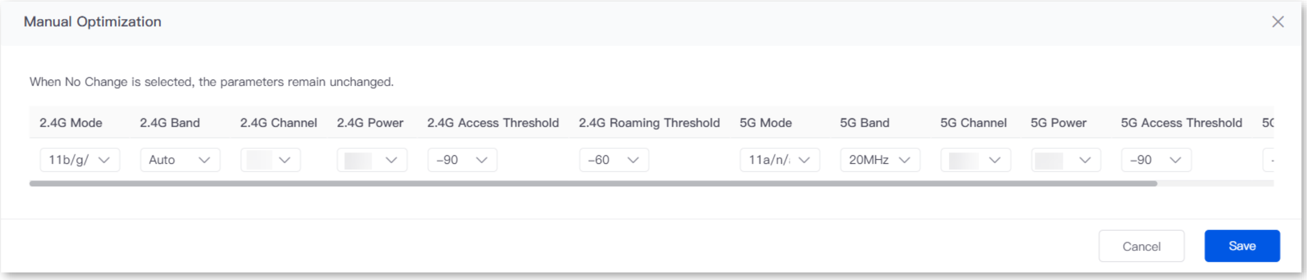
Optimization Records No Data

Manual Optimization

Online: 2 device(s) Offline: 0 device(s)

□	Group Name	Remark	MAC Address	2.4G Mode	2.4G Band	2.4G Channel	2.4G Power	2.4G Access Threshold	2.4G Roaming Threshold	5G Mode	5G Band	5G Channel	5G Power	5G Access Threshold	5G Roaming Threshold	Status	Operation
□	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit
□	APGroup_Default	i26V1.0	[redacted]	11b/g/n	Auto	[redacted]	[redacted]	-90dBm	-60dBm	11a/n/ac/ax	20MHz	[redacted]	[redacted]	-90dBm	-60dBm	Online-Optimizable	Edit

Click **Edit** of the AP you want to manually optimize wireless network. Modify the wireless parameters such as channel, bandwidth and transmit power as required, and click **Save**. The following figure is for reference only.



Manual Optimization

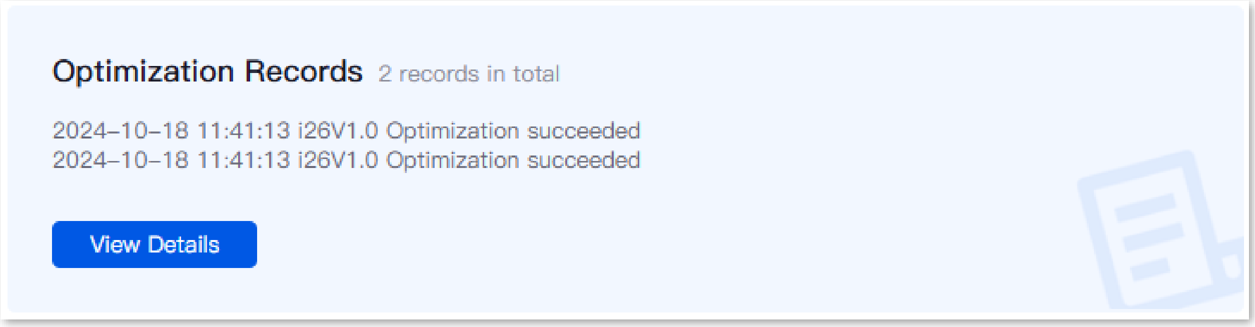
When No Change is selected, the parameters remain unchanged.

2.4G Mode	2.4G Band	2.4G Channel	2.4G Power	2.4G Access Threshold	2.4G Roaming Threshold	5G Mode	5G Band	5G Channel	5G Power	5G Access Threshold	5(
11b/g/	Auto	[redacted]	[redacted]	-90	-60	11a/n/	20MHz	[redacted]	[redacted]	-90	-

6.10.5 View optimization records

In the **Optimization Record** module, you can view records that contain detailed information about each optimization task you performed.

Up to 3 records are displayed. To view more records, click **View Details**.



Optimization Records 2 records in total

2024-10-18 11:41:13 i26V1.0 Optimization succeeded
2024-10-18 11:41:13 i26V1.0 Optimization succeeded

7 Authentication

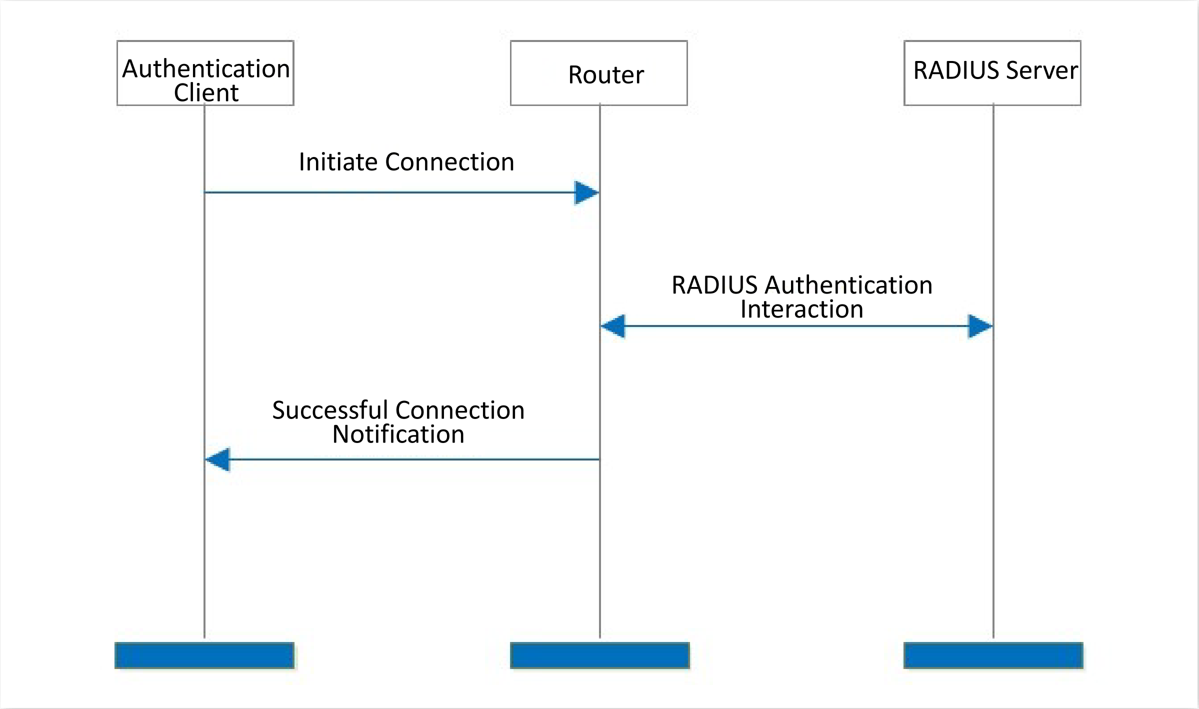
This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

7.1 Overview

By default, when the router is connected to the internet, the LAN users can access the internet. With the Authentication function enabled, clients connected to the authentication network can access the internet only after successful authentication. If a client is reconnected to the router after successful authentication, the client may be required to perform authentication again. The authentication policies of this router take effect based on the VLAN interface.

After the local server authentication is enabled, the user authentication is completed on the local router. The authentication users are saved on the local router and the portal customization is also generated on the local router. The local authentication types supported by the router include SMS, E-mail, Account, No Authentication, PPPoE and Random Code.

The working principle of local authentication is as follows.


Authentication Client
Router
RADIUS Server
Initiate Connection
RADIUS Authentication Interaction
Successful Connection Notification

Step 1 The authentication client uses HTTP to initiate a connection request.

Step 2 The router will request redirection to the local portal customization, and the user enters the user name and password on the portal customization.

Step 3 Based on the user name and password, the router performs RADIUS authentication interaction with RADIUS server for user authentication and charging.

Step 4 The router notifies the authentication client that the online connection is successful.

7.2 Configuration wizard

Procedure	Task	Description
1	Configure authentication templates	Required. Manually create a portal customization.
2	Configure authentication type	Required. Configure one or multiple authentication types based on actual requirements.
3	Configure time policy	Required. Configure the time policy based on actual requirements.
4	Configure guest policies	Required.
5	Configure authentication account	Optional. If the **Authentication Type** is **Account**, **PPPoE** or **Random Code**, the authentication account must be configured.
6	Configure authentication-free hosts	Optional. To enable the devices to connect to the internet without authentication, the authentication-free host must be configured.

TIP

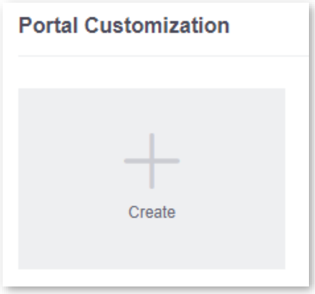
If PPPoE authentication is configured, the authentication template and time policy do not need to be configured.

7.3 Configure authentication templates

7.3.1 Image template

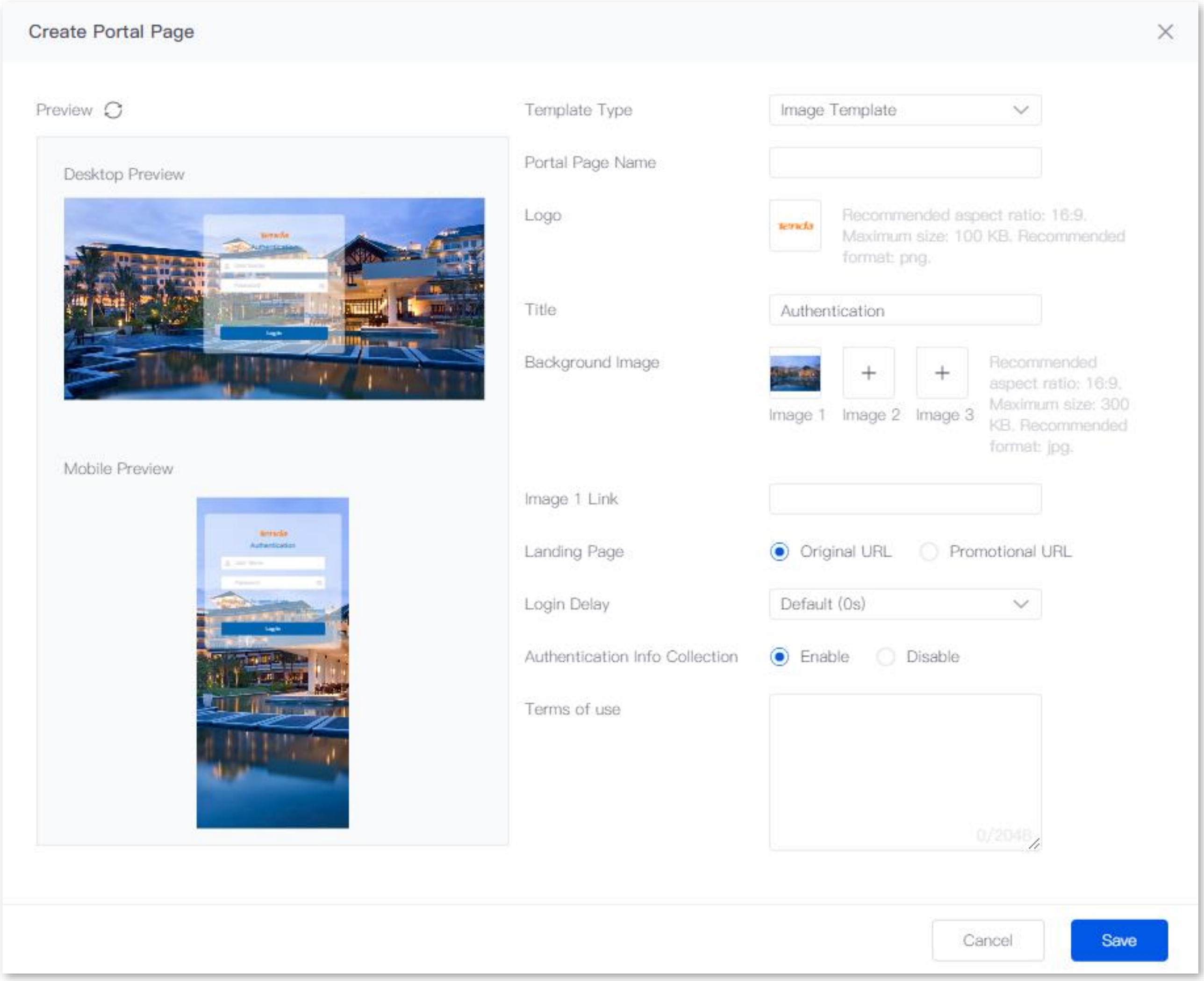
The image template can be used for SMS authentication, email authentication, account authentication, no authentication and random code authentication. An image template has been preset in the system. You can edit based on the preset template or create a new one.

To add an image template, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Portal Customization**, and click **Create**.



Portal Customization

Create



Create Portal Page

Template Type: Image Template

Portal Page Name:

Logo: Recommended aspect ratio: 16:9. Maximum size: 100 KB. Recommended format: png.

Title: Authentication

Background Image: Image 1, Image 2, Image 3. Recommended aspect ratio: 16:9. Maximum size: 300 KB. Recommended format: jpg.

Image 1 Link:

Landing Page: ● Original URL ○ Promotional URL

Login Delay: Default (0s)

Authentication Info Collection: ● Enable ○ Disable

Terms of use: 0/2048

Cancel Save

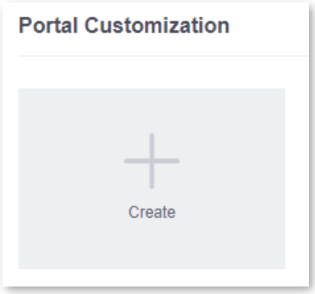
Parameter description

Parameter	Description
Preview	⟳ : Used to refresh the preview pages.
Template Type	Specifies the type of template, including **Image Template** and **Text Template.**
Portal Page Name	Specifies the name of the portal page. The name is required.
Logo	Specifies the logo image of the portal page. By default, the logo image is **Tenda**. You can click it to change the logo image.
Title	Specifies the title information of the portal page. By default, the title is **Authentication**.
Background Image	Specifies the background images of the portal page. You can upload at most three images. TIP – This parameter is available only when the **Template Type** is set to **Image Template**. – When two or three background images are uploaded, the images will be displayed in turn on the portal page.
Image 1 Link, Image 2 Link, Image 3 Link	Specifies the URL linked to the corresponding background image. After the configuration is completed, you can access the website by clicking the corresponding background image on the portal page. NOTE – This parameter is available only when the **Template Type** is set to **Image Template**. – The link must be an http URL, otherwise the function will not take effect.
Landing Page	Specifies the web address that users are automatically redirected to after passing the authentication. – **Original URL:** After users pass the authentication, the browser redirects to the website that users visited before the authentication. For example, if the user is visiting Google when being redirected to the portal page, the user will be redirected back to Google after passing the authentication. – **Promotional URL:** After users pass the authentication, the browser redirects to the address specified here.
Login Delay	Specifies the delay time before login. By default, the delay time is **Default (0s).**
Authentication Info Collection	Used to enable or disable the authentication information collection function.
Terms of use	Specifies the disclaimer information on the web portal page. Users must agree and tick the disclaimer before logging in.

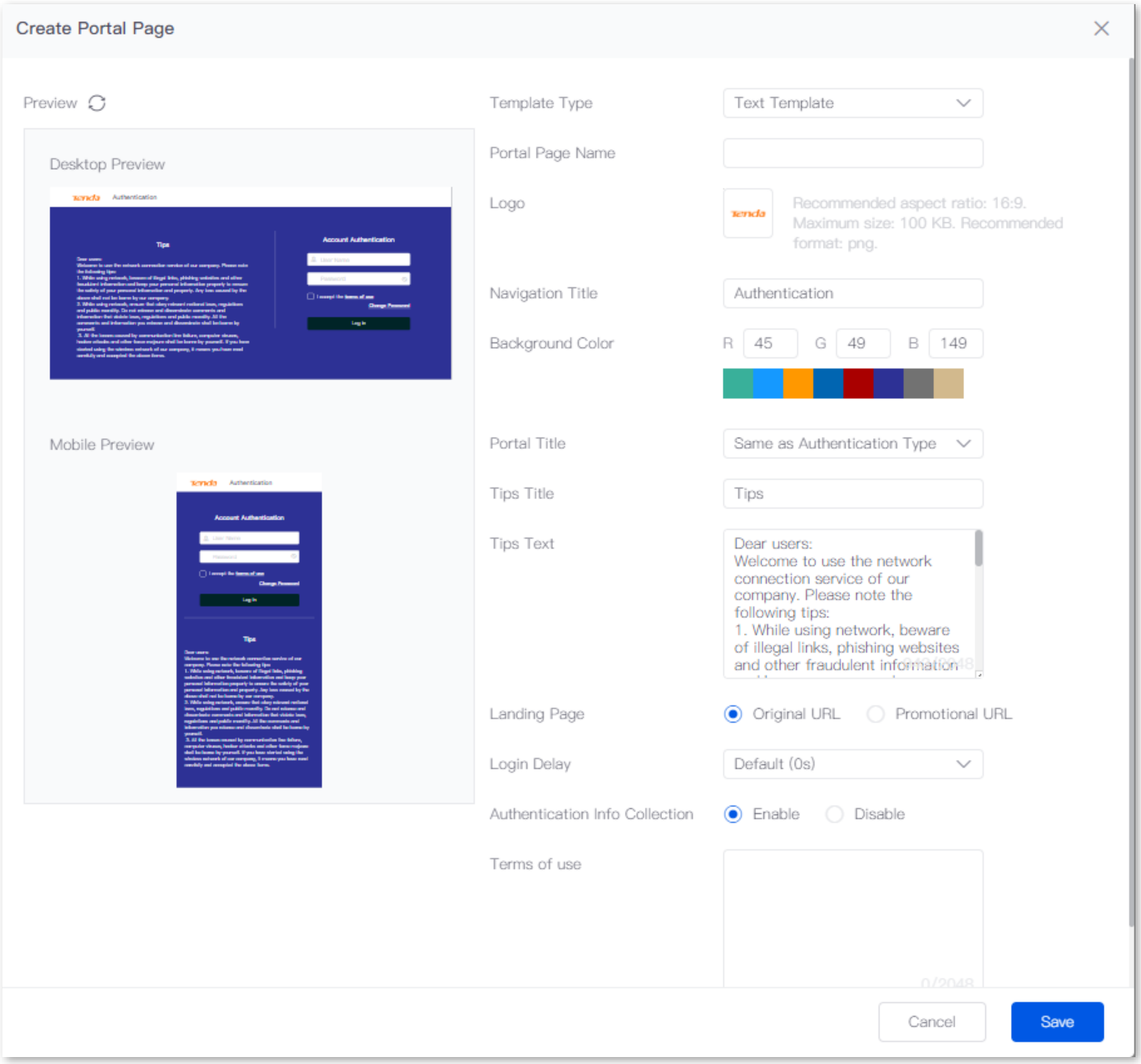
7.3.2 Text template

The text template can be used for SMS authentication, email authentication, account authentication, no authentication and random code authentication. You can create a text template for authentication as required.

To add a text template, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Portal Customization**, and click **Create**.



Portal Customization



Create Portal Page

Template Type	Text Template
Portal Page Name	
Logo	Recommended aspect ratio: 16:9. Maximum size: 100 KB. Recommended format: png.
Navigation Title	Authentication
Background Color	R 45 G 49 B 149
Portal Title	Same as Authentication Type
Tips Title	Tips
Tips Text	Dear users: Welcome to use the network connection service of our company. Please note the following tips: 1. While using network, beware of illegal links, phishing websites and other fraudulent information
Landing Page	● Original URL ○ Promotional URL
Login Delay	Default (0s)
Authentication Info Collection	● Enable ○ Disable
Terms of use	0/2048

Parameter description

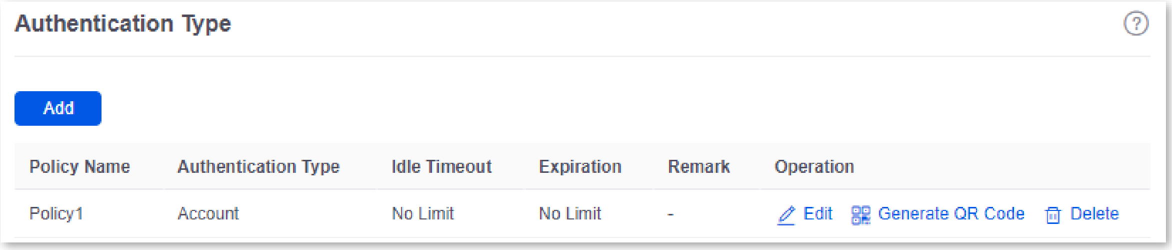
Parameter	Description
Preview	⟳ : Used to refresh the preview pages.
Template Type	Specifies the type of template, including **Image Template** and **Text Template.**
Portal Page Name	Specifies the name of the portal page. The name is required.
Logo	Specifies the logo image of the portal page. By default, the logo image is **Tenda**. You can click it to change the logo image.
Navigation Title	Specifies the title information of the portal page. By default, the title is **Authentication**.
Background Color	Specifies the background color. You can enter an RGB value or select one from the given colors. TIP This parameter is available only when the **Template Type** is set to **Text Template**.
Portal Title	Specifies the title of the portal page, including **Same as Authentication Type** and **Customize**. – **Same as Authentication Type**: The name is the same as the authentication type. For example, if this template is used for account authentication, the authentication title will be **Account.** – **Customize**: You can customize a portal title here.
Tips Title	Specifies the tip title on the portal page. By default, the title is **Tips**. TIP This parameter is available only when the **Template Type** is set to **Text Template**.
Tips Text	Specifies the tip content on the portal page. TIP This parameter is available only when the **Template Type** is set to **Text Template**.
Landing Page	Specifies the web address that users are automatically redirected to after passing the authentication. – **Original URL**: After users pass the authentication, the browser redirects to the website that users visited before the authentication. For example, if the user is visiting Google when being redirected to the portal page, the user will be redirected back to Google after passing the authentication. – **Promotional URL**: After users pass the authentication, the browser redirects to the address specified here.
Login Delay	Specifies the delay time before login. By default, the delay time is **Default (0s).**

Parameter	Description
Authentication Info Collection	Used to enable or disable the authentication information collection function.
Terms of use	Specifies the disclaimer information on the web portal page. Users must agree and tick the disclaimer before logging in.

7.4 Configure authentication type

7.4.1 Overview

Log in to the web UI of the router, and navigate to **AuthN** > **Authentication Template** > **Authentication Type**, you can configure the authentication type as required. The authentication types include **SMS**, **Email**, **Account**, **No Authentication**, **PPPoE** and **Random Code**.



Authentication Type

Policy Name	Authentication Type	Idle Timeout	Expiration	Remark	Operation
Policy1	Account	No Limit	No Limit	-	Edit Generate QR Code Delete

Parameter description

Parameter	Description
Policy Name	Specifies the policy name of the authentication type.
Authentication Type	Specifies the type of the authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the idle timeout after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
Remark	(Optional) Specifies the description of the authentication.
Operation	Used to edit or delete the policy of the authentication type. Edit **:** Used to modify the policy. Generate QR Code : Used to generate the QR code, which you can scan to access the portal page. Delete**:** Used to delete the policy.

7.4.2 SMS

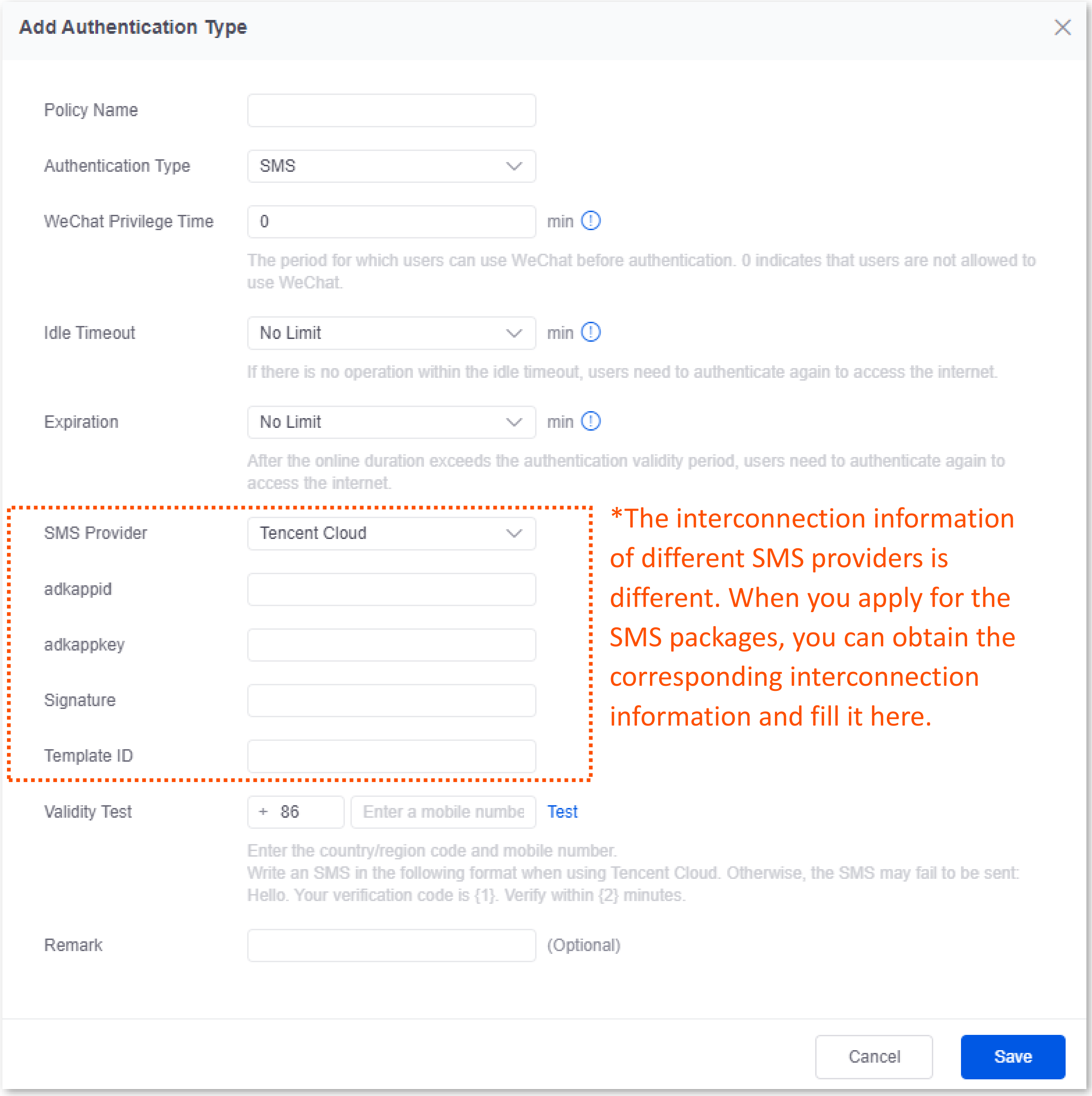
After the **SMS** authentication is enabled, you need to enter a valid mobile phone number on the portal page to obtain a verification code for authentication. After successful authentication, you can access the internet.

The SMS providers issues the authorization verification code to the specified mobile phone number. Currently, the preset SMS providers include **Tencent Cloud**, **Alibaba Cloud**, **Jixintong** and **NEXMO**. Meanwhile, **Customize HTTP Interconnection** is also supported if you want to use other SMS providers.

NOTE

You need to subscribe to an SMS package from an SMS provider before performing corresponding configurations on the router.

To add an SMS authentication type, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Authentication Type**, and click **Add**. The following figure is for reference only.



Add Authentication Type

Policy Name

Authentication Type: SMS

WeChat Privilege Time: 0 min

The period for which users can use WeChat before authentication. 0 indicates that users are not allowed to use WeChat.

Idle Timeout: No Limit min

If there is no operation within the idle timeout, users need to authenticate again to access the internet.

Expiration: No Limit min

After the online duration exceeds the authentication validity period, users need to authenticate again to access the internet.

SMS Provider: Tencent Cloud

adkappid

adkappkey

Signature

Template ID

Validity Test: + 86 Enter a mobile numbe Test

Enter the country/region code and mobile number.
Write an SMS in the following format when using Tencent Cloud. Otherwise, the SMS may fail to be sent:
Hello. Your verification code is {1}. Verify within {2} minutes.

Remark: (Optional)

*The interconnection information of different SMS providers is different. When you apply for the SMS packages, you can obtain the corresponding interconnection information and fill it here.

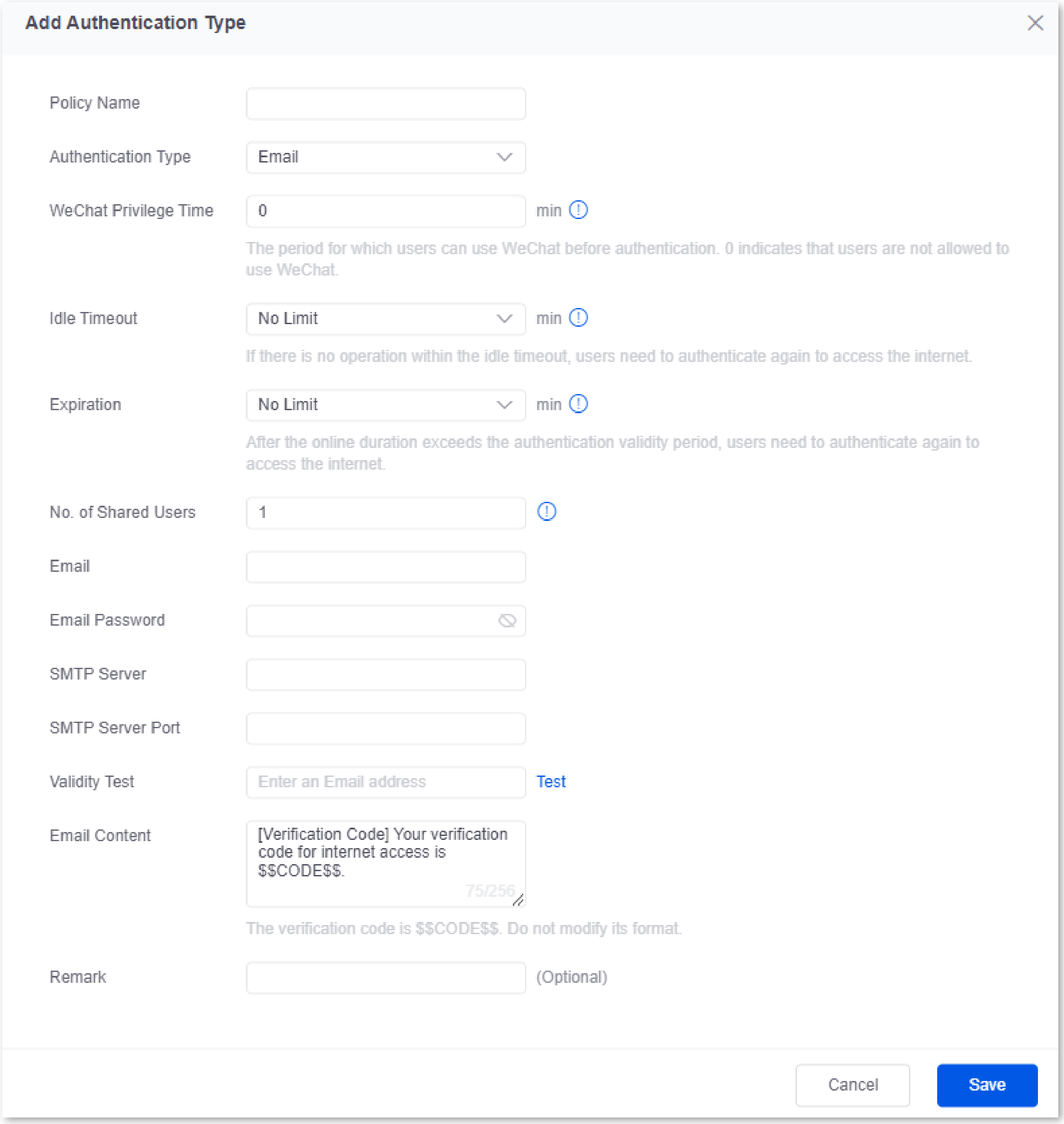
Parameter description

Parameter	Description
Policy Name	Specifies the policy name of the authentication type.
Authentication Type	Specifies the authentication type. Select **SMS** from the drop-down menu.
WeChat Privilege Time	Specifies the duration for which users can use WeChat before authentication. **0** indicates that users are not allowed to use WeChat before authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the **Idle Timeout** after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
Validity Test	Used to check whether the router is connected to the SMS provider. Enter the mobile phone number and click Test . If the connection is successful, the mobile phone number will receive a short message with the verification code.
Remark	(Optional) Specifies the description of the authentication.

7.4.3 E-mail

After the **E-mail** authentication is enabled, you need to enter an E-mail address on the portal page to obtain a verification code for authentication. After successful authentication, you can access the internet.

To add an E-mail authentication type, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Authentication Type**, and click **Add**.



Add Authentication Type

Policy Name	
Authentication Type	Email
WeChat Privilege Time	0 min The period for which users can use WeChat before authentication. 0 indicates that users are not allowed to use WeChat.
Idle Timeout	No Limit min If there is no operation within the idle timeout, users need to authenticate again to access the internet.
Expiration	No Limit min After the online duration exceeds the authentication validity period, users need to authenticate again to access the internet.
No. of Shared Users	1
Email	
Email Password	
SMTP Server	
SMTP Server Port	
Validity Test	Enter an Email address Test
Email Content	[Verification Code] Your verification code for internet access is $$CODE$$. 75/256 The verification code is $$CODE$$. Do not modify its format.
Remark	(Optional)

Parameter description

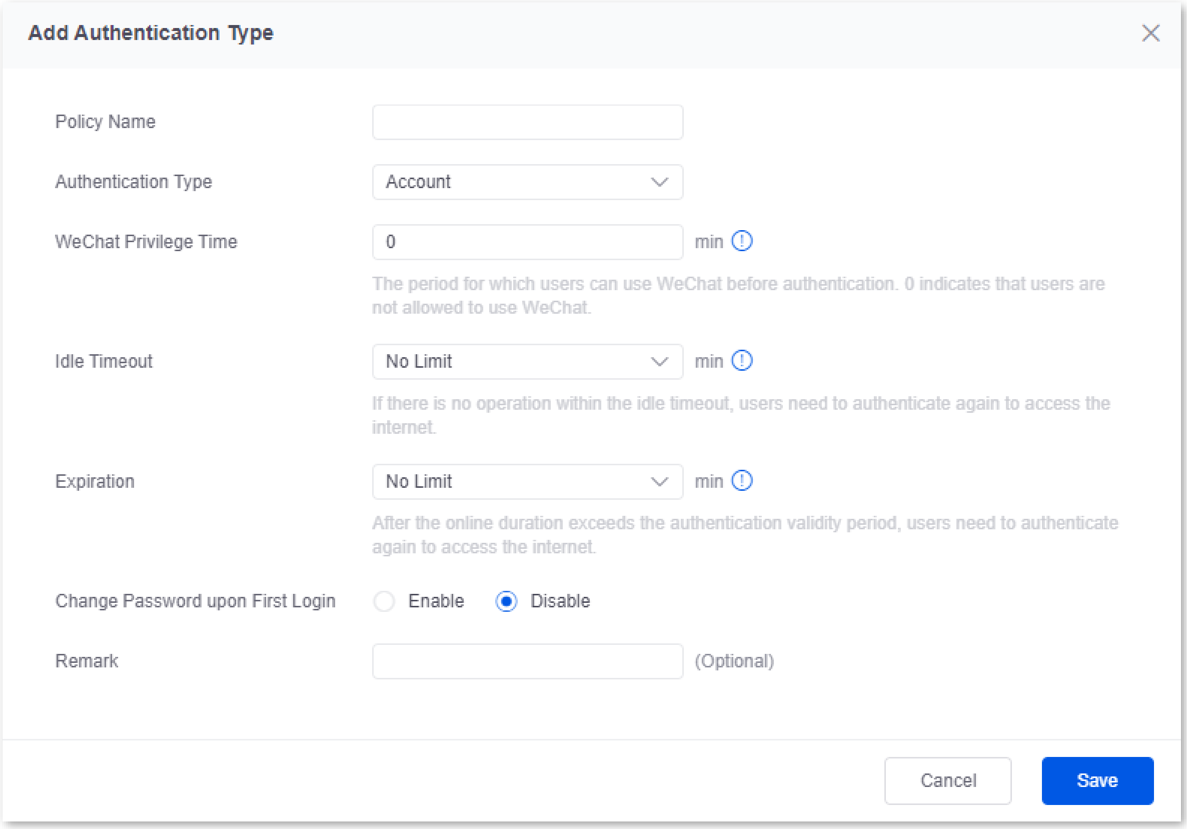
Parameter	Description
Policy Name	Specifies the policy name of the authentication type.

Parameter	Description
Authentication Type	Specifies the authentication type. Select **E-mail** from the drop-down menu.
WeChat Privilege Time	Specifies the duration for which users can use WeChat before authentication. **0** indicates that users are not allowed to use WeChat before authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the **Idle Timeout** after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
No. of Shared Users	Specifies the number of shared users allowed to access the internet through E-mail authentication at the same time.
E-mail	Specify the account and password used to send verification code mails.
E-mail Password	
SMTP Server	Specify the SMTP server address or port. The Simple Mail Transfer Protocol (SMTP) server is a proxy server for sending mails. The SMTP server addresses and ports of each mail server provider are different, so the user needs to query them by themselves.
SMTP Server Port	
Validity Test	Used to check whether the router is connected to the mail server. Enter the E-mail address and click Test . If the connection is successful, the E-mail box will receive a verification code.
E-mail Content	Specifies the content of the verification code E-mail.
Remark	Specifies the description of the authentication. The remark is optional.

7.4.4 Account

After **Account** is enabled, you need to enter the user name and password on the portal page. After successful authentication, you can access the internet. The user name and password should be configured in Account Management in advance.

To add an account authentication type, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Authentication Type**, and click **Add**.



Policy Name

Authentication Type: Account

WeChat Privilege Time: 0 min

The period for which users can use WeChat before authentication. 0 indicates that users are not allowed to use WeChat.

Idle Timeout: No Limit min

If there is no operation within the idle timeout, users need to authenticate again to access the internet.

Expiration: No Limit min

After the online duration exceeds the authentication validity period, users need to authenticate again to access the internet.

Change Password upon First Login: ○ Enable ● Disable

Remark: (Optional)

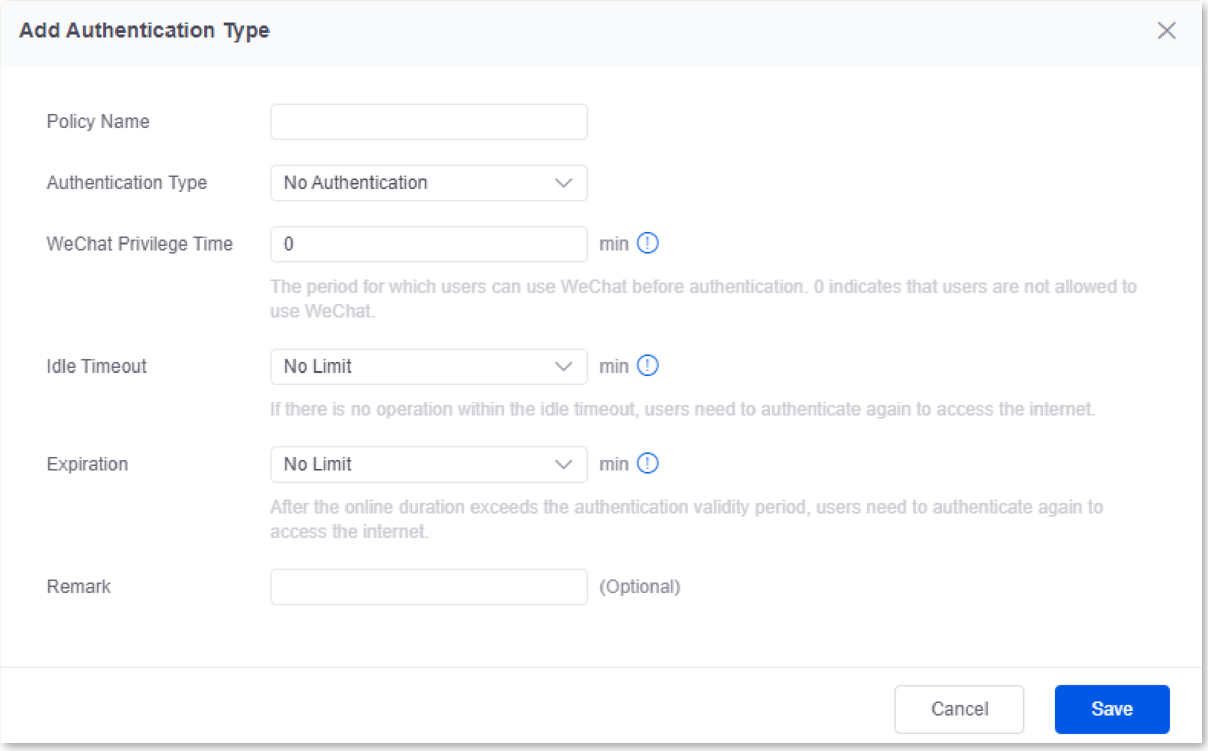
Parameter description

Parameter	Description
Policy Name	Specifies the policy name of the authentication type.
Authentication Type	Specifies the authentication type. Select **Account** from the drop-down menu.
WeChat Privilege Time	Specifies the duration for which users can use WeChat before authentication. **0** indicates that users are not allowed to use WeChat before authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the **Idle Timeout** after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
Change Password upon First Login	Used to enable or disable the change password upon first login function. After this function is enabled, the user needs to change the password to access the internet after the first successful authentication.
Remark	(Optional) Specifies the description of the authentication.

7.4.5 No authentication

After **No Authentication** is enabled, you only need to click **Connect** on the pop-up portal page to access the internet.

To allow no authentication, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Authentication Type**, and click **Add**.



Add Authentication Type

Policy Name

Authentication Type: No Authentication

WeChat Privilege Time: 0 min

The period for which users can use WeChat before authentication. 0 indicates that users are not allowed to use WeChat.

Idle Timeout: No Limit min

If there is no operation within the idle timeout, users need to authenticate again to access the internet.

Expiration: No Limit min

After the online duration exceeds the authentication validity period, users need to authenticate again to access the internet.

Remark (Optional)

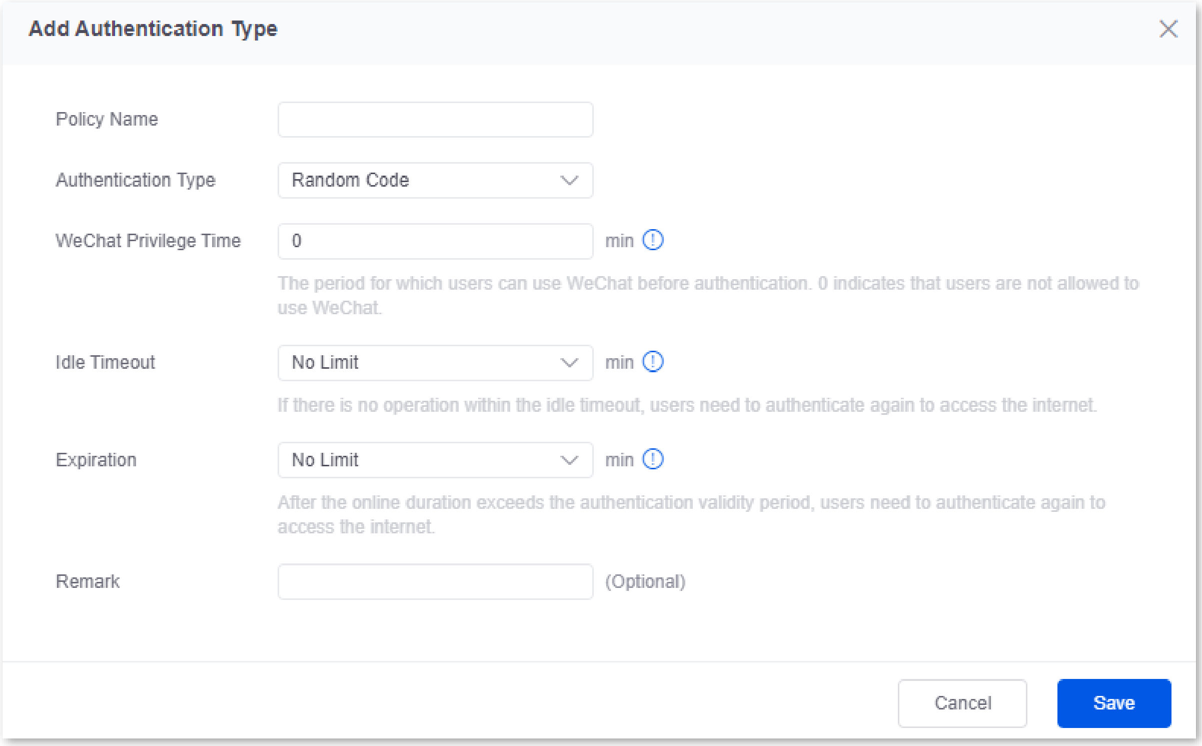
Parameter description

Parameter	Description
Policy Name	Specifies the policy name of the authentication type.
Authentication Type	Specifies the authentication type. Select **No Authentication** from the drop-down menu.
WeChat Privilege Time	Specifies the duration for which users can use WeChat before authentication. **0** indicates that users are not allowed to use WeChat before authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the **Idle Timeout** after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
Remark	(Optional) Specifies the description of the authentication.

7.4.6 Random code

After the **Random Code** authentication is enabled, you need to enter the random code on the portal page to obtain a verification code for authentication. After successful authentication, you can access the internet. The random codes need to be configured in random code account in advance.

To add a random code authentication type, log in to the web UI of the router, navigate to **AuthN** > **Authentication Template** > **Authentication Type**, and click **Add**.



Add Authentication Type

Policy Name

Authentication Type: Random Code

WeChat Privilege Time: 0 min

The period for which users can use WeChat before authentication. 0 indicates that users are not allowed to use WeChat.

Idle Timeout: No Limit min

If there is no operation within the idle timeout, users need to authenticate again to access the internet.

Expiration: No Limit min

After the online duration exceeds the authentication validity period, users need to authenticate again to access the internet.

Remark: (Optional)

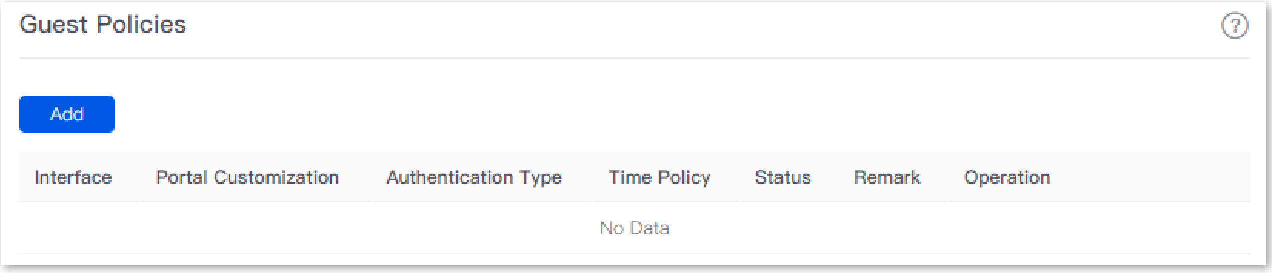
Parameter description

Parameter	Description
Policy Name	Specifies the policy name of the authentication type.
Authentication Type	Specifies the authentication type. Select **Random Code** from the drop-down menu.
WeChat Privilege Time	Specifies the duration for which users can use WeChat before authentication. **0** indicates that users are not allowed to use WeChat before authentication.
Idle Timeout	Specifies the idle timeout of the authentication. If there is no operation within the **Idle Timeout** after successful authentication, you need to authenticate again to access the internet.
Expiration	Specifies the validity period of authentication. If the internet access expires after successful authentication, you need to re-authenticate to access the internet.
Remark	(Optional) Specifies the description of the authentication.

7.5 Configure guest policies

Log in to the web UI of the router, and navigate to **AuthN** > **Guest Policies** to enter the page.

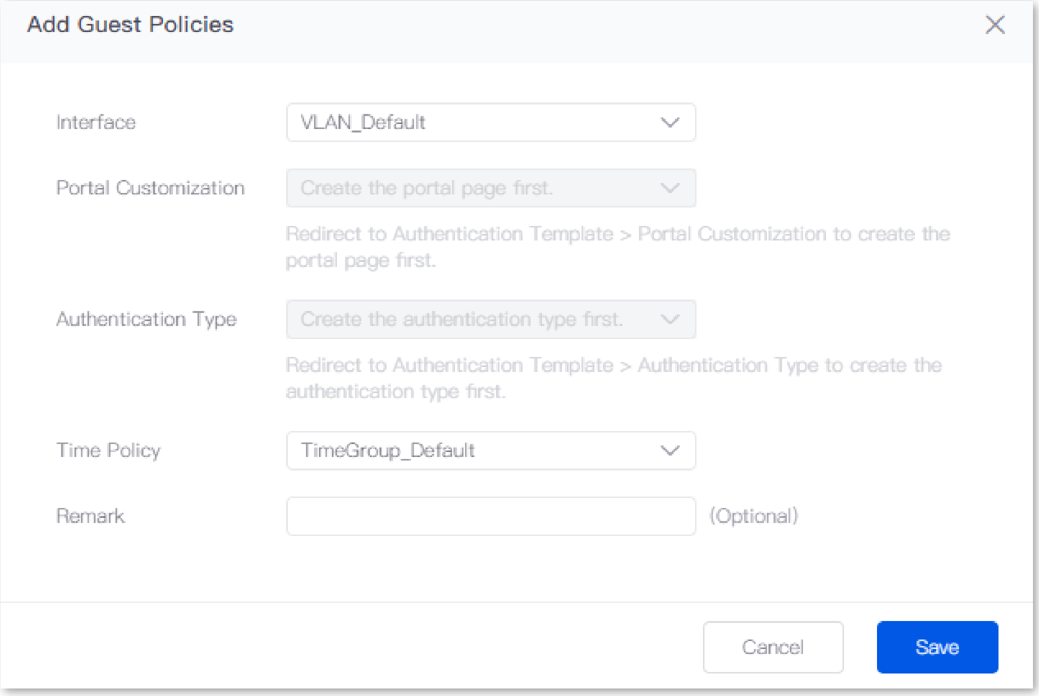
On this page, you can configure the corresponding guest policies based on the VLAN interface.



Guest Policies

Interface	Portal Customization	Authentication Type	Time Policy	Status	Remark	Operation
No Data						

You can click **Add** to add a new guest policy.



Add Guest Policies

Interface: VLAN_Default

Portal Customization: Create the portal page first.

Redirect to Authentication Template > Portal Customization to create the portal page first.

Authentication Type: Create the authentication type first.

Redirect to Authentication Template > Authentication Type to create the authentication type first.

Time Policy: TimeGroup_Default

Remark: (Optional)

Parameter description

Parameter	Description
Interface	Specifies the interface that the guest policy is used to. Configure the VLAN Interface in advance.
Portal Customization	Specifies the portal customization of the guest policy. The portal customization should be configured in Portal Customization in advance.
Authentication Type	Specifies the authentication type of the guest policy. The authentication type should to be configured in Authentication Type in advance.

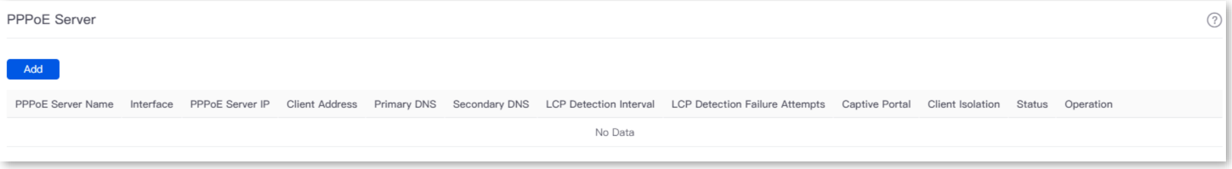
Parameter	Description
Time Policy	Specifies the period during which guest policy takes effect. The time policy should be configured in Time Group in advance.
Status	Specifies the status of the guest policy, including **Enabled**, **Disabled** and **Expired**.
Remark	Specifies the description of the guest policy. The remark is optional.
Operation	Used to edit, enable, disable or delete a guest policy. Edit **:** Used to modify the policy. Enable : Used to enable the policy. Disable **:** Used to disable the policy. Delete**:** Used to delete the policy.

7.6 PPPoE server

Log in to the web UI of the router, and navigate to **AuthN** > **PPPoE Server** to enter the page.

On this page, you can configure the PPPoE Server based on the VLAN interface.

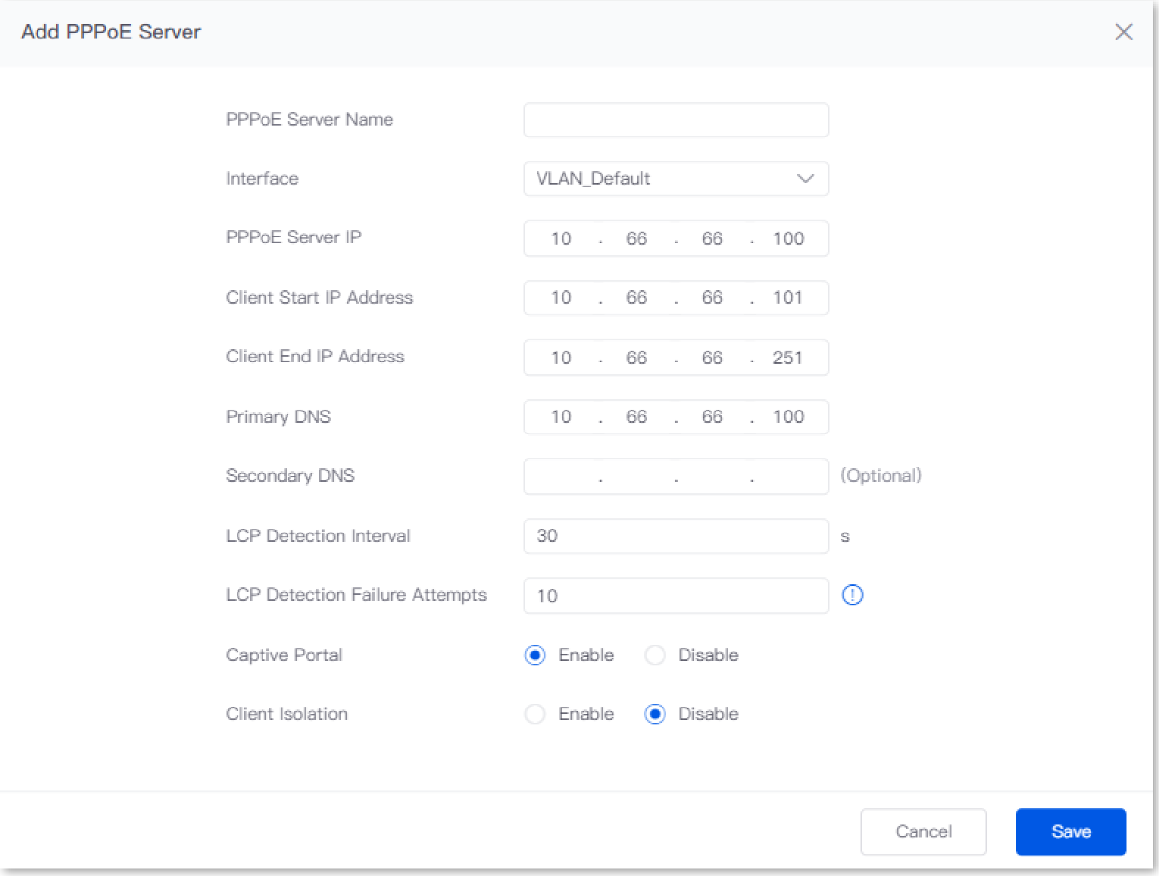
After the **PPPoE Server** is enabled, the router is configured as a PPPoE server. You need to access the internet through broadband dial-up authentication. The PPPoE user name and password need to be configured in Account Management in advance.



PPPoE Server

PPPoE Server Name	Interface	PPPoE Server IP	Client Address	Primary DNS	Secondary DNS	LCP Detection Interval	LCP Detection Failure Attempts	Captive Portal	Client Isolation	Status	Operation
No Data											

You can click **Add** to add a PPPoE server.



Add PPPoE Server

PPPoE Server Name		
Interface	VLAN_Default	
PPPoE Server IP	10 . 66 . 66 . 100	
Client Start IP Address	10 . 66 . 66 . 101	
Client End IP Address	10 . 66 . 66 . 251	
Primary DNS	10 . 66 . 66 . 100	
Secondary DNS	. . .	(Optional)
LCP Detection Interval	30	s
LCP Detection Failure Attempts	10	
Captive Portal	● Enable ○ Disable	
Client Isolation	○ Enable ● Disable	

Parameter description

Parameter	Description
PPPoE Server Name	Specifies the name of the customized PPPoE server.
Interface	Specifies the VLAN interface upon which the customized PPPoE server takes effect.

Parameter	Description
PPPoE Server Name	Specifies the name of the customized PPPoE server.
PPPoE Server IP	Specifies the IP address of the customized PPPoE server. It is also the gateway address of the client and must be in the same network segment with the address pool of the client.
Client Start IP Address	Specify the start or end IP address that the PPPoE server assigns to clients.
Client End IP Address	
Primary DNS	Specify the IP addresses of primary and secondary DNS servers assigned by the PPPoE server to users. **Secondary DNS** is optional. TIP To provide normal internet access, ensure that **Primary DNS** is set to the IP address of a correct DNS server or proxy.
Secondary DNS	
LCP Detection Interval	Specifies the interval at which PPPoE sends Link Control Protocol (LCP) packets.
LCP Detection Failure Attempts	Specifies the limit of failure attempts of the LCP Detection. When the number of unreplied LCP packets reaches the limit, the PPPoE server will disconnect the connection automatically.
Captive Portal	Used to enable or disable the captive portal function. With **Captive Portal** enabled, the clients connected to authenticated VLAN interface need to make a broadband dial-up authentication for internet access.
Client Isolation	Used to enable or disable the client isolation function. With **Client Isolation** enabled, clients cannot access each other.
Remark	Specifies the introduction to the authentication. The remark is optional.

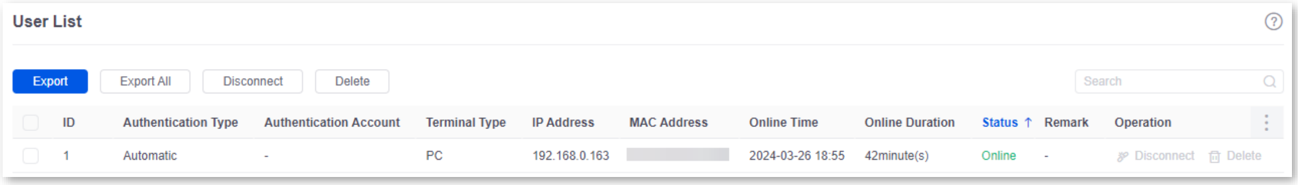
7.7 Account

7.7.1 User list

Log in to the web UI of the router, and navigate to **AuthN** > **Account** > **User List** to enter the page.

On this page, you can check and export the authentication user information, kick authenticated accounts offline in batches and delete authentication information of offline users in batches.

You can click ⋮ to select parameters to be displayed.



User List

□	ID	Authentication Type	Authentication Account	Terminal Type	IP Address	MAC Address	Online Time	Online Duration	Status ↑	Remark	Operation
□	1	Automatic	-	PC	192.168.0.163	[redacted]	2024-03-26 18:55	42minute(s)	Online	-	Disconnect Delete

Button description

Parameter	Description
Export	Used to back up the configuration information of selected users. The exported file is suffixed with **.csv**.
Export All	Used to back up the configuration information of all users. The exported file is suffixed with **.csv**.
Disconnect	Used to disconnect the selected online users who have authenticated successfully. After being disconnected, an online user that has been authenticated before needs to re-authenticate to access the internet and an authentication-free online user will automatically connect to the internet again.
Delete	Used to delete information of selected offline users.

Parameter description

Parameter	Description
ID	Specifies the ID of the user.
Authentication Type	Specifies the authentication type of the current authenticated user. The user configured as the authentication-free host is displayed as **Authentication-free** and the user whose guest policy is not configured is displayed as **Automatic**.
Authentication Account	Specifies the account, E-mail, mobile phone number, real name or random code used by the user.

Parameter	Description
Authentication Interface	Specifies the VLAN interface that the guest policy is used to.
Terminal Name	Specifies the name of the client.
Terminal Type	Specifies the type of client.
IP Address	Specifies the IP address of the authenticated user.
MAC Address	Specifies the MAC address of the authenticated user.
Online Time	Specifies the first online time of the authenticated user.
Online Duration	Specifies the online duration of the authenticated user.
Status	Specifies the current status of the authenticated user. – **Online**: Specifies the authentication user is online. – **Offline**: Specifies the authentication user is offline. – **Authenticating**: Specifies the authentication user is authenticating.
Remark	Specifies the description of the user.
Operation	Used to disconnect or delete a user. Disconnect : Used to disconnect the user. Delete: Used to delete the user.

7.7.2 Account management

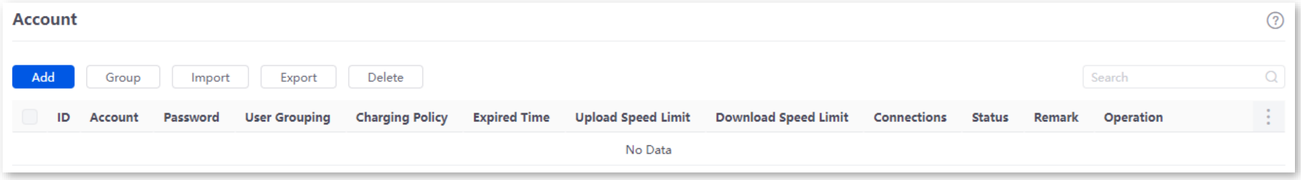
Overview

Log in to the web UI of the router, and navigate to **AuthN** > **Account** > **Account** to enter the page.

On this page, you can add a user account for account authentication or PPPoE authentication to access the internet.

You can configure account charging strategy and upload or download speed to complete the authentication charging and the flow control function. You can also recharge for the existing accounts and check the charging records. The following figure is for reference only.

You can click ⋮ to select parameters to be displayed.



ID	Account	Password	User Grouping	Charging Policy	Expired Time	Upload Speed Limit	Download Speed Limit	Connections	Status	Remark	Operation

No Data

Button description

Parameter	Description
Add	Used to add an authentication account.
Group	Used to add selected users to user groups.
Import	Used to import the account files backed up previously to the local computer.
Export	Used to back up the information of selected accounts to the local computer. The exported file is suffixed with **.csv**.
Delete	Used to delete the selected authentication accounts.

Parameter description

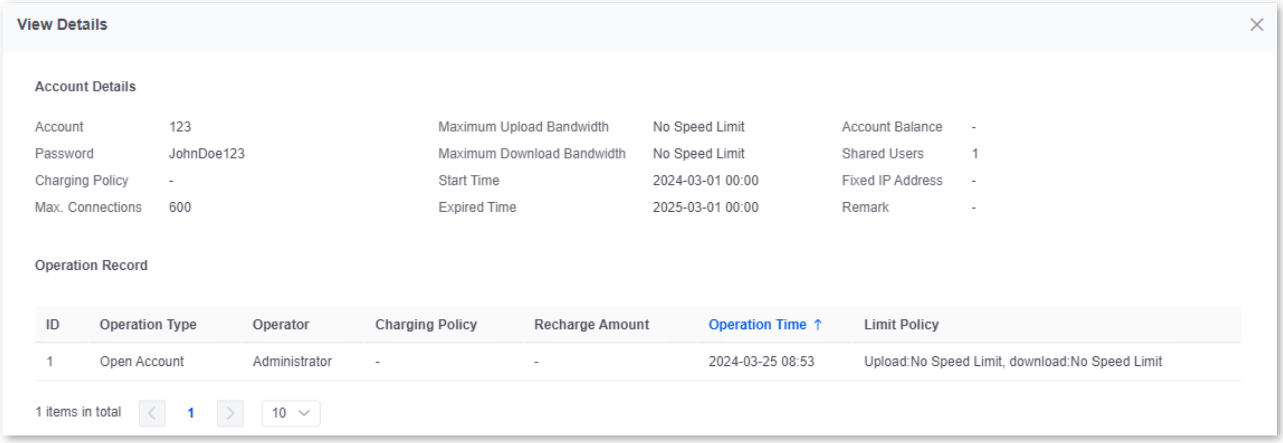
Parameter	Description
ID	Specifies the ID of the authentication account.
Account	Specify the user name and password used for authentication.
Password	
User Grouping	Specifies the user group of the account.
Charging Policy	Specifies the charging policy of the account, which should be configured in Charging Policy in advance. **Unused** specifies that the charging function is disabled for this account.
Upload Speed Limit/Maximum Upload Speed	Specify the maximum upload and download rate of the account. TIP If a charging policy is selected, the maximum upload and download rate configured in the charging policy will be used automatically. If no charging policy is selected, you can manually configure the parameters here.
Download Speed Limit/Maximum Download Speed	
Account Balance	Specifies the balance of the account. It needs to be entered after the charging policy is selected.
Charging Start Time	Specifies the time when the account becomes valid. NOTE If no charging policy is selected, you can manually configure this parameter.

Parameter	Description
End Time/Expired Time	Specifies the validity period of internet access of the account. If the internet access period of the account expires after successful authentication, you need to recharge to access the internet again. NOTE The parameter value will be calculated automatically by the router after the charging policy is selected and the account balance is entered. If no charging policy is selected, the parameter needs to be configured manually.
Connections/Max. Connections	Specifies the maximum number of concurrent connections allowed for the account, which is also the maximum number of conversations that the router can deal with simultaneously. When the account is used by multiple persons at the same time, the number of concurrent connections per person is the set value.
No. of Shared Users	Specifies the number of users that are allowed to use this account to authenticate and access the internet at the same time. NOTE When the bind MAC address function is enabled, the router will bind the first few MAC addresses that successfully use this account to authenticate and access the internet, and other MAC addresses cannot use this account to authenticate and access the internet. For example, if the number of shared users is 2, the router will bind the first two MAC addresses that successfully use this account to authenticate. Devices with other MAC addresses cannot use this account to authenticate and access the internet.
Bind MAC Address	Specifies whether MAC addresses are bound for authentication. With this function enabled, the router binds the first few MAC addresses that successfully use this account to authenticate and access the internet.
Fixed IP Address	Specifies the fixed IP address of the router. After it is configured, only the device with this IP address can use the account to authenticate and access the internet. By default, the fixed IP address is not configured. NOTE The fixed IP address does not take effect in the PPPoE authentication type.
Status	Specifies the current status of the authentication account. – **Enabled**: Specifies the account has been enabled. – **Disabled**: Specifies the account has been disabled. – **Overdue**: Specifies the account balance is insufficient or the account has expired.
Remark	Specifies the description of the authentication account. The remark is optional.

Parameter	Description
Operation	Used to scan the details of the account, and recharge, edit, disable or delete the account. Details : Used to check the account details and operation records. Recharge : Used to recharge the account. Edit : Used to edit the account. Enable : Used to enable the account. Disable : Used to disable the account. Delete : Used to delete the account.

Account details and operation records

Click Details of the corresponding account to check the account details and operation records in the pop-up window. The following figure is for reference only.



View Details

Account Details

Account	123	Maximum Upload Bandwidth	No Speed Limit	Account Balance	-
Password	JohnDoe123	Maximum Download Bandwidth	No Speed Limit	Shared Users	1
Charging Policy	-	Start Time	2024-03-01 00:00	Fixed IP Address	-
Max. Connections	600	Expired Time	2025-03-01 00:00	Remark	-

Operation Record

ID	Operation Type	Operator	Charging Policy	Recharge Amount	Operation Time ↑	Limit Policy
1	Open Account	Administrator	-	-	2024-03-25 08:53	Upload:No Speed Limit, download:No Speed Limit

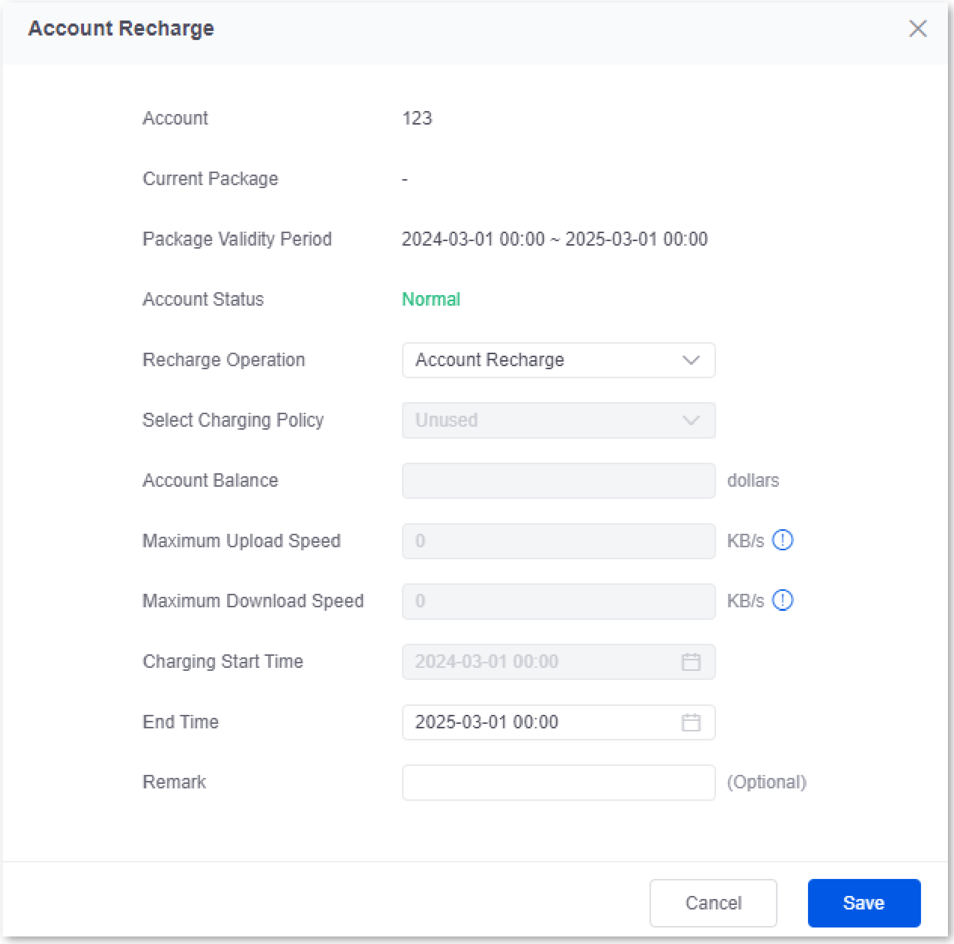
1 items in total 1 10

Recharge the account

Click Recharge of the corresponding account to recharge the account in the pop-up window or change the charging policy. The following figure is for reference only.

TIP

If no charging policy is used in the account, you can change the expired time manually to recharge the account.



Account Recharge

Account	123
Current Package	-
Package Validity Period	2024-03-01 00:00 ~ 2025-03-01 00:00
Account Status	Normal
Recharge Operation	Account Recharge
Select Charging Policy	Unused
Account Balance	dollars
Maximum Upload Speed	0 KB/s
Maximum Download Speed	0 KB/s
Charging Start Time	2024-03-01 00:00
End Time	2025-03-01 00:00
Remark	(Optional)

Parameter description

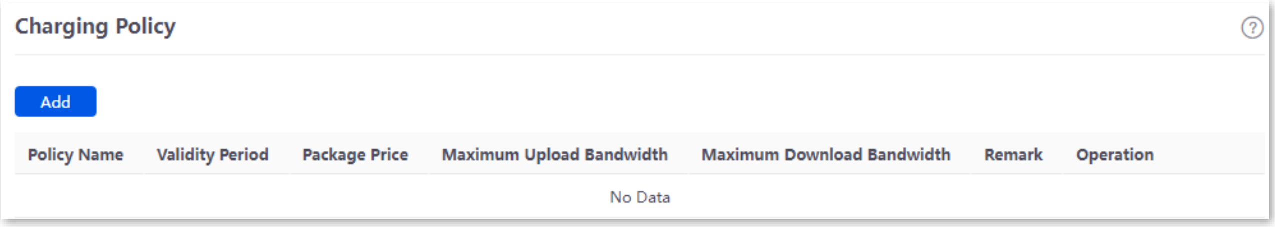
Parameter	Description
Account	Specifies the account used for authentication.
Current Package	Specifies the name of the account charging policy.
Package Validity Period	Specifies the start time and end time the account takes effect.
Account Status	Specifies the current status of the account.
Recharge Operation	Used to select the recharge operation. You can select **Account Recharge** to renew the current package or **Charging Policy Modification** to change the current package. TIP Changing the charging policy will clear the account balance and validity period.
Select Charging Policy	Used to select the charging policy of the account. When **Recharge Operation** is set to **Charging Policy Modification**, you can select a new charging policy here.

Parameter	Description
Account Balance	Specifies the balance of the charging. TIP If no charging policy is used on the account, which means that **Select Charging Policy** is set to **Unused**, account balance cannot be set.
Maximum Upload Speed	Specify the maximum upload and download speed of the current account. TIP If no charging policy is used on the account, which means that **Recharge Operation** is set to **Charging Policy Modification** and **Select Chagrin Policy** is set to **Unused**, these parameters need to be set manually.
Maximum Download Speed	
Charging Start Time	Specifies the time when the account starts to take effect.
End Time	Specifies the validity end time for using the account to access the internet. After this account is authenticated and connected to the internet successfully, if the online time exceeds the end time, you need to recharge to access the internet. TIP If no charging policy is used on the account, which means that **Select Charging Policy** is set to **Unused**, the parameter needs to be set manually.
Remark	Specifies the description of the recharge policy. The remark is optional.

7.7.3 Charging policy

Log in to the web UI of the router, and navigate to **AuthN** > **Account** > **Charging Policy** to enter the page.

On this page, you can configure charging policies based on actual charging requirements.

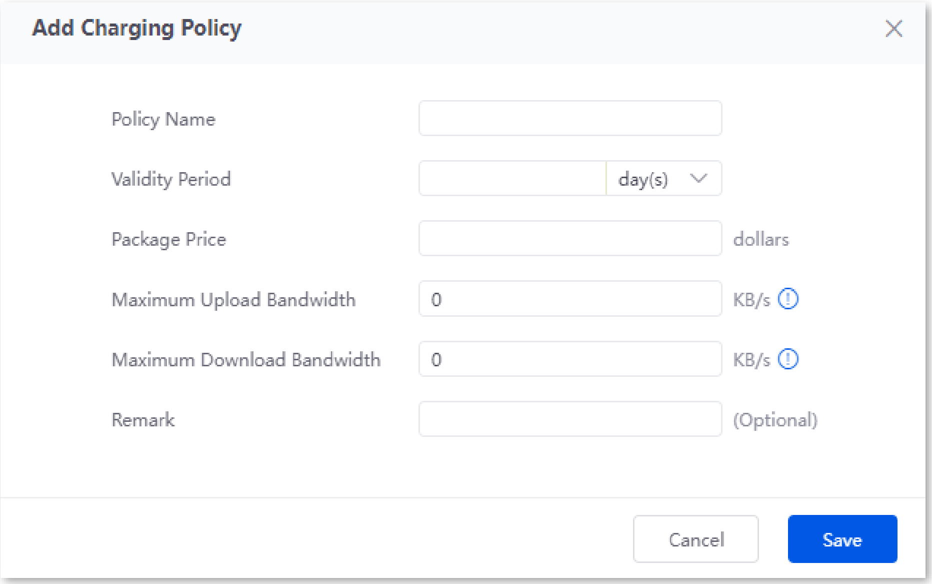


Charging Policy

Add

Policy Name	Validity Period	Package Price	Maximum Upload Bandwidth	Maximum Download Bandwidth	Remark	Operation
No Data						

You can click **Add** to add a new charging policy.



Add Charging Policy

Policy Name		
Validity Period	day(s)	
Package Price		dollars
Maximum Upload Bandwidth	0	KB/s
Maximum Download Bandwidth	0	KB/s
Remark		(Optional)

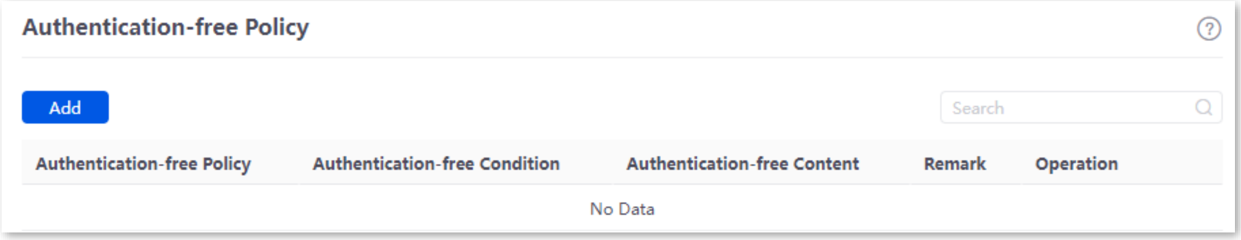
Parameter description

Parameter	Description
Policy Name	Specifies the name of the charging policy.
Validity Period	Specifies the charging cycle of a charging policy.
Package Price	Specifies the package amount of a charging cycle. For example, if the charging cycle is 1 hour, and the package price is $2, then it costs $2 per hour to access the internet using this charging policy.
Maximum Upload Bandwidth	Specify the maximum upload and download rate of the account. **0** indicates no limit.
Maximum Download Bandwidth	
Remark	Specifies the description of the charging policy. The remark is optional.
Operation	Used to edit or delete the charging policy. Edit : Used to modify the policy. Delete: Used to delete the policy.

7.7.4 Authentication-free policy

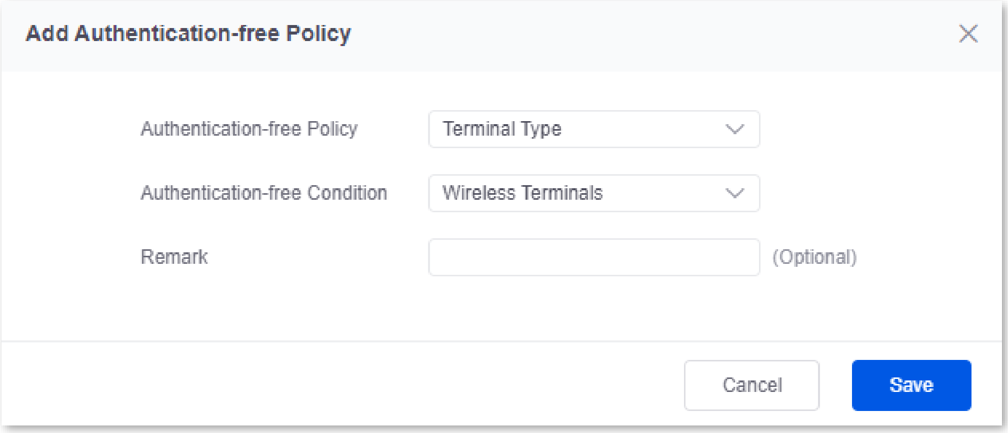
Log in to the web UI of the router, and navigate to **AuthN** > **Account** > **Authentication-free Policy** to enter the page.

On this page, you can configure the authentication-free policies for special devices such as network cameras. After configuration, these devices can connect to the internet without authentication.


Authentication-free Policy

Authentication-free Policy	Authentication-free Condition	Authentication-free Content	Remark	Operation
No Data				

You can click **Add** to add a new authentication-free policy.


Add Authentication-free Policy

Authentication-free Policy: Terminal Type

Authentication-free Condition: Wireless Terminals

Remark: (Optional)

Parameter description

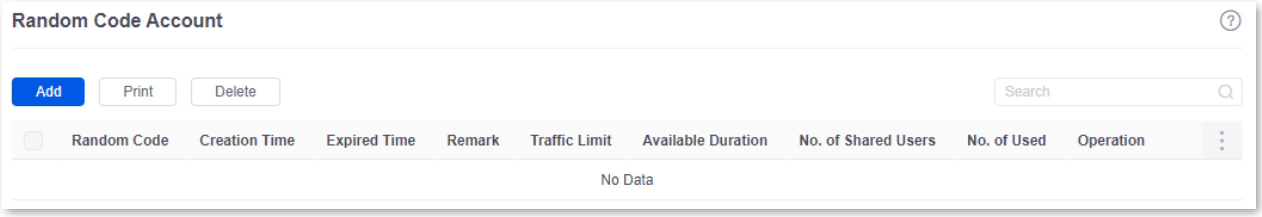
Parameter	Description
Authentication-free Policy	Specifies the authentication-free policy type of the router, including **Terminal Type** and **Terminal Unique Information**.

Parameter	Description
Authentication-free Condition	Specifies the condition of the authentication-free policy. Only the clients that meet the condition can access the internet without authentication. When **Authentication-free Policy** is set to **Terminal Unique Information**, the following authentication-free conditions are available: – **Mobile Number**: When SMS authentication is enabled, set mobile numbers that do not require authentication to enable them to access the internet without obtaining verification codes. – **IP Address**: Devices with the configured IP addresses can access the internet without authentication. – **MAC Address**: Devices with the configured MAC addresses can access the internet without authentication. When **Authentication-free Policy** is set to **Terminal Type**, the following authentication-free conditions are available: – **Wired Terminals**: Devices that are connected to the LAN of the router in a wired manner can access the internet without authentication. – **Wireless Terminals**: Devices that are connected to the LAN of the router in a wireless manner can access the internet without authentication. – **Mobile Phone**: Devices that are identified as mobile phones can access the internet without authentication.
Authentication-free Content	Specifies the content of the authentication-free policy. When a device meets both the authentication-free policy and content, it can access the internet without authentication. **"–"** indicates no authentication contents.
Remark	Specifies the description of the authentication-free policy. The remark is optional.
Operation	Used to edit or delete an authentication-free policy. ✎ Edit **:** Used to modify the policy. 🗑 Delete **:** Used to delete the policy.

7.7.5 Random code account

Log in to the web UI of the router, and navigate to **AuthN** > **Account** > **Random Code Account** to enter the page.

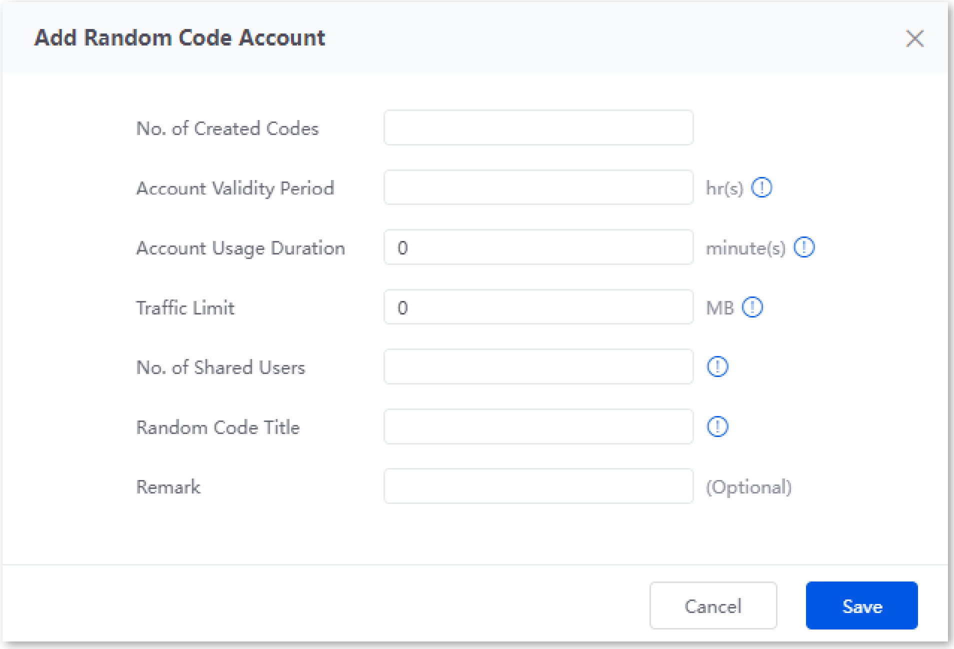
On this page, you can add the random codes used in random code authentication.



Random Code Account

□	Random Code	Creation Time	Expired Time	Remark	Traffic Limit	Available Duration	No. of Shared Users	No. of Used	Operation
				No Data					

You can click **Add** to add a new random code account policy.



Add Random Code Account

No. of Created Codes

Account Validity Period hr(s)

Account Usage Duration 0 minute(s)

Traffic Limit 0 MB

No. of Shared Users

Random Code Title

Remark (Optional)

Button description

Button	Description
Add	Used to add a random code.
Print	Used to print some information of the selected random codes with the printer installed on your computer.
Delete	Used to delete the selected authentication-free policies.

Parameter description

Parameter	Description
Random Code	Specifies the random code used for authentication.

Parameter	Description
Creation Time	Specifies the time when the random code is created.
No. of Created Codes	Specifies the number of random codes to be created.
Account Validity Period	Specifies the validity period of the random code, ranging from 0 to 87600. **0** indicates no limit.
Expired Time	Specifies the time point when the random code expires. Expired accounts cannot be used again. The expiration time point is calculated based on the creation time of the random code and the validity period of the configured account.
Remark	Specifies the description of the random code. The remark is optional.
Traffic Limit	Specifies the total download traffic that the random code is allowed to use. Once this value is exceeded, the random code will be denied internet access.
Available Duration	Specifies the longest duration this random code is allowed to stay online at a time. When the random code expires, the user needs to log in again.
No. of Shared Users	Specifies the number of users who are allowed to access the internet using this random code at the same time. TIP The bind MAC address function is enabled by default in Random Code authentication policies. For example, if the number of shared users is 2, the router will bind the first two MAC addresses that successfully use this random code to authenticate. Devices with other MAC addresses cannot use this random code to authenticate and access the internet.
No. of Used	Specifies the number of users who are using the random code to access the internet.
Random Code Title	Specifies the title of the random code. It appears on the central upper part of the page. You can use it for advertising promotion. For example, “Welcome to *XX*”.
Operation	Used to print or delete a random code. Print : Used to print the random code. Delete : Used to delete the random code.

7.8 Example of tenant authentication

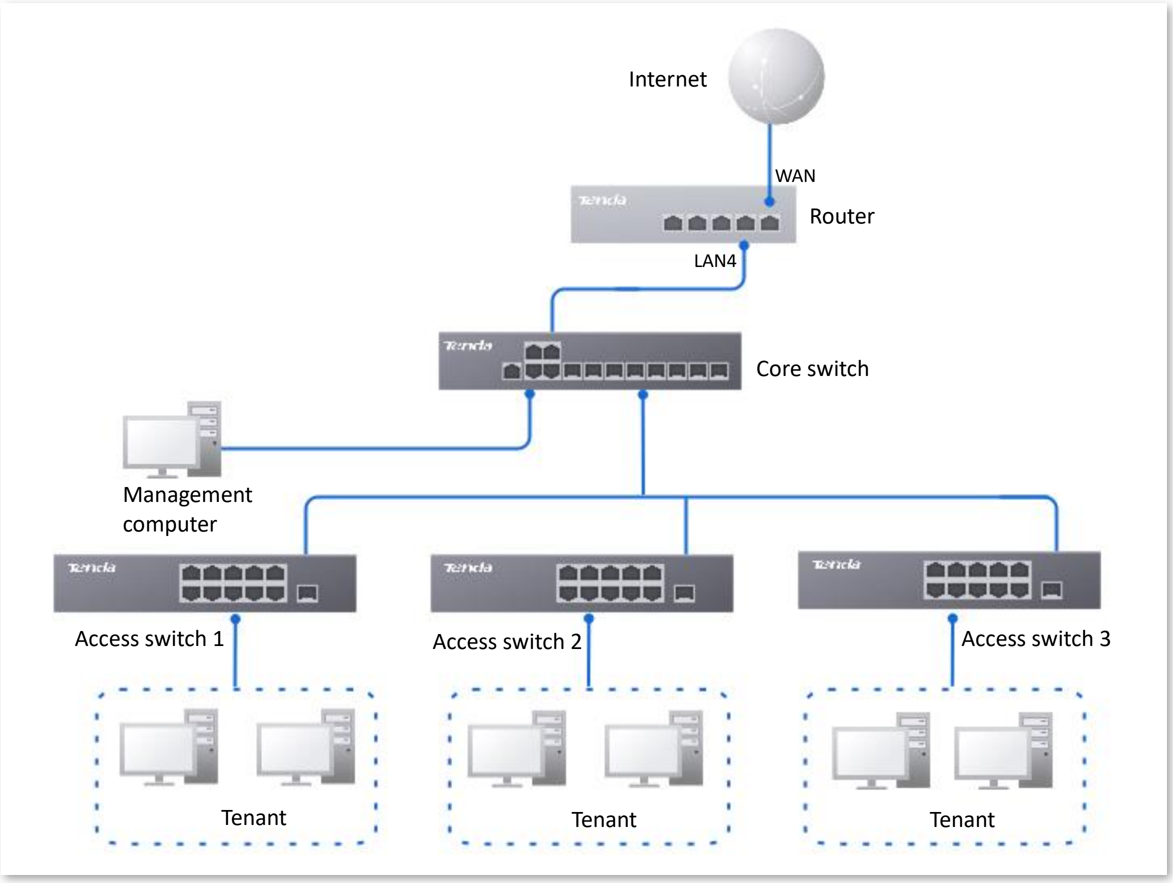
7.8.1 Networking requirements

An owner of rented flats uses a router as the egress gateway. Tenants need to pay by months to get internet access when connecting to the flat network.

To manage the network usage, the following requirements are raised for the flat network:

- All tenants have to access the internet using the PPPoE connection mode.
- Two internet access packages ($15 per month with 20 MHz bandwidth and $50 per month with 100 MHz bandwidth) are provided for tenants.
- The flat manager's computer can access the internet without authentication for convenient management.

The network topology is as follows.



7.8.2 Solution

- Configure the PPPoE authentication based on the VLAN interface.
- Configure an authentication-free policy for the manager's computer.
- Configure authentication accounts.

7.8.3 Configuration procedure

Configure the router

Configure the core switch

I. Configure the router.

Step 1 Log in to the web UI of the router.

Step 2 Add VLANs and configure a DHCP server.

The following table lists the VLAN parameters for example.

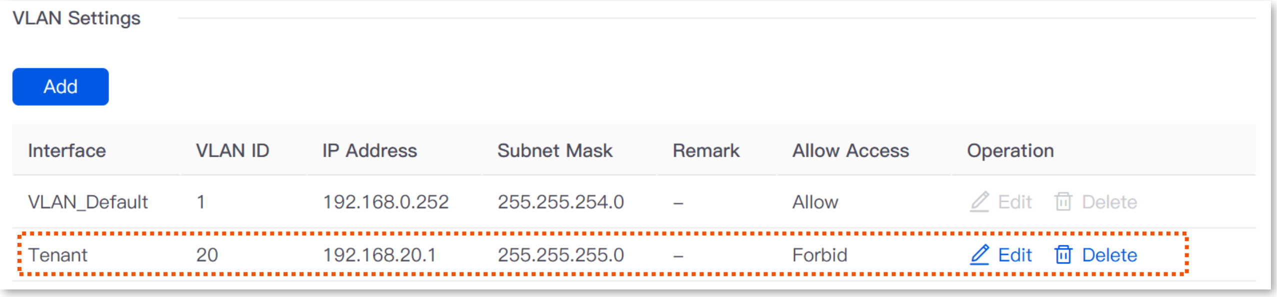
Interface	VLAN ID	IP Address/Subnet Mask	Allow Access	Physical Port
Tenant	20	192.168.20.1/24	Forbid	LAN4

The following table lists the DHCP server parameters of the VLAN for illustration.

Policy Name	Interface Name	User DHCP	AP DHCP
Tenant	Tenant	Client address: 192.168.20.100 - 192.168.20.200 Subnet mask: 255.255.255.0 Default gateway: 192.168.20.1 Primary DNS: 192.168.20.1	/

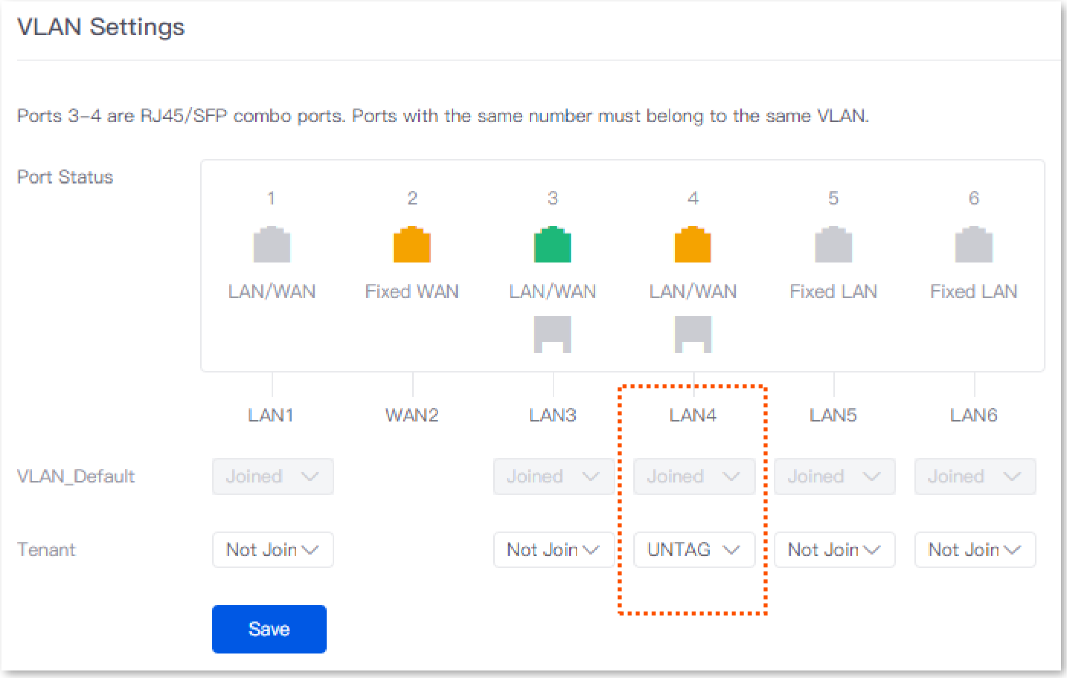
1. Add VLANs.

– Navigate to **Network** > **VLAN Settings**. Click **Add**, configure VLAN parameters and click **Save.**



Interface	VLAN ID	IP Address	Subnet Mask	Remark	Allow Access	Operation
VLAN_Default	1	192.168.0.252	255.255.254.0	–	Allow	Edit Delete
Tenant	20	192.168.20.1	255.255.255.0	–	Forbid	Edit Delete

– Select LAN port for the **Tenant** VLAN, which is **LAN4** in this example, set VLAN policy to **UNTAG**. Then click **Save**.



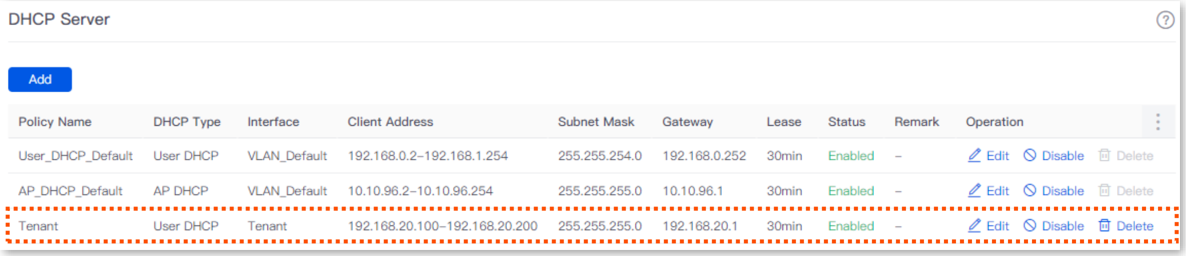
VLAN Settings

Ports 3–4 are RJ45/SFP combo ports. Ports with the same number must belong to the same VLAN.

Port Status	1	2	3	4	5	6
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN
	LAN1	WAN2	LAN3	LAN4	LAN5	LAN6
VLAN_Default	Joined		Joined	Joined	Joined	Joined
Tenant	Not Join		Not Join	UNTAG	Not Join	Not Join

2. Configure the DHCP server for the VLAN.

Navigate to **Network** > **DHCP Settings** > **DHCP Server**. Click **Add**, configure parameters for user DHCP server of the Tenant VLAN and click **Save.**

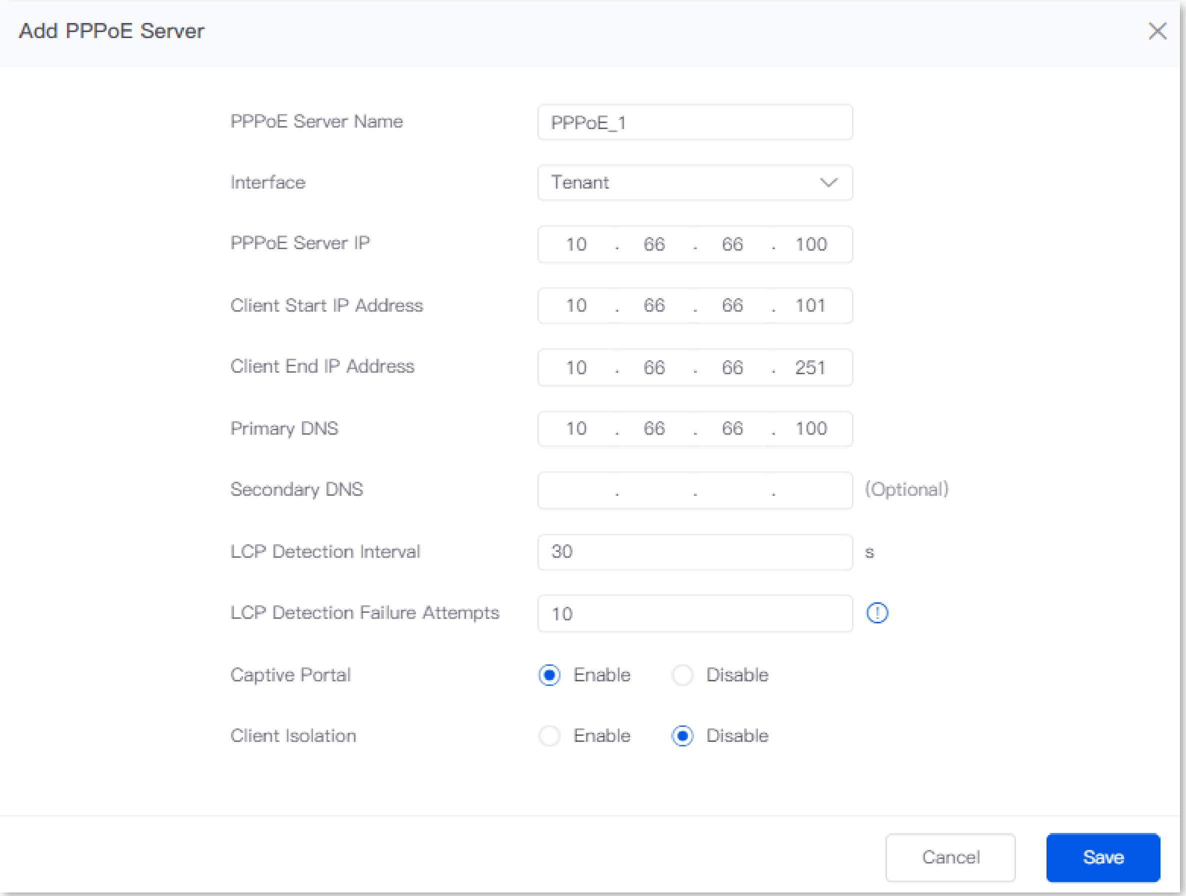


DHCP Server

Policy Name	DHCP Type	Interface	Client Address	Subnet Mask	Gateway	Lease	Status	Remark	Operation
User_DHCP_Default	User DHCP	VLAN_Default	192.168.0.2–192.168.1.254	255.255.254.0	192.168.0.252	30min	Enabled	–	Edit Disable Delete
AP_DHCP_Default	AP DHCP	VLAN_Default	10.10.96.2–10.10.96.254	255.255.255.0	10.10.96.1	30min	Enabled	–	Edit Disable Delete
Tenant	User DHCP	Tenant	192.168.20.100–192.168.20.200	255.255.255.0	192.168.20.1	30min	Enabled	–	Edit Disable Delete

Step 3 Configure the PPPoE server.

Navigate to **AuthN** > **PPPoE Server**, and click **Add**. Configure parameters as required, and click **Save**. The following figure is for reference only.



Add PPPoE Server

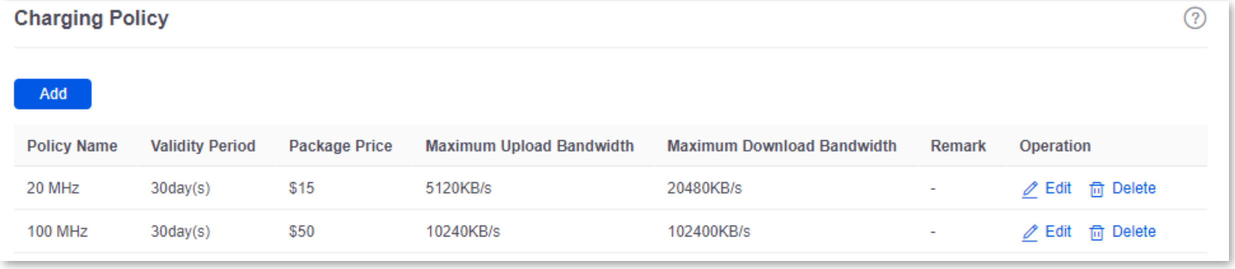
PPPoE Server Name	PPPoE_1	
Interface	Tenant	
PPPoE Server IP	10 . 66 . 66 . 100	
Client Start IP Address	10 . 66 . 66 . 101	
Client End IP Address	10 . 66 . 66 . 251	
Primary DNS	10 . 66 . 66 . 100	
Secondary DNS	. . .	(Optional)
LCP Detection Interval	30	s
LCP Detection Failure Attempts	10	
Captive Portal	● Enable ○ Disable	
Client Isolation	○ Enable ● Disable	

Step 4 Configure the PPPoE service package.

The following table lists the PPPoE package parameters for illustration.

20 MHz Package	100 MHz Package
Policy Name: 20 MHz Validity Period: 30 days Package Price: 15 dollars Maximum Upload Bandwidth: 5120 KB/s Maximum Download Bandwidth: 20480 KB/s	Policy Name: 100 MHz Validity Period: 30 days Package Price: 50 dollars Maximum Upload Bandwidth: 10240 KB/s Maximum Download Bandwidth: 102400 KB/s

Navigate to **AuthN** > **Account** > **Charging Policy**, and click **Add**. Configure parameters as required, and click **Save**. The following figure is for reference only.



Charging Policy

Policy Name	Validity Period	Package Price	Maximum Upload Bandwidth	Maximum Download Bandwidth	Remark	Operation
20 MHz	30day(s)	$15	5120KB/s	20480KB/s	-	Edit Delete
100 MHz	30day(s)	$50	10240KB/s	102400KB/s	-	Edit Delete

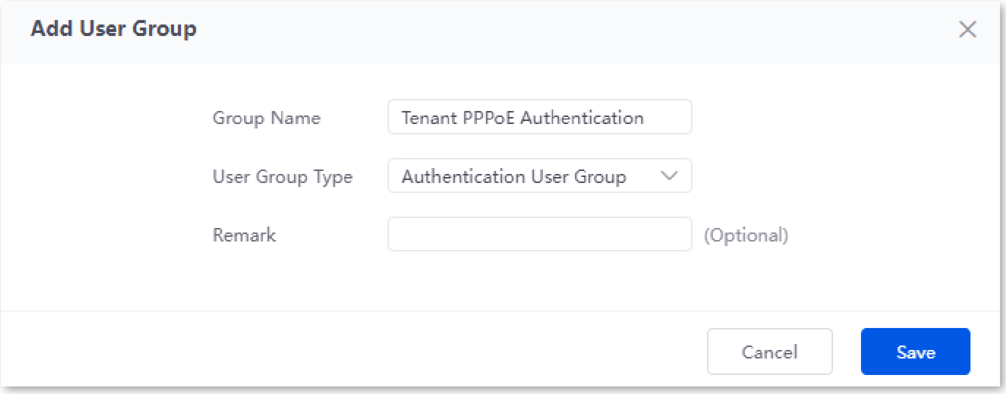
Step 5 Configure authentication accounts for tenants.

The following table lists the account parameters for illustration. For other parameters not mentioned, the default settings are used.

User Group	Authentication Account
	Account: Room number
	Password: Room number+Mobile number
Group Name: Tenant PPPoE Authentication	User Grouping: Tenant PPPoE Authentication
User Group Type: Authentication User Group	Select Charging Policy: 20 MHz or 100 MHz
	Account Balance: Set as required
	No. of Shared Users: 1

1. Add the user group.

   Navigate to **Audit** > **Group Policy** > **User Group**, and click **Add**. Configure parameters as required, and click **Save**. The following figure is for reference only.



Add User Group

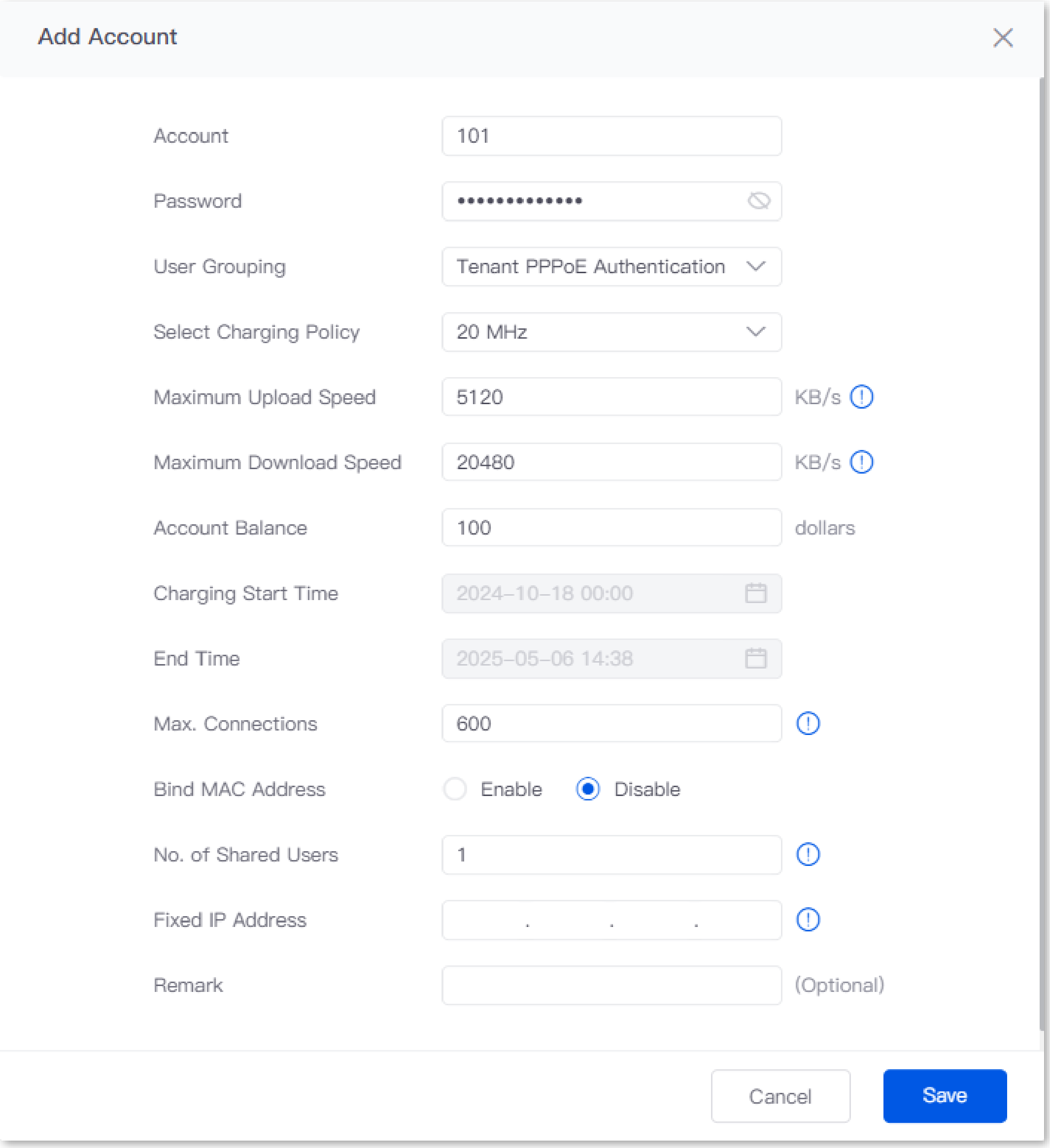
Group Name: Tenant PPPoE Authentication

User Group Type: Authentication User Group

Remark: (Optional)

2. Add an authentication account and add it to the user group.

Navigate to **AuthN** > **Account** > **Account**, and click **Add**. Configure parameters as required, and click **Save**. The following figure is for reference only.



Add Account

Account	101
Password	••••••••••••••
User Grouping	Tenant PPPoE Authentication
Select Charging Policy	20 MHz
Maximum Upload Speed	5120 KB/s
Maximum Download Speed	20480 KB/s
Account Balance	100 dollars
Charging Start Time	2024-10-18 00:00
End Time	2025-05-06 14:38
Max. Connections	600
Bind MAC Address	○ Enable ● Disable
No. of Shared Users	1
Fixed IP Address	. . .
Remark	(Optional)

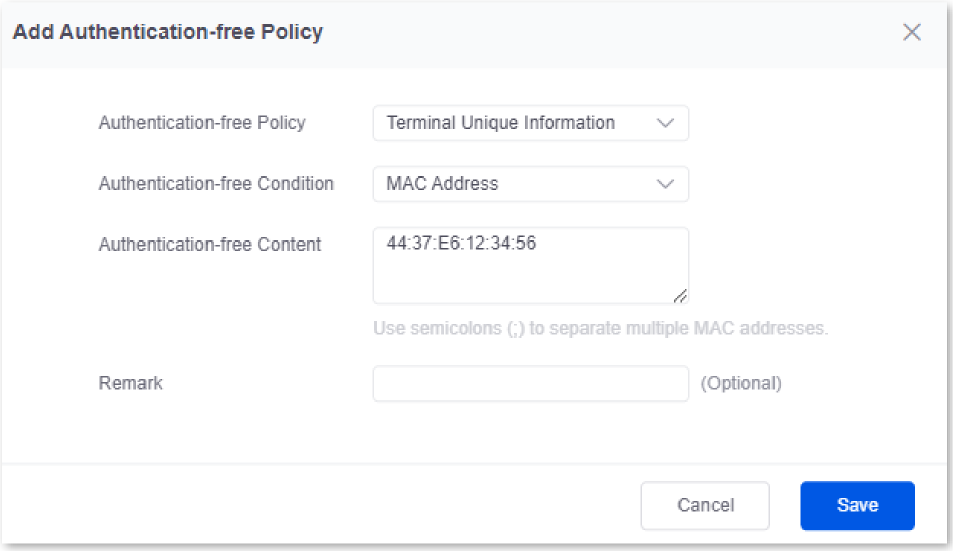
3. Add an authentication account and add it to the user group.

   Repeat the substep 2 to configure authentication accounts for other tenants.

Step 6 Configure the authentication-free policy.

Assume that the MAC address of the computer to which the authentication-free policy applies is 44:37:E6:12:34:56.

Navigate to **AuthN** > **Account** > **Authentication-free Policy**, and click **Add**. Configure parameters as required, and click **Save**.


Add Authentication-free Policy

Authentication-free Policy: Terminal Unique Information

Authentication-free Condition: MAC Address

Authentication-free Content: 44:37:E6:12:34:56

Use semicolons (;) to separate multiple MAC addresses.

Remark: (Optional)

II. Configure the managed switch.

Divide the IEEE 802.1Q VLAN on the VLAN as follows.

Port Connected to	VLAN ID (VLAN Allowed to Pass)	Port Property	PVID
Router	20	Trunk	20
Access switch	20	Access	20
Management computer	20	Access	20

For other ports that are not mentioned, keep the default settings. For details about the configuration procedure, see the user guide of the switch.

---End

7.8.4 Verification

The flat manager’s computer (MAC address: 44:37:E6:12:34:56) can access the internet without authentication.

Tenants need to dial in when accessing the internet.

Dial-up from the router

This method is applicable for scenarios where the tenant uses a router to connect to the broadband Ethernet port of the flat network. For details about the router settings, see the user guide of the router.

Step 1 Log in to the web UI of the router.

Step 2 Set the internet connection mode to PPPoE, enter the PPPoE user name and password, and save the settings.

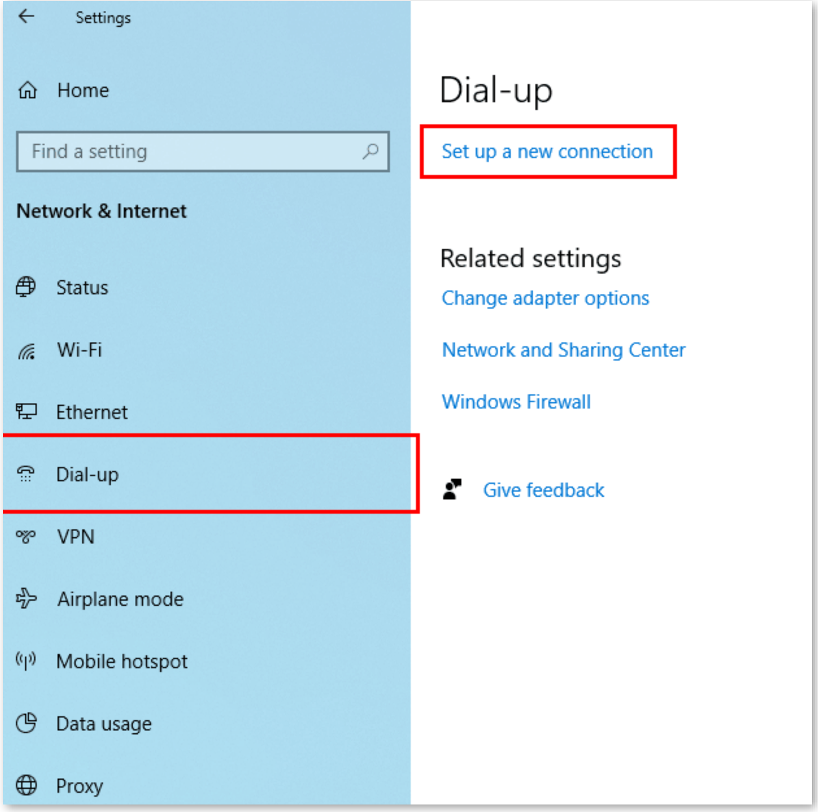
After the configuration is completed, the clients can access the internet through the router.

Dial-up from the computer

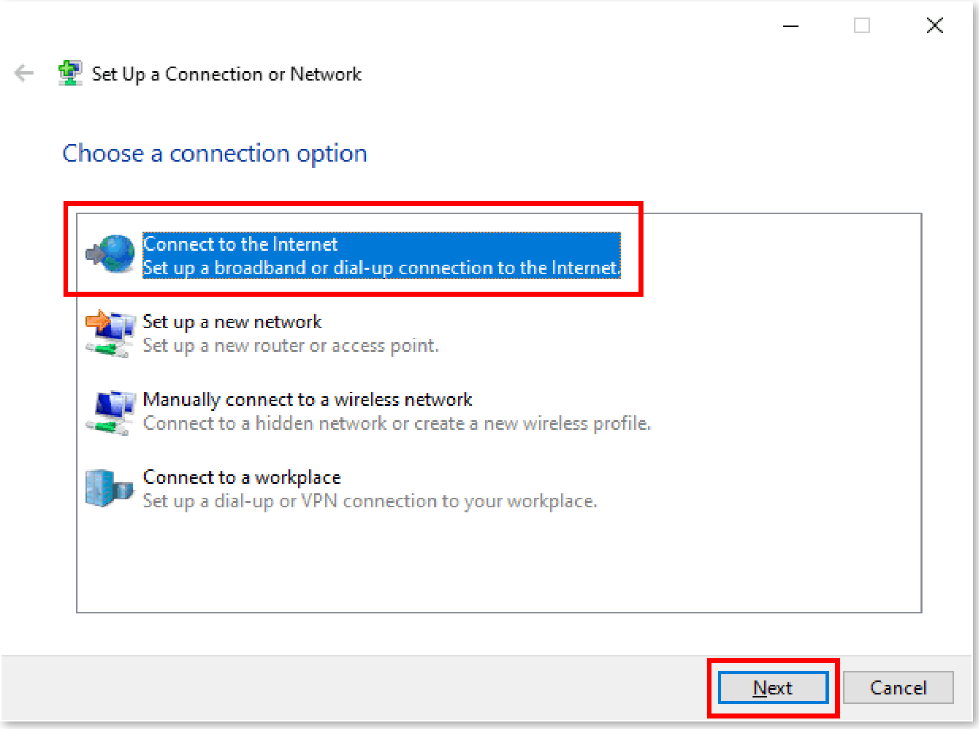
This method is applicable for scenarios where the tenant uses the computer to connect to the broadband Ethernet port of the flat network. Windows 10 is used for example in the following steps.

Step 1 Right-click 🌐 in the lower-right corner of your desktop. Then click **Network & Internet**.

Step 2 Click **Dial-up** in the left navigation bar. Then, click **Set up a new connection**.



Step 3 Select **Connect to the Internet**, and click **Next**.

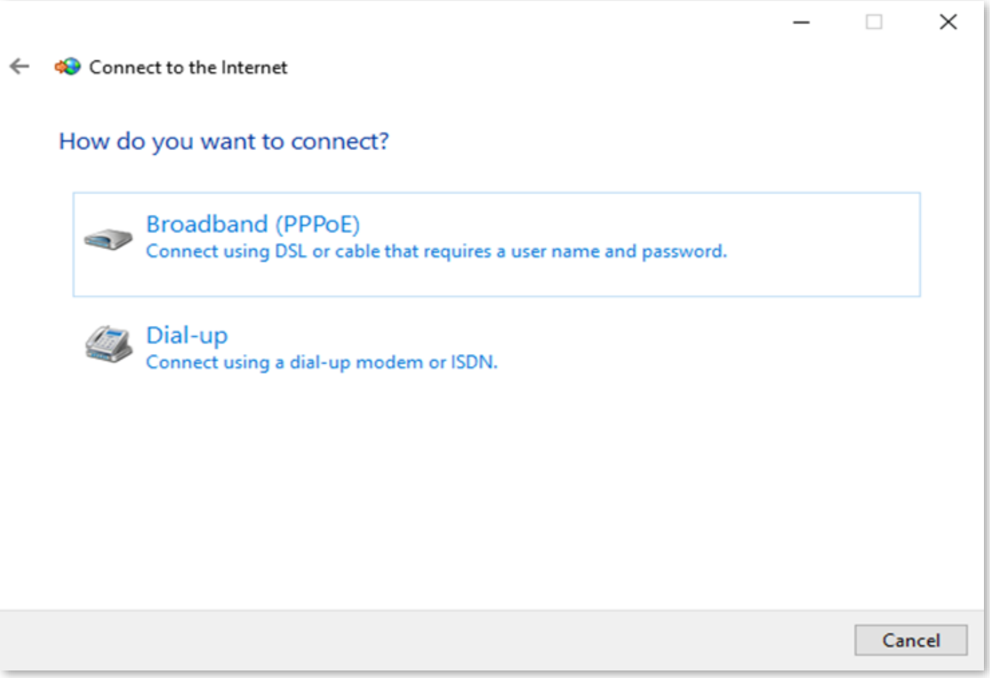


Set Up a Connection or Network

Choose a connection option

- Connect to the Internet
  Set up a broadband or dial-up connection to the Internet.
- Set up a new network
  Set up a new router or access point.
- Manually connect to a wireless network
  Connect to a hidden network or create a new wireless profile.
- Connect to a workplace
  Set up a dial-up or VPN connection to your workplace.

Step 4 Select **Broadband (PPPoE)**.

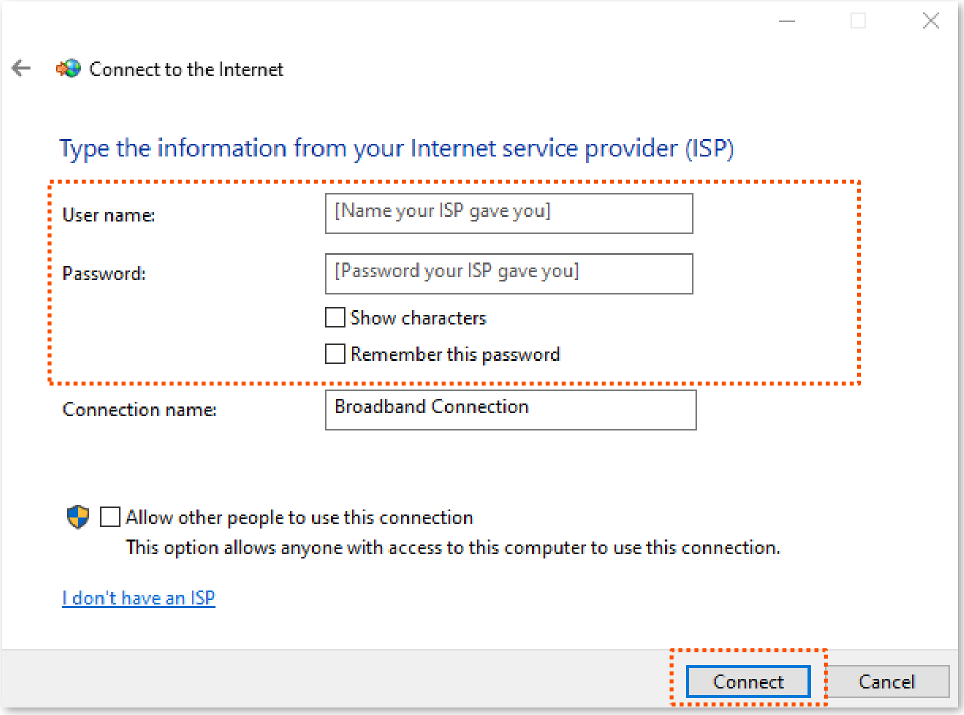


Connect to the Internet

How do you want to connect?

- Broadband (PPPoE)
  Connect using DSL or cable that requires a user name and password.
- Dial-up
  Connect using a dial-up modem or ISDN.

Step 5 Enter the PPPoE user name and password, select **Remember this password**, and click **Connect**.



Connect to the Internet

Type the information from your Internet service provider (ISP)

User name: [Name your ISP gave you]

Password: [Password your ISP gave you]

□ Show characters

□ Remember this password

Connection name: Broadband Connection

□ Allow other people to use this connection

This option allows anyone with access to this computer to use this connection.

I don't have an ISP

Wait until the dial-up completes successfully. Then the tenant can access the internet.

To access the internet after the tenant's computer is restarted, click 🖳 and then **Broadband Connection** to perform dial-up again.

8 Bandwidth limit

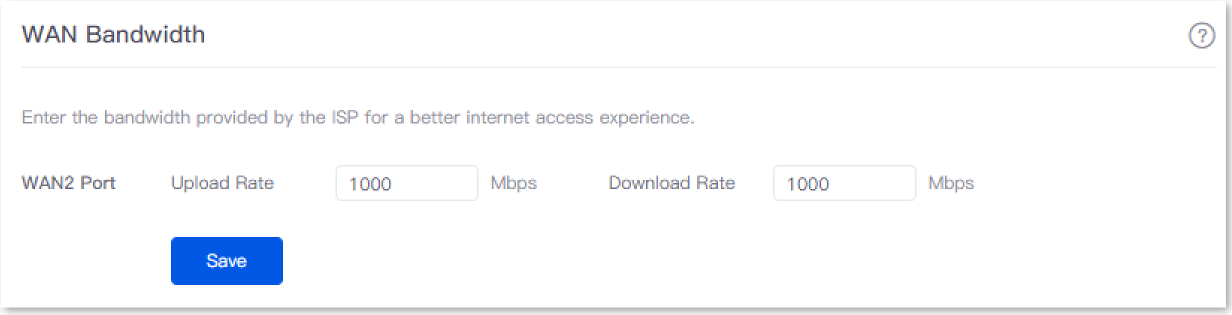
This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

8.1 WAN bandwidth

Log in to the web UI of the router, and navigate to **BW Limit** > **WAN Bandwidth** to enter the page.

On this page, you can configure the WAN port bandwidth parameters. After you set multiple WAN ports, you can limit the bandwidth of multiple WAN ports respectively.

By properly configuring the WAN port bandwidth, you can allocate bandwidth to LAN users more accurately when using the Group Speed Limit policy.



WAN Bandwidth

Enter the bandwidth provided by the ISP for a better internet access experience.

WAN2 Port Upload Rate 1000 Mbps Download Rate 1000 Mbps

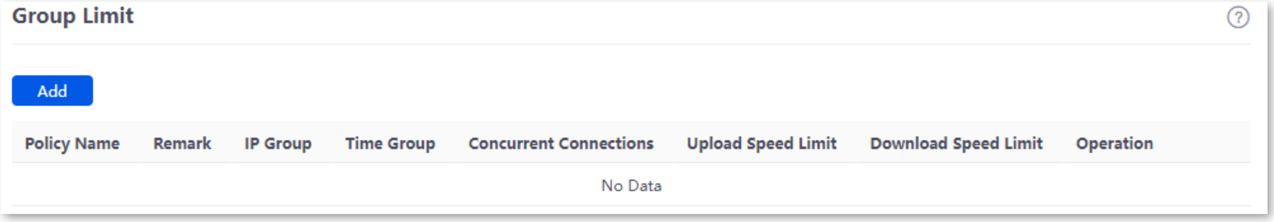
Parameter description

Parameter	Description
Upload Rate	Specify the bandwidth values of the broadband. If you are not sure, contact your ISP for help.
Download Rate	

8.2 Group limit

Group limit policies are provided for administrators to prioritize network resources for critical operations while meeting your organization's specific bandwidth requirements. By configuring a group limit, you can enable each user within a group to share the total bandwidth.

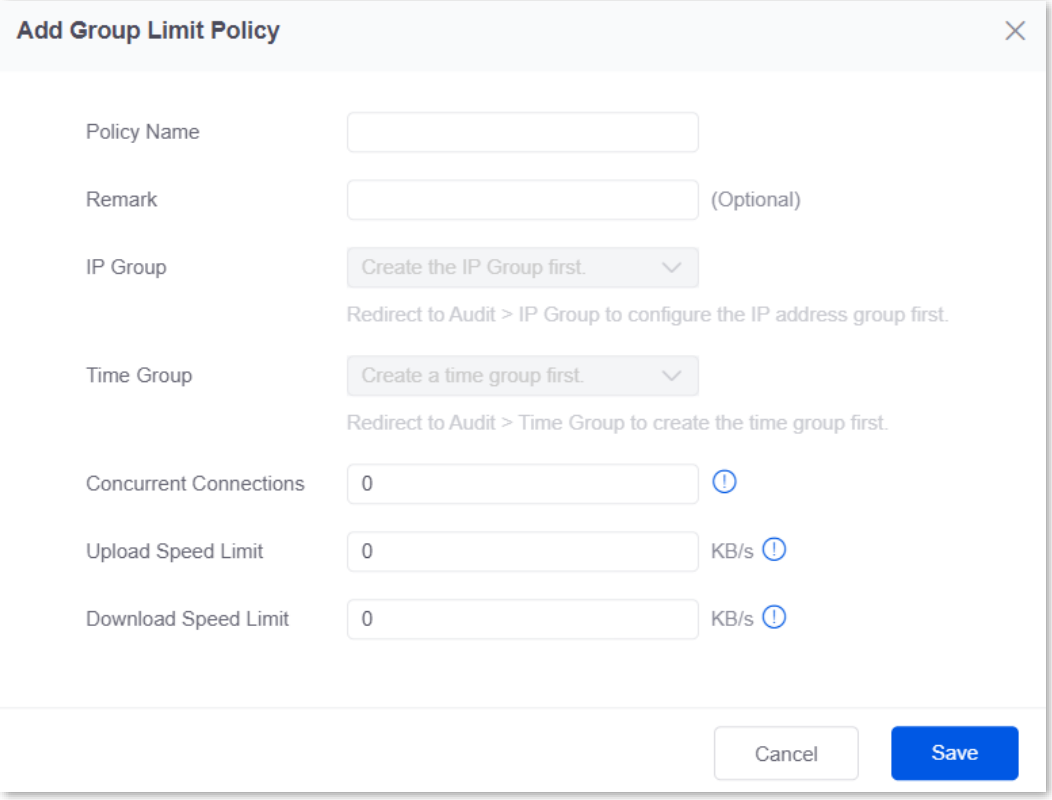
Log in to the web UI of the router, and navigate to **BW Limit** > **Group Limit**.



Group Limit

Policy Name	Remark	IP Group	Time Group	Concurrent Connections	Upload Speed Limit	Download Speed Limit	Operation
No Data							

You can click **Add** to add a new group limit policy.



Add Group Limit Policy

Policy Name	
Remark	(Optional)
IP Group	Create the IP Group first. Redirect to Audit > IP Group to configure the IP address group first.
Time Group	Create a time group first. Redirect to Audit > Time Group to create the time group first.
Concurrent Connections	0
Upload Speed Limit	0 KB/s
Download Speed Limit	0 KB/s

Parameter description

Parameter	Description
Policy Name	Specifies the name of the group limit policy.
Remark	(Optional) Specifies the description of the group limit policy.
IP Group	Specifies the IP address group upon which the group speed limit policy takes effect. The group speed limit policy takes effect only when the device IP addresses are in the IP address group. Configure the IP group in IP Group first.
Time Group	Specifies the time group upon which the group speed limit policy takes effect. The group speed limit policy takes effect only in such configured time. Configure the time group in Time Group first.

Parameter	Description
Concurrent Connections	Specifies the maximum connections for a single user in the IP group. TIP **0** indicates no limit.
Upload Speed Limit	Specify the maximum upload or download bandwidth that each user in the IP group can share. TIP **0** indicates no limit.
Download Speed Limit	

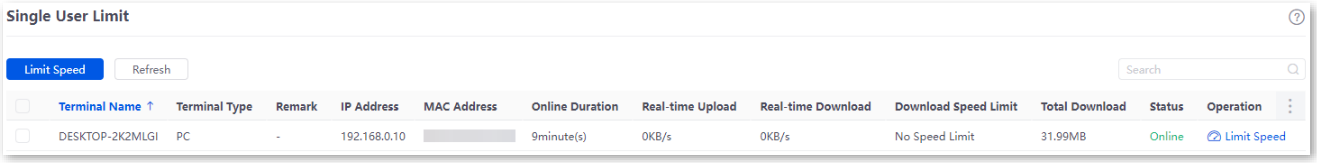
8.3 Single user limit

8.3.1 Overview

You can restrict the amount of bandwidth allocated for certain users, either individually or together.

Log in to the web UI of the router, and navigate to **BW Limit** > **Single User Limit**.

Click ⋮ to select parameters to be displayed.



	Terminal Name ↑	Terminal Type	Remark	IP Address	MAC Address	Online Duration	Real-time Upload	Real-time Download	Download Speed Limit	Total Download	Status	Operation
□	DESKTOP-2K2MLGI	PC	-	192.168.0.10	[redacted]	9minute(s)	0KB/s	0KB/s	No Speed Limit	31.99MB	Online	Limit Speed

Parameter description

Parameter	Description
Terminal Name	Specifies the name of the client.
Terminal Type	Specifies the type of the client.
Remark	Specifies the description of the client.
IP Address	Specifies the IP address of the client.
MAC Address	Specifies the MAC address of the client.
Online Duration	Specifies the online duration of the client.

Parameter	Description
Real-time Upload	Specify the real-time upload or download rate of the client.
Real-time Download	
Upload Speed Limit	Specifies the maximum upload rate of the client.
Total Upload	Specifies the total upload traffic of the client.
Download Speed Limit	Specifies the maximum download rate of the client.
Total Download	Specifies the total download traffic of the client.
Status	Specifies the status of the device, including **Online** and **Offline**.
Limit Speed	Used to limit the speed of the selected devices.
Refresh	Used to refresh the current list.

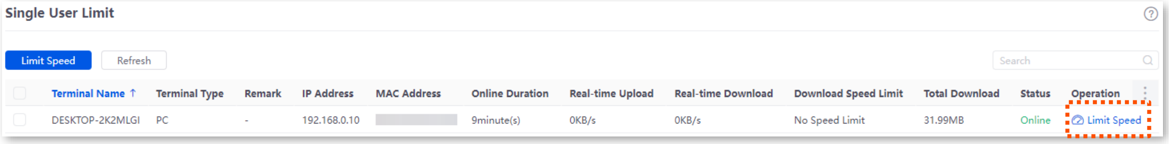
8.3.2 Configure single user limit

Step 1 Log in to the web UI of the router, and navigate to **BW Limit** > **Single User Limit**.

Step 2 Select the client to be limited and click **Limit Speed**.

TIP

To batch set a limit, you can select multiple clients and click **Limit Speed**.



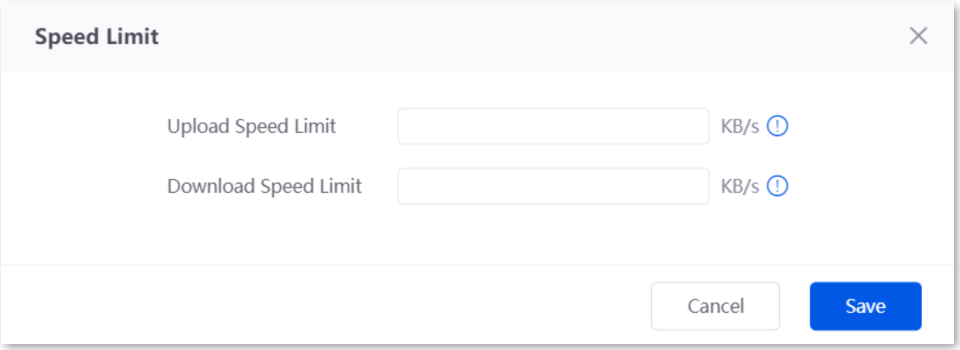
Single User Limit

Terminal Name ↑	Terminal Type	Remark	IP Address	MAC Address	Online Duration	Real-time Upload	Real-time Download	Download Speed Limit	Total Download	Status	Operation
DESKTOP-2K2MLGI	PC	-	192.168.0.10	[redacted]	9minute(s)	0KB/s	0KB/s	No Speed Limit	31.99MB	Online	Limit Speed

Step 3 Set the **Upload Speed Limit** and **Download Speed Limit** for the selected client, and click **Save**.

TIP

0 indicates no limit. By default, clients are set with no speed limit.



Speed Limit

Upload Speed Limit KB/s

Download Speed Limit KB/s

----End

8.4 Example of configuring group speed limit

Networking requirements

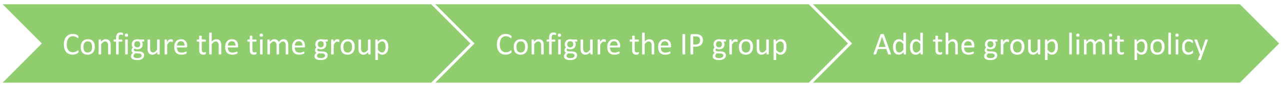
An enterprise uses the enterprise router to set up a network.

Requirements: Each purchasing staff in the network (IP range: 192.168.0.2 – 192.168.0.50) can share a maximum upload and download bandwidth of 10 Mbps (1 Mbps = 128 KB/s) during working hours (8:00 - 18:00) from Monday to Friday, while users outside the specified IP range are not restricted.

Solution

Configure a group limit based on IP range. Assume that the concurrent connections of each user are 600.

Configuration procedure



Configure the time group

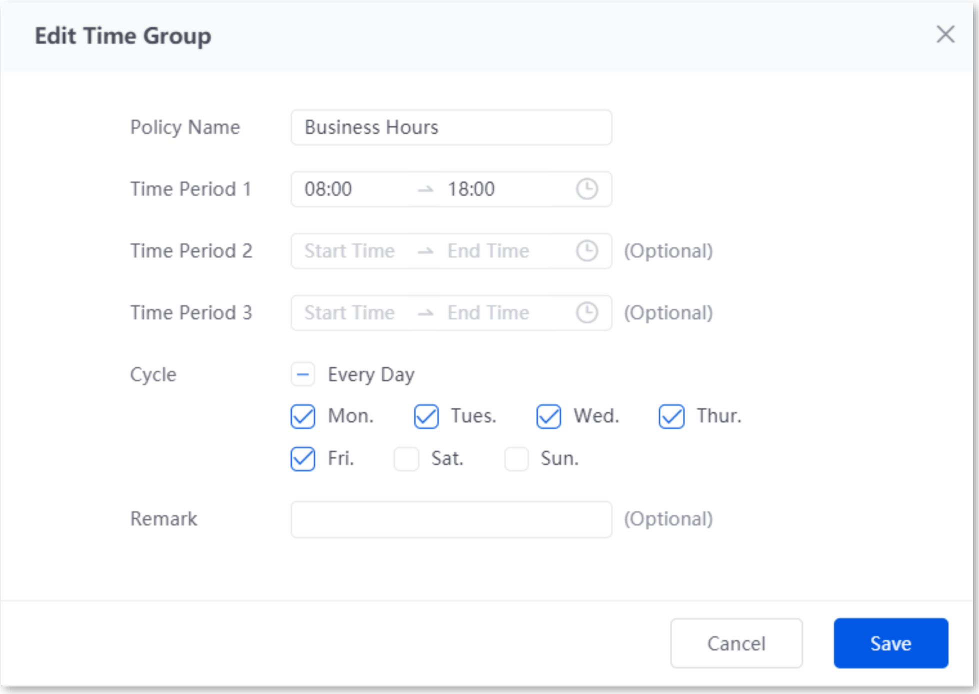
Configure the IP group

Add the group limit policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and click **Add** to configure the following time group.

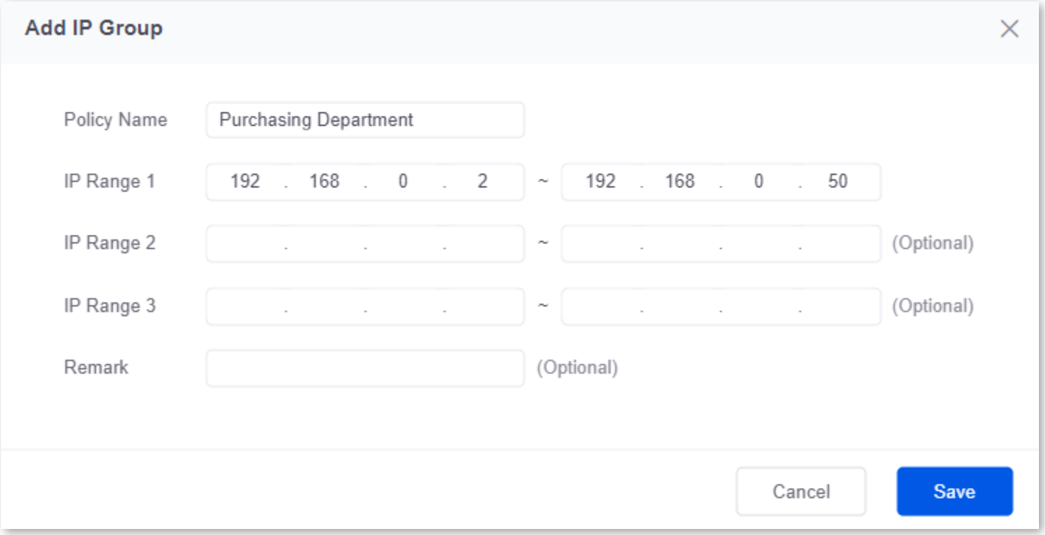


Edit Time Group

Policy Name	Business Hours
Time Period 1	08:00 → 18:00
Time Period 2	Start Time → End Time (Optional)
Time Period 3	Start Time → End Time (Optional)
Cycle	☐ Every Day ☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur. ☑ Fri. ☐ Sat. ☐ Sun.
Remark	(Optional)

Step 3 Configure the IP group.

Navigate to **Audit** > **Group Policy** > **IP Group**, and click **Add** to configure the following IP group.

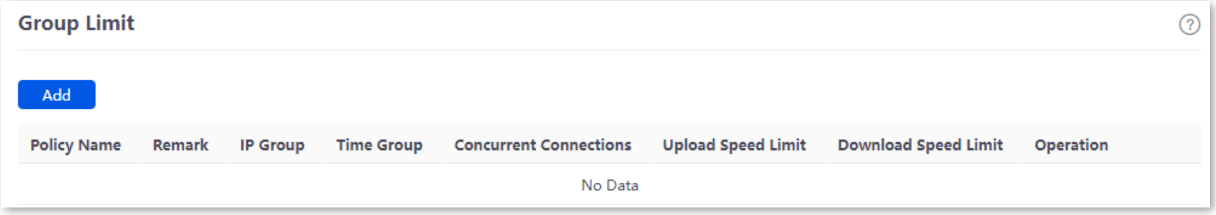


Add IP Group

Policy Name	Purchasing Department
IP Range 1	192 . 168 . 0 . 2 ~ 192 . 168 . 0 . 50
IP Range 2	. . . ~ . . . (Optional)
IP Range 3	. . . ~ . . . (Optional)
Remark	(Optional)

Step 4 Add the group limit policy.

1. Navigate to **BW Limit** > **Group Limit**, and click **Add**.

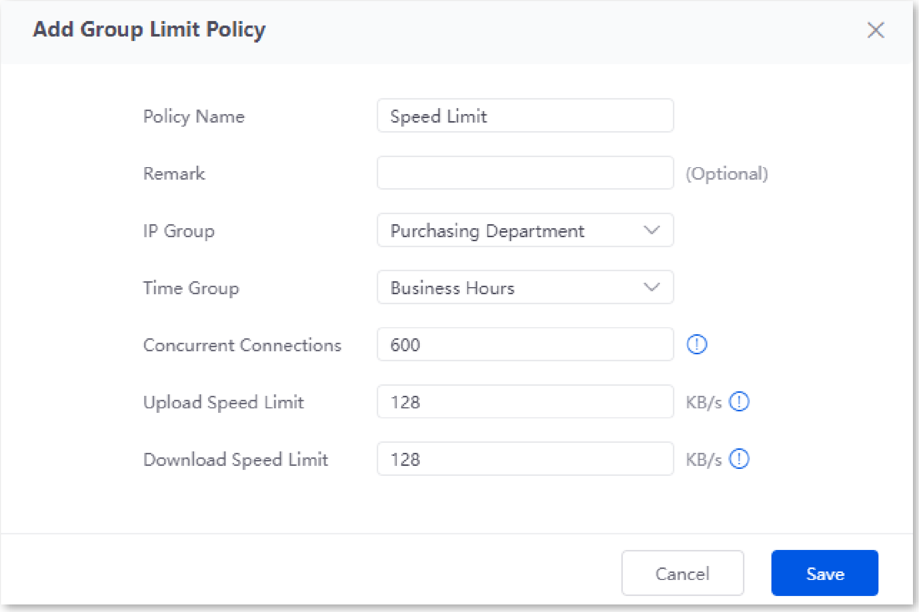


Group Limit

Policy Name	Remark	IP Group	Time Group	Concurrent Connections	Upload Speed Limit	Download Speed Limit	Operation
No Data							

2. Configure the parameters in the **Add Group Limit Policy** window, and click **Save**.

- Set the **Policy Name**, which is **Speed Limit** in this example.
- Select the **IP Group** to which the policy applies, which is **Purchasing Department** in this example.
- Select the **Time Group** to which the policy applies, which is **Business Hours** in this example.
- Set the **Concurrent Connections** per client, which is **600** in this example.
- Set the **Upload Speed Limit** and **Download Speed Limit** of clients, which are both **128** KB/s.



Add Group Limit Policy

Policy Name: Speed Limit

Remark: (Optional)

IP Group: Purchasing Department

Time Group: Business Hours

Concurrent Connections: 600

Upload Speed Limit: 128 KB/s

Download Speed Limit: 128 KB/s

----End

Verification

For users within the IP range 192.168.0.2 - 192.168.0.50, each shares a maximum upload speed and download speed of 128 KB/s during 8:00 - 18:00 from Monday to Friday.

9 Behavior&Audit

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

9.1 Group policy

When configuring the functions such as various kinds of filtering, group limit and multi-WAN policy, you need to configure the IP group and time group in advance.

9.1.1 Time group

The time group policy is used to divide time into different groups and combine different groups together randomly.

Log in to the web UI of the router, and navigate to **Audit** > **Group Policy** > **Time Group** to enter the page.

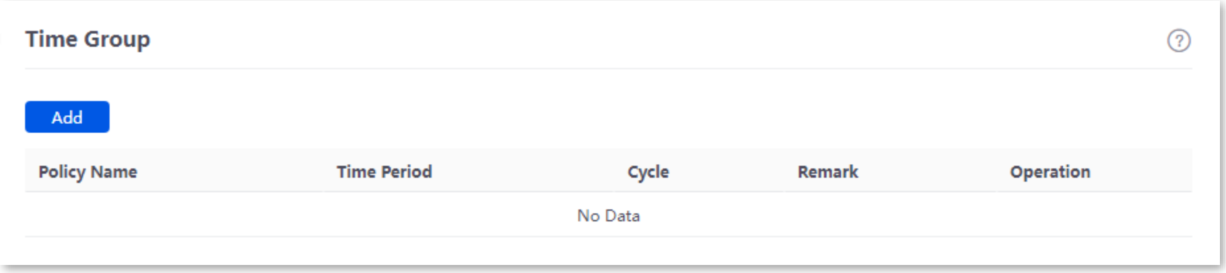
On this page, you can configure the time group policy as required.

Configuration procedure:

Step 1 Log in to the web UI of the router.

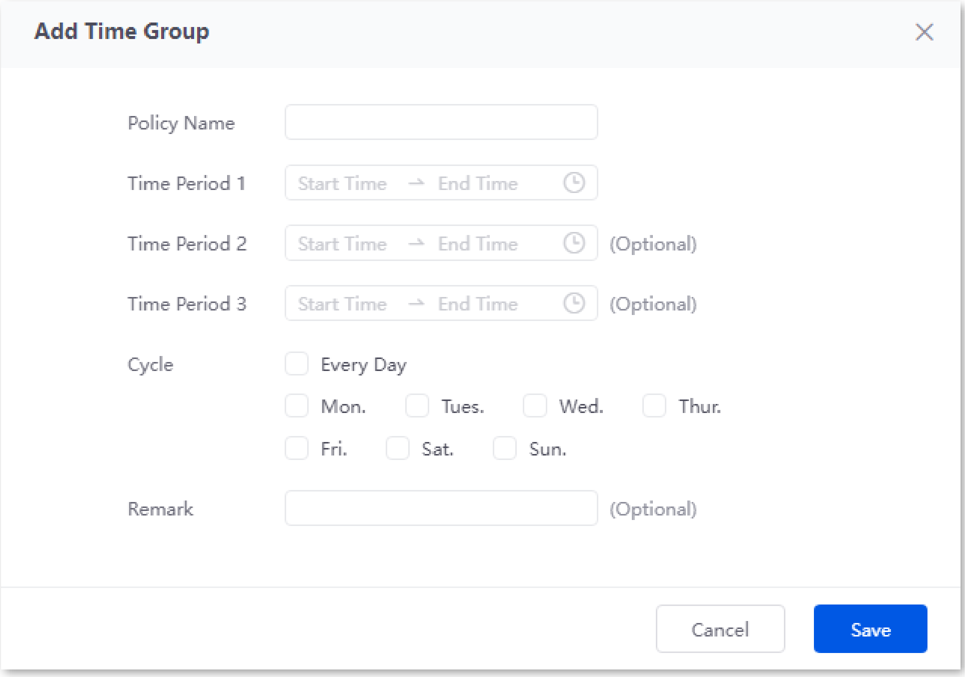
Step 2 Navigate to **Audit** > **Group Policy** > **Time Group**.

Step 3 Click **Add**.



Policy Name	Time Period	Cycle	Remark	Operation
No Data				

Step 4 Configure the parameters in the **Add Time Group** window, and click **Save**.



Add Time Group

Policy Name	
Time Period 1	Start Time → End Time
Time Period 2	Start Time → End Time (Optional)
Time Period 3	Start Time → End Time (Optional)
Cycle	□ Every Day □ Mon. □ Tues. □ Wed. □ Thur. □ Fri. □ Sat. □ Sun.
Remark	(Optional)

----End

Parameter description

Parameter	Description
Policy Name	Specifies the name of the time group policy.
Time Period	Specifies the time periods included in the time group. One policy supports at most 3 time periods, and the time periods cannot be repeated.
Cycle	Specifies the cycle upon which the time group policy takes effect.
Remark	Specifies the description of the policy. The remark is optional.

9.1.2 IP group

The IP group policy is used to set the hosts within the LAN into different groups based on their IP addresses.

Log in to the web UI of the router, and navigate to **Audit** > **Group Policy** > **IP Group** to enter the page.

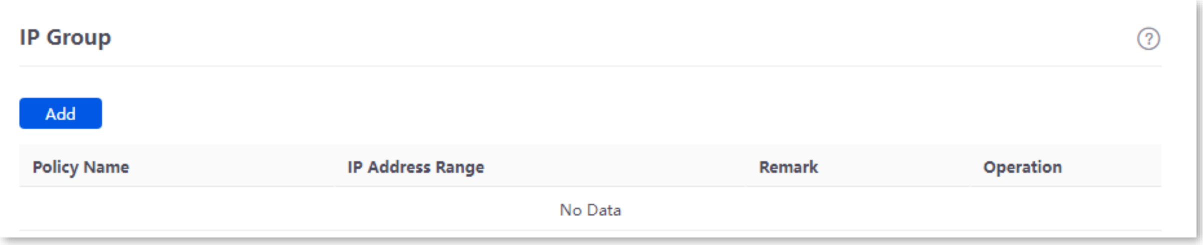
On this page, you can configure the IP group policy as required.

Configuration procedure:

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Audit** > **Group Policy** > **IP Group**.

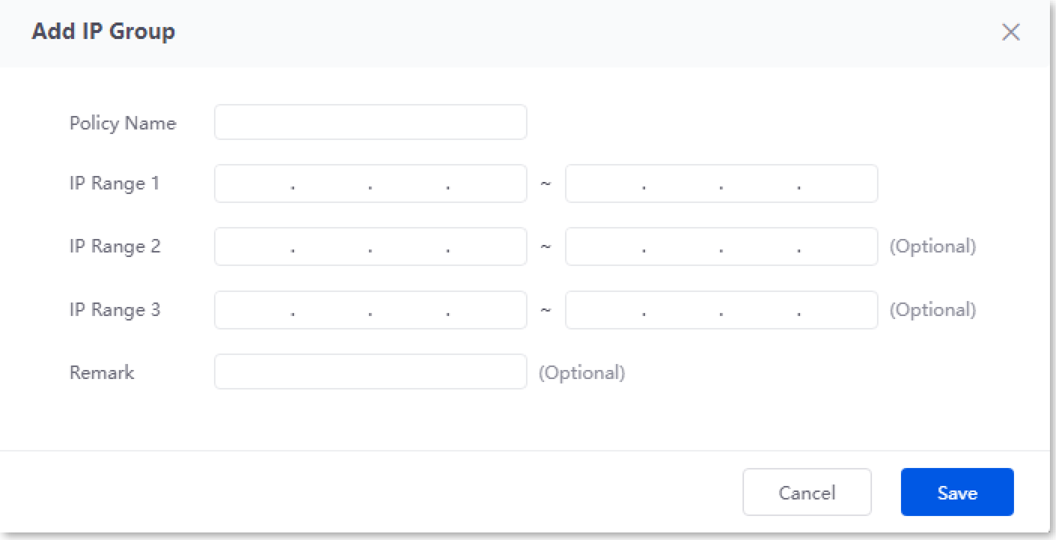
Step 3 Click **Add**.



IP Group

Policy Name	IP Address Range	Remark	Operation
No Data			

Step 4 Configure the parameters in the **Add IP Group** window, and click **Save**.



Add IP Group

Policy Name

IP Range 1 ~

IP Range 2 ~ (Optional)

IP Range 3 ~ (Optional)

Remark (Optional)

----End

Parameter description

Parameter	Description
Policy Name	Specifies the name of the IP group policy.
IP Address Range	Specifies the IP address ranges included in the IP group. One policy supports at most 3 IP address ranges, and the IP address ranges cannot be repeated.
Remark	(Optional) Specifies the description of the IP group policy.

9.1.3 User group

The user group policy is used to set the hosts within the LAN into different groups based on authenticated users and VPN dial-up users.

Log in to the web UI of the router, and navigate to **Audit** > **Group Policy** > **User Group** to enter the page.

On this page, you can configure the user group policy as required.

TIP

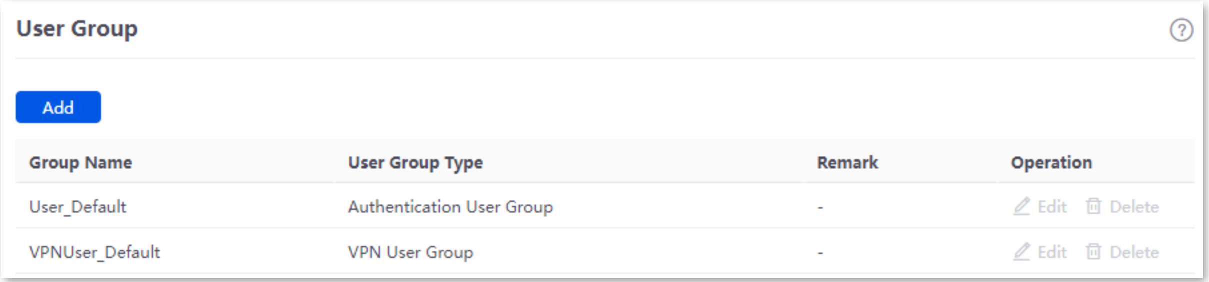
Two user groups named **User_Default** and **VPNUser_Default** have been added by default. The default user group cannot be deleted and edited.

Configuration procedure:

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Audit** > **Group Policy** > **User Group**.

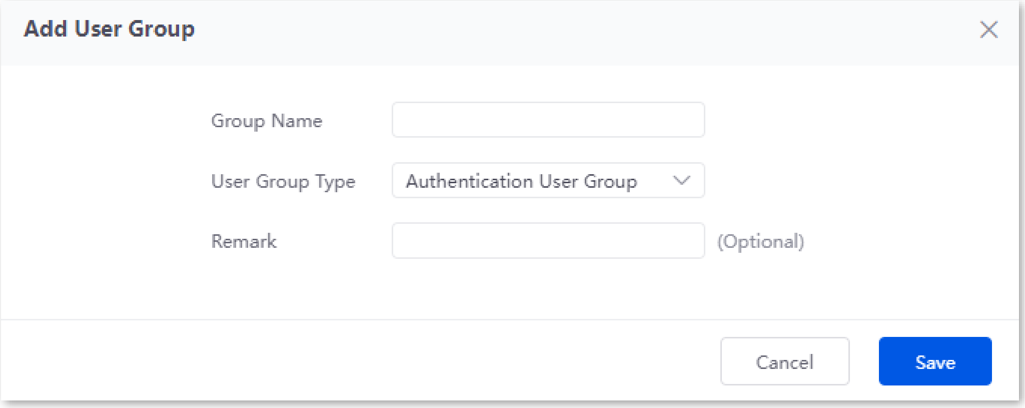
Step 3 Click **Add**.



User Group

Group Name	User Group Type	Remark	Operation
User_Default	Authentication User Group	-	Edit Delete
VPNUser_Default	VPN User Group	-	Edit Delete

Step 4 Configure the parameters in the **Add User Group** window, and click **Save**.



Add User Group

Group Name

User Group Type: Authentication User Group

Remark (Optional)

----End

Parameter description

Parameter	Description
Group Name	Specifies the name of the user group policy.

Parameter	Description
User Group Type	Specifies the type of the user group, including **Authentication User Group** and **VPN User Group**. TIP – After a user group whose **User Group Type** is set to **Authentication User Group** is referenced by account management, all users who are authenticated with these user name and password will belong to this user group. – After a user group whose **User Group Type** is set to **VPN User Group** is referenced by user management, all users who use these user name and password to perform VPN dial-up will belong to this user group.
Remark	(Optional) Specifies the description of the user group policy.

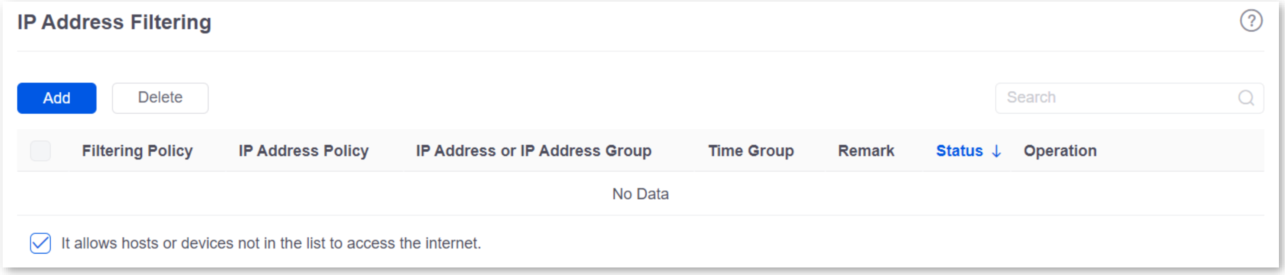
9.2 Filtering

9.2.1 IP address filtering

Overview

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **IP address Filtering** to enter the page.

On this page, you can configure the IP address filtering rules to allow or block the LAN hosts to connect to the router for internet.

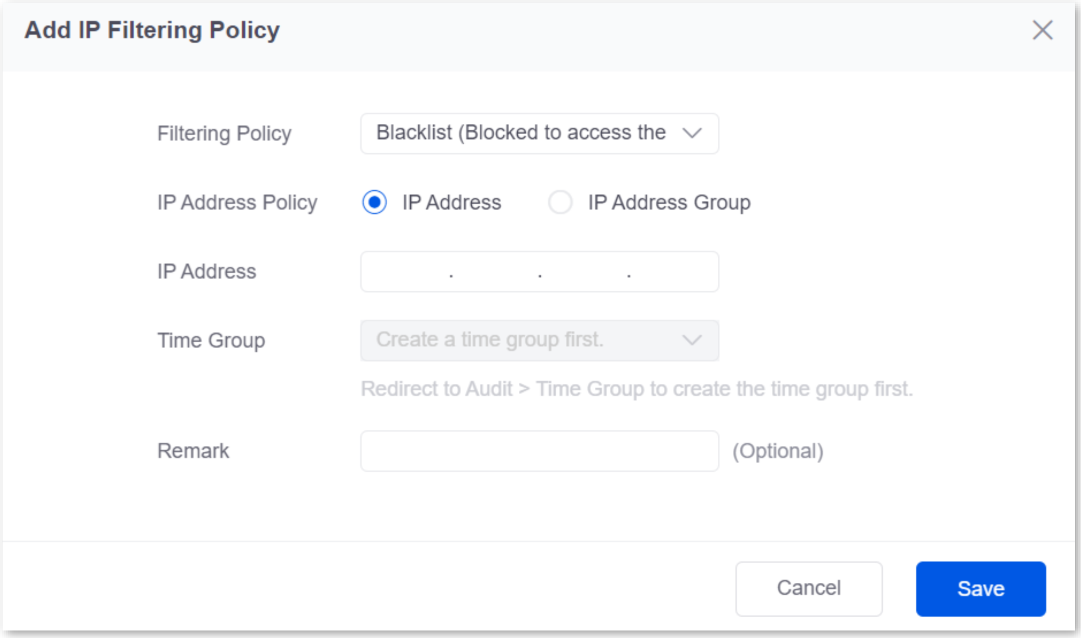


IP Address Filtering

□	Filtering Policy	IP Address Policy	IP Address or IP Address Group	Time Group	Remark	Status ↓	Operation
			No Data				

☑ It allows hosts or devices not in the list to access the internet.

You can click **Add** to add a new IP address filtering policy.



Add IP Filtering Policy

Filtering Policy: Blacklist (Blocked to access the

IP Address Policy: ● IP Address ○ IP Address Group

IP Address: . . .

Time Group: Create a time group first.

Redirect to Audit > Time Group to create the time group first.

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the IP address filtering policy. - **Blacklist (Blocked to access the internet)**: The user with the specified IP address is blocked to access the internet during the specified time period, and is allowed to access the internet during other time. - **White List (Allowed to access the internet)**: The user with the specified IP address is allowed to access the internet during the specified time period, and is blocked to access the internet during other time.
IP Address Policy	To filter one IP address, select **IP Address** and enter the IP address. To filter one or more IP address groups, select **IP Address Group** and select the corresponding IP group policy you set. NOTE The IP group should be configured in IP Group in advance.
IP Address or IP Address Group	
Time Group	Used to select the time group policy upon which the IP address filtering policy takes effect. NOTE The time group should be configured in Time Group in advance.
Remark	(Optional) Specifies the description of the IP address filtering policy.
Status	Specifies the status of the IP address filtering policy, including **Enabled** or **Disabled**.
Operation	Used to edit, enable, disable or delete the IP address filtering policy. Edit: Used to modify the IP address filtering policy. Enable: Used to enable the IP address filtering policy. Disable: Used to disable the IP address filtering policy. Delete: Used to delete the IP address filtering policy.
It allows hosts or devices not in the list to access the internet.	- When Selected: The devices not in the filtering list or devices with the filtering policy disabled can access the internet. - When Deselected: The devices not in the filtering list or devices with the filtering policy disabled cannot access the internet. TIP To deselect this function, configure a whitelist first.

Example of configuring IP address filtering

Networking requirements

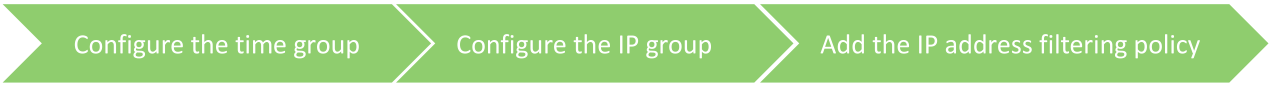
An enterprise uses the enterprise router to set up a network.

Requirements: During the business hours (at 8:00 – 18:00 from Monday to Friday), only purchasing staff can access the internet while other staff cannot access the internet.

Solution

The router's IP address filtering function can achieve the requirements. Assume that the IP addresses of purchasing staff's computers range from 192.168.0.2 - 192.168.0.50.

Configuration procedure

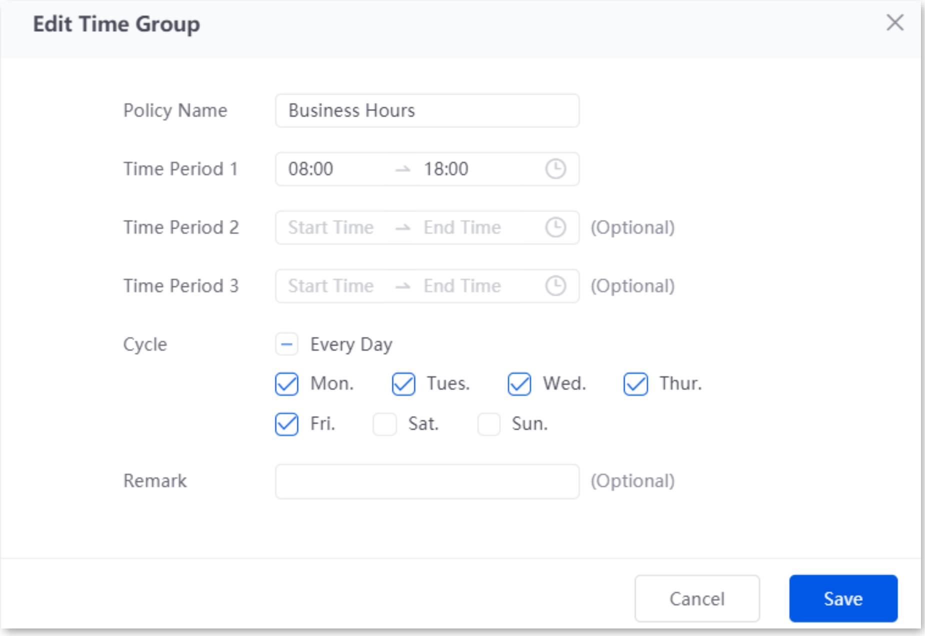


Configure the time group → Configure the IP group → Add the IP address filtering policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and click **Add** to configure the following time group.



Edit Time Group

Policy Name: Business Hours

Time Period 1: 08:00 → 18:00

Time Period 2: Start Time → End Time (Optional)

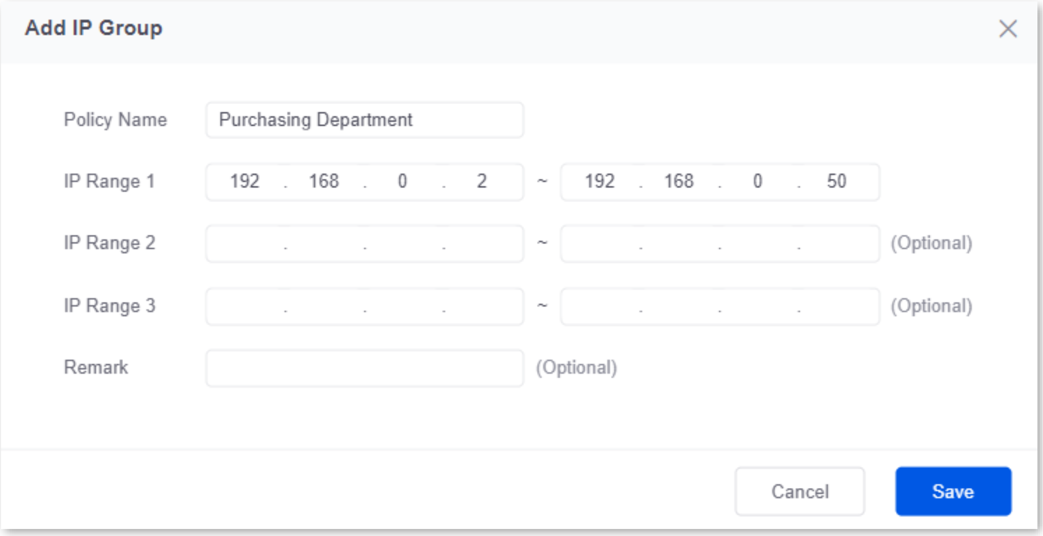
Time Period 3: Start Time → End Time (Optional)

Cycle: □ Every Day
☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur.
☑ Fri. □ Sat. □ Sun.

Remark: (Optional)

Step 3 Configure the IP group.

Navigate to **Audit** > **Group Policy** > **IP Group**, and click **Add** to configure the following IP group.


Add IP Group

Policy Name: Purchasing Department

IP Range 1: 192 . 168 . 0 . 2 ~ 192 . 168 . 0 . 50

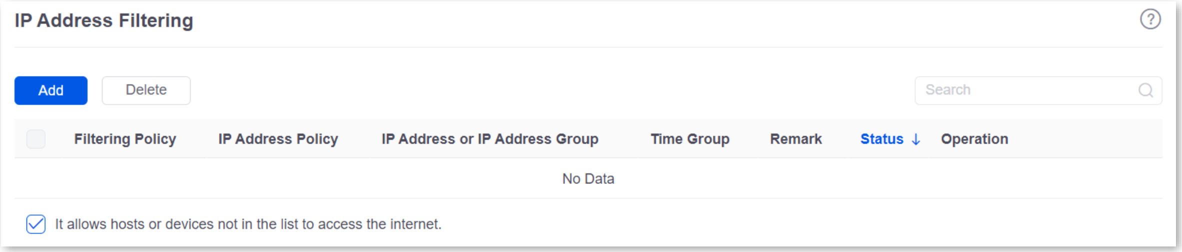
IP Range 2: . . . ~ . . . (Optional)

IP Range 3: . . . ~ . . . (Optional)

Remark: (Optional)

Step 4 Add the IP address filtering policy.

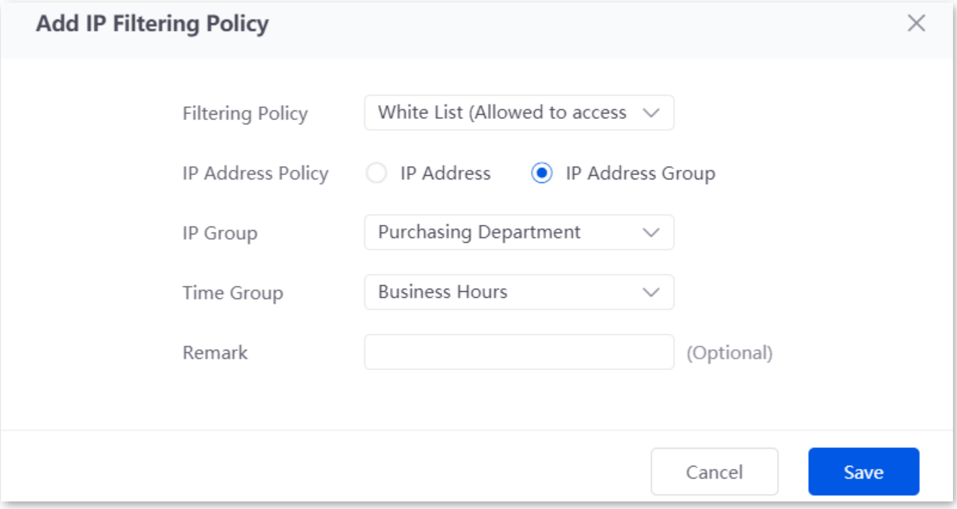
1. Navigate to **Audit** > **Filtering** > **IP Address Filtering**, and click **Add**.


IP Address Filtering

	Filtering Policy	IP Address Policy	IP Address or IP Address Group	Time Group	Remark	Status ↓	Operation
No Data							

☑ It allows hosts or devices not in the list to access the internet.

2. Configure the parameters in the **Add IP Filtering Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **White List (Allowed to access the internet)** in this example.
   - Select **IP Address Group** for **IP Address Policy**.
   - Select the **IP Group** upon which the policy takes effect, which is **Purchasing Department** in this example.
   - Select the **Time Group** upon which the policy takes effect, which is **Business Hours** in this example.


Add IP Filtering Policy

Filtering Policy: White List (Allowed to access

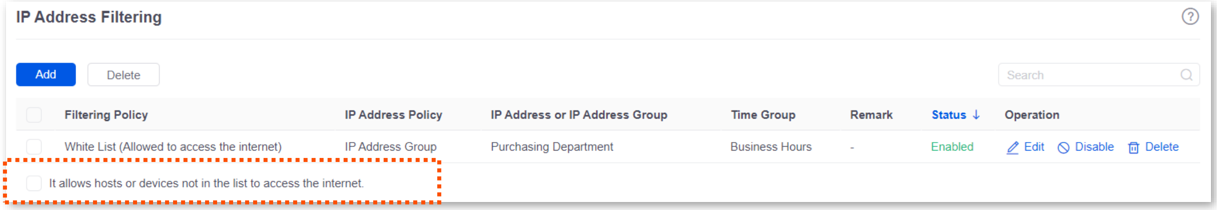
IP Address Policy: ○ IP Address ● IP Address Group

IP Group: Purchasing Department

Time Group: Business Hours

Remark: (Optional)

3. Deselect **It allows hosts or devices not in the list to access the internet**. In the displayed dialog box, click **OK**.



IP Address Filtering

□	Filtering Policy	IP Address Policy	IP Address or IP Address Group	Time Group	Remark	Status ↓	Operation
□	White List (Allowed to access the internet)	IP Address Group	Purchasing Department	Business Hours	-	Enabled	Edit Disable Delete

□ It allows hosts or devices not in the list to access the internet.

----End

Verification

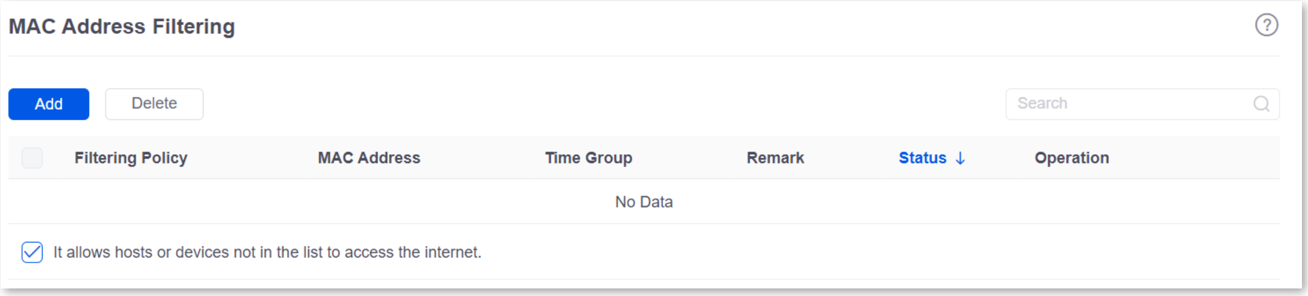
Only computers of purchasing staff (IP address range: 192.168.0.2 – 192.168.0.50) in the LAN can access the internet while other staff cannot access the internet at 8:00 – 18:00 from Monday to Friday.

9.2.2 MAC address filtering

Overview

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **MAC Address Filtering** to enter the page.

You can configure the MAC address filtering rules to allow or block the LAN hosts to connect to the router for internet.

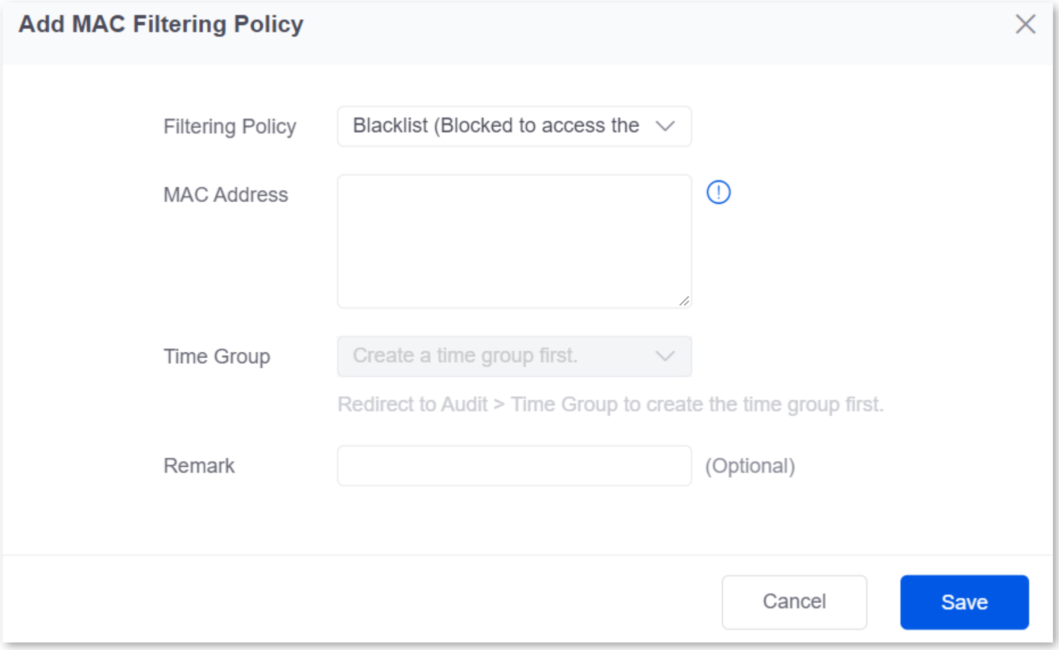


MAC Address Filtering

□	Filtering Policy	MAC Address	Time Group	Remark	Status ↓	Operation
			No Data			

☑ It allows hosts or devices not in the list to access the internet.

You can click **Add** to add a new MAC address filtering policy.



Add MAC Filtering Policy

Filtering Policy: Blacklist (Blocked to access the

MAC Address:

Time Group: Create a time group first.

Redirect to Audit > Time Group to create the time group first.

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the MAC address filtering policy. – **Blacklist (Blocked to access the internet)**: The user with the specified MAC address is blocked to access the internet during the specified time period, and is allowed to access the internet during other time. – **White List (Allowed to access the internet)**: The user with the specified MAC address is allowed to access the internet during the specified time period, and is blocked to access the internet during other time.
MAC Address	Specifies the MAC address in the **Blacklist** or **Whitelist.**
Time Group	Used to select the time group policy upon which the MAC address filtering policy takes effect. NOTE The time group should be configured in Time Group in advance.
Remark	(Optional) Specifies the description of the MAC address filtering policy.
Status	Specifies the status of the MAC address filtering policy, including **Enabled** or **Disabled**.
Operation	Used to edit, enable, disable or delete the MAC address filtering policy. Edit: Used to modify the MAC address filtering policy. Enable: Used to enable the MAC address filtering policy. Disable : Used to disable the MAC address filtering policy. Delete : Used to delete the MAC address filtering policy.

Parameter	Description
It allows hosts or devices not in the list to access the internet.	– When Selected: The devices not in the filtering list or devices with the filtering policy disabled can access the internet. – When Deselected: The devices not in the filtering list or devices with the filtering policy disabled cannot access the internet. TIP To deselect this function, configure a whitelist first.

Example of configuring MAC address filtering

Networking requirements

An enterprise uses the enterprise router to set up a network.

Requirements: During the business hours (at 8:00 – 18:00 from Monday to Friday), only a purchasing staff can access the internet while other staff cannot access the internet.

Solution

The router's MAC address filtering function can achieve the requirements. Assume that the MAC address of the purchasing staff's computer is CC:3A:61:71:1B:6E.

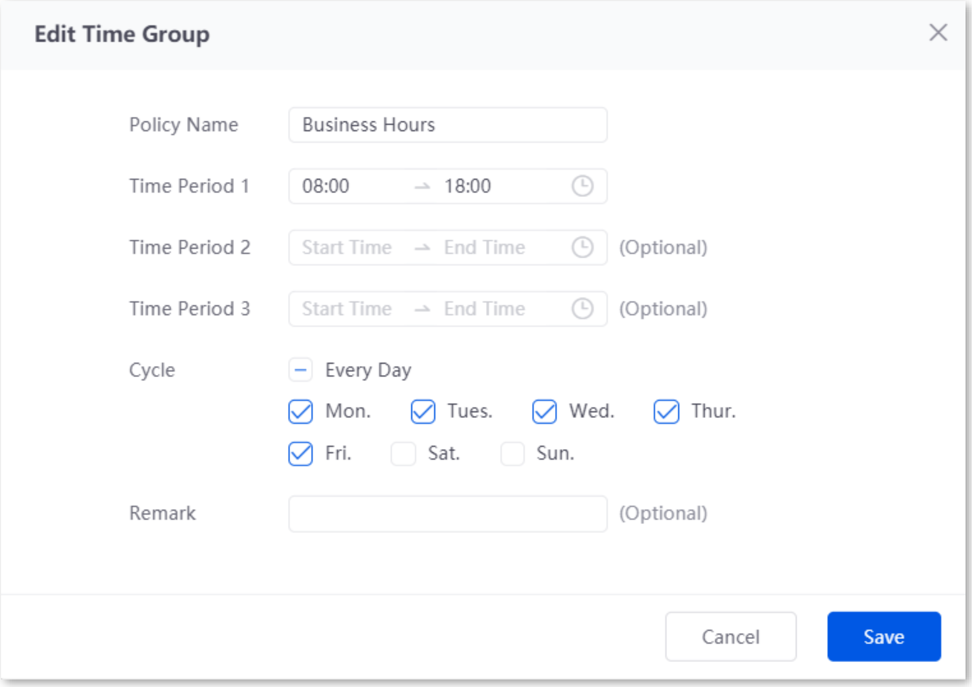
Configuration procedure

Configure the time group
Add the MAC address filtering policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and click **Add** to configure the following time group.



Edit Time Group

Policy Name: Business Hours

Time Period 1: 08:00 → 18:00

Time Period 2: Start Time → End Time (Optional)

Time Period 3: Start Time → End Time (Optional)

Cycle: ☐ Every Day
☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur.
☑ Fri. ☐ Sat. ☐ Sun.

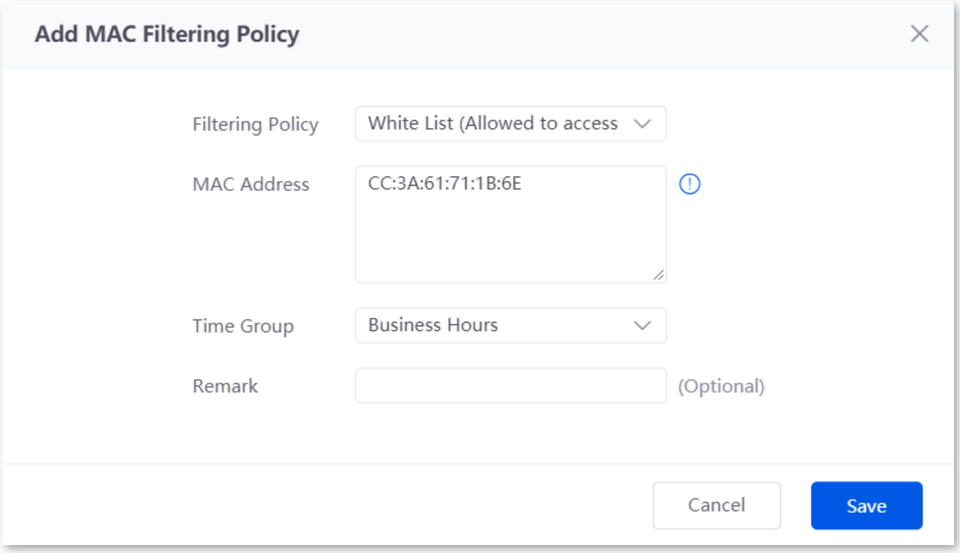
Remark: (Optional)

Step 3 Add the MAC address filtering policy.

1. Navigate to **Audit** > **Filtering** > **MAC Address Filtering**, and click **Add**.
2. Configure the parameters in the **Add MAC Filtering Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **White List (Allowed to access the internet)** in this example.
   - Enter the **MAC Address** allowed to access the internet, which is **CC:3A:61:71:1B:6E** in this example.
   - Select the **Time Group** upon which the policy takes effect, which is **Business Hours** in this example.

TIP

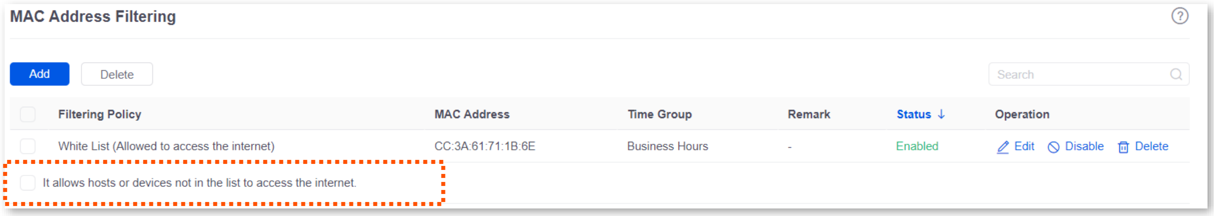
If you need to filter multiple MAC addresses, use semicolons (;) to separate them.



Add MAC Filtering Policy

Filtering Policy	White List (Allowed to access
MAC Address	CC:3A:61:71:1B:6E
Time Group	Business Hours
Remark	(Optional)

3. Deselect **It allows hosts or devices not in the list to access the internet**. In the displayed dialog box, click **OK**.



MAC Address Filtering

☐	Filtering Policy	MAC Address	Time Group	Remark	Status ↓	Operation
☐	White List (Allowed to access the internet)	CC:3A:61:71:1B:6E	Business Hours	-	Enabled	Edit Disable Delete

☐ It allows hosts or devices not in the list to access the internet.

----End

Verification

Only a purchasing staff using the computer with a MAC address of CC:3A:61:71:1B:6E in the LAN can access the internet while other staff cannot access the internet at 8:00 – 18:00 from Monday to Friday.

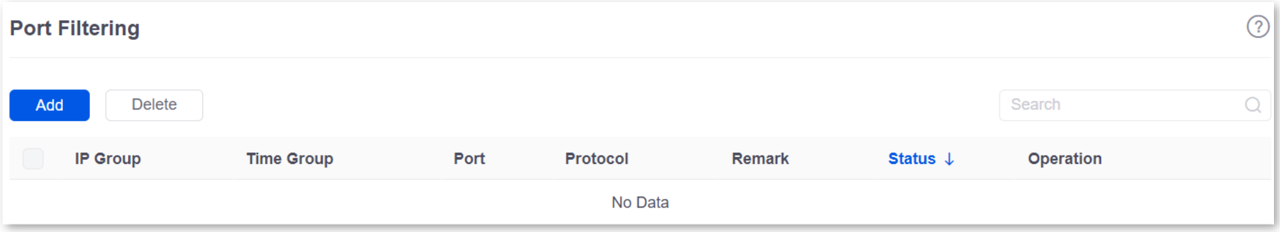
9.2.3 Port filtering

Overview

Application protocols for internet services have specific port numbers. 0 to 1023 are port numbers for some common services. These ports are generally fixed to specific services.

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **Port Filtering** to enter the page.

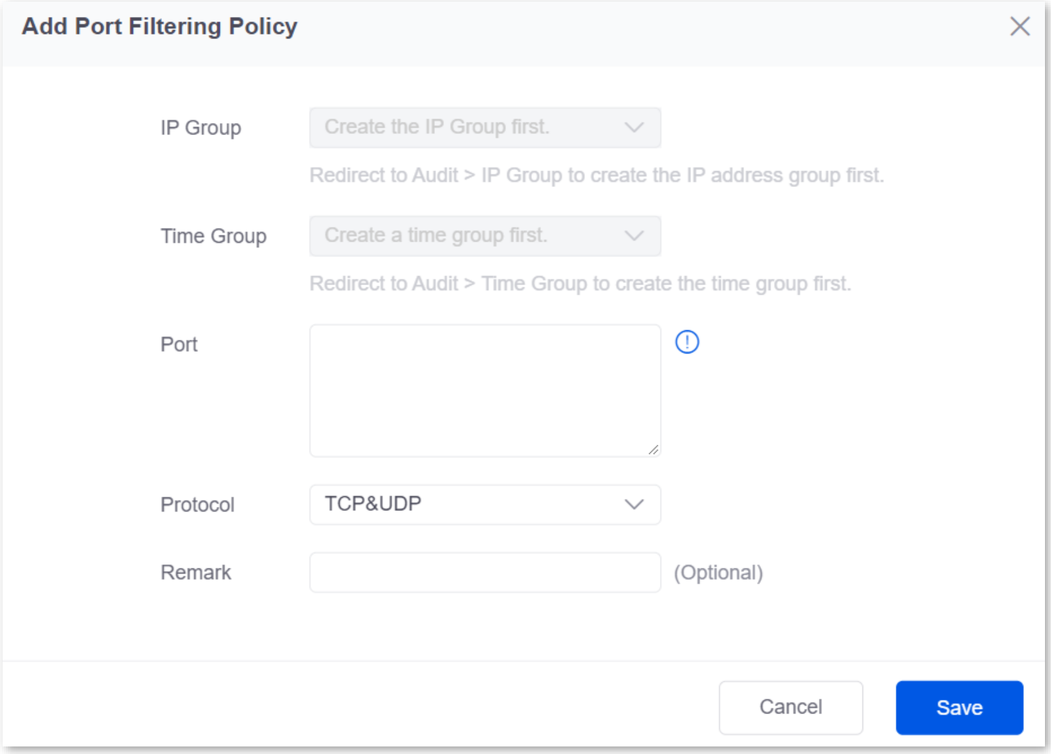
On this page, you can control users' access to certain types of internet services by forbidding their access to the specified service ports.



Port Filtering

	IP Group	Time Group	Port	Protocol	Remark	Status ↓	Operation
No Data							

You can click **Add** to add a new port filtering policy.



Add Port Filtering Policy

IP Group: Create the IP Group first.

Redirect to Audit > IP Group to create the IP address group first.

Time Group: Create a time group first.

Redirect to Audit > Time Group to create the time group first.

Port:

Protocol: TCP&UDP

Remark: (Optional)

Parameter description

Parameter	Description
IP Group	Used to select the IP address group policy upon which the port filtering policy takes effect. NOTE The IP address group should be configured in IP Group in advance.
Time Group	Used to select the time group policy upon which the port filtering policy takes effect. NOTE The time group should be configured in Time Group in advance.
Port	Specifies the service port forbidden to access.
Protocol	Specifies the service protocol forbidden to access.
Remark	(Optional) Specifies the description of the port filtering policy.
Status	Specifies the status of the port filtering policy, including **Enabled** or **Disabled**.
Operation	Used to edit, enable, disable or delete the port filtering policy. Edit: Used to modify the port filtering policy. Enable: Used to enable the port filtering policy. Disable: Used to disable the port filtering policy. Delete: Used to delete the port filtering policy.

Example of configuring port filtering

Networking requirements

An enterprise uses the enterprise router to set up a network.

Requirements: During the business hours (at 8:00 – 18:00 from Monday to Friday), purchasing staff are forbidden to browse webpages (The default port number for webpage browsing is 80.).

Solution

The router's port filtering function can achieve the requirements. Assume that the IP address of the purchasing staff's computers range from 192.168.0.2 – 192.168.0.50.

Configuration procedure

Configure the time group

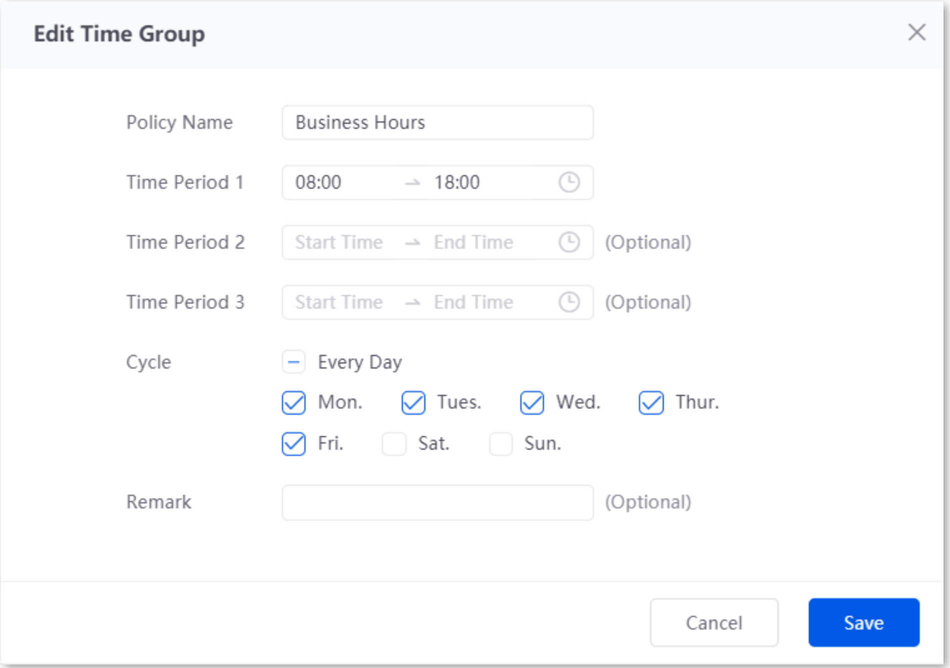
Configure the IP group

Add the port filtering policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and click **Add** to configure the following time group.



Edit Time Group

Policy Name: Business Hours

Time Period 1: 08:00 → 18:00

Time Period 2: Start Time → End Time (Optional)

Time Period 3: Start Time → End Time (Optional)

Cycle: ⊟ Every Day

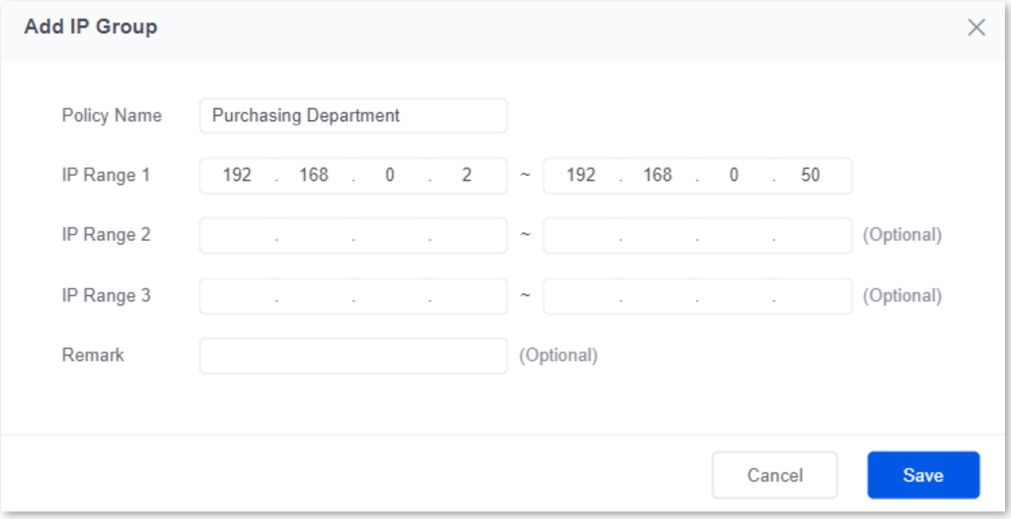
☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur.

☑ Fri. □ Sat. □ Sun.

Remark: (Optional)

Step 3 Configure the IP group.

Navigate to **Audit** > **Group Policy** > **IP Group**, and click **Add** to configure the following IP group.



Add IP Group

Policy Name: Purchasing Department

IP Range 1: 192 . 168 . 0 . 2 ~ 192 . 168 . 0 . 50

IP Range 2: . . . ~ . . . (Optional)

IP Range 3: . . . ~ . . . (Optional)

Remark: (Optional)

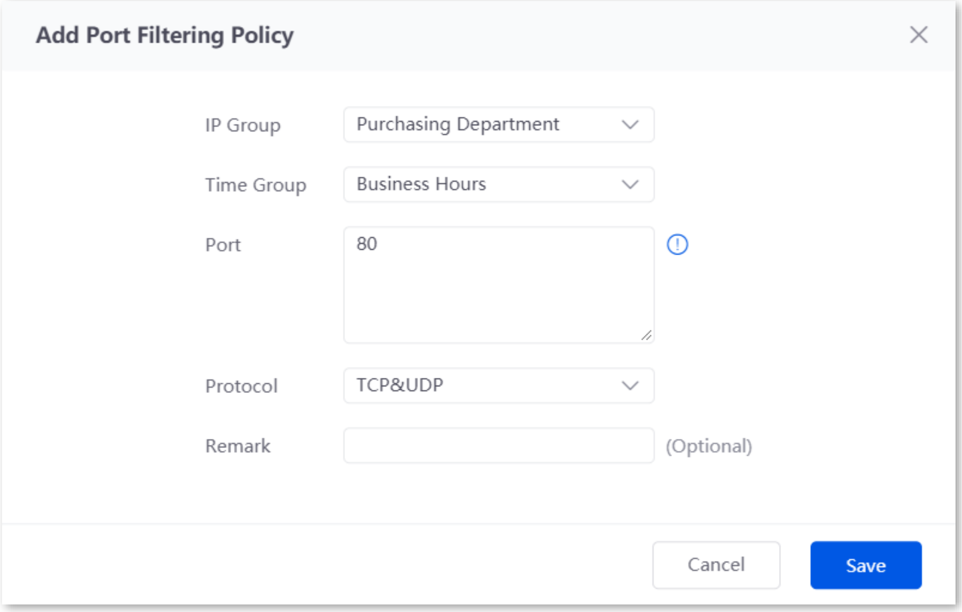
Step 4 Add the port filtering policy.

1. Navigate to **Audit** > **Filtering** > **Port Filtering**, and click **Add**.
2. Configure the parameters in the **Add Port Filtering Policy** window, and click **Save**.
   - Select the **IP Group** upon which the policy takes effect, which is **Purchasing Department** in this example.
   - Select the **Time Group** upon which the policy takes effect, which is **Business Hours** in this example.
   - Enter the **Port** number for webpage browsing, which is **80** in this example.

- Select the **Protocol** used by the service. It is recommended to keep the default **TCP&UDP**.

TIP

- If you need to filter multiple non-consecutive ports, use semicolons (;) to separate them, such as **80;20**.
- If you need to filter multiple consecutive ports, use tildes (~) to connect them, such as **75~80**.



Add Port Filtering Policy

IP Group: Purchasing Department

Time Group: Business Hours

Port: 80

Protocol: TCP&UDP

Remark: (Optional)

----End

Verification

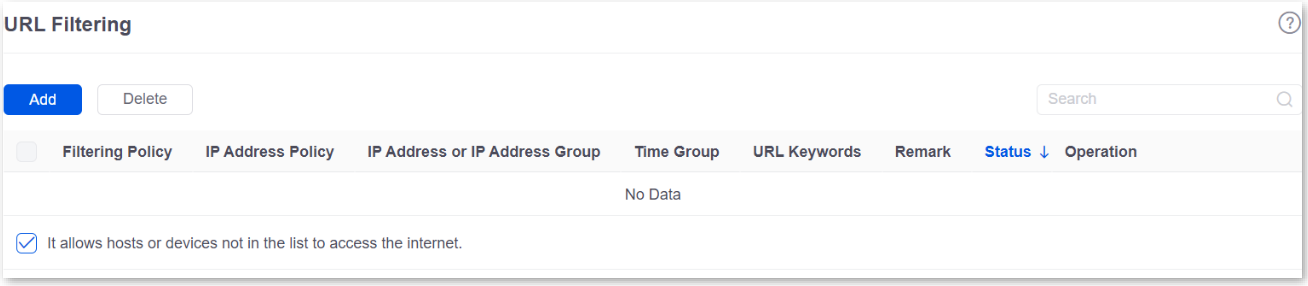
Purchasing staff using computers with IP addresses ranging from 192.168.0.2 – 192.168.0.50 in the LAN cannot browse webpages at 8:00 – 18:00 from Monday to Friday.

9.2.4 URL filtering

Overview

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **URL Filtering** to enter the page.

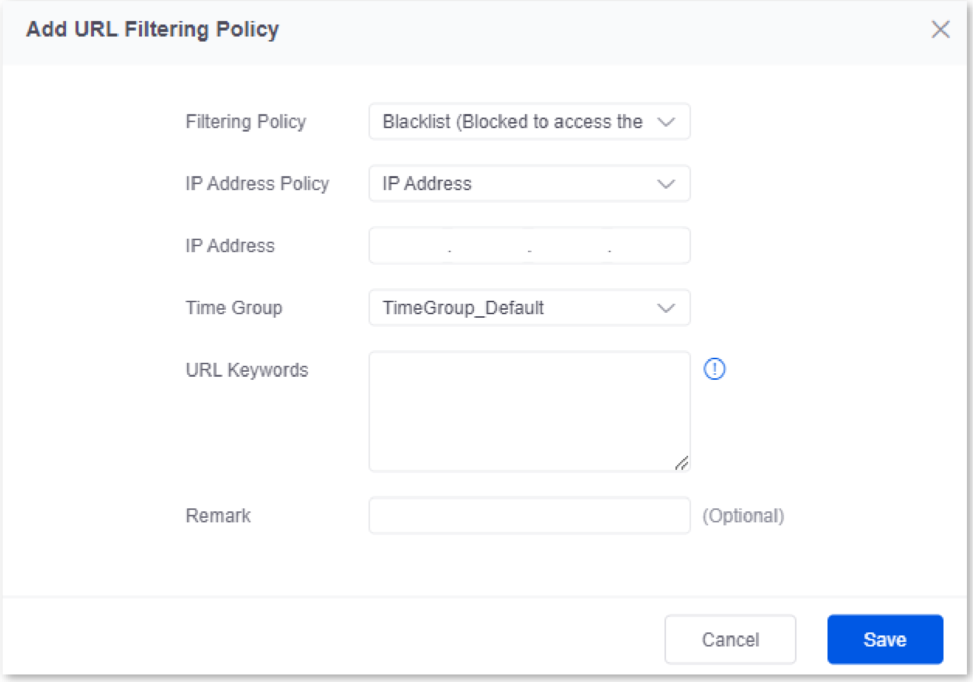
On this page, you can allow or block users to access specified websites to regulate users' online behavior in the LAN.



☐	Filtering Policy	IP Address Policy	IP Address or IP Address Group	Time Group	URL Keywords	Remark	Status ↓	Operation
No Data								

☑ It allows hosts or devices not in the list to access the internet.

You can click **Add** to add a new URL filtering policy.



Filtering Policy: Blacklist (Blocked to access the

IP Address Policy: IP Address

IP Address: . . .

Time Group: TimeGroup_Default

URL Keywords:

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the URL filtering policy. – **Blacklist (Blocked to access the internet)**: The user with the specified IP address is only blocked to access specified websites during the specified time period, and is allowed to access all websites during other time. – **White List (Allowed to access the internet)**: The user with the specified IP address is only allowed to access specified websites during the specified time period, and is allowed to access all websites during other time.
IP Address Policy	To filter one IP address, select **IP Address** and enter the IP address. To filter one or more IP address groups, select **IP Address Group** and select the corresponding IP group policy you set. TIP The IP group should be configured in IP Group in advance.
IP Address or IP Address Group	

Parameter	Description
Time Group	Used to select the time group policy upon which the URL filtering policy takes effect. TIP The time group should be configured in Time Group in advance.
URL Keywords	Specifies the keywords of the URL forbidden or allowed to access.
Remark	Specifies the description of the URL filtering policy. The remark is optional.
Status	Specifies the status of the URL filtering policy, including **Enabled** or **Disabled**.
Operation	Used to edit, enable, disable or delete the URL filtering policy. Edit: Used to modify the URL filtering policy. Enable: Used to enable the URL filtering policy. Disable: Used to disable the URL filtering policy. Delete: Used to delete the URL filtering policy.
It allows hosts or devices not in the list to access the internet.	– When Selected: The devices not in the filtering list or devices with the filtering policy disabled can access the specified websites. – When Deselected: The devices not in the filtering list or devices with the filtering policy disabled cannot access the specified websites. TIP To deselect this function, configure a whitelist first.

Example of configuring URL filtering

Networking requirements

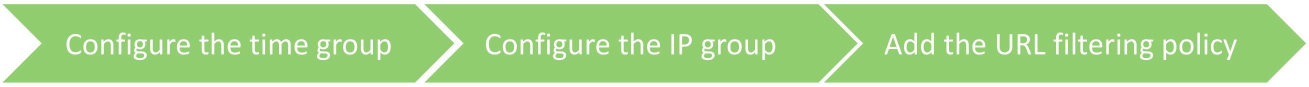
An enterprise uses the enterprise router to set up a network.

Requirements: During the business hours (at 8:00 – 18:00 from Monday to Friday), only designers can access some websites for designing, such as Pinterest (pinterest.com), Behance (behance.net) and Dribbble (dribbble.com), while other staff cannot access the internet.

Solution

The router's URL filtering function can achieve the requirements. Assume that the IP addresses of designers' computers range from 192.168.0.60 - 192.168.0.100.

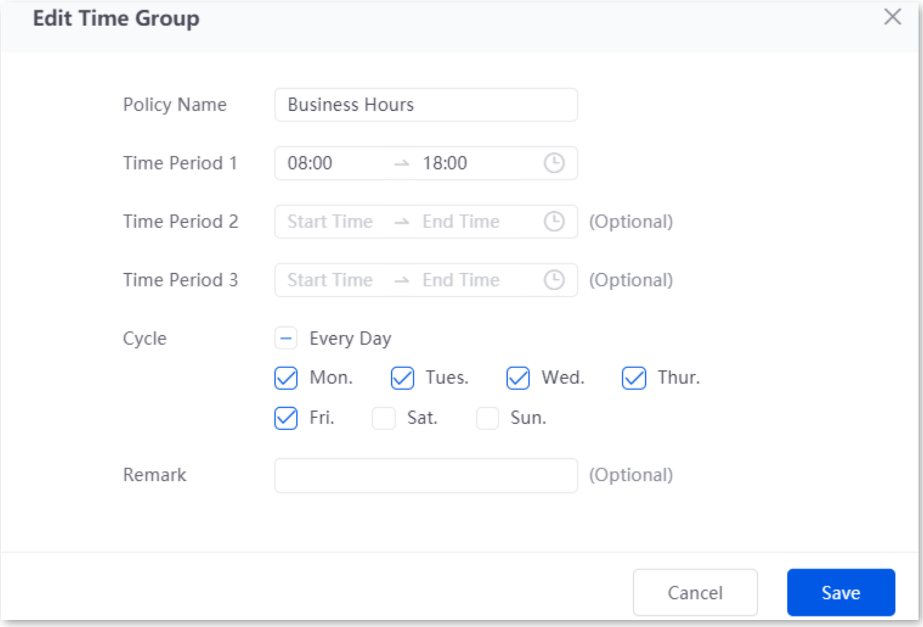
Configuration procedure



Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and configure the following time group.



Edit Time Group

Policy Name: Business Hours

Time Period 1: 08:00 → 18:00

Time Period 2: Start Time → End Time (Optional)

Time Period 3: Start Time → End Time (Optional)

Cycle: ⊟ Every Day

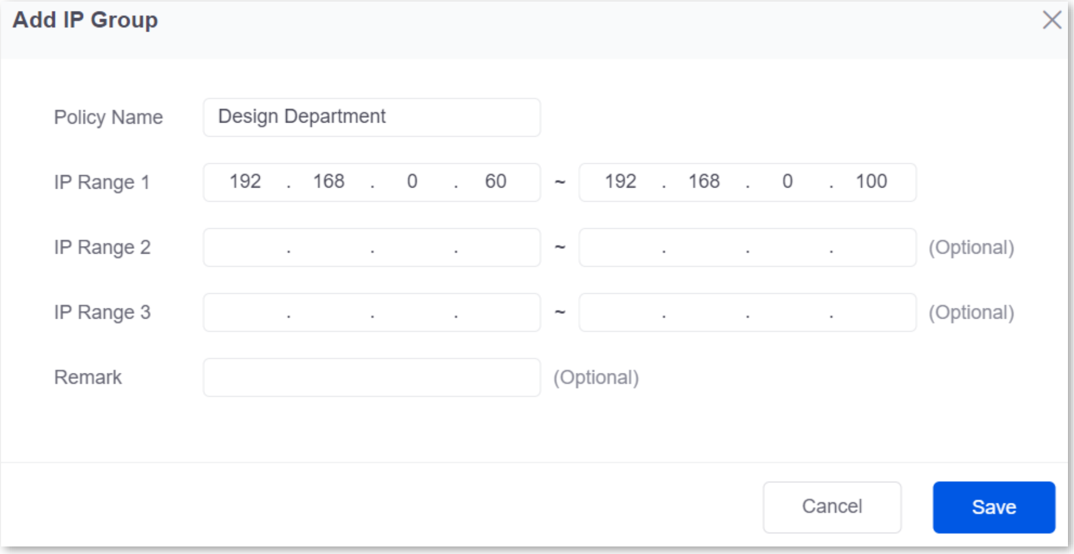
☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur.

☑ Fri. ☐ Sat. ☐ Sun.

Remark: (Optional)

Step 3 Configure the IP group.

Navigate to **Audit** > **Group Policy** > **IP Group**, and click **Add** to configure the following IP group.



Add IP Group

Policy Name: Design Department

IP Range 1: 192 . 168 . 0 . 60 ~ 192 . 168 . 0 . 100

IP Range 2: . . . ~ . . . (Optional)

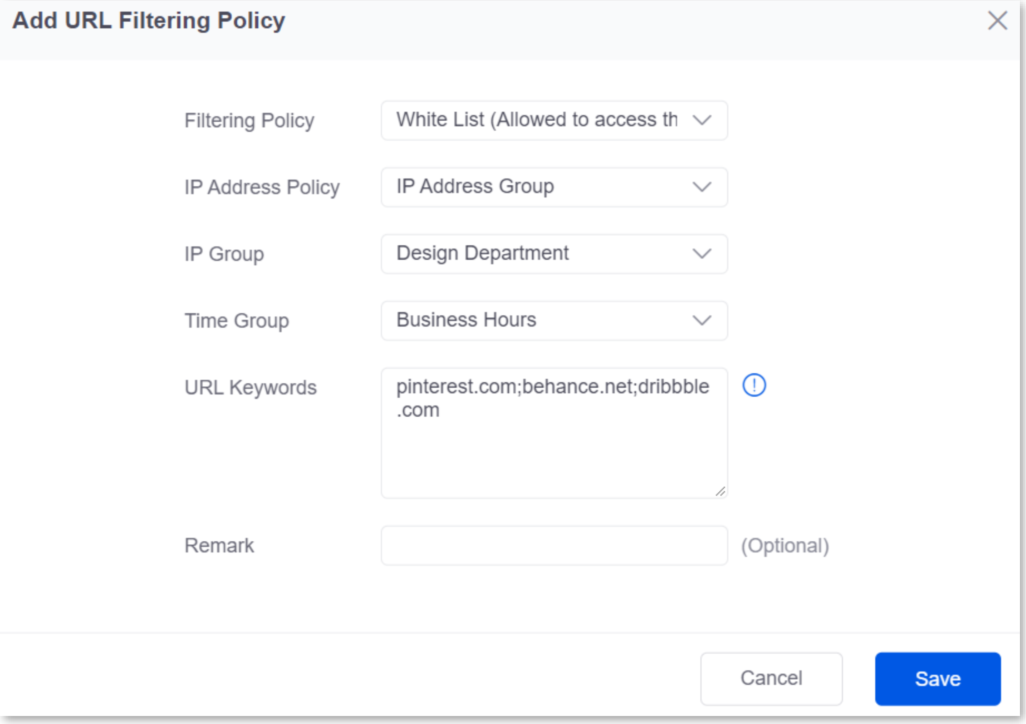
IP Range 3: . . . ~ . . . (Optional)

Remark: (Optional)

Step 4 Add the URL filtering policy.

1. Navigate to **Audit** > **Filtering** > **URL Filtering**, and click **Add**.
2. Configure the parameters in the **Add URL Filtering Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **White List (Allowed to access the internet)** in this example.
   - Select **IP Address Group** for **IP Address Policy**.
   - Select the **IP Group** upon which the policy takes effect, which is **Design Department** in this example.
   - Select the **Time Group** upon which the policy takes effect, which is **Business Hours** in this example.

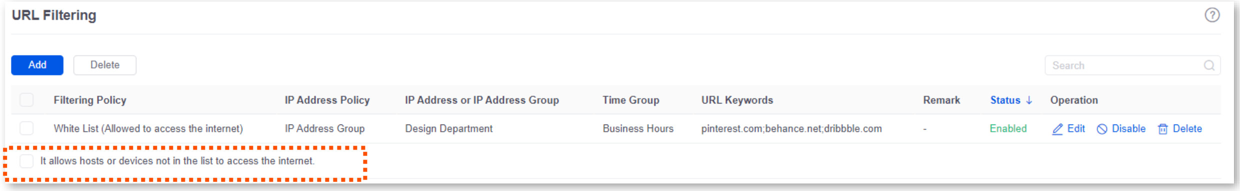
- Enter the **URL Keywords**, which are **pinterest.com;behance.net;dribbble.com** in this example.



Add URL Filtering Policy

Filtering Policy	White List (Allowed to access th
IP Address Policy	IP Address Group
IP Group	Design Department
Time Group	Business Hours
URL Keywords	pinterest.com;behance.net;dribbble.com
Remark	(Optional)

3. Deselect **It allows hosts or devices not in the list to access the internet**. In the displayed dialog box, click **OK**.



URL Filtering

□	Filtering Policy	IP Address Policy	IP Address or IP Address Group	Time Group	URL Keywords	Remark	Status ↓	Operation
□	White List (Allowed to access the internet)	IP Address Group	Design Department	Business Hours	pinterest.com;behance.net;dribbble.com	-	Enabled	Edit Disable Delete

□ It allows hosts or devices not in the list to access the internet.

----End

Verification

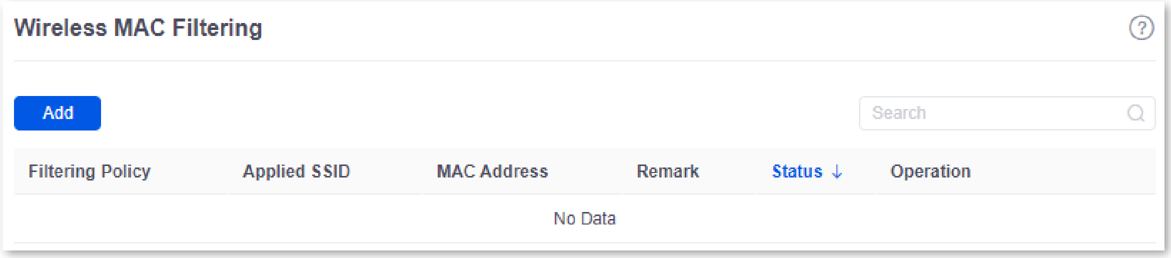
Only computers of designers (IP address range: 192.168.0.60 – 192.168.0.100) in the LAN can access the websites of pinterest.com, behance.net and dribbble.com while other computers cannot access the internet at 8:00 – 18:00 from Monday to Friday.

9.2.5 Wireless MAC filtering

Overview

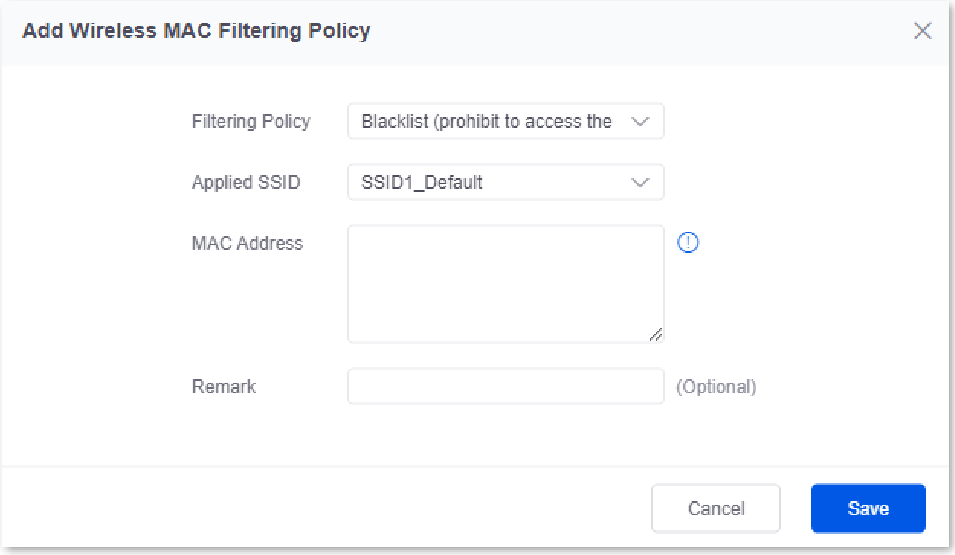
Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **Wireless MAC Filtering** to enter the page.

On this page, you can allow or block mobile users in the LAN to connect to specified wireless networks based on their wireless MAC addresses.


Wireless MAC Filtering

Filtering Policy	Applied SSID	MAC Address	Remark	Status ↓	Operation
No Data					

You can click **Add** to add a new wireless MAC filtering policy.


Add Wireless MAC Filtering Policy

Filtering Policy: Blacklist (prohibit to access the

Applied SSID: SSID1_Default

MAC Address:

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the wireless MAC address filtering policy. – **Blacklist (prohibit to access the Wi-Fi network)**: The user with the specified MAC address is blocked to access the internet through the specified SSID during the specified period, and is allowed to access the internet through the SSID during other times. – **Whitelist (allow to access the Wi-Fi network)**: The user with the specified MAC address is allowed to access the internet through the specified SSID during the specified period, and is blocked from accessing the internet through the SSID during other times.
AP Grouping	Specifies the group upon which wireless MAC address filtering policy takes effect. The AP group should be configured in AP Groups in advance.

Parameter	Description
SSID	Used to select the SSID policy upon which the wireless MAC address filtering policy takes effect. The SSID policy should be configured in the Wi-Fi Names in advance.
MAC Address	Specifies the MAC address to be filtered.
Remark	(Optional) Specifies the remark of the wireless MAC address filtering policy.
Status	Specifies the status of the wireless MAC address filtering policy including **Enabled** and **Disabled**.
Operation	Used to edit, enable, disable, or delete the wireless MAC filtering policy. Edit: Used to modify the wireless MAC filtering policy. Enable: Used to enable the wireless MAC filtering policy. Disable: Used to disable the wireless MAC filtering policy. Delete: Used to delete the wireless MAC filtering policy.

Example of configuring wireless MAC filtering

Networking requirements

An enterprise uses the router to set up a network. The router is connected to an AP managed by the router, and already delivers the wireless network named VIP to the AP.

Requirement: The wireless network of VIP only opens access to several devices.

Solution

The router’s wireless MAC filtering function can achieve the requirements. Assume that only 3 wireless devices are allowed to connect to the wireless network of VIP during business hours. The MAC addresses are D8:38:0D:00:00:01, D8:38:0D:00:00:02 and D8:38:0D:00:00:03.

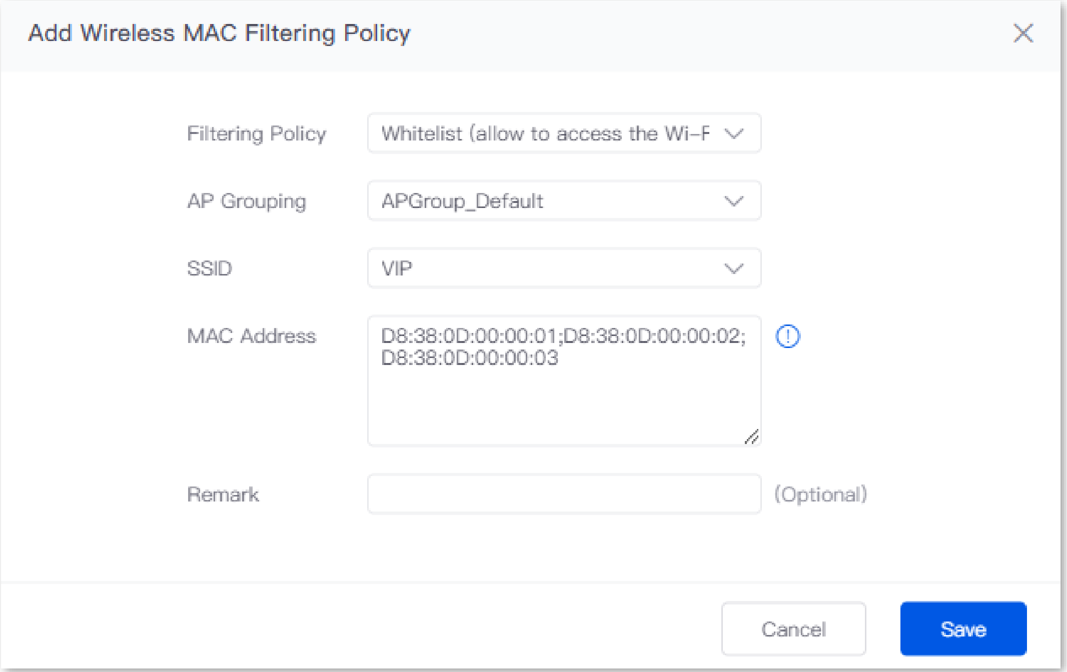
Configuration procedure

Step 1 Log in to the web UI of the router.

Step 2 Add the wireless MAC filtering policy.

1. Navigate to **Audit** > **Filtering** > **Wireless MAC Filtering**, and click **Add**.
2. Configure the parameters in the **Add Wireless MAC Filtering Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **Whitelist (allow to access the Wi-Fi network)** in this example.
   - Select the **AP Grouping**, which is **APGroup_Default** in this example.
   - Select the **SSID**, which is **VIP** (set in advance) in this example.

- Enter the **MAC Addresses** upon which the policy takes effect, which are **D8:38:0D:00:00:01;D8:38:0D:00:00:02;D8:38:0D:00:00:03** in this example.



Add Wireless MAC Filtering Policy

Filtering Policy: Whitelist (allow to access the Wi-F

AP Grouping: APGroup_Default

SSID: VIP

MAC Address: D8:38:0D:00:00:01;D8:38:0D:00:00:02;
D8:38:0D:00:00:03

Remark: (Optional)

----End

Verification

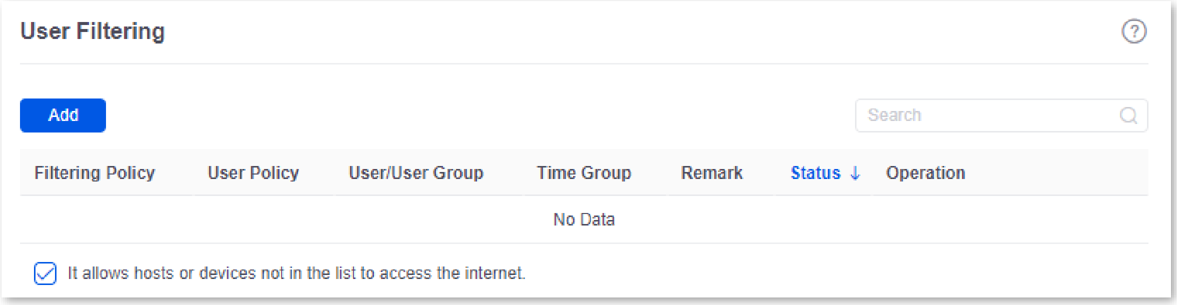
Only the above wireless devices can connect to the network of VIP while other devices cannot.

9.2.6 User filtering

Overview

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **User Filtering** to enter the page.

On this page, you can allow or block authenticated users in the LAN to connect to the internet based on users and user groups.

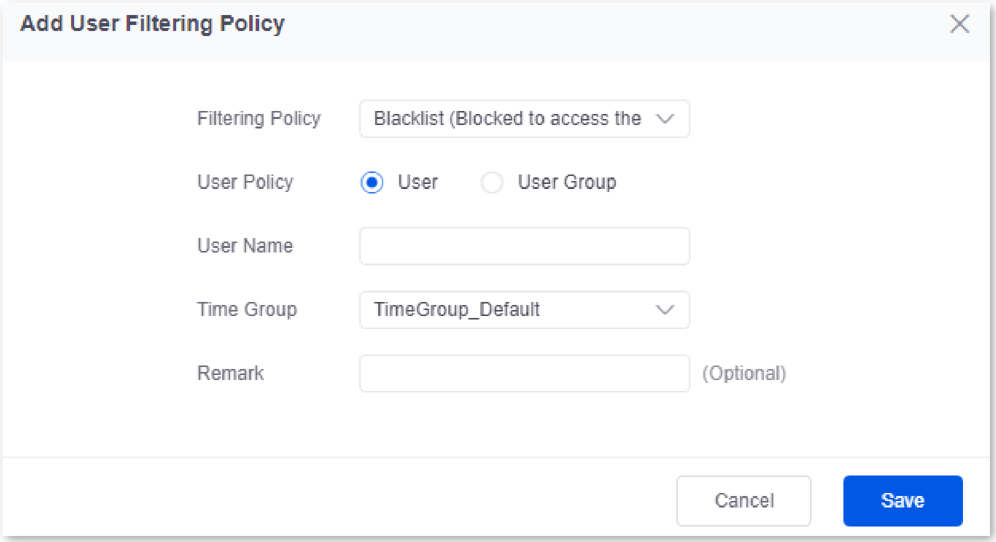


User Filtering

Filtering Policy	User Policy	User/User Group	Time Group	Remark	Status ↓	Operation
No Data						

☑ It allows hosts or devices not in the list to access the internet.

You can click **Add** to add a new user filtering policy.



Add User Filtering Policy

Filtering Policy: Blacklist (Blocked to access the

User Policy: ● User ○ User Group

User Name:

Time Group: TimeGroup_Default

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the user filtering policy. – **Blacklist (Blocked to access the internet)**: The specified user or user group is blocked to access the internet during the specified period, and is allowed to access the internet during other times. – **White List (Allowed to access the internet)**: The specified user or user group is allowed to access the internet during the specified period, and is blocked from accessing the internet during other times.
User Policy	Used to select the user policy (authenticated user or user group) upon which the user filtering policy takes effect. The authenticated user should be configured in Account Management in advance, and the authenticated user group should be configured in User Group in advance.
User/User Group	Specifies the authenticated user or user group to be filtered.
User Name	Specifies the user name of the authenticated user.
Time Group	Used to select the time group upon which the user filtering policy takes effect. The time group should be configured in Time Group in advance.
Remark	(Optional) Specifies the remark of the user filtering policy.
Status	Specifies the status of the user filtering policy, including **Enabled** and **Disabled**.

Parameter	Description
Operation	Used to edit, enable, disable, or delete the user filtering policy. Edit: Used to modify the user filtering policy. Enable: Used to enable the user filtering policy. Disable: Used to disable the user filtering policy. Delete: Used to delete the user filtering policy.
It allows hosts or devices not in the list to access the internet.	– When Selected: The devices not in the filtering list or devices with the filtering policy disabled can access the internet. – When Deselected: The devices not in the filtering list or devices with the filtering policy disabled cannot access the internet. TIP To deselect this function, configure a whitelist first.

Example of configuring user filtering

Networking requirements

An enterprise uses the router to set up a network. The enterprise has configured the account authentication, and the account has been added to the authenticated user group of R&D Department. Refer to Authentication for specific instructions.

Requirement: During business hours (8:00 -18:00 from Monday to Friday), only the staff of R&D Department authenticated through the user name and password can access the internet while other staff cannot.

Solution

The router's user filtering function can achieve the requirements.

Configuration procedure

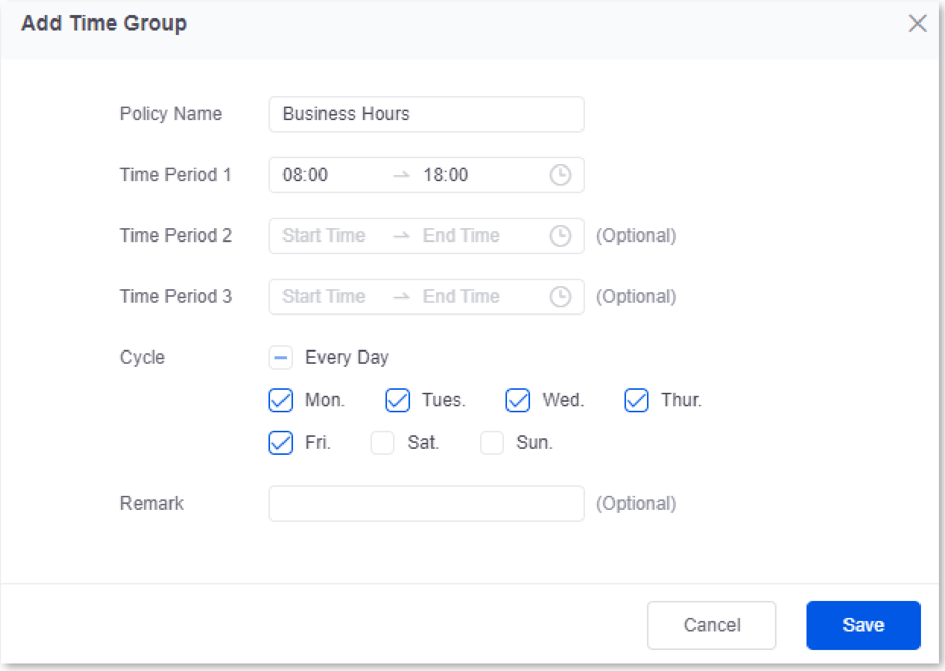
Configure the time group

Add the user filtering policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the time group.

Navigate to **Audit** > **Group Policy** > **Time Group**, and click **Add** to configure the following time group.



Add Time Group

Policy Name: Business Hours

Time Period 1: 08:00 → 18:00

Time Period 2: Start Time → End Time (Optional)

Time Period 3: Start Time → End Time (Optional)

Cycle: − Every Day

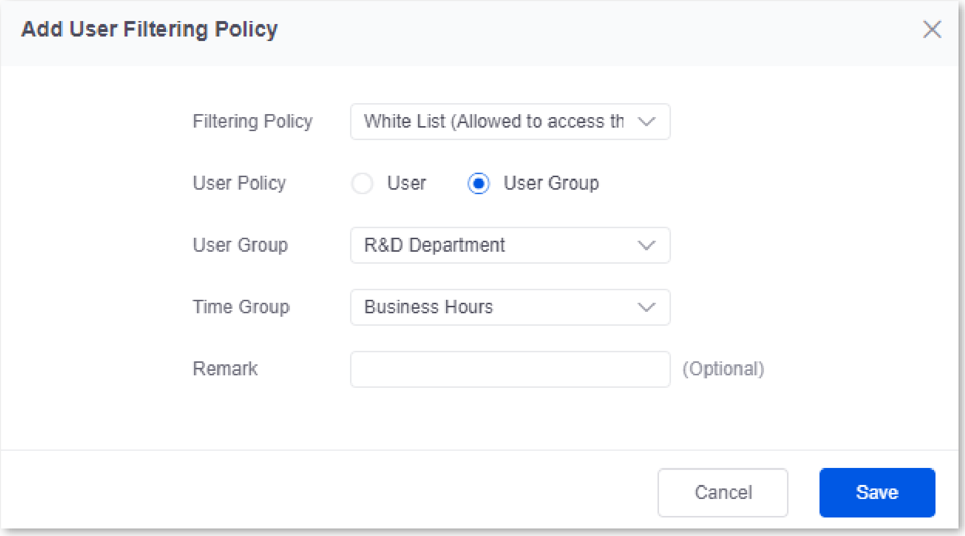
☑ Mon. ☑ Tues. ☑ Wed. ☑ Thur.

☑ Fri. □ Sat. □ Sun.

Remark: (Optional)

Step 3 Add the user filtering policy.

1. Navigate to **Audit** > **Filtering** > **User Filtering**, and click **Add**.
2. Configure the parameters in the **Add User Filtering Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **White List (Allowed to access the internet)** in this example.
   - Select **User Group** for **User Policy**.
   - Select the **User Group** upon which the policy takes effect, which is **R&D Department** (set in advance) in this example.
   - Select the **Time Group** upon which the policy takes effect, which is **Business Hours** in this example.



Add User Filtering Policy

Filtering Policy: White List (Allowed to access th

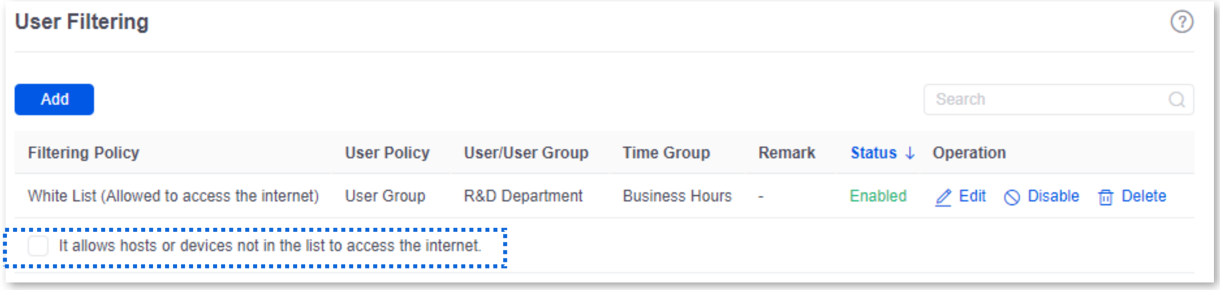
User Policy: ○ User ● User Group

User Group: R&D Department

Time Group: Business Hours

Remark: (Optional)

3. Deselect **It allows hosts or devices not in the list to access the internet**. In the pop-up window, click **OK**.



Filtering Policy	User Policy	User/User Group	Time Group	Remark	Status ↓	Operation
White List (Allowed to access the internet)	User Group	R&D Department	Business Hours	-	Enabled	Edit Disable Delete

□ It allows hosts or devices not in the list to access the internet.

----End

Verification

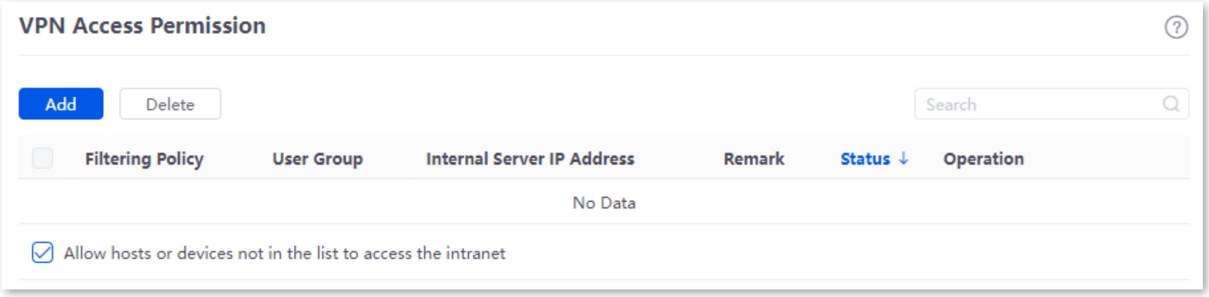
During business hours (8:00 -18:00 from Monday to Friday), only the staff of R&D Department authenticated through the user name and password can access the internet while other staff cannot.

9.2.7 VPN access permission

Overview

Log in to the web UI of the router, and navigate to **Audit** > **Filtering** > **VPN Access Permission** to enter the page.

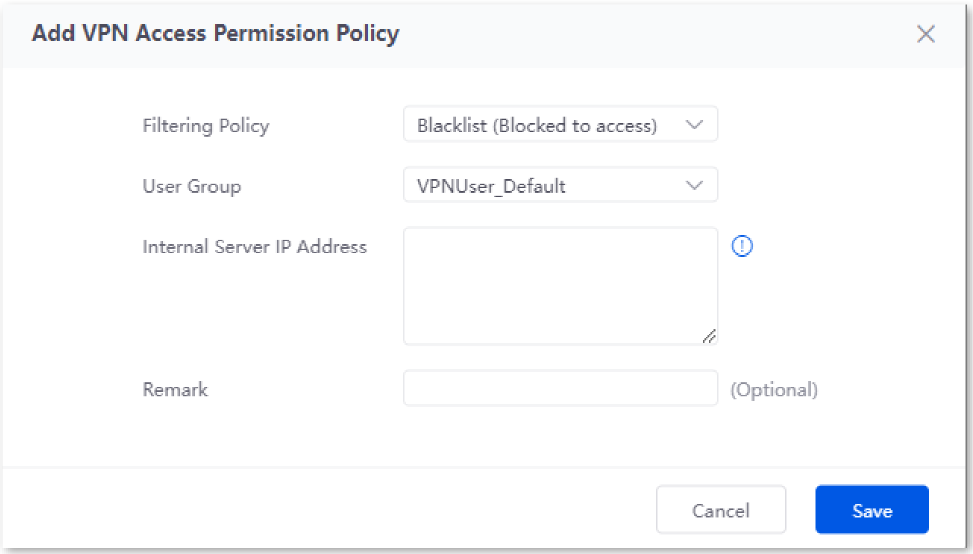
On this page, you can configure VPN access permissions rules to allow or block VPN users to access servers in the LAN.



□	Filtering Policy	User Group	Internal Server IP Address	Remark	Status ↓	Operation
			No Data			

☑ Allow hosts or devices not in the list to access the intranet

You can click **Add** to add a new VPN access permission policy.



Add VPN Access Permission Policy

Filtering Policy: Blacklist (Blocked to access)

User Group: VPNUser_Default

Internal Server IP Address:

Remark: (Optional)

Parameter description

Parameter	Description
Filtering Policy	Specifies the mode of the VPN access permission policy. – **Blacklist (Blocked to access)**: The specified VPN user group is blocked to access specified servers in the LAN. – **Whitelist (Allowed to access)**: The specified VPN user group is allowed to access the specified servers in the LAN.
User Group	Specifies the VPN user group for which the VPN access permission policy takes effect. TIP The VPN user group should be configured in User Group in advance.
Internal Server IP Address	Specifies the internal server IP address for which the VPN access permission policy takes effect.
Remark	(Optional) Specifies the description of the VPN access permission policy.
Status	Specifies the status of the VPN access permission policy, including **Enabled** or **Disabled**.
Operation	Used to edit, enable, disable or delete the VPN access permission policy. Edit: Used to modify the VPN access permission policy. Enable: Used to enable the VPN access permission policy. Disable: Used to disable the VPN access permission policy. Delete: Used to delete the VPN access permission policy.

Parameter	Description
Allow hosts or devices not in the list to access the intranet	– When Selected: The devices not in the list or devices with the policy disabled can access the intranet server. – When Deselected: The devices not in the list or devices with the policy disabled cannot access the intranet server. TIP To deselect this function, configure a whitelist first.

Example of configuring VPN access permission

Networking requirements

An enterprise uses the enterprise router to set up a network.

The enterprise has established a PPTP VPN between the enterprise's headquarters and subsidiary 1 through the router. The headquarters has created the VPN user group named **Subsidiary 1 Staff** on the router, and has added the user names and passwords of subsidiary 1 staff to the VPN user group. If you want to check the specific configuration of VPN, refer to VPN service.

Requirements: Only subsidiary 1 staff are allowed to access the headquarters FTP server through PPTP VPN, and other staff cannot access it.

Solution

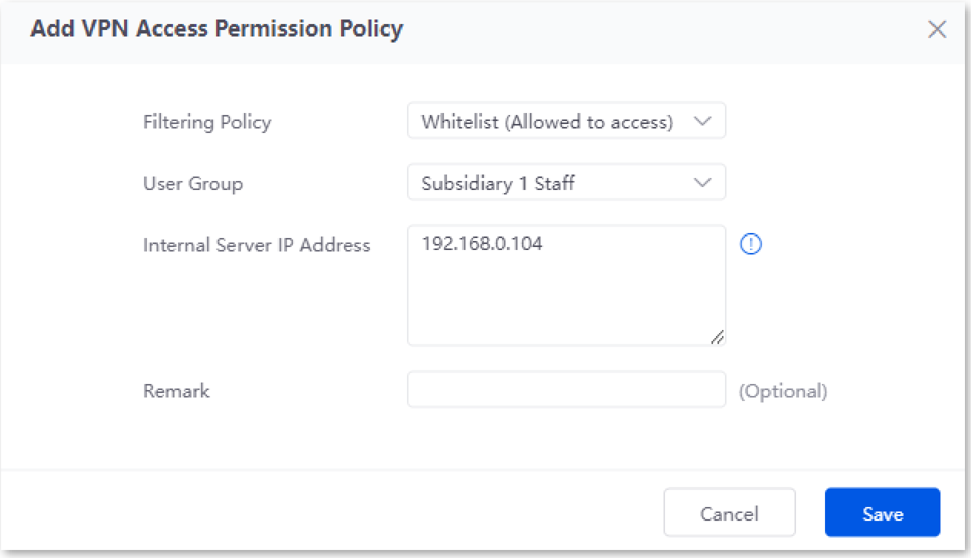
The router’s VPN access permission function can achieve the requirements. Assume that the IP address of the headquarters FTP server is 192.168.0.104.

Configuration procedure

Step 1 Log in to the web UI of the router.

Step 2 Add the VPN access permission policy.

1. Navigate to **Audit** > **Filtering** > **VPN Access Permission**, and click **Add**.
2. Configure the parameters in the **Add VPN Access Permission Policy** window, and click **Save**.
   - Select the **Filtering Policy**, which is **Whitelist (Allowed to access)** in this example.
   - Select the **User Group**, which is **Subsidiary 1 Staff** in this example.
   - Set **Internal Server IP Address**, which is **192.168.0.104** in this example.



Add VPN Access Permission Policy

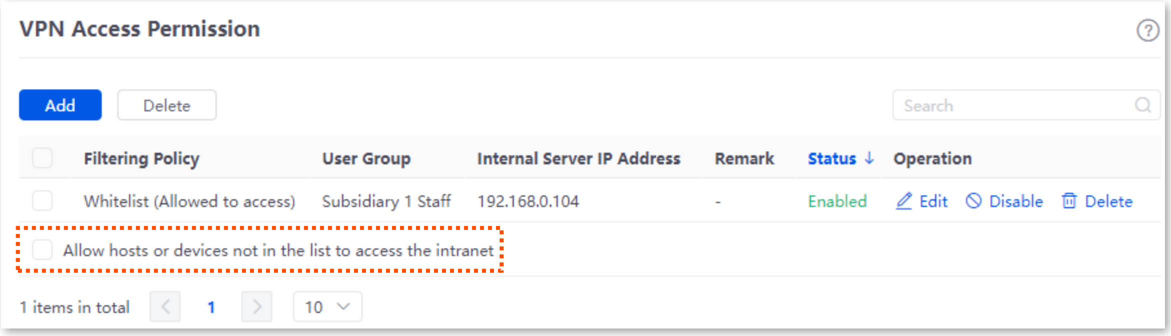
Filtering Policy: Whitelist (Allowed to access)

User Group: Subsidiary 1 Staff

Internal Server IP Address: 192.168.0.104

Remark: (Optional)

3. Deselect **Allow hosts or devices not in the list to access the intranet**. In the displayed dialog box, click **OK**.



VPN Access Permission

	Filtering Policy	User Group	Internal Server IP Address	Remark	Status	Operation
□	Whitelist (Allowed to access)	Subsidiary 1 Staff	192.168.0.104	-	Enabled	Edit Disable Delete

□ Allow hosts or devices not in the list to access the intranet

1 items in total 1 10

----End

Verification

Only the subsidiary 1 staff can access the FTP server with the headquarters IP address 192.168.0.104 through PPTP VPN, and other staff cannot access it.

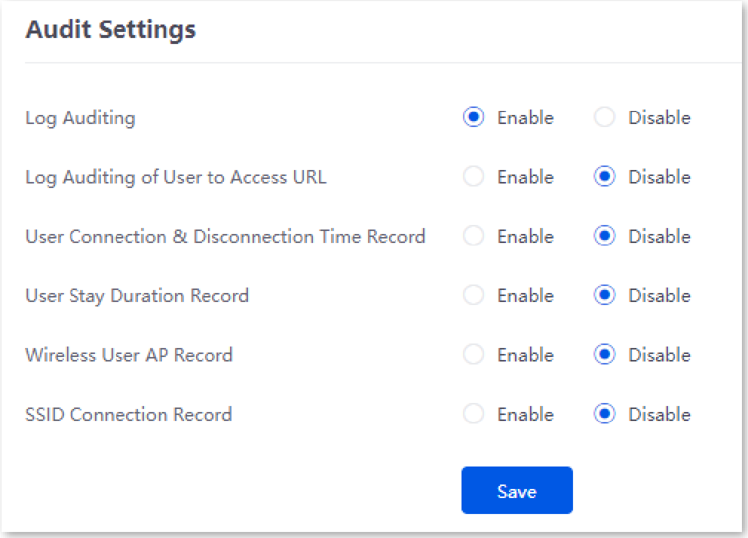
9.3 Log auditing

9.3.1 Audit settings

Log in to the web UI of the router, and navigate to **Audit** > **Log Auditing** > **Audit Settings** to enter the page.

On this page, you can collect specified types of logs from the specified port as required.

This function is disabled by default. The following displays the page when the function is enabled.



Audit Settings

Log Auditing	● Enable	○ Disable
Log Auditing of User to Access URL	○ Enable	● Disable
User Connection & Disconnection Time Record	○ Enable	● Disable
User Stay Duration Record	○ Enable	● Disable
Wireless User AP Record	○ Enable	● Disable
SSID Connection Record	○ Enable	● Disable

Parameter description

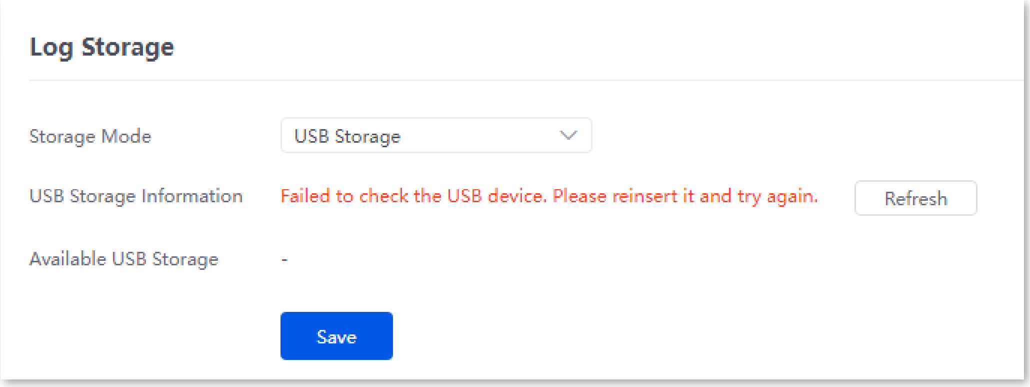
Parameter	Description
Log Auditing	Used to enable or disable the log auditing function.
Log Auditing of User to Access URL	Used to enable or disable the function to record the information of web pages accessed by users.
User Connection & Disconnection Time Record	Used to enable or disable the function to record the time at which a user obtains an IP address from the user DHCP server.
User Stay Duration Record	Used to enable or disable the function to record the users' online duration.
Wireless User AP Record	Used to enable or disable the function to record the information about the AP connected to the wireless user.
SSID Connection Record	Used to enable or disable the function to record the name of the SSID connected to the wireless user.

9.3.2 Log storage

Log in to the web UI of the router, and navigate to **Audit** > **Log Auditing** > **Log Storage** to enter the page.

When the log auditing function is enabled, the result of log auditing can only be stored to the local PC or a USB disk. A log tool is required to be installed in the local computer, such as **Syslog**.

USB storage is enabled by default. The following displays the page when the function is enabled.



Log Storage

Storage Mode: USB Storage

USB Storage Information: Failed to check the USB device. Please reinsert it and try again.

Available USB Storage: -

Parameter description

Parameter	Description
Storage Mode	Specifies the storage mode of the router. – **USB Storage**: Store the result of log auditing to other USB storage devices through USB ports. – **Local Computer Storage**: Store the result of log auditing on the local computer.
USB Storage Information	Specifies the basic information of the USB storage device. When the **Storage Mode** is set to **USB Storage**, the system will automatically obtain the information.
Available USB Storage	Specifies the available storage space of the USB storage device. When the **Storage Mode** is set to **USB Storage**, the system will automatically scan the device.
Local Computer IP Address	Specifies the IP address of the local computer where the result of log auditing is stored. It is needed when the **Storage Mode** is set to **Local Computer Storage.**

10 More

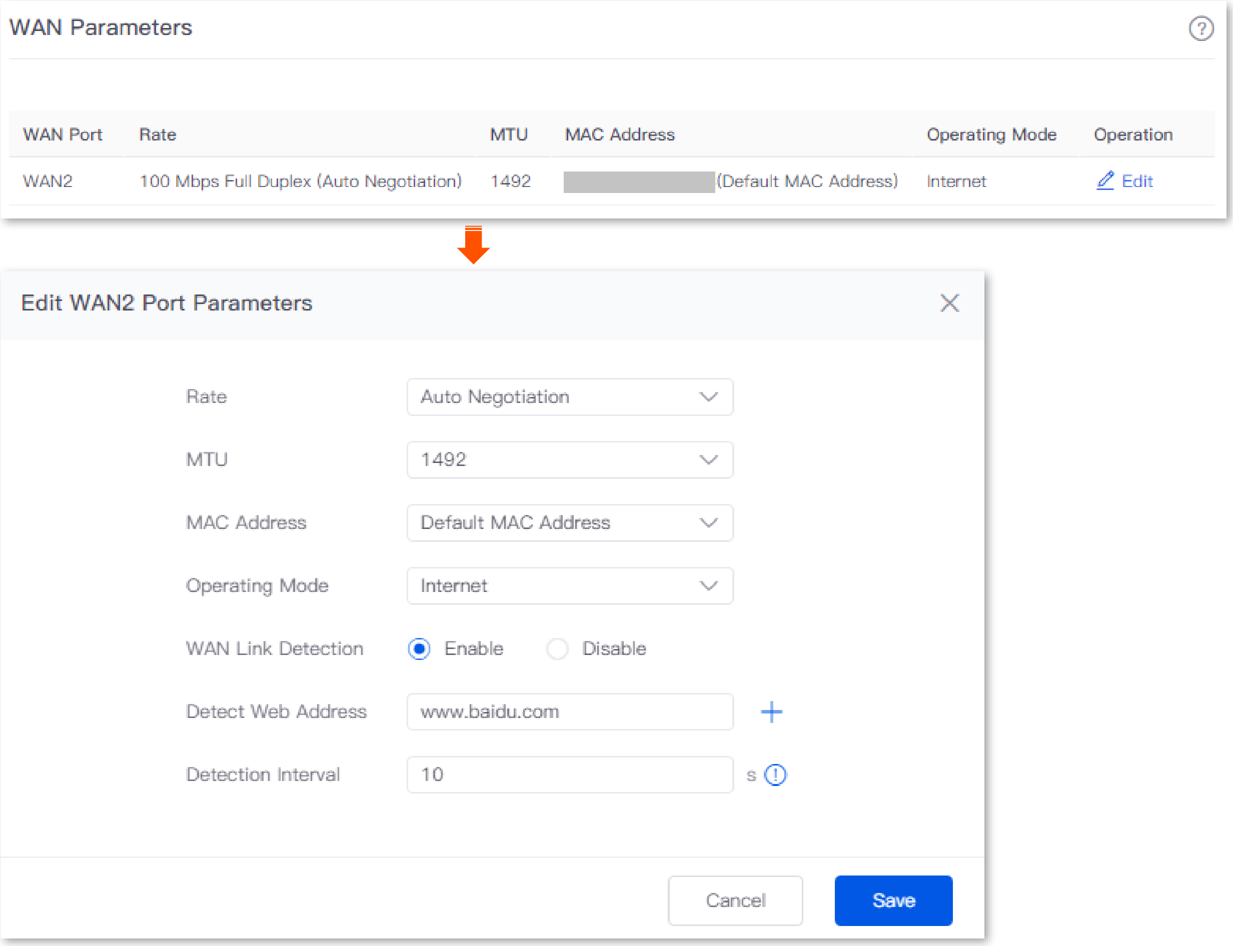
This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

10.1 Advanced routing

10.1.1 WAN parameters

Log in to the web UI of the router, and navigate to **More** > **Advanced Routing** > **WAN Parameters** to enter the page. On this page, you can configure the parameters of the WAN port.

If you have completed the Internet settings correctly, but users of the router's LAN still cannot access the internet, or there is a problem with the internet, you can try to modify the WAN parameters to solve the problem.



WAN Parameters

WAN Port	Rate	MTU	MAC Address	Operating Mode	Operation
WAN2	100 Mbps Full Duplex (Auto Negotiation)	1492	[redacted](Default MAC Address)	Internet	Edit

Edit WAN2 Port Parameters

Rate	Auto Negotiation
MTU	1492
MAC Address	Default MAC Address
Operating Mode	Internet
WAN Link Detection	● Enable ○ Disable
Detect Web Address	www.baidu.com
Detection Interval	10 s

Parameter description

Parameter	Description
WAN Port	Specifies the WAN port of the router.
Rate	Specifies the rate and duplex mode of the WAN port, which must be consistent with the rate and duplex mode of the WAN port at the peer side. Otherwise, the WAN port may fail to transmit and receive data normally. If the WAN port of the router is connected normally, but the corresponding interface light is not on. Or the interface light will on wait for a while (more than 5 seconds) after the Ethernet cable is plugged in. At this point, you can adjust the WAN port rate of the router to 10 Mbps half-duplex or 10 Mbps full-duplex to solve the problem. If you are uncertain about the rate and duplex mode of the WAN port of the peer side, select **Auto Negotiation**.
MTU	Maximum Transmission Unit (**MTU**) is the largest data packet that a network device transmits, and is related to the WAN port's connection type. Generally, keep the default value. If you cannot access some websites or cannot send and receive emails, you can try to modify the MTU value. The recommended modification range is 1400 to 1500. The following are scenarios where commonly used MTU apply: – **1500**: Used for the most common settings in non-PPPoE connections and non-VPN connections. – **1492**: Used for PPPoE connections. – **1480**: It is the maximum value for the Ping function (packets larger than this value will be broken down). – **1450**: Used for DHCP, which assigns dynamic IP addresses to connected devices. – **1400**: Used for VPN or PPTP.
MAC Address	Specifies the MAC address of the WAN port, which can be customized. After the networking is set up, if the router still cannot connect to the internet, the ISP may have bound the account to a certain MAC address. You can try to solve the problem by modifying the MAC address of the WAN port. – **Default MAC Address**: The default value can be changed if the MAC address is set to **Customize**. – **Customize**: You can customize the MAC address as required.
Operating Mode	Specifies the working mode of the WAN port. – **Internet**: This mode is used as a normal WAN port to connect to the internet. – **Local Network**: The WAN port cannot forward DNS requests, which means that the internet cannot be accessed. This mode is usually used for enterprise intranet.

Parameter	Description
WAN Link Detection	When the **WAN Link Detection** function is enabled, the router periodically detects the connectivity between **WAN Port** and **Detect Web Address**, and then selects the best WAN port link as the main egress link according to the detection results.
Detect Web Address	Specifies the domain name that needs to be detected. TIP When the **WAN Link Detection** function is enabled, **Detect Web Address** can be configured.
Detection Interval	Specifies the interval to perform detections. TIP When the **WAN Link Detection** function is enabled, **Detection Interval** can be configured.
Operation	Edit: Used to modify the WAN parameters.

10.1.2 Multi-WAN policy

Overview

Log in to the web UI of the router, and navigate to **More** > **Advanced Routing** > **Multi-WAN Policy** to enter the page. On this page, you can configure the multi-WAN policy and E-bank data based on source in&out.

- **Multi-WAN policy**

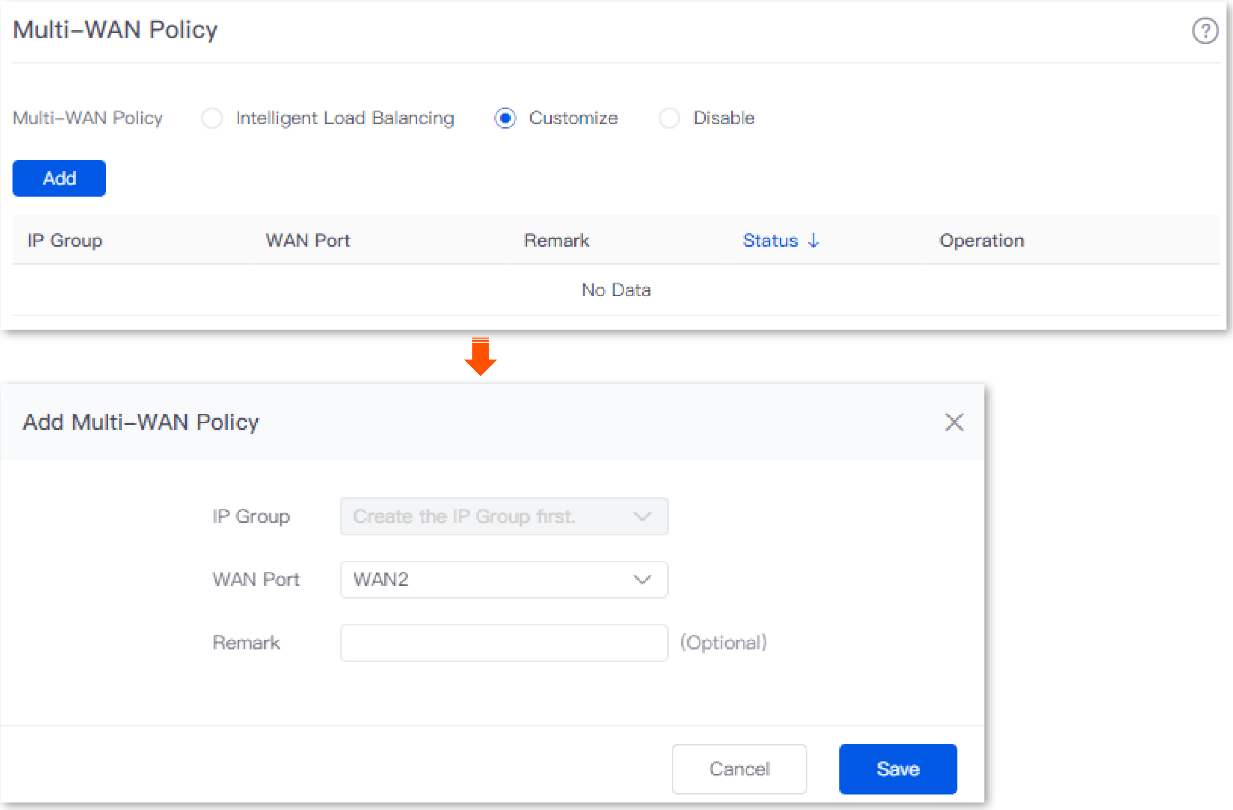
After the router enables multiple WAN ports, it can allow multiple broadband access at the same time to achieve bandwidth superposition. When multiple WAN ports are working at the same time, setting a reasonable multi-WAN policy can greatly improve the bandwidth utilization of the router.

  - **Intelligent Load Balancing**: It indicates that data traffic is allocated automatically and the system will use the WAN port with the least traffic for communication automatically.
  - **Customize**: Users can designate a WAN port for forwarding traffic of a source IP address as required.

- **E-bank data based on source in&out**

When this function is enabled, the transmitting port and receiving port of E-bank traffic must be consistent, and this configuration is not affected by the load balancing policy. When this function is disabled, some E-banks cannot be used normally.

By default, the router's multi-WAN policy is **Intelligent Load Balancing**. When **Customize** is selected, the page is as follows. You can click **Add** to customize the multi-WAN policy.



Multi-WAN Policy

Multi-WAN Policy ○ Intelligent Load Balancing ● Customize ○ Disable

Add

IP Group	WAN Port	Remark	Status ↓	Operation
No Data				

Add Multi-WAN Policy

IP Group: Create the IP Group first.

WAN Port: WAN2

Remark: (Optional)

Cancel Save

Parameter description

Parameter	Description
Add	Used to add a new multi-WAN policy.
IP Group	Specifies the IP group of the multi-WAN policy. Data traffic from this IP group which can only be forwarded through the specified WAN port. Only one rule can be configured for an IP group. You can configure the IP group in IP Group.
WAN Port	Specifies the WAN port of the multi-WAN policy. Data traffic from the specified IP group will only be forwarded through this WAN port.
Remark	Specifies the description of the multi-WAN policy.
Status	Specifies the status of the customized multi-WAN policy, including **Enabled** and **Disabled**.
Operation	Used to edit, enable, disable or delete the multi-WAN policy. ✎ Edit: Used to modify the multi-WAN policy. ▷ Enable: Used to enable the multi-WAN policy. ⊘ Disable: Used to disable the multi-WAN policy. 🗑 Delete: Used to delete the multi-WAN policy.

Example of configuring multi-WAN policy

Networking requirements

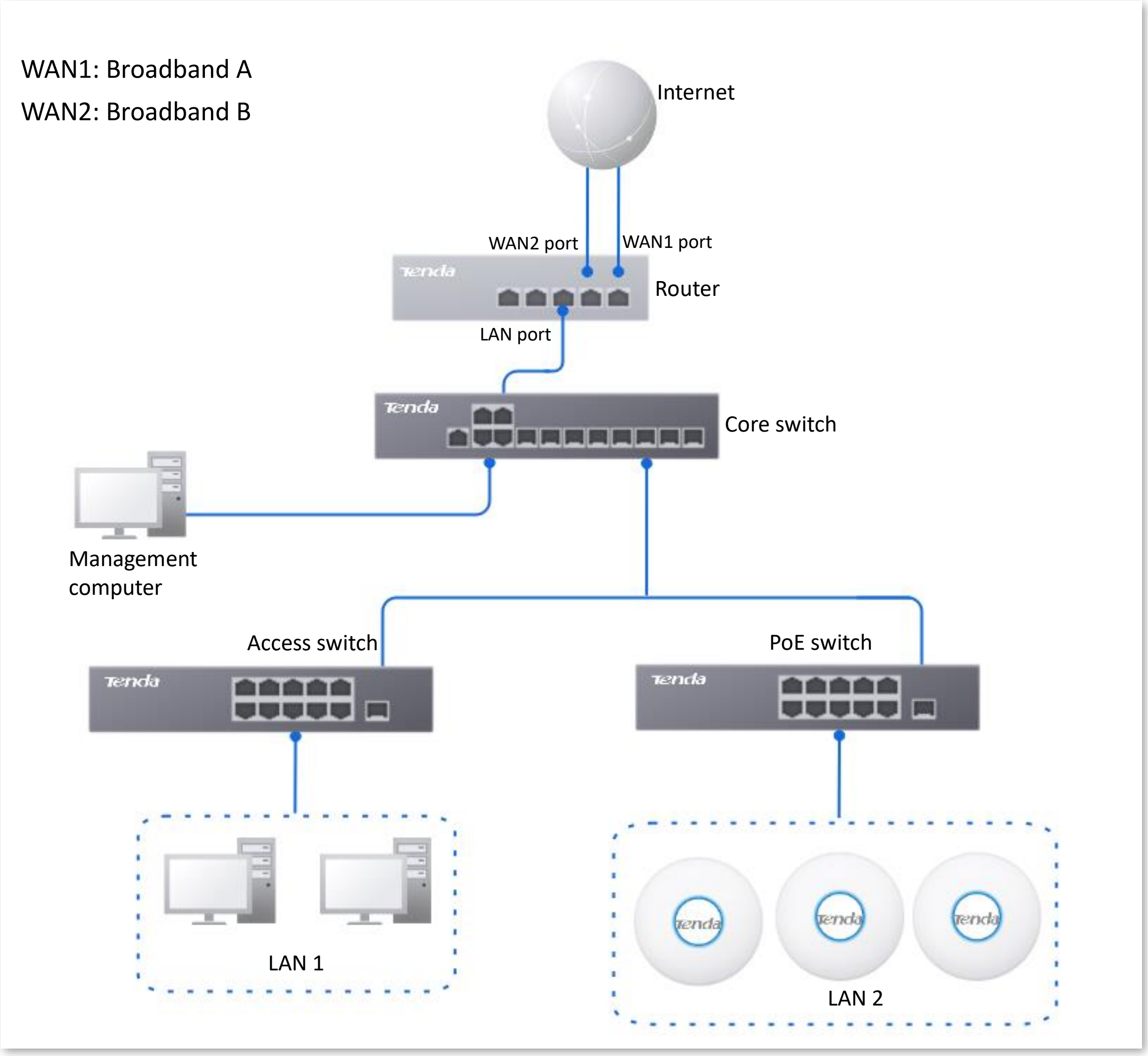
An enterprise uses the enterprise router to set up a network. To meet the requirements of the enterprise network, two broadband lines have been handled and the internet has been successfully accessed.

To achieve load balancing, the enterprise has the following requirements:

- Computers with IP addresses 192.168.0.2 - 192.168.0.100 access the internet through Broadband A.
- Computers with IP addresses 192.168.0.101 - 192.168.0.250 access the internet through Broadband B.

Solution

You can use the multi-WAN policy function of the router to meet the requirements.



Configuration procedure

Configure the IP group

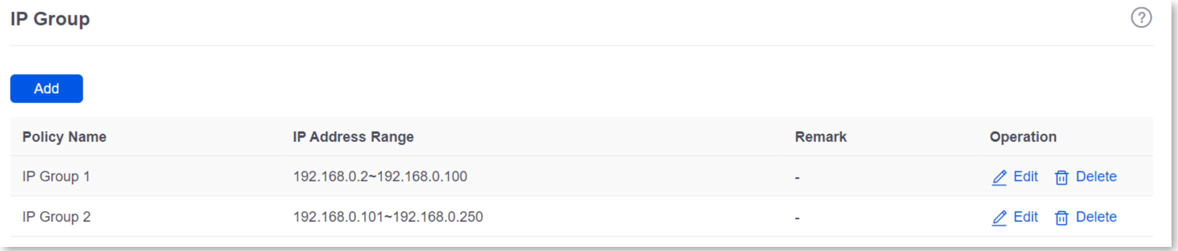
Enable the multi-WAN policy function

Customize the multi-WAN policy

Step 1 Log in to the web UI of the router.

Step 2 Configure the IP group.

Navigate to **Audit** > **Group Policy** > **IP Group**, and click **Add** to configure the following two IP groups.

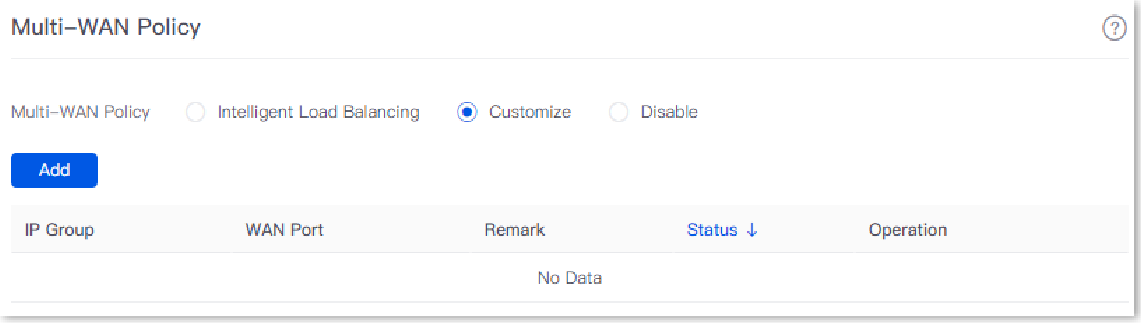


IP Group

Policy Name	IP Address Range	Remark	Operation
IP Group 1	192.168.0.2~192.168.0.100	-	Edit Delete
IP Group 2	192.168.0.101~192.168.0.250	-	Edit Delete

Step 3 Enable the multi-WAN policy function.

1. Navigate to **More** > **Advanced Routing** > **Multi-WAN Policy**.
2. Select **Customize** for **Multi-WAN Policy**.
3. Confirm the prompt information, and click **OK**.



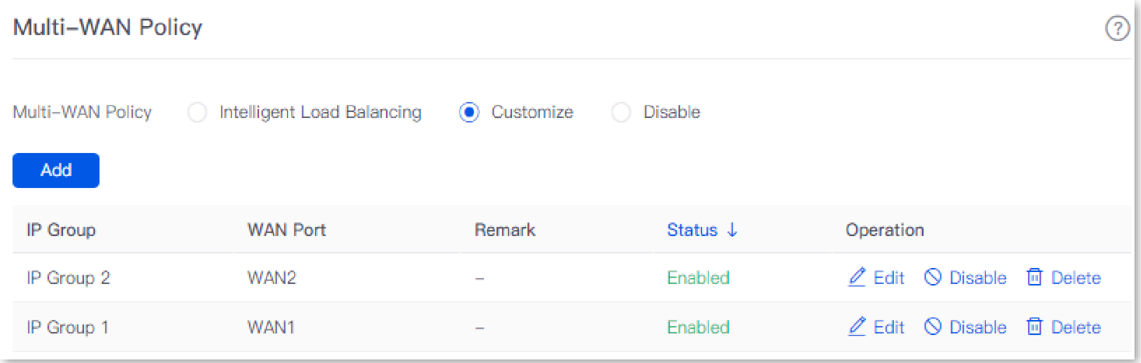
Multi-WAN Policy

Multi-WAN Policy ○ Intelligent Load Balancing ● Customize ○ Disable

IP Group	WAN Port	Remark	Status ↓	Operation
No Data				

Step 4 Customize the multi-WAN policy.

Click **Add** to configure the following two multi-WAN policies.



Multi-WAN Policy

Multi-WAN Policy ○ Intelligent Load Balancing ● Customize ○ Disable

IP Group	WAN Port	Remark	Status ↓	Operation
IP Group 2	WAN2	–	Enabled	Edit Disable Delete
IP Group 1	WAN1	–	Enabled	Edit Disable Delete

----End

Verification

When a device in the LAN with an IP address in the range of 192.168.0.2 - 192.168.0.100 accesses the internet, the data traffic is forwarded by the WAN1 port. When a device in the LAN with an IP address in the range of 192.168.0.101 - 192.168.0.250 accesses the internet, the data traffic is forwarded by the WAN2 port.

10.1.3 Static routing

Overview

Routing is an operation to choose an optimum path to convey data from the source address to the target address. A static route is a manually configured special route and is simpler, more efficient, and more reliable. An appropriate static route can reduce issues arising from route selection and ease the overflow of route selection data flow, improving the rate of data packet forwarding.

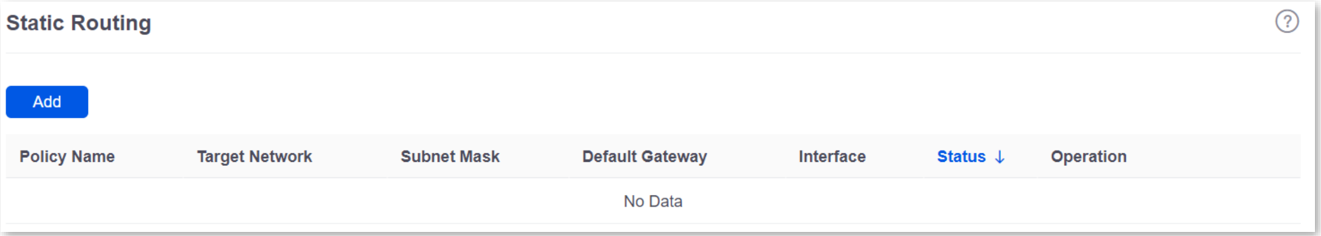
You can specify a static route by setting **Target Network**, **Subnet Mask**, **Default Gateway** and **Interface**. Among these parameters, **Target Network** and **Subnet Mask** are used to specify a target network or host. After the static route is configured successfully, all the data whose target address is in the target network of the static routing is directly forwarded to the gateway address through the interface of the static route.

NOTE

– If static routes are completely used in a large-scale and complicated network, route unavailability and network interruption may occur in case of network fault or topology change. Under such circumstances, the network administrator needs to manually change the static routing configurations.

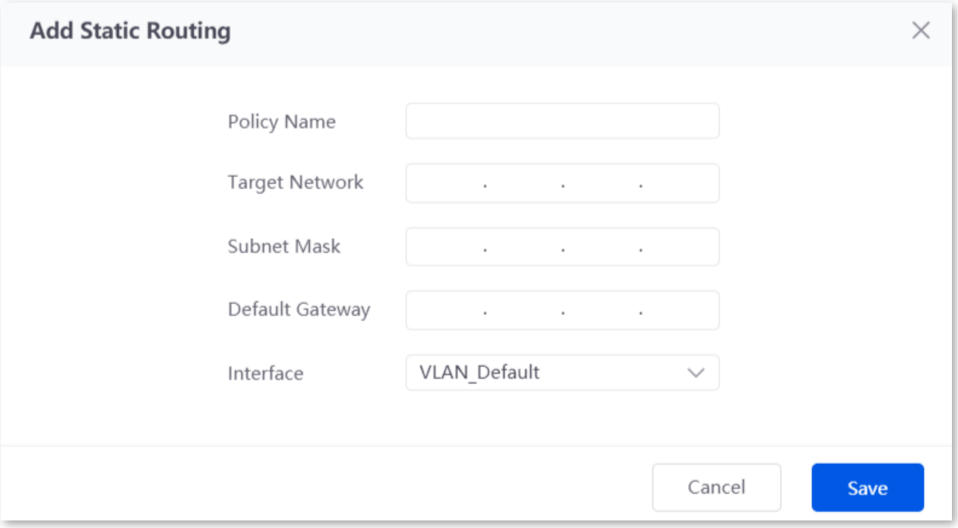
– When a static routing policy conflicts with a customized multi-WAN policy, static routing takes precedence.

Log in to the web UI of the router, and navigate to **More** > **Advanced Routing** > **Static Routing** to enter the page. On this page, you can configure the corresponding static routing according to actual network conditions. You can click ⋮ to select parameters to be displayed.



Policy Name	Target Network	Subnet Mask	Default Gateway	Interface	Status ↓	Operation
No Data						

You can click **Add** to add a new static routing policy.



Policy Name	
Target Network	. . .
Subnet Mask	. . .
Default Gateway	. . .
Interface	VLAN_Default

Parameter description

Parameter	Description
Policy Name	Specifies the name of the static routing policy.
Target Network	Specifies the IP address of the target network. **0.0.0.0** target network and **0.0.0.0** subnet mask indicate the default route. TIP If no accurate route is found in the route table, the default route will be chosen for router to forward data packets.
Subnet Mask	Specifies the subnet mask of the target network.
Default Gateway	Specifies the ingress port IP address of the next hop route after data packets egress from the router. **0.0.0.0** indicates direct routing, which means that the target network is directly connected to the interface of the router.
Interface	Specifies the interface from which packets egress. Select it as required.
Status	Specifies the current policy status, including **Enabled** and **Disabled**.
Operation	Used to edit, enable, disable or delete the static routing policy. Edit: Used to modify the static routing policy. Enable : Used to enable the static routing policy. Disable : Used to disable the static routing policy. Delete : Used to delete the static routing policy.

Example of configuring static routing

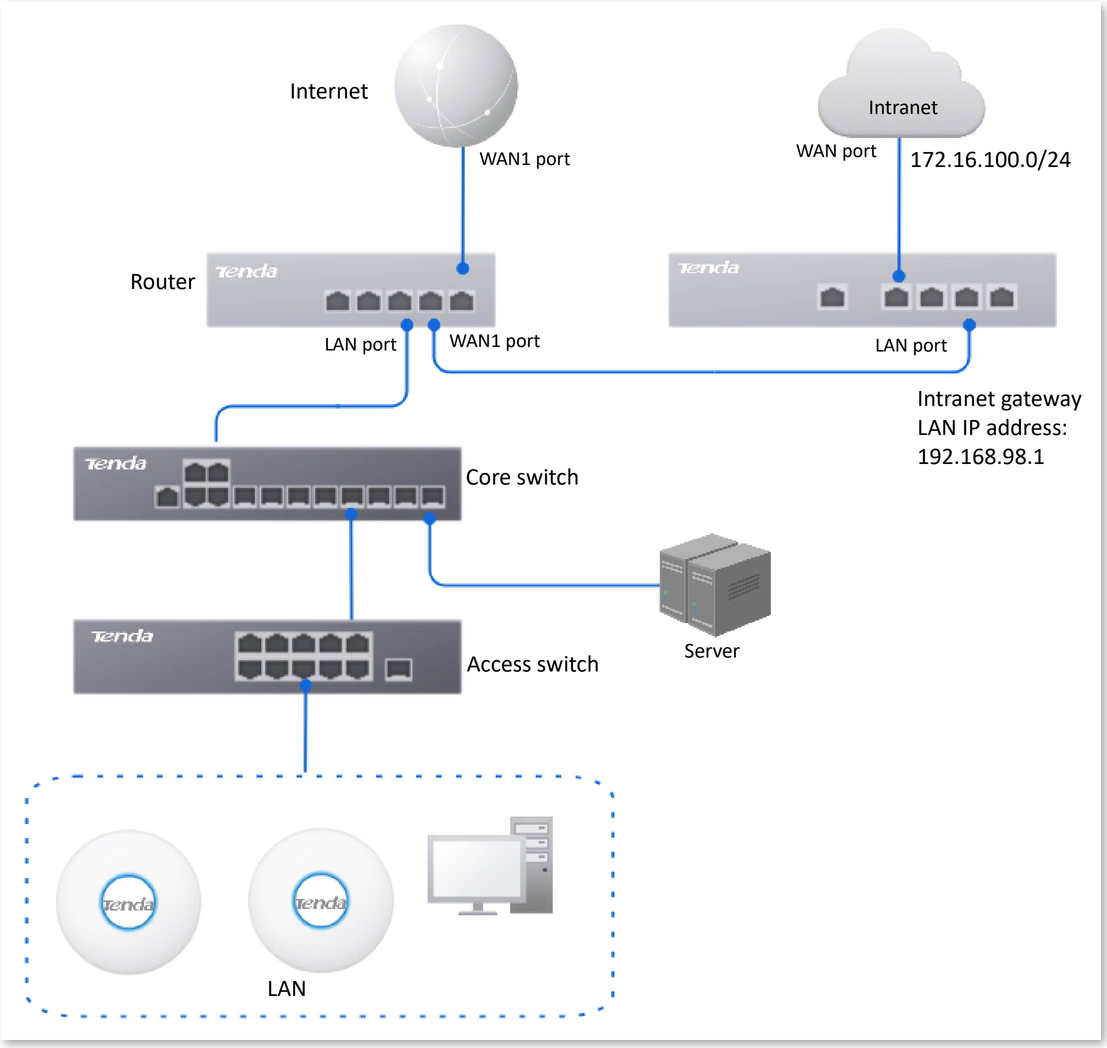
Networking requirements

An enterprise uses the enterprise router to set up a network. The WAN1 port is connected to the internet through PPPoE. Now the enterprise has set up an intranet, which is in a different network from the internet. The WAN2 port is connected to the enterprise's intranet through dynamic IP address.

The enterprise has the following requirements: LAN users can access both the internet and the intranet.

Solution

You can use the static routing function to meet the requirements.



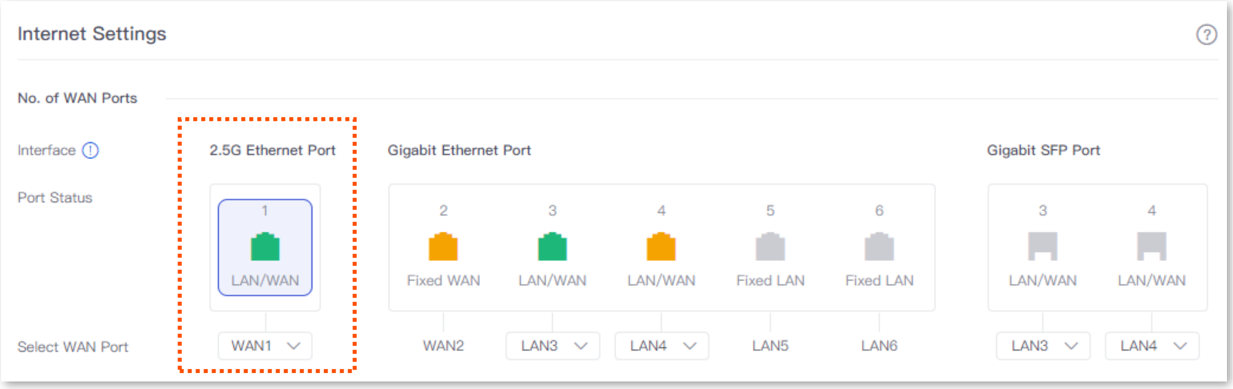
Configuration procedure

Connect the WAN port to the internet
Configure the static routing

Step 1 Log in to the web UI of the router.

Step 2 Enable two WAN ports and connect WAN1 port to the internet.

1. Navigate to **Network** > **Internet Settings**.
2. Set **WAN1** as Ethernet port 1.

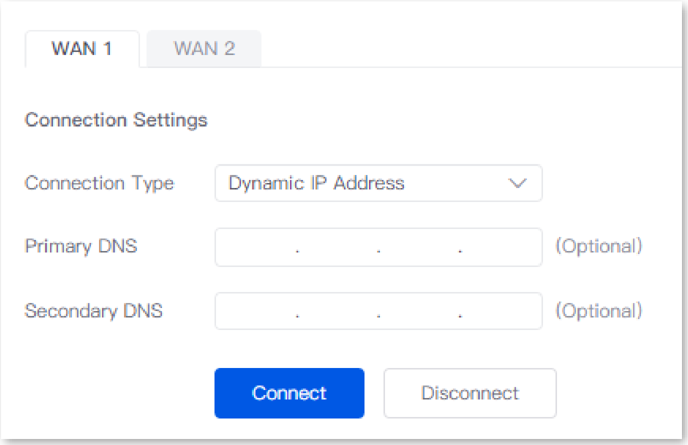


Internet Settings

No. of WAN Ports

Interface	2.5G Ethernet Port	Gigabit Ethernet Port					Gigabit SFP Port	
Port Status	1	2	3	4	5	6	3	4
	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN	LAN/WAN	LAN/WAN
Select WAN Port	WAN1	WAN2	LAN3	LAN4	LAN5	LAN6	LAN3	LAN4

3. Under **WAN1**, select **Dynamic IP Address** for **Connection Type**, and click **Connect**.



WAN 1 WAN 2

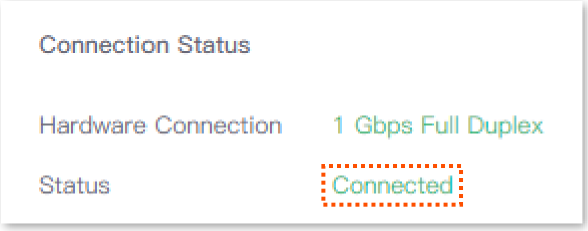
Connection Settings

Connection Type: Dynamic IP Address

Primary DNS: . . . (Optional)

Secondary DNS: . . . (Optional)

When the **Status** is **Connected**, the WAN1 port is successfully connected to the network.



Connection Status

Hardware Connection: 1 Gbps Full Duplex

Status: Connected

Step 3 Configure the static routing.

1. Obtain the IP address information of the WAN1 port.

   Navigate to **Network > Internet Settings,** and view the IP address information obtained by WAN2 under **Connection Status**, assuming the following:

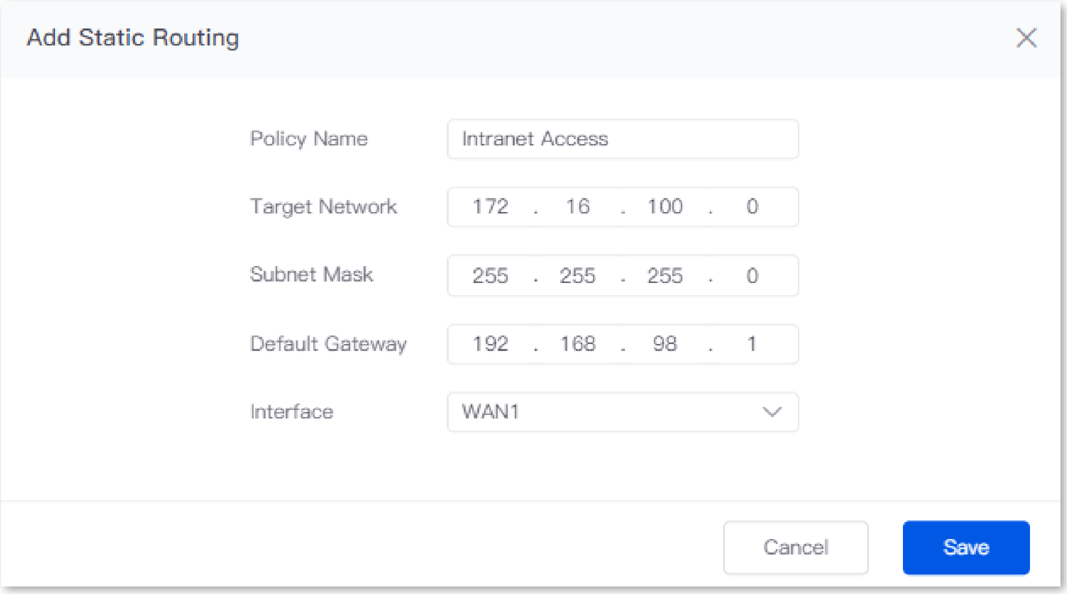
WAN2 IP Address	Subnet Mask	Default Gateway	Primary DNS
192.168.98.190	255.255.255.0	192.168.98.1	192.168.98.1

2. Configure parameters of the static routing.

   The following table lists the static routing parameters for example:

Policy Name	Target Network	Subnet Mask	Default Gateway	Interface
Intranet Access	172.16.100.0	255.255.255.0	192.168.98.1	WAN1

   Navigate to **More** > **Advanced Routing** > **Static Routing**, click **Add** to configure parameters in the **Add Static Routing** window, and click **Save**.

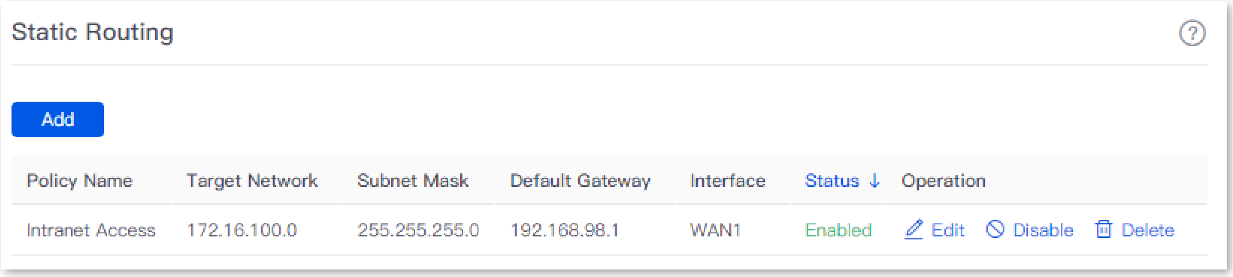


Add Static Routing

Policy Name	Intranet Access
Target Network	172 . 16 . 100 . 0
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	192 . 168 . 98 . 1
Interface	WAN1

----End

The static route is added successfully.



Static Routing

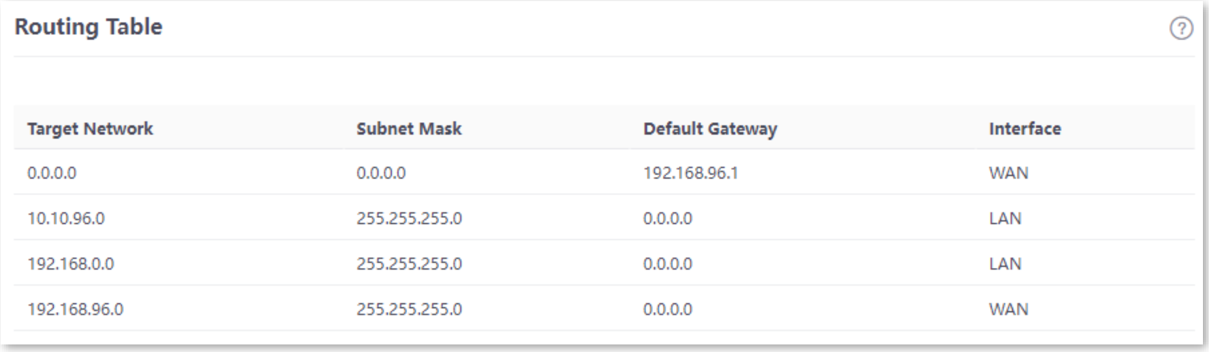
Policy Name	Target Network	Subnet Mask	Default Gateway	Interface	Status ↓	Operation
Intranet Access	172.16.100.0	255.255.255.0	192.168.98.1	WAN1	Enabled	Edit Disable Delete

Verification

LAN users can access both the internet and the intranet.

10.1.4 Routing table

Log in to the web UI of the router, and navigate to **More** > **Advanced Routing** > **Routing Table** to enter the page. On this page, you can view the detailed routing information of the router.



Routing Table

Target Network	Subnet Mask	Default Gateway	Interface
0.0.0.0	0.0.0.0	192.168.96.1	WAN
10.10.96.0	255.255.255.0	0.0.0.0	LAN
192.168.0.0	255.255.255.0	0.0.0.0	LAN
192.168.96.0	255.255.255.0	0.0.0.0	WAN

Parameter description

Parameter	Description
Target Network	Specifies the IP address of the destination network. If both the destination network and subnet mask are 0.0.0.0, it is the default route. NOTE When a route that exactly matches the destination address of the packet cannot be found in the routing table, the router will select the default route to forward the packet.
Subnet Mask	Specifies the subnet mask of the destination network.
Default Gateway	Specifies the ingress IP address of the next hop router of data packets. The default gateway is 0.0.0.0, which means direct routing, that is, the destination network is the network directly connected to the interface of the router.
Interface	Specifies the interface of the router that data packets are forwarded.

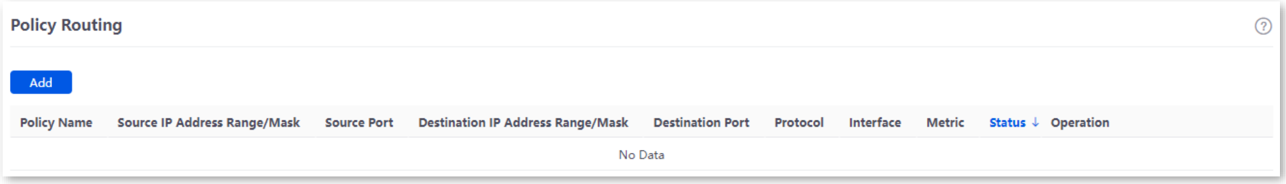
10.1.5 Policy routing

Overview

Policy routing, also known as policy-based routing, means that the next hop forwarding address of an IP packet is determined by a comprehensive consideration of multiple factors, rather than the destination or source IP address. You can set the source network, target network, destination port, protocol and WAN port with the policy routing for more accurate route selection.

With this function enabled, the router will forward the data packets that meet the policy conditions to the specified target network through the specified WAN port.

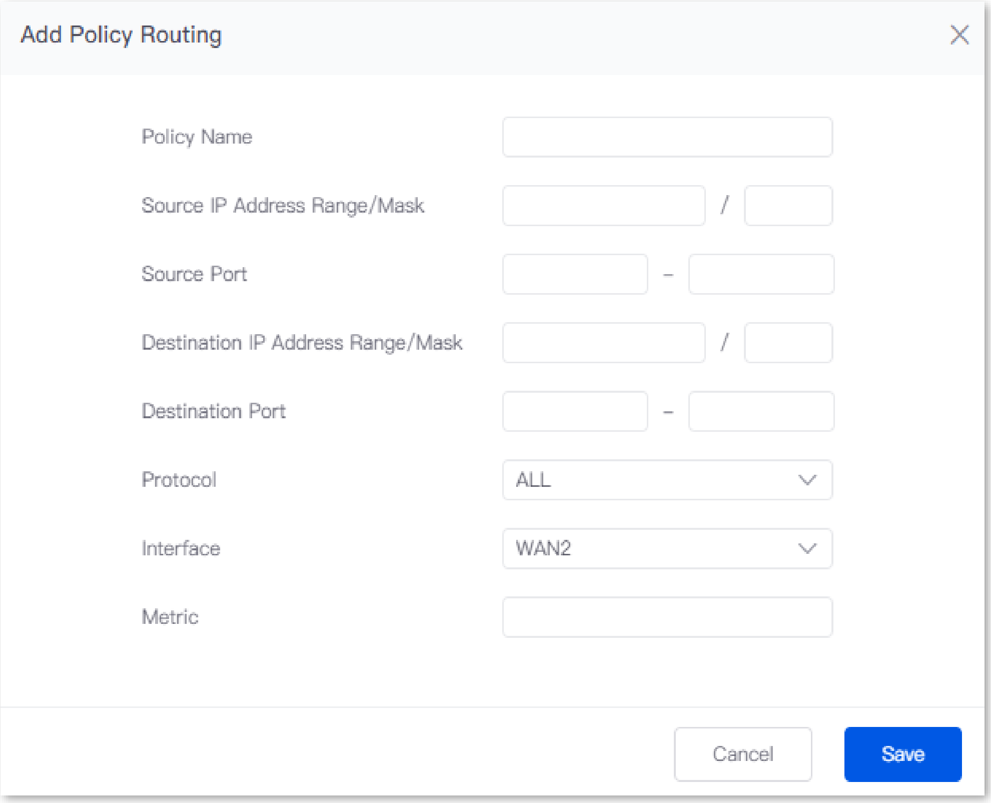
Log in to the web UI of the router, and navigate to **More** > **Advanced Routing** > **Policy Routing** to enter the page. On this page, you can configure the policy routing as required.



Policy Routing

Policy Name	Source IP Address Range/Mask	Source Port	Destination IP Address Range/Mask	Destination Port	Protocol	Interface	Metric	Status ↓	Operation
No Data									

You can click **Add** to add a new policy routing policy.



Add Policy Routing

Policy Name	
Source IP Address Range/Mask	/
Source Port	–
Destination IP Address Range/Mask	/
Destination Port	–
Protocol	ALL
Interface	WAN2
Metric	

Parameter description

Parameter	Description
Policy Name	Specifies the name of the policy routing rule.
Source IP Address Range/Mask	Specifies the source IP address range of data packets.
Source Port	Specifies the source port of data packets.
Destination IP Address Range/Mask	Specifies the destination IP address range to which data packets are forwarded.
Destination Port	Specifies the port of the device to which data packets are forwarded, which ranges from 1 to 65535.

Parameter	Description
Protocol	Specifies the protocol type of data packets. - **ALL**: If you are not sure about the protocol type, **ALL** is recommended. - **TCP**: Transmission Control Protocol is a common protocol that provides reliable data transmission. - **UDP**: User Datagram Protocol is a simple packet-oriented communication protocol.
Interface	Specifies the physical port for which the policy takes effect. Data packets that meet the conditions of the policy routing will be forwarded through this port.
Metric	Specifies the metric of the policy. A smaller metric indicates a higher priority for policy routing. The metric value ranges from 1 to 9999.
Status	Specifies the status of the policy routing rule, including **Enabled**, **Disabled** and **Expired**.
Operation	Used to edit, enable, disable or delete the policy routing policy. ✎ Edit: Used to modify the corresponding policy routing policy. ▷ Enable : Used to enable the corresponding policy routing policy. ⊘ Disable : Used to disable the corresponding policy routing policy. 🗑 Delete : Used to delete the corresponding policy routing policy.

Example of configuring policy routing

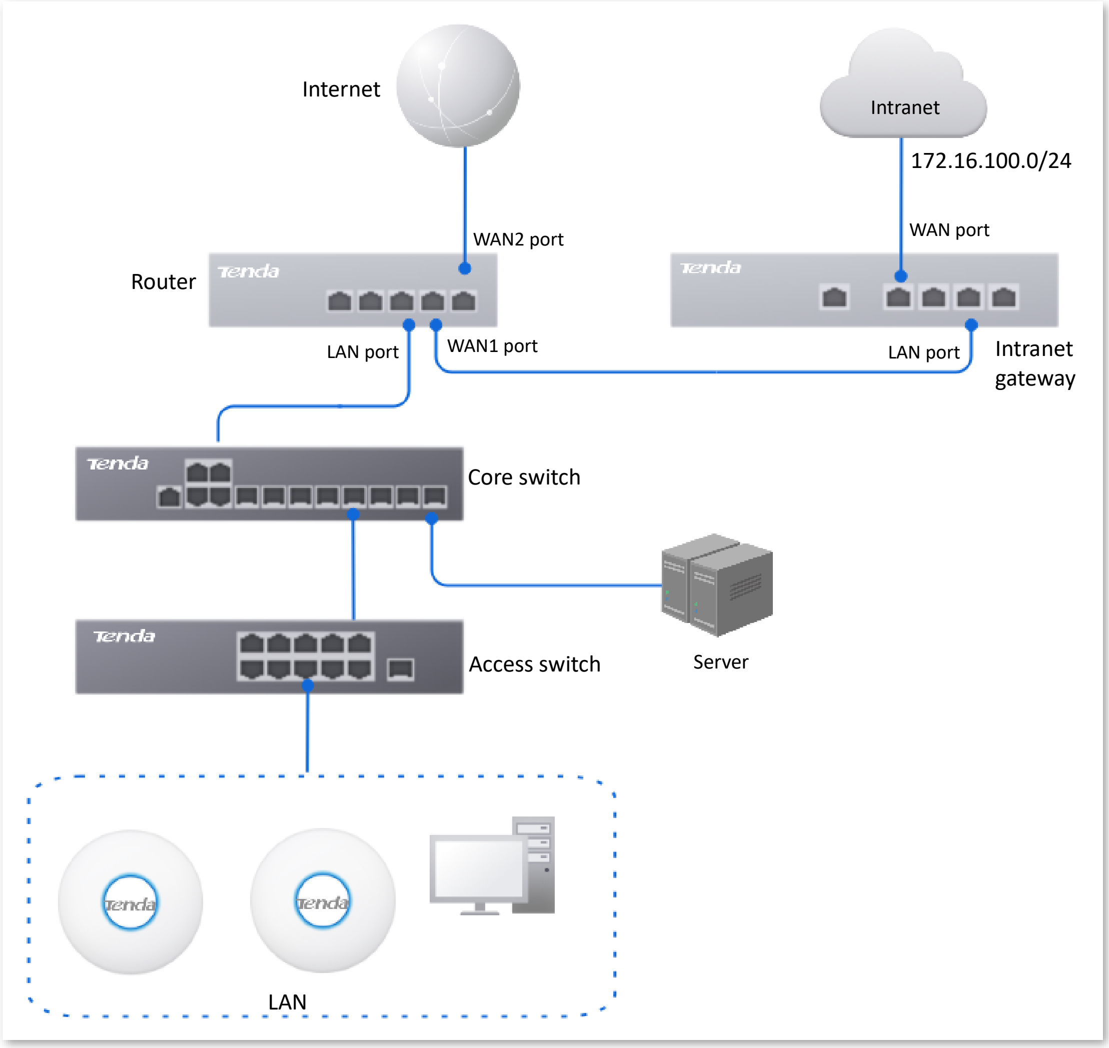
Networking requirements

An enterprise uses the enterprise router to set up a network. The router is connected to the internet through PPPoE. The enterprise has built a web server on the intranet, which is in a different network from the internet. The access mode of the enterprise's intranet is dynamic IP address.

The enterprise has the following requirements: Users whose LAN addresses are 192.168.0.2 - 192.168.0.254 can access both the internet and the Web server of the enterprise's intranet (the port number is 9999).

Solution

You can use the policy routing function to meet the requirements.



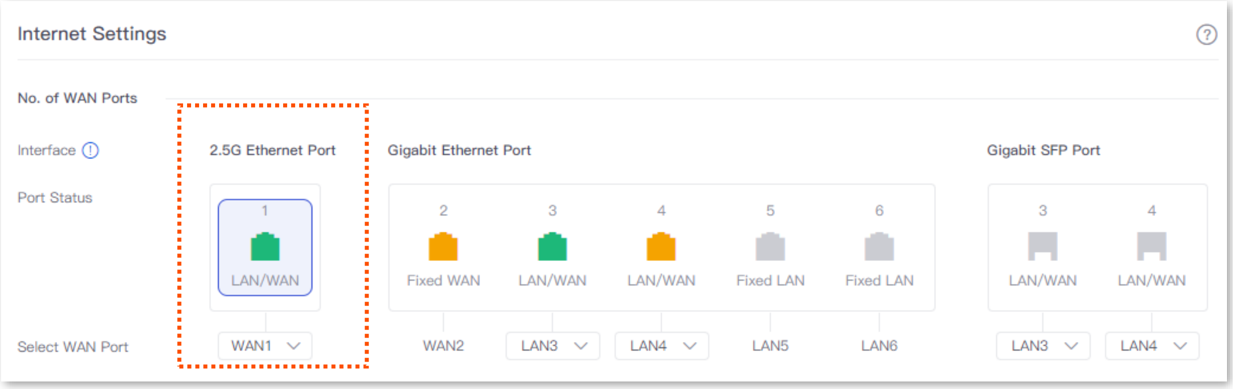
Configuration procedure

Configure the WAN1 port to access the internet → Configure the policy routing

Step 1 [Log in to the web UI of the router](#).

Step 2 Configure the WAN1 port to access the internet.

1. Navigate to **Network** > **Internet Settings**.
2. Set **WAN1** as Ethernet port 1.



Internet Settings

No. of WAN Ports

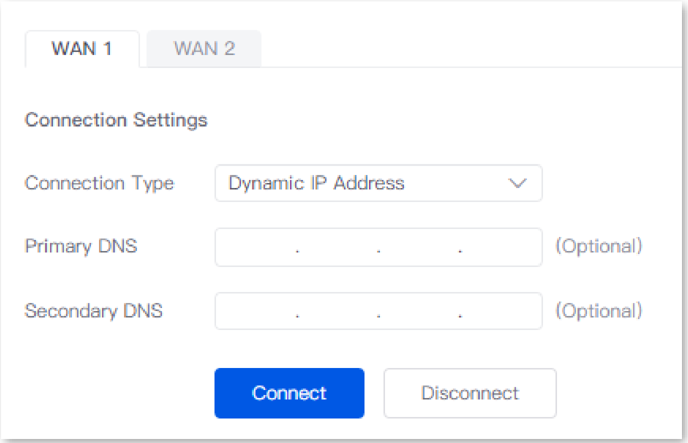
Interface

Port Status

Select WAN Port

	2.5G Ethernet Port	Gigabit Ethernet Port					Gigabit SFP Port	
	1	2	3	4	5	6	3	4
Port Status	LAN/WAN	Fixed WAN	LAN/WAN	LAN/WAN	Fixed LAN	Fixed LAN	LAN/WAN	LAN/WAN
Select WAN Port	WAN1	WAN2	LAN3	LAN4	LAN5	LAN6	LAN3	LAN4

3. Under **WAN1**, select **Dynamic IP Address** for **Connection Type**, and click **Connect**.



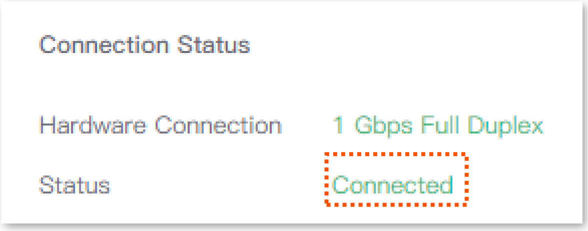
Connection Settings

Connection Type: Dynamic IP Address

Primary DNS: . . . (Optional)

Secondary DNS: . . . (Optional)

When the **Status** is **Connected**, the WAN port is successfully connected to the network.



Connection Status

Hardware Connection: 1 Gbps Full Duplex

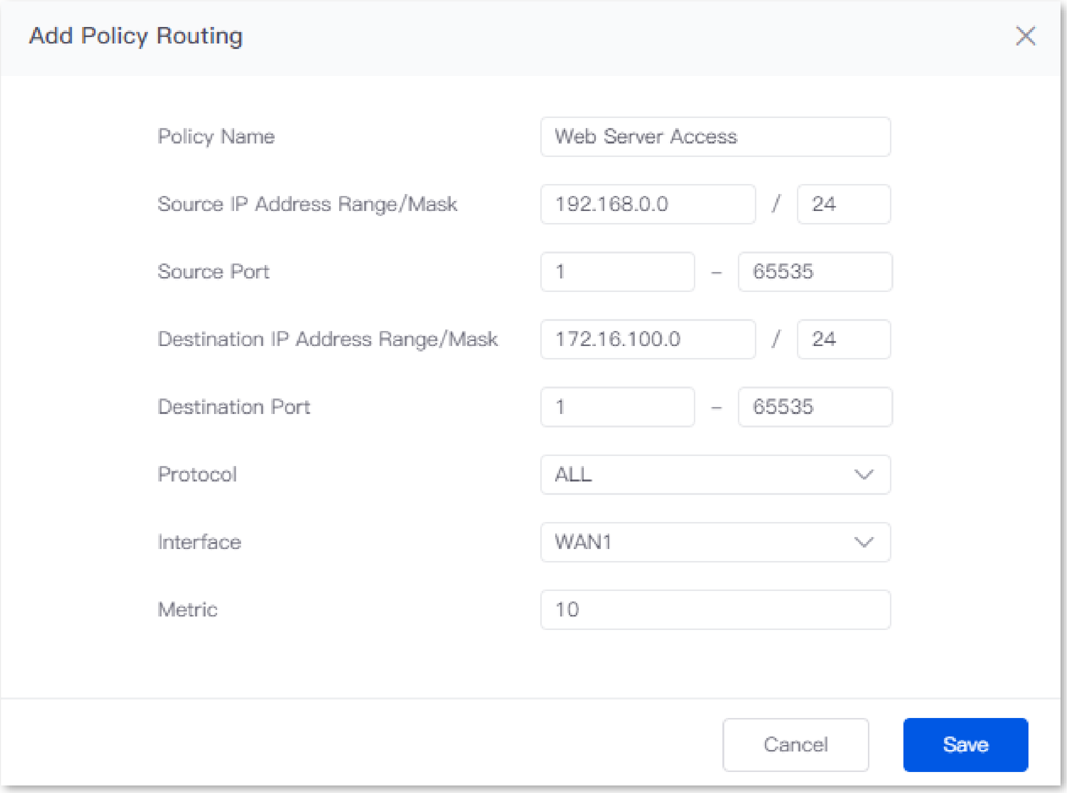
Status: Connected

Step 3 Configure the policy routing.

The following table provides the examples of policy routing parameters.

Policy Name	Source IP Address Range/Mask	Source Port	Destination IP Address Range/Mask	Destination Port	Protocol	Interface	Metric
Web Server Access	192.168.0.0/24	1–65535	172.16.100.0/24	1–65535	ALL	WAN1	10

Navigate to **More** > **Advanced Routing** > **Policy Routing**, click **Add** to configure parameters in the **Add Policy Routing** window, and click **Save**.

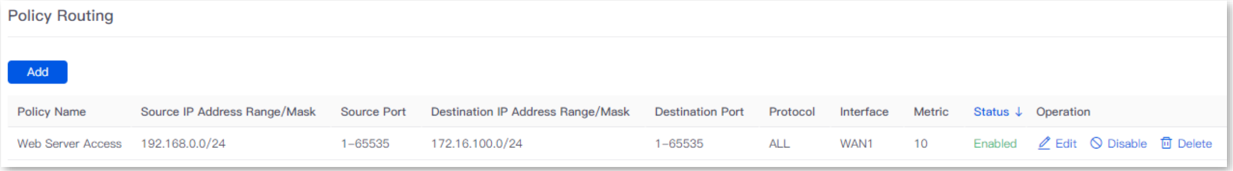


Add Policy Routing

Policy Name	Web Server Access
Source IP Address Range/Mask	192.168.0.0 / 24
Source Port	1 – 65535
Destination IP Address Range/Mask	172.16.100.0 / 24
Destination Port	1 – 65535
Protocol	ALL
Interface	WAN1
Metric	10

----End

The policy routing is added successfully.



Policy Routing

Policy Name	Source IP Address Range/Mask	Source Port	Destination IP Address Range/Mask	Destination Port	Protocol	Interface	Metric	Status ↓	Operation
Web Server Access	192.168.0.0/24	1–65535	172.16.100.0/24	1–65535	ALL	WAN1	10	Enabled	Edit Disable Delete

Verification

Users whose LAN addresses ranging from 192.168.0.2 - 192.168.0.254 can access both the internet and the intranet.

10.2 Virtual Service

10.2.1 DMZ

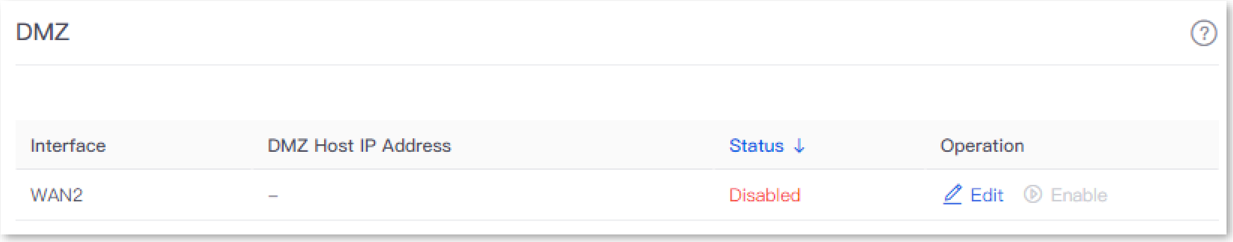
Overview

After a device in the LAN is set as the DMZ host, the device enjoys no limitations when communicating with the internet. For example, if video meeting or online games are underway on a computer, you can set that computer as the DMZ host to make the video meeting and online games go smoother.

NOTE

- After you set a LAN device as a DMZ host, the device will be completely exposed to the internet and the firewall of the router does not take effect on the device.
- Hackers may attack on the local network by using the DMZ host. Exercise caution to use the DMZ function.
- The security guard, anti-virus software and system firewall on the DMZ host may affect the DMZ function. Disable them when using this function. When you are not using the DMZ function, you are recommended to disable the function and enable the firewall, security guard and anti-virus software on the DMZ host.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **DMZ** to enter the page. On this page, you can modify the corresponding DMZ policy as required. This function is disabled by default. You can click ⋮ to select parameters to be displayed.



DMZ

Interface	DMZ Host IP Address	Status ↓	Operation
WAN2	–	Disabled	Edit Enable

Parameter description

Parameter	Description
Interface	Specifies the port whose DMZ service will be enabled.
DMZ Host IP Address	Specifies the IP address of the device to be set as a DMZ host within the LAN.
Status	Specifies the status of the DMZ policy, including **Enabled** and **Disabled**.
Operation	Used to edit, enable or disable the DMZ policy. Edit: Used to modify the DMZ policy. Enable: Used to enable the DMZ policy. Disable : Used to disable the DMZ policy.

Example of configuring DMZ

Networking requirements

An enterprise uses the enterprise router to set up a network. The router has connected to the internet and can offer internet service for LAN users. The enterprise has the following requirements:

The intranet web server is open to internet users to enable staff to access the intranet even when they are not in the enterprise.

Solution

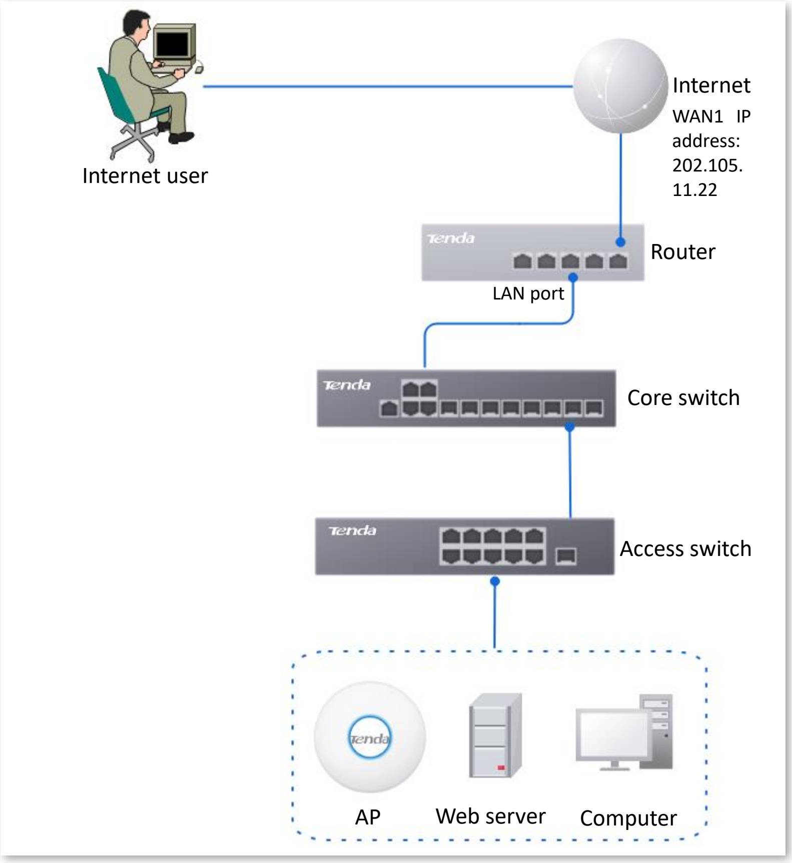
- You can use the DMZ function to enable internet users to access the intranet web server.
- You can use the DHCP reservation function to avoid access failures caused by web server address change.

Assume that the information of the web server is shown as below:

- IP address of the web server: 192.168.0.250
- MAC address of the host that runs the web server: C8:9C:DC:60:54:69
- Service port: 9999

TIP

- Before the configuration, ensure that the WAN port of the router obtains a public IP address. If the WAN port obtains a private IP address or an intranet IP address assigned by the ISP, the DMZ function may not take effect. Common IPv4 addresses are classified into class A, class B and class C. Private IP addresses of class A range from 10.0.0.0 to 10.255.255.255. Private IP addresses of class B range from 172.16.0.0 to 172.31.255.255. Private IP addresses of class C range from 192.168.0.0 to 192.168.255.255.
- ISPs may not support unreported web service accessed using the default port number 80. Therefore, when setting DMZ host, you are recommended to set the external port as a non-familiar port (1024 to 65535), such as 9999, to ensure normal access.



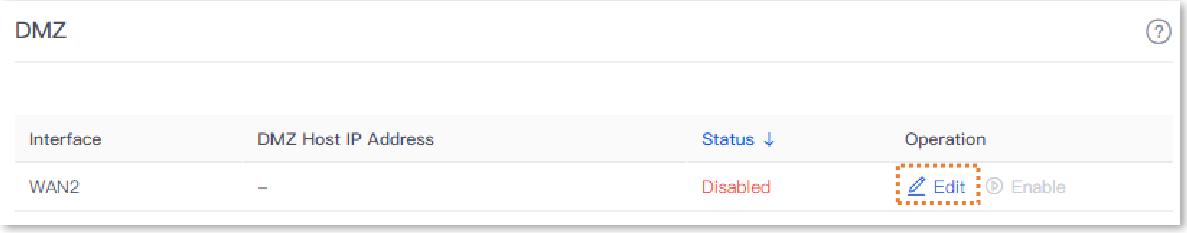
Configuration procedure

Set the DMZ host → Reserve a fixed IP address for the DMZ host

Step 1 Log in to the web UI of the router.

Step 2 Set the DMZ host.

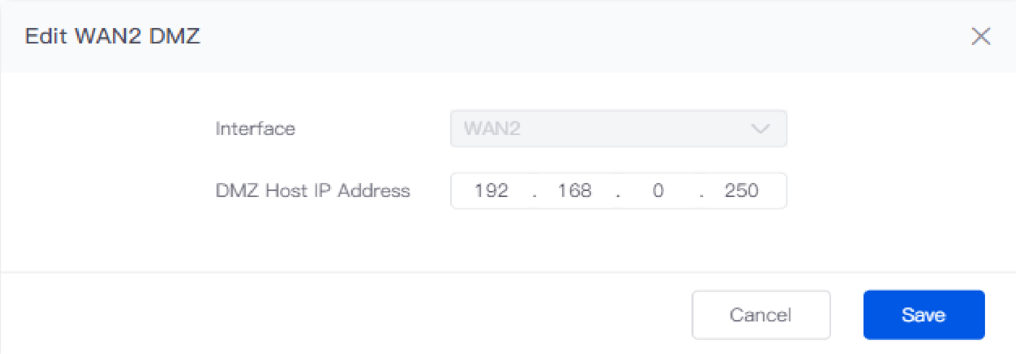
1. Navigate to **More** > **Virtual Service** > **DMZ**.
2. Locate the corresponding WAN port, and click **Edit**.



DMZ

Interface	DMZ Host IP Address	Status ↓	Operation
WAN2	–	Disabled	Edit Enable

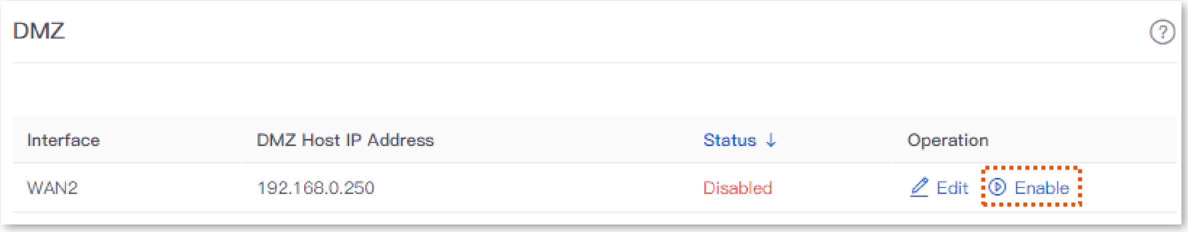
3. Set **DMZ Host IP Address** (the IP address of the LAN device to be set as the DMZ host), which is **192.168.0.250** in this example.
4. Click **Save**.



Edit WAN2 DMZ

Interface	WAN2
DMZ Host IP Address	192 . 168 . 0 . 250

5. Click **Enable**.

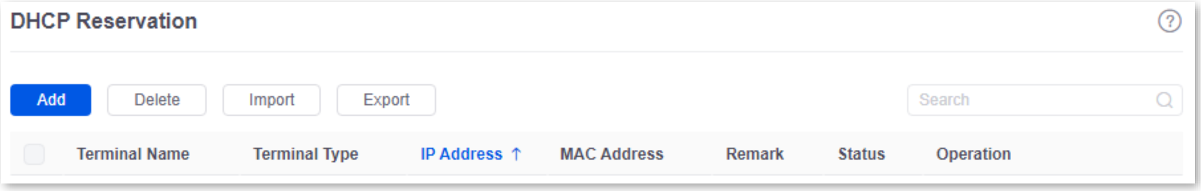


DMZ

Interface	DMZ Host IP Address	Status ↓	Operation
WAN2	192.168.0.250	Disabled	Edit Enable

Step 3 Reserve a fixed IP address for the DMZ host.

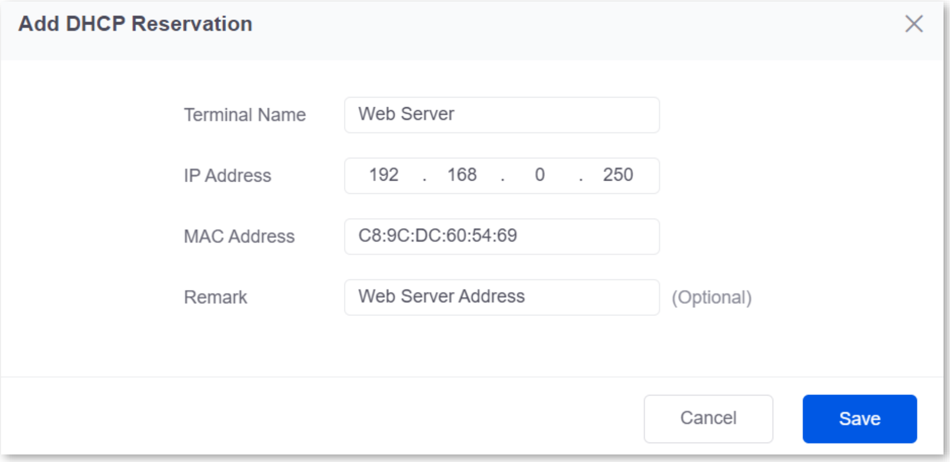
1. Navigate to **Network** > **DHCP Settings** > **DHCP Reservation**, and click **Add**.



DHCP Reservation

□	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Remark	Status	Operation

2. Set the following rules, and click **Save**.
   - Set **Terminal Name**, which is **Web Server** in this example.
   - Set **IP Address** to the fixed IP address assigned to the server host, which is **192.168.0.250** in this example.
   - Set **MAC Address** of the server host, which is **C8:9C:DC:60:54:69** in this example.
   - Set **Remark**, which is **Web Server Address** in this example.



Add DHCP Reservation

Terminal Name	Web Server
IP Address	192 . 168 . 0 . 250
MAC Address	C8:9C:DC:60:54:69
Remark	Web Server Address (Optional)

----End

Verification

Internet users can successfully access the intranet server by using the **Intranet service application layer protocol name**://**WAN port IP address**. If the intranet service port is not the default port number, the access address is **Intranet service application layer protocol name**://**WAN port IP address**:**Intranet service port**.

In this example, the access address is **http://202.105.11.22:9999**.

You can find the router's current WAN port IP address in Connection Status.

If DDNS is enabled on the WAN port, internet users can also access the intranet server by using **Intranet service application layer protocol name://WAN port domain name: Intranet service port**.

10.2.2 DDNS

Overview

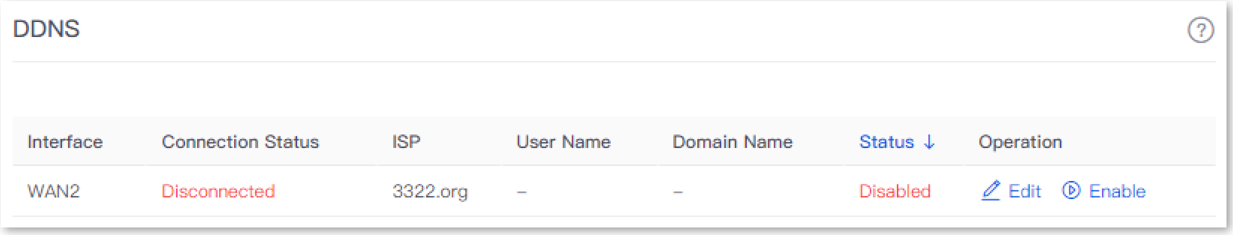
DDNS is abbreviated for Dynamic Domain Name Service. When a service is running, the DDNS client sends the IP address of the current WAN port of the router to the DDNS server, and the server updates the mapping relationships between the domain name and IP address in the database, achieving dynamic domain name resolution.

On this page, you can map the dynamic WAN IP address of the router (public IP address) to a fixed domain name. The DDNS function is generally used with such functions as port mapping and DMZ host to enable internet users to access the LAN server or the web UI of the router through a domain name without caring about the change of the WAN IP address.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **DDNS** to enter the page.

The router has created a corresponding DDNS policy for each WAN port by default, and the status is **Disabled**. On this page, you can modify the DDNS policy as required.

This function is disabled by default. You can click ⋮ to select parameters to be displayed.



DDNS

Interface	Connection Status	ISP	User Name	Domain Name	Status ↓	Operation
WAN2	Disconnected	3322.org	–	–	Disabled	Edit Enable

Parameter description

Parameter	Description
Interface	Specifies the port for which the DDNS service is enabled.
Connection Status	Specifies the connection status between the router and the domain server.

Parameter	Description
ISP	Specifies the service provider of DDNS. NOTE You need to sign up at the website of the ISP for an account before configuring the DDNS service.
User Name	Specifies the user name for logging in to the DDNS service. The user name is the login user name that you have signed up at the website of the ISP.
Domain Name	Specifies the domain name information provided by the DDNS service provider. Except for **oray.com**, you have to manually enter the domain name that you have applied at the corresponding website when you use services from other service providers.
Status	Specifies the status of the DDNS service policy, including **Enabled**, **Disabled** and **Expired**.
Operation	Used to edit, enable or disable the DDNS service policy. Edit: Used to modify the DDNS service policy. Enable: Used to enable the DDNS service policy. Disable : Used to disable the DDNS service policy.

Example of configuring DDNS

Networking requirements

An enterprise uses the enterprise router to set up a network. The router has connected to the internet and can offer internet service for LAN users. The enterprise has the following requirements:

The intranet web server is open to internet users to enable staff to access the intranet even when they are not in the enterprise.

Solution

- You can use the port mapping function to enable internet users to access the intranet web server.
- You can use the DDNS function to enable internet users to access the intranet web server through a fixed domain name, avoiding access failures caused by WAN IP address change.
- You can use the DHCP reservation function to avoid access failures caused by web server address change.

Assume that the information of the web server is shown as below:

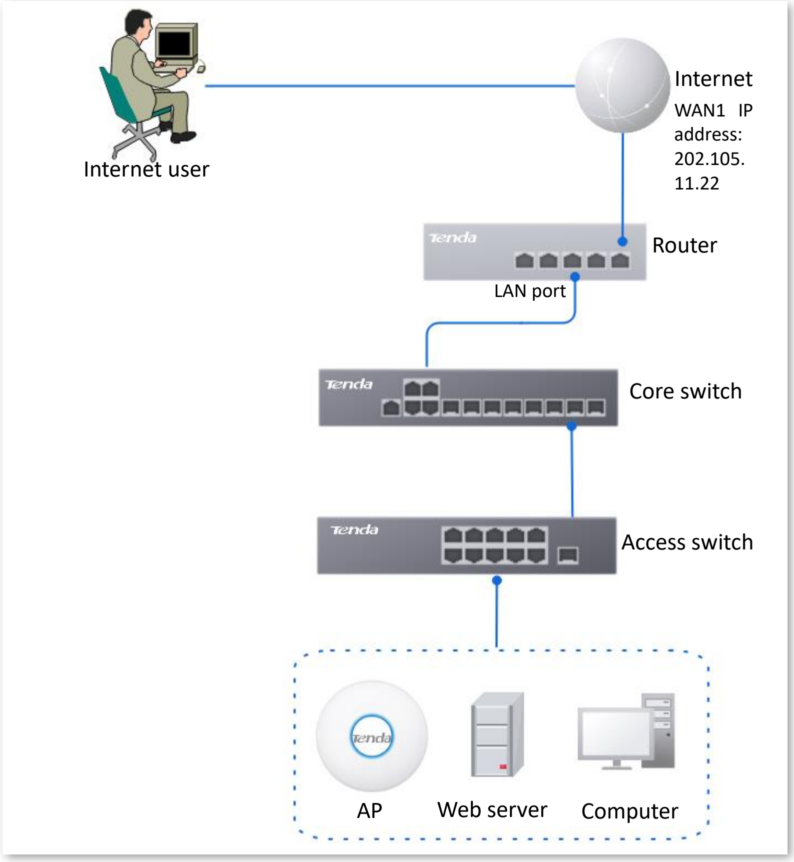
- IP address of the web server: 192.168.0.250
- MAC address of the host that runs the web server: C8:9C:DC:60:54:69
- Service port: 9999

TIP

– Before the configuration, ensure that the WAN port of the router obtains a public IP address. If the WAN port obtains a private IP address or an intranet IP address assigned by the ISP, the DDNS function may not take effect. Common IPv4 addresses are classified into class A, class B and class C. Private IP addresses of class A range from 10.0.0.0 to 10.255.255.255. Private IP addresses of class B range from 172.16.0.0 to 172.31.255.255. Private IP addresses of class C range from 192.168.0.0 to 192.168.255.255.

– ISPs may not support unreported web service accessed using the default port number 80. Therefore, when setting port mapping, you are recommended to set the external port as a non-familiar port (1024 to 65535), such as 9999, to ensure normal access.

– Internal and external ports can be different.



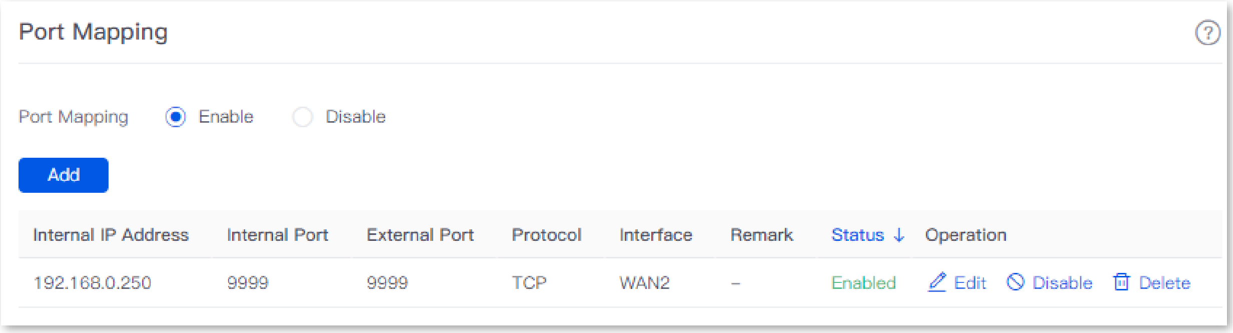
Configuration procedure

Set port mapping → Set the fixed IP address assigned to the server host → Set DDNS

Step 1 Log in to the web UI of the router.

Step 2 Set port mapping.

Navigate to **More** > **Virtual Service** > **Port Mapping**, and set the following rules. If necessary, you can refer to Port mapping.



Port Mapping

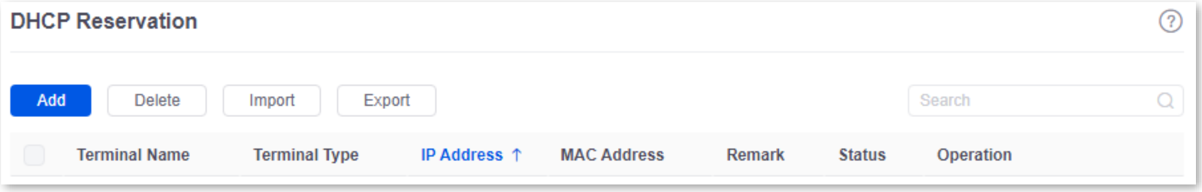
Port Mapping ● Enable ○ Disable

Add

Internal IP Address	Internal Port	External Port	Protocol	Interface	Remark	Status ↓	Operation
192.168.0.250	9999	9999	TCP	WAN2	–	Enabled	Edit Disable Delete

Step 3 Set the fixed IP address assigned to the server host.

1. Navigate to **Network** > **DHCP Settings** > **DHCP Reservation**, and click **Add**.

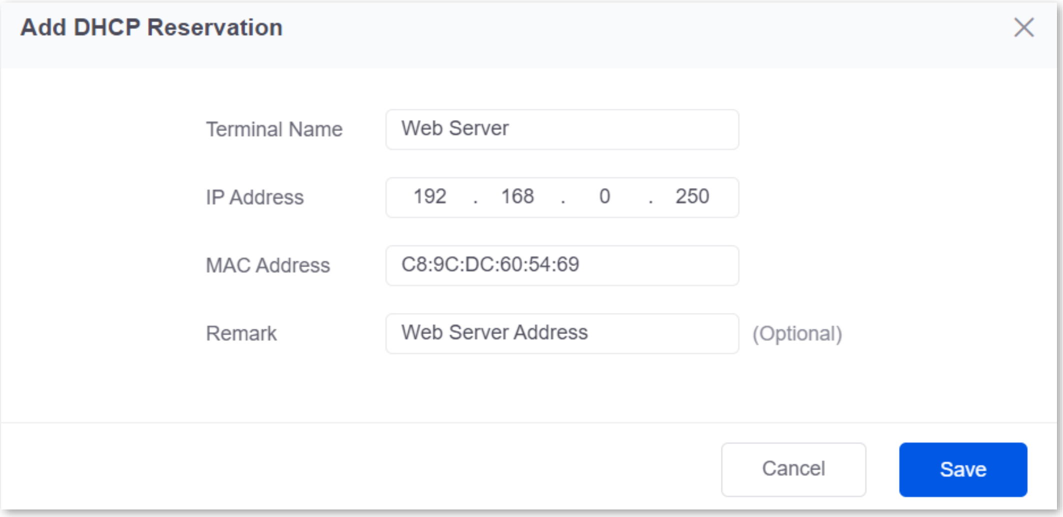


DHCP Reservation

Add Delete Import Export Search

□	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Remark	Status	Operation

2. Set the following rules, and click **Save**.
   - Set **Terminal Name**, which is **Web Server** in this example.
   - Set **IP Address** to the fixed IP address assigned to the server host, which is **192.168.0.250** in this example.
   - Set **MAC Address** of the server host, which is **C8:9C:DC:60:54:69** in this example.
   - Set **Remark**, which is **Web Server Address** in this example.



Add DHCP Reservation

Terminal Name: Web Server

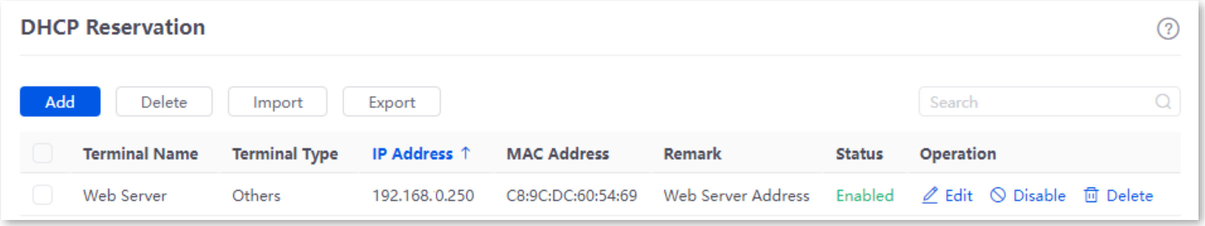
IP Address: 192 . 168 . 0 . 250

MAC Address: C8:9C:DC:60:54:69

Remark: Web Server Address (Optional)

Cancel Save

The fixed IP address is reserved successfully. See the following figure.



DHCP Reservation

Add Delete Import Export Search

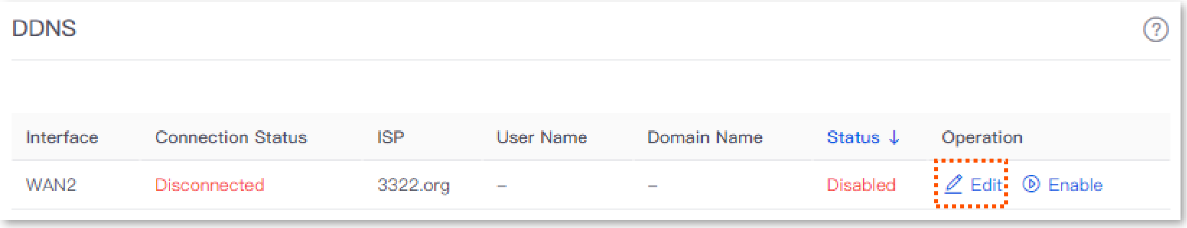
□	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Remark	Status	Operation
□	Web Server	Others	192.168.0.250	C8:9C:DC:60:54:69	Web Server Address	Enabled	Edit Disable Delete

Step 4 Register a domain name.

Log in to the DDNS provider website. Assume that the user name you registered is **JohnDoe**, the password is **JohnDoe123456**, and the domain name is **JohnDoe.3322.org**.

Step 5 Set DDNS.

1. Navigate to **More** > **Virtual Service** > **DDNS** to enter the configuration page. Click **Edit** after the corresponding WAN port rule, which is **WAN2** in this example.

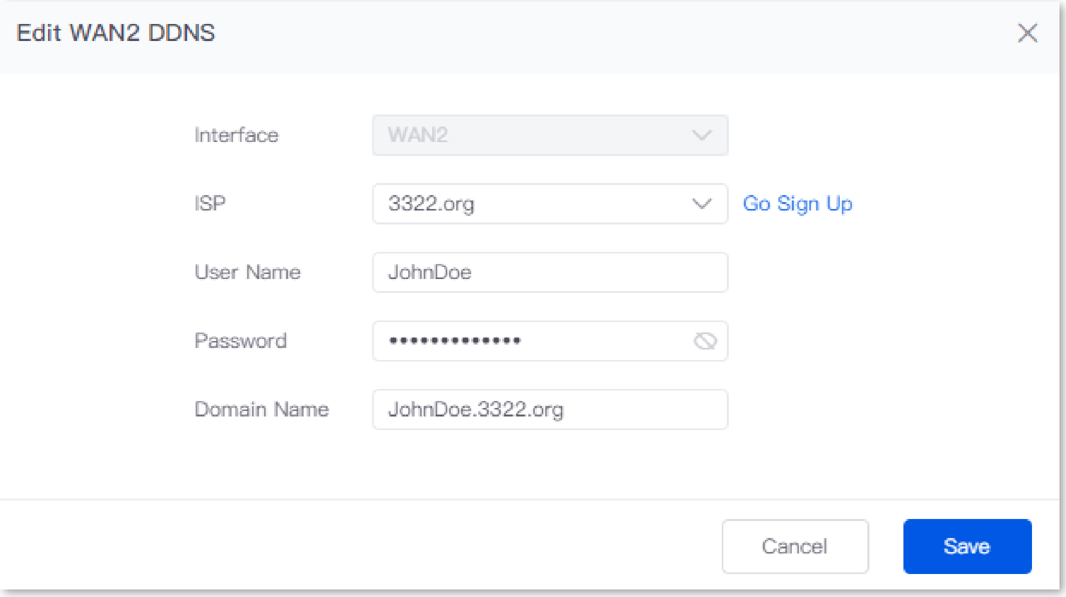


DDNS

Interface	Connection Status	ISP	User Name	Domain Name	Status ↓	Operation
WAN2	Disconnected	3322.org	–	–	Disabled	Edit Enable

2. Configure the following parameters in the pop-up **Edit WAN2 DDNS** window, and then click **Save**.

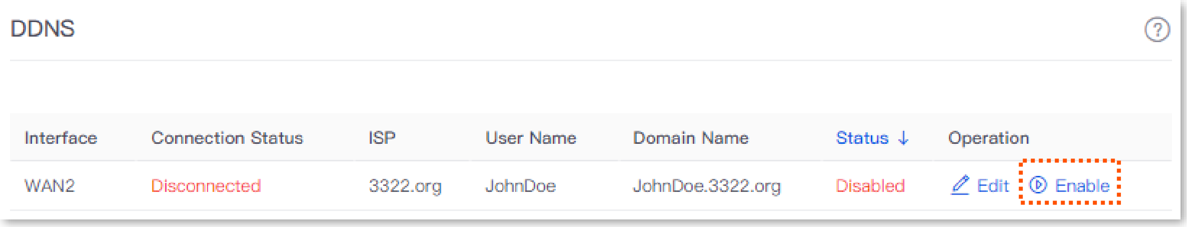
   - Set **Server Provider** (the DDNS provider where you applied the domain name), which is **3322.org** in this example.
   - Set **User Name** and **Password**, which are **JohnDoe** and **JohnDoe123456** in this example.
   - Set **Domain Name**, which is **JohnDoe.3322.org** in this example.



Edit WAN2 DDNS

Interface	WAN2
ISP	3322.org
User Name	JohnDoe
Password	•••••••••••••
Domain Name	JohnDoe.3322.org

3. Click **Enable**.

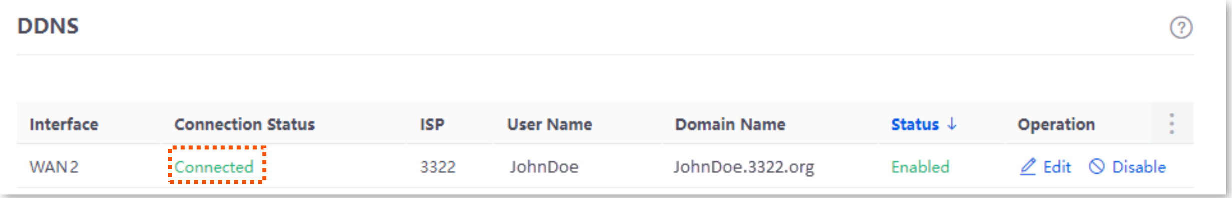


DDNS

Interface	Connection Status	ISP	User Name	Domain Name	Status ↓	Operation
WAN2	Disconnected	3322.org	JohnDoe	JohnDoe.3322.org	Disabled	Edit Enable

----End

The configuration is finished. Wait a moment, and refresh the page. When the **Connection Status** is **Connected**, the connection is successful.



DDNS

Interface	Connection Status	ISP	User Name	Domain Name	Status ↓	Operation
WAN2	Connected	3322	JohnDoe	JohnDoe.3322.org	Enabled	Edit Disable

Verification

Internet users can successfully access the intranet server by using the **Intranet service application layer protocol name**://**WAN port IP address**. If the intranet service port is not the default port number, the access address is **Intranet service application layer protocol name**://**WAN port IP address**:**External port**.

In this example, the access address is http://JohnDoe.3322.org:9999.

TIP

If internet users still cannot access the LAN server after the configuration is completed, try the following methods one by one:

– Ensure that the internal port you entered is correct.

– Maybe the system firewall, anti-virus software and security guard on the LAN server blocked internet user access. Disable these programs and try again.

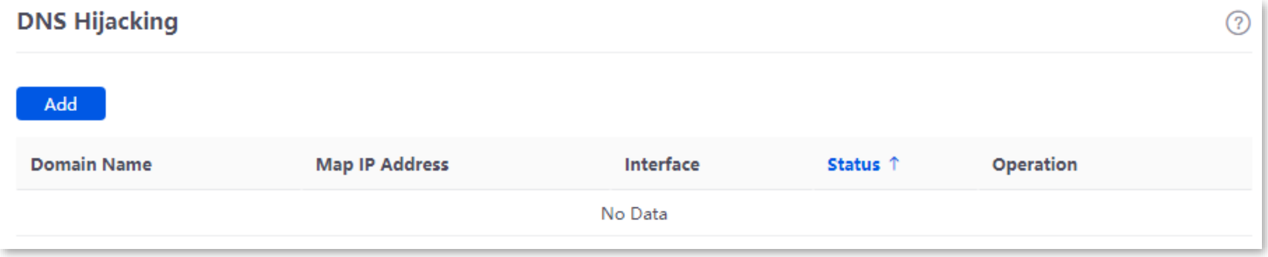
10.2.3 DNS hijacking

Overview

DNS is abbreviated for Domain Name Server, which is used to manage the relationships between the domain name and the IP address, and map the domain name and the IP address to each other.

After DNS hijacking is configured, when LAN users access the specified domain name, the domain name is directly parsed to the IP address corresponding to the access rule.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **DNS Hijacking** to enter the page. On this page, you can configure the DNS hijacking policy as required.



DNS Hijacking

Domain Name	Map IP Address	Interface	Status ↑	Operation
No Data				

Parameter description

Parameter	Description
Add	Used to add a new DNS hijacking policy.
Domain Name	Specifies the domain name to be hijacked.
Map IP Address	Specifies the IP address to be accessed after the hijacking.
Interface	Specifies the specified egress of the DNS hijacking policy.
Status	Specifies the current status of the DNS hijacking policy, including **Enabled** and **Disabled**.
Operation	Used to edit, enable, disable or delete the DNS hijacking policy. ✎ Edit: Used to modify the DNS hijacking policy. ⊙ Enable : Used to enable the DNS hijacking policy. ⊘ Disable : Used to disable the DNS hijacking policy. 🗑 Delete : Used to delete the DNS hijacking policy.

Example of configuring DNS hijacking

Networking requirements

An enterprise uses the enterprise router to set up a network. The router has connected to the internet and can offer internet service for LAN users. The enterprise has the following requirements:

When LAN users visit Amazon (Amazon.com), eBay (eBay.com) and other websites, they can access the web UI of the router.

Solution

The above requirements can be achieved using the DNS hijacking function of the router. Assume that the IP address of the router is 192.168.0.252.

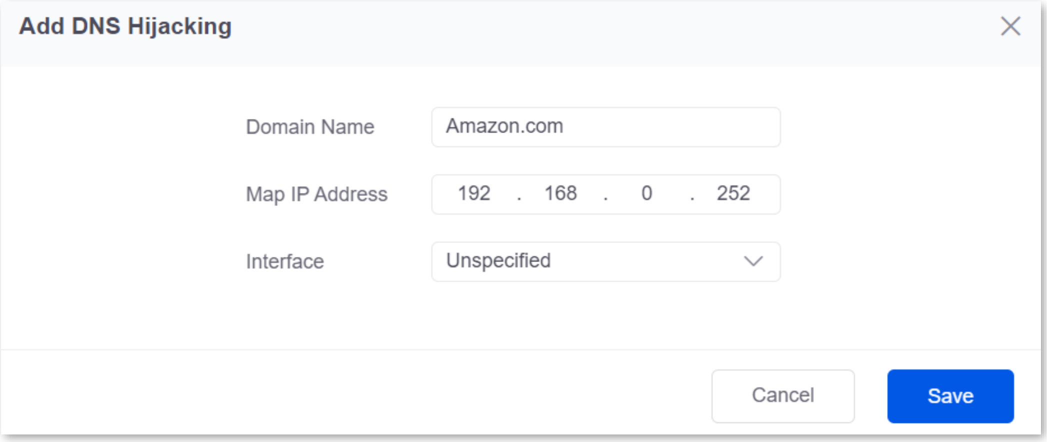
Configuration procedure

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **More** > **Virtual Service** > **DNS Hijacking**, and click **Add**.

Step 3 Set the following rules of the DNS hijacking policy, and click **Save**.

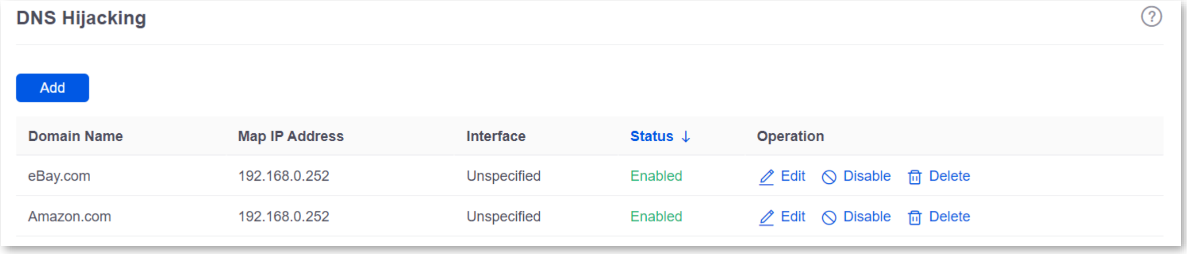
1. Set **Domain Name** of Amazon, which is **Amazon.com** in this example.
2. Set **Map IP Address** of the router, which is **192.168.0.252** in this example.



Add DNS Hijacking

Domain Name	Amazon.com
Map IP Address	192 . 168 . 0 . 252
Interface	Unspecified

Step 4 Refer to **Steps 2** - **3** to add a DNS hijacking policy whose domain name is eBay (eBay.com).



DNS Hijacking

Domain Name	Map IP Address	Interface	Status ↓	Operation
eBay.com	192.168.0.252	Unspecified	Enabled	Edit Disable Delete
Amazon.com	192.168.0.252	Unspecified	Enabled	Edit Disable Delete

----End

Verification

When LAN users visit Amazon (Amazon.com) and eBay (eBay.com) websites, they always visit the web UI of the router.

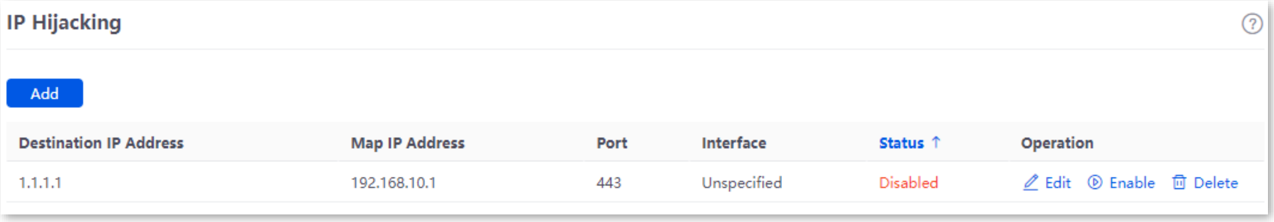
10.2.4 IP hijacking

Overview

After IP hijacking is configured, when a LAN user accesses a port of the specified IP address, the IP address will be directly hijacked to the mapped address.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **IP Hijacking** to enter the page. On this page, you can configure the IP hijacking policy as required.

Common ports: 443 (HTTPS protocol webpage service), 80 (HTTP protocol webpage service), 21 (FTP service) and so on.



IP Hijacking

Destination IP Address	Map IP Address	Port	Interface	Status ↑	Operation
1.1.1.1	192.168.10.1	443	Unspecified	Disabled	Edit Enable Delete

Parameter description

Parameter	Description
Add	Used to add a new IP hijacking policy.
Destination IP Address	Specifies the IP address to which the IP hijacking policy applies.
Map IP Address	Specifies the IP address to be accessed after the hijacking.
Port	Specifies the port to which the IP hijacking policy applies. The IP addresses will be hijacked only when specified ports are accessed. TIP The value 0 indicates all ports.
Interface	Specifies the specified egress of the IP hijacking policy.
Status	Specifies the current status of the IP hijacking policy, including **Enabled** and **Disabled**.
Operation	Used to edit, enable, disable or delete the IP hijacking policy. Edit: Used to modify the IP hijacking policy. Enable : Used to enable the IP hijacking policy. Disable : Used to disable the IP hijacking policy. Delete : Used to delete the IP hijacking policy.

Example of configuring IP hijacking

Networking requirements

An enterprise uses the enterprise router to set up a network. The router has connected to the internet and can offer internet service for LAN users. The enterprise has the following requirements:

The LAN users are redirected to the web UI of the router when accessing 1.1.1.1.

Solution

You can configure the IP hijacking function to meet the preceding requirements.

Assume that the management IP address of the router is 192.168.0.252 and the port number of the HTTPS web service is 443.

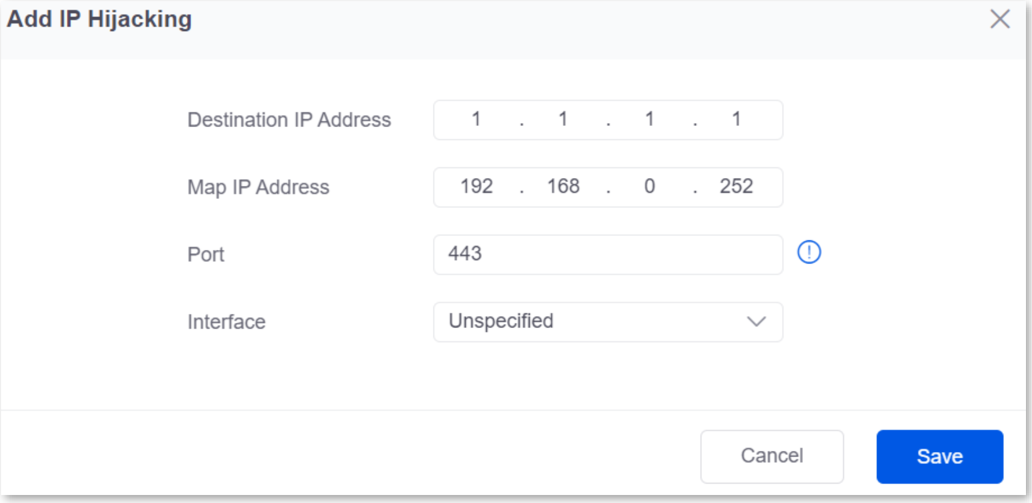
Configuration procedure

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **More** > **Virtual Service** > **IP Hijacking**, and click **Add**.

Step 3 Configure parameters in the **Add IP Hijacking** window, and click **Save**.

1. Set **Destination IP Address**, which is **1.1.1.1** in this example.
2. Set **Map IP Address**, which is **192.168.0.252** in this example.
3. Set **Port**, which is **443** in this example.



Add IP Hijacking

Destination IP Address: 1 . 1 . 1 . 1

Map IP Address: 192 . 168 . 0 . 252

Port: 443

Interface: Unspecified

----End

Verification

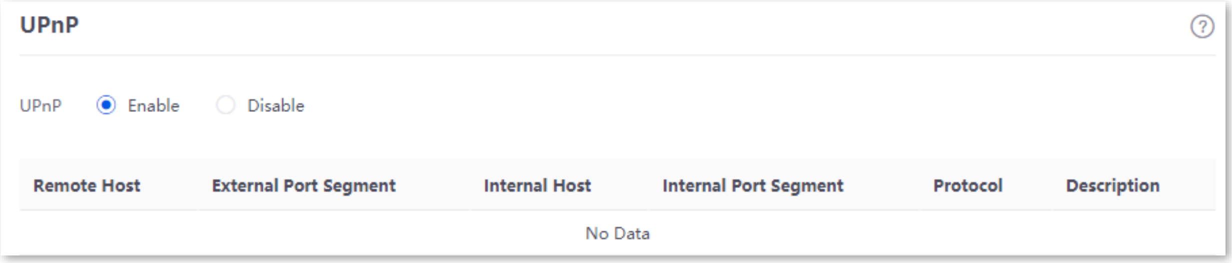
When LAN users access **1.1.1.1:443**, they actually access the web UI of the router.

10.2.5 UPnP

UPnP is abbreviated for Universal Plug and Play. After the UPnP function is enabled, the router can automatically open the ports for UPnP-supporting programs in the LAN (such as BitComet and AnyChat) and make these applications run smoother.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **UPnP** to enter the page. This function is disabled by default.

After this function is enabled, when UPnP-supporting programs (such as BitComet) are running in the LAN, you can check the port switching information generated when application programs send requests.



UPnP

UPnP ● Enable ○ Disable

Remote Host	External Port Segment	Internal Host	Internal Port Segment	Protocol	Description
No Data					

Parameter description

Parameter	Description
UPnP	Used to enable or disable the UPnP function.

Parameter	Description
Remote Host	Specifies the IP address of the remote server.
External Port Segment	Specifies the ports used by the remote server.
Internal Host	Specifies the server IP address for automatic port mapping of the LAN.
Internal Port Segment	Specifies the service port of the LAN server.
Protocol	Specifies the protocol type used for the service.
Description	Specifies the relevant information of the application.

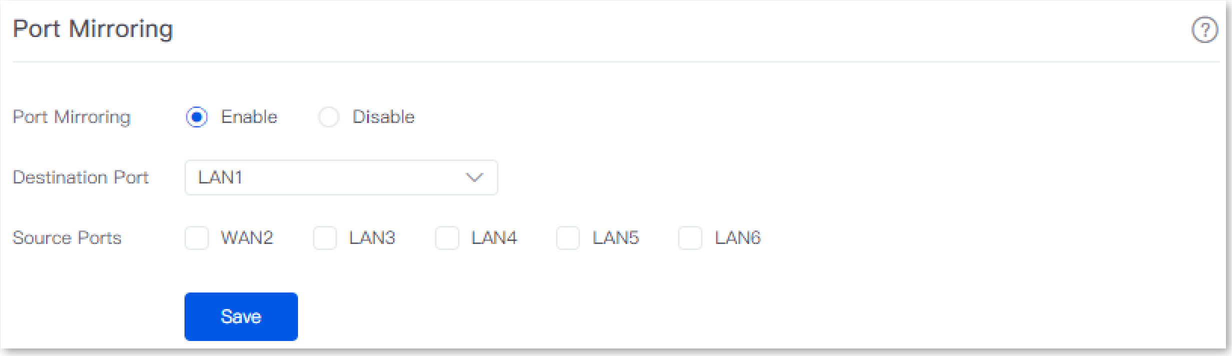
10.2.6 Port mirroring

Overview

On this page, you can copy the data from one or multiple ports (source ports) to a specified port (destination port) with the Port Mirroring function. Generally, the mirroring port is connected to a data monitoring device for the network administrator to perform real-time traffic monitoring, performance analysis and fault diagnosis.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **Port Mirroring** to enter the page. On this page, you can configure the port mirroring as required.

This function is disabled by default. The following displays the page when the function is enabled.



Port Mirroring

Port Mirroring ● Enable ○ Disable

Destination Port LAN1

Source Ports □ WAN2 □ LAN3 □ LAN4 □ LAN5 □ LAN6

Parameter description

Parameter	Description
Port Mirroring	Used to enable or disable the port mirroring function.
Destination Port	Specifies the destination port, to which the data from the source ports is copied. Generally, the router connected to this port is installed with monitoring firmware. NOTE When the **Port Mirroring** function is enabled, **Destination Port** can be configured.

Parameter	Description
Source Ports	Specifies the source port, whose data is copied to the destination port. NOTE When the **Port Mirroring** function is enabled, **Source Ports** can be configured.

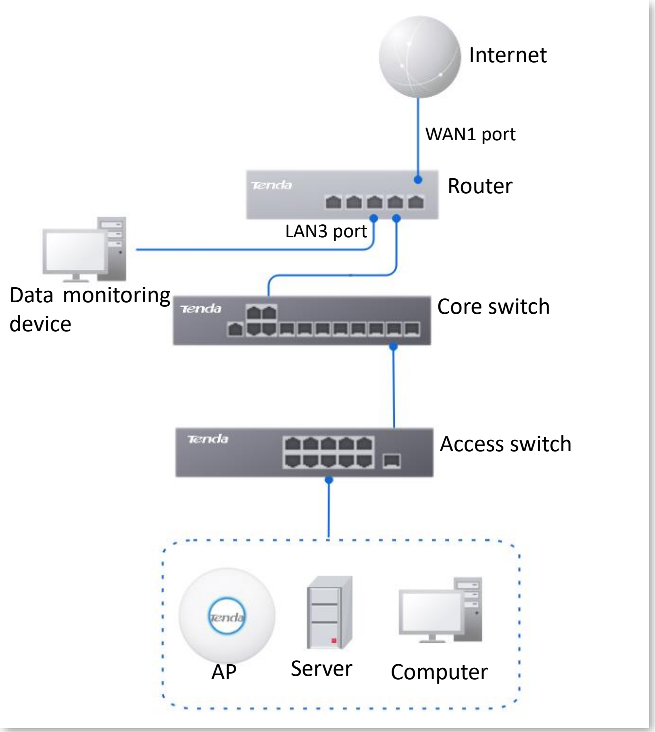
Example of configuring port mirroring

Networking requirements

An enterprise uses the enterprise router to set up a network. Recently, the enterprise's network is abnormal and often cannot access the internet. The network administrator needs to capture the data of the router's WAN port and LAN port for analysis.

Solution

- The above requirements can be achieved using the port mirroring function of the router.
- Assume that the monitoring device is connected to the LAN3 port. The device needs to monitor the data of other ports.



Configuration procedure

Step 1 [Log in to the web UI of the router](#).

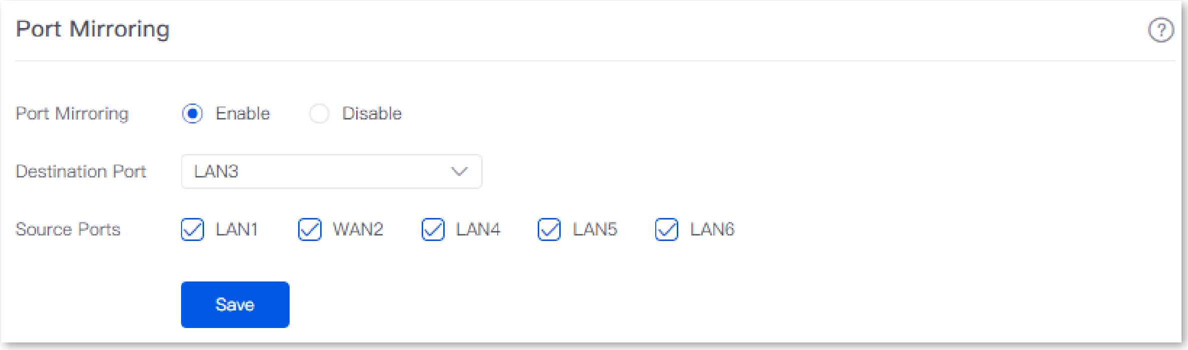
Step 2 Navigate to **More** > **Virtual Service** > **Port Mirroring**.

Step 3 Enable the **Port Mirroring** function.

Step 4 Select **Destination Port**, which is **LAN3** in this example.

Step 5 Select **Source Ports**, which is **LAN1**, **WAN2**, **LAN4**, **LAN5** and **LAN6** in this example.

Step 6 Click **Save**.



Port Mirroring

Port Mirroring ● Enable ○ Disable

Destination Port LAN3

Source Ports ☑ LAN1 ☑ WAN2 ☑ LAN4 ☑ LAN5 ☑ LAN6

----End

Verification

Running monitoring software on the monitoring computer, such as Wireshark, to capture the data packets of the source ports.

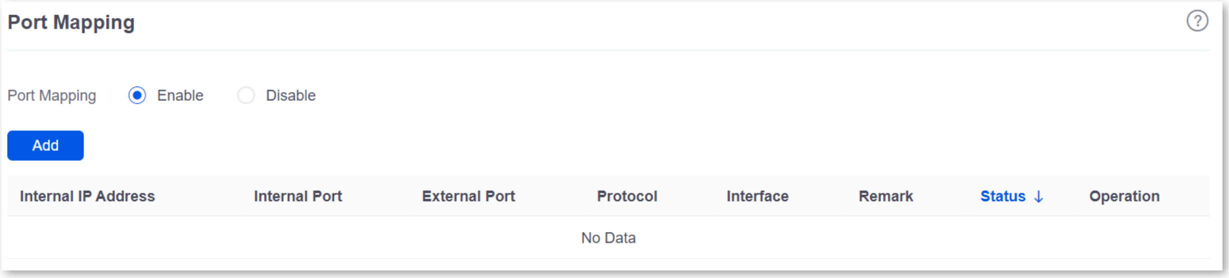
10.2.7 Port mapping

Overview

By default, users on the internet cannot access devices in the LAN. The Port Mapping function enables the router to open one or multiple service ports and specify the corresponding LAN server using the IP address and internal port. Therefore, visiting the ports from the internet are mapped to the LAN server. Such a function enables internet users to access the LAN server and prevents the LAN from being attacked.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **Port Mapping** to enter the page. On this page, you can configure the port mapping policy as required.

This function is disabled by default. The following displays the page when the function is enabled.



Port Mapping

Port Mapping ● Enable ○ Disable

Internal IP Address	Internal Port	External Port	Protocol	Interface	Remark	Status ↓	Operation
No Data							

Parameter description

Parameter	Description
Internal IP Address	Specifies the IP address of intranet server.
Internal Port	Specifies the service port of the LAN host.

Parameter	Description
External Port	Specifies the port opened by the router for access from internet users.
Protocol	Specifies the protocol type used by the LAN host. If you are not sure about the protocol type of the service, **TCP&UDP** is recommended.
Interface	Specifies the WAN port used by internet users to access the LAN host.
Remark	Specifies the description of the port mapping rule.
Status	Specifies the status of the port mapping policy, including **Enabled**, **Disabled** and **Expired**.
Operation	Used to edit, enable, disable or delete the port mapping policy. Edit: Used to modify the port mapping policy. Enable : Used to enable the port mapping policy. Disable : Used to disable the port mapping policy. Delete : Used to delete the port mapping policy.

Example of configuring port mapping

Networking requirements

An enterprise uses the enterprise router to set up a network. The router has connected to the internet and can offer internet service for LAN users. The enterprise has the following requirements:

The intranet web server is open to internet users to enable staff to access the intranet even when they are not physically in the enterprise.

Solution

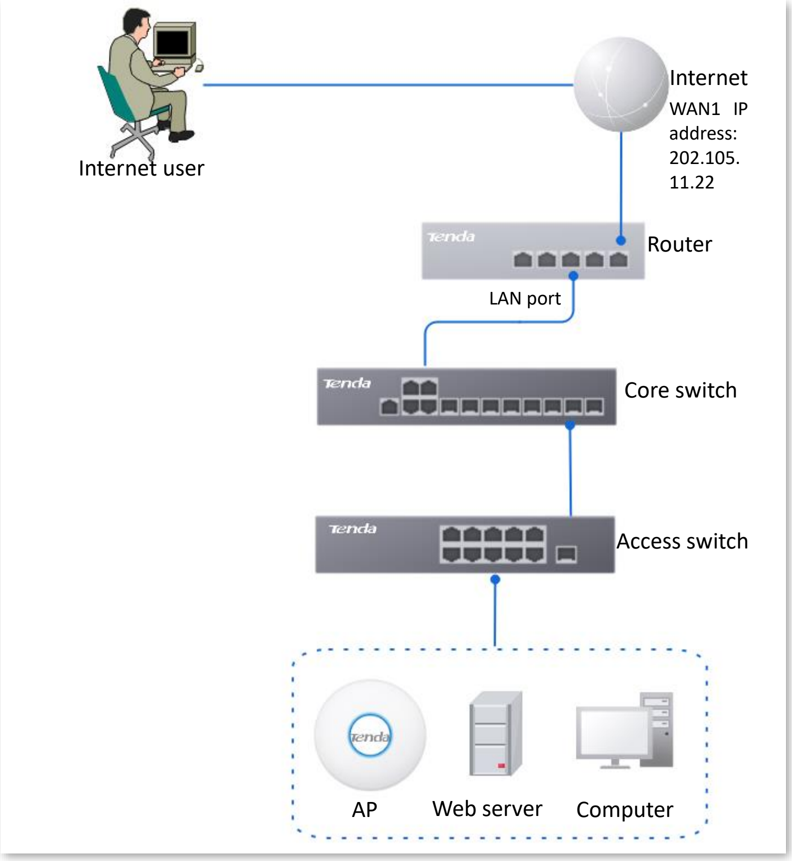
- You can use the port mapping function to enable internet users to access the intranet web server. Assume that the external network port opened by the router is 9999.
- You can use the DHCP reservation function to avoid access failures caused by web server address change.

Assume that the information of the web server is shown as below:

- IP address of the web server: 192.168.0.250
- MAC address of the host that runs the web server: C8:9C:DC:60:54:69
- Service port: 9999

TIP

- Before the configuration, ensure that the WAN port of the router obtains a public IP address. If the WAN port obtains a private IP address or an intranet IP address assigned by the ISP, the port mapping function may not take effect. Common IPv4 addresses are classified into class A, class B and class C. Private IP addresses of class A range from 10.0.0.0 to 10.255.255.255. Private IP addresses of class B range from 172.16.0.0 to 172.31.255.255. Private IP addresses of class C range from 192.168.0.0 to 192.168.255.255.
- ISPs may not support unreported web service accessed using the default port number 80. Therefore, when setting port mapping, you are recommended to set the external port as a non-familiar port (1024 to 65535), such as 9999, to ensure normal access.
- Internal and external ports can be different.



Configuration procedure

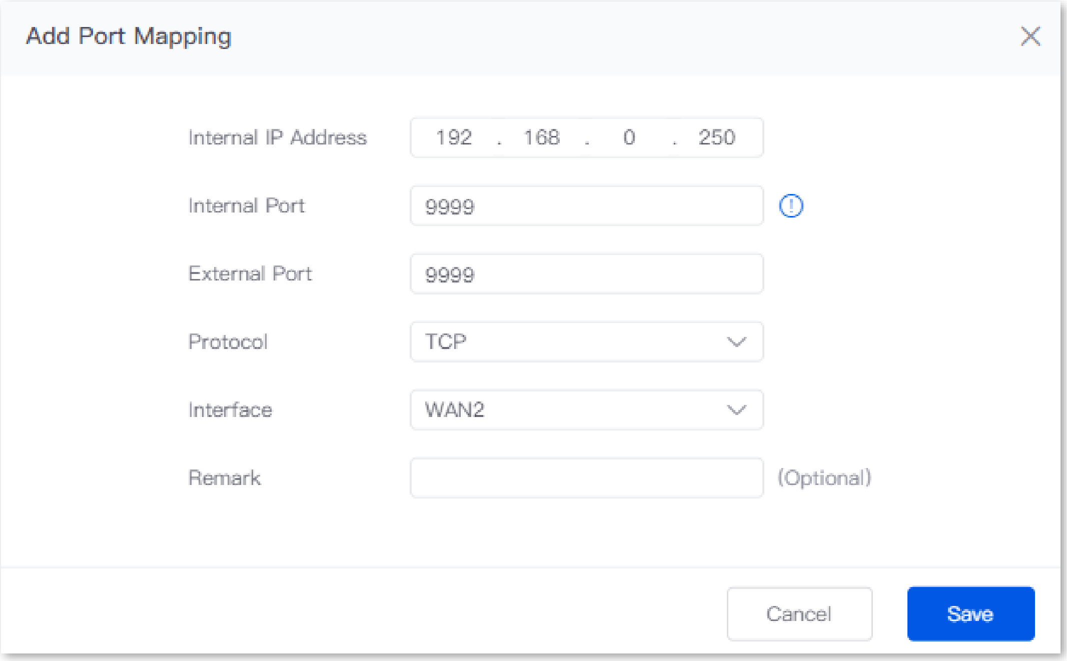
Set port mapping → Set the fixed IP address assigned to the server host

Step 1 Log in to the web UI of the router.

Step 2 Set port mapping.

1. Navigate to **More** > **Virtual Service** > **Port Mapping**.
2. Enable the **Port Mapping** function, and click **Add**.
3. Configure parameters in the **Add** window, and click **Save**.
   - Set **Internal IP Address** (the IP address of the web server), which is **192.168.0.250** in this example.

- Set **Intranet Port** (the port used by the web server), which is **9999** in this example.
- Set **External Port** (the port that the router opens to WAN users), which is **9999** in this example.
- Set **Protocol**, which is **TCP** in this example. If you are not sure about the protocol type of the service, **TCP&UDP** is recommended.
- Set **Interface** (the WAN port used by internet users to access the LAN server), which is **WAN2** in this example.



Add Port Mapping

Internal IP Address: 192 . 168 . 0 . 250

Internal Port: 9999

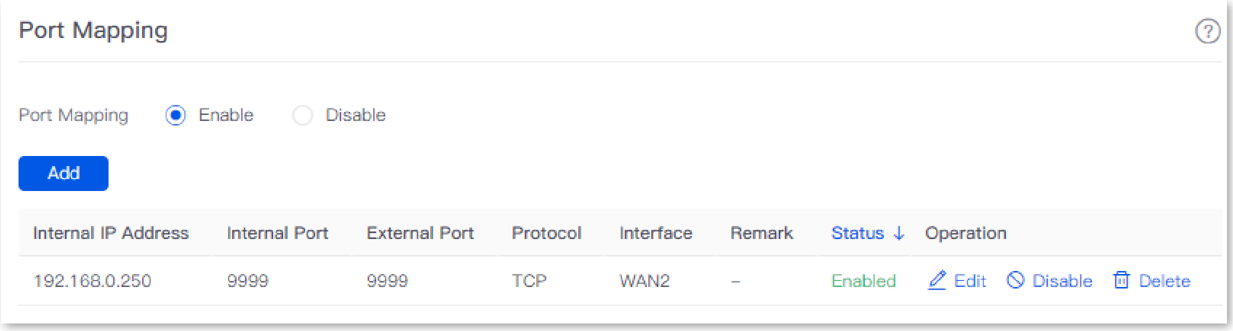
External Port: 9999

Protocol: TCP

Interface: WAN2

Remark: (Optional)

The port mapping policy is added successfully. See the following figure.



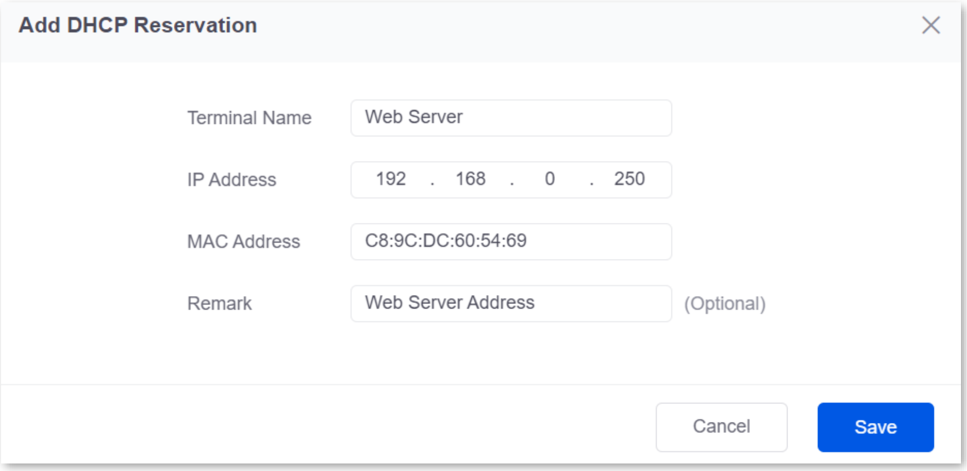
Port Mapping

Port Mapping ● Enable ○ Disable

Internal IP Address	Internal Port	External Port	Protocol	Interface	Remark	Status ↓	Operation
192.168.0.250	9999	9999	TCP	WAN2	–	Enabled	Edit Disable Delete

Step 3 Set the fixed IP address assigned to the server host.

1. Navigate to **Network** > **DHCP Settings** > **DHCP Reservation**, and Click **Add**.
2. Set the following rules, and click **Save**.
   - Set **Terminal Name**, which is **Web Server** in this example.
   - Set **IP Address** assigned to the server host, which is **192.168.0.250** in this example.
   - Set **MAC Address** of the server host, which is **C8:9C:DC:60:54:69** in this example.
   - Set **Remark**, which is **Web Server Address** in this example.



Add DHCP Reservation

Terminal Name: Web Server

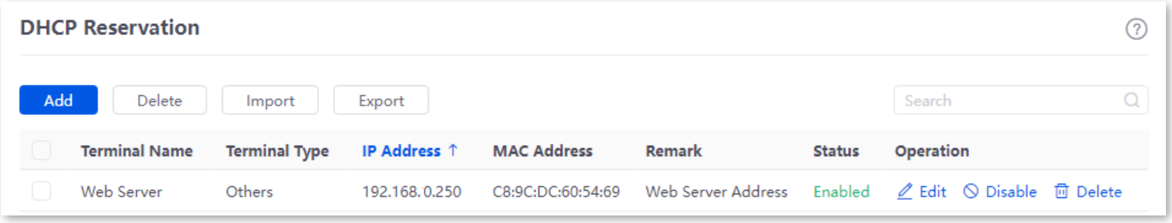
IP Address: 192 . 168 . 0 . 250

MAC Address: C8:9C:DC:60:54:69

Remark: Web Server Address (Optional)

----End

The fixed IP address is reserved successfully. See the following figure.



DHCP Reservation

	Terminal Name	Terminal Type	IP Address ↑	MAC Address	Remark	Status	Operation
□	Web Server	Others	192.168.0.250	C8:9C:DC:60:54:69	Web Server Address	Enabled	Edit Disable Delete

Verification

Internet users can successfully access the intranet server by using the **Intranet service application layer protocol name**://**WAN port IP address**. If the intranet service port is not the default port number, the access address is **Intranet service application layer protocol name**://**WAN port IP address**:**External port**.

In this example, the access address is http://202.105.11.22:9999.

You can find the router's current WAN port IP address on the Internet Settings page.

If DDNS is enabled on the WAN port, internet users can also access the intranet server by using **Intranet service application layer protocol name://WAN port domain name:External port**.

TIP

If internet users still cannot access the LAN server after the configuration is completed, try the following methods one by one:

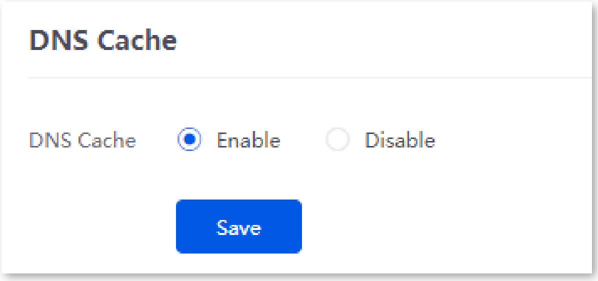
- Ensure that the internal port you entered is correct.
- Maybe the system firewall, anti-virus software and security guard on the LAN server blocked internet user access. Disable these programs and try again.

10.2.8 DNS cache

The Domain Name Server (DNS) is used to manage the relationships between domain names and IP addresses so that domain names can be mapped with corresponding IP addresses. Users accessing domain names are actually accessing the mapped IP addresses through DNS domain name parsing.

The DNS cache function enables the router to cache DNS-resolved information about websites visited by users. When other users access the websites, the router directly uses the information in the cache to direct users to the websites without accessing the DNS server. This improves the website accessing speed.

Log in to the web UI of the router, and navigate to **More** > **Virtual Service** > **DNS Cache** to enter the page. The DNS cache function is enabled by default.



DNS Cache

DNS Cache ● Enable ○ Disable

10.3 Maintenance service

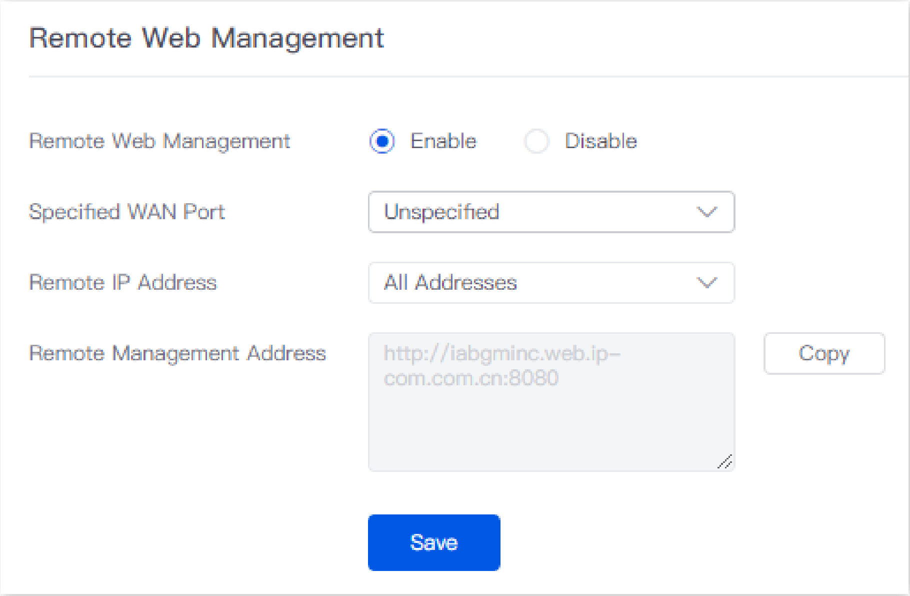
10.3.1 Remote web management

Overview

Generally, you can log in to the web UI of the router only when you connect to the LAN port or the WiFi network of the router. However, the remote web management function enables access to the web UI remotely through the WAN port in special cases (like when you need remote technical support).

Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Remote Web Management** to enter the page. On this page, you can enable or disable the remote web management and restrict the hosts that can remotely log in to the local router.

This function is disabled by default. The following displays the page when the function is enabled.



Remote Web Management

Remote Web Management ● Enable ○ Disable

Specified WAN Port: Unspecified

Remote IP Address: All Addresses

Remote Management Address: http://iabgminc.web.ip-com.com.cn:8080

Parameter description

Parameter	Description
Remote Web Management	Used to enable or disable the remote web management function.
Specified WAN Port	Specifies the WAN port used when logging in to the web UI of the router from the internet remotely. When multiple WAN ports are available, you can select any one of them.
Remote IP Address	Specifies the IP address of the device that can access the web UI of the router remotely. – **All Addresses**: Devices with any IP address on the internet can access the web UI of the router. For network security, this option is not recommended. – **Specified Address**: Only devices with specified IP addresses can access the web UI of the router. If the device is in the local area network, the IP address (public IP address) of the gateway of the device should be filled in.
Remote Management Address	Specifies the domain name used for remote access. The internet users can access the web UI of the router using the domain name when the **Remote Web Management** function is enabled.

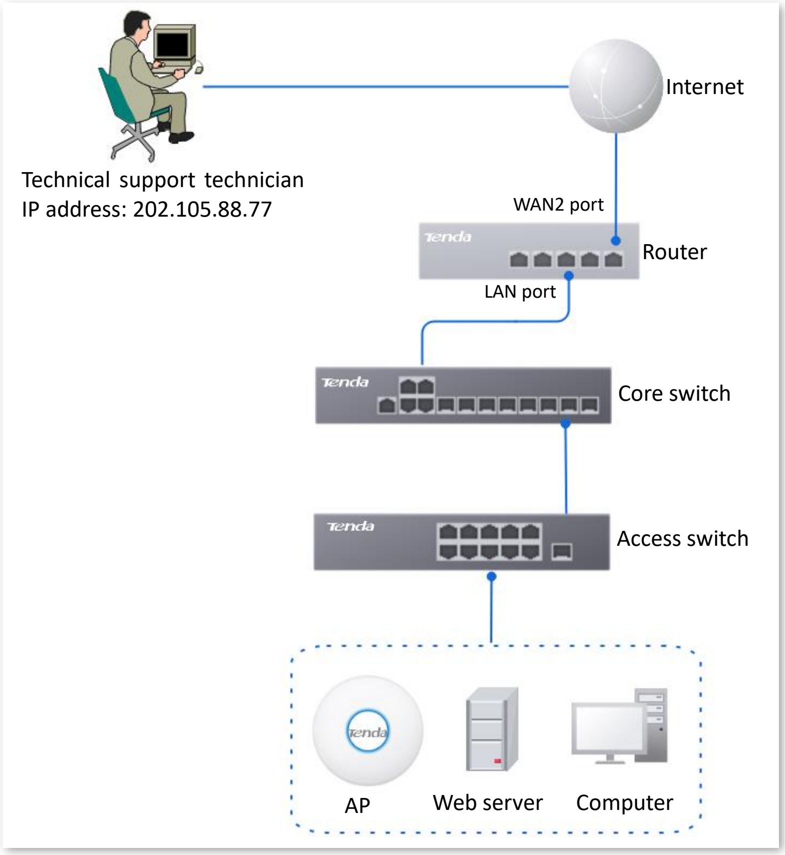
Example of configuring remote web management

Networking requirements

An enterprise uses the enterprise router to set up a network. The network administrator encountered a problem during network setup and needs the Tenda technical support to remotely log in to the web UI of the router to perform analysis and troubleshooting.

Solution

You can use the remote web management function to meet the requirements.



Configuration procedure

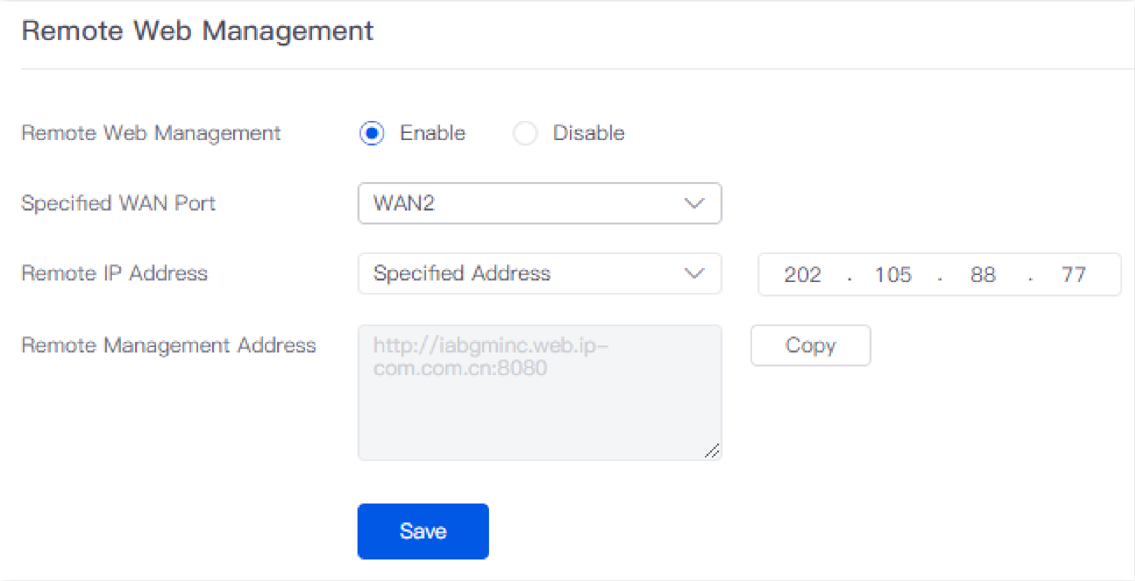
Step 1 Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Remote Web Management**.

Step 2 Enable the **Remote Web Management** function.

Step 3 Set **Specified WAN Port**, which is **WAN2** in this example.

Step 4 Set **Remote IP Address** to **Specified Address.** And enter the IP address of the computer supported by Tenda technology, which is **202.105.88.77** in this example**.**

Step 5 Click **Save**.



Remote Web Management

Remote Web Management ● Enable ○ Disable

Specified WAN Port: WAN2

Remote IP Address: Specified Address 202 . 105 . 88 . 77

Remote Management Address: http://iabgminc.web.ip-com.com.cn:8080

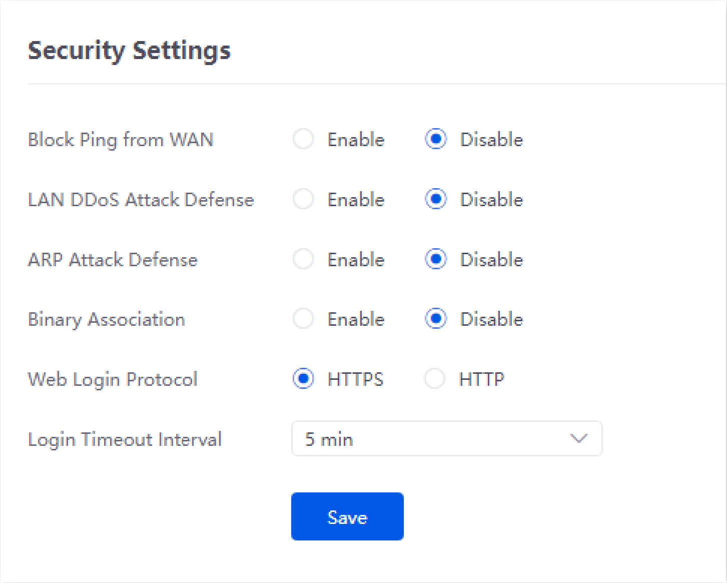
----End

Verification

The Tenda technical support technician can log in to the web UI of the router by visiting the remote management address on the computer (the IP address of the computer is 202.105.88.77).

10.3.2 Security settings

Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Security Settings** to enter the page. On this page, you can enable corresponding attack defense functions according to the actual network conditions.



Security Settings

Block Ping from WAN ○ Enable ● Disable

LAN DDoS Attack Defense ○ Enable ● Disable

ARP Attack Defense ○ Enable ● Disable

Binary Association ○ Enable ● Disable

Web Login Protocol ● HTTPS ○ HTTP

Login Timeout Interval: 5 min

Parameter description

Parameter	Description
Block Ping from WAN	Used to enable or disable the block Ping from WAN function. With this function enabled, when a WAN host pings the IP address of the WAN port on the router, the router automatically ignores the Ping request to prevent itself from being exposed and defend against external Ping attacks.
LAN DDoS Attack Defense	Used to enable or disable the LAN DDoS attack defense function. DDoS is abbreviated for Distributed Denial of Service. The DDoS attack allows an attacker to exhaust the resources of a system, making the system unable to properly provide services. With this function enabled, the router can defend common DDoS attacks from the internal network.
ARP Attack Defense	Used to enable or disable the ARP attack defense function. With this function enabled, the router can identify ARP spoofing in the LAN and record the MAC address of the attacker.
Binary Association	Used to enable or disable the binary association function. With this function enabled, only devices whose IP addresses are bound with MAC addresses in the list to access the internet.
Web Login Protocol	Specifies the mode to log in to the web UI of the router, including **HTTPS** and **HTTP**. The default mode is **HTTPS**. – **HTTPS**: Hyper Text Transfer Protocol Secure (HTTPS) uses SSL/TLS to encrypt data packets based on HTTP and establishes a secure channel, thus ensuring the security of the data transmission process. It ensures the security of data transmission and the authenticity of the website via HTTPS Access. – **HTTP**: Hyper Text Transfer Protocol (HTTP) is a specification for communication between browsers and servers.
Login Timeout Interval	Used to set the login timeout interval. After logging in to the web UI of the router, you will be automatically logged out when no operation is performed within the defined time period.

10.3.3 Cloud maintenance

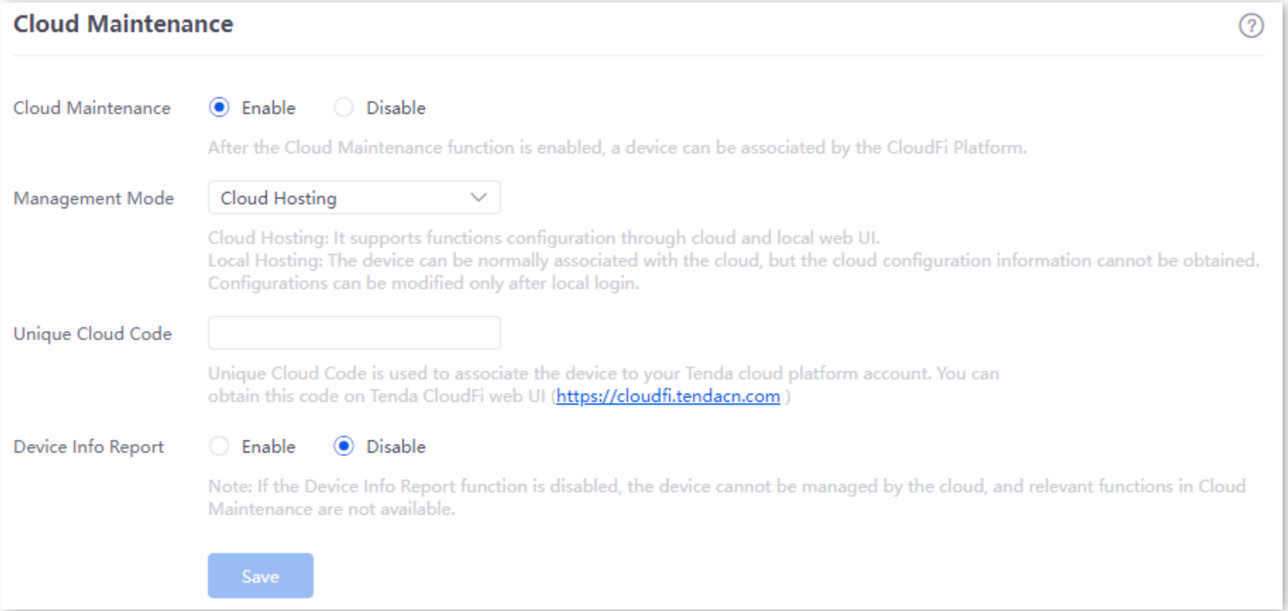
Overview

The Tenda CloudFi cloud management system is a cloud platform established by Tenda, providing central management for Tenda devices that support cloud management.

The router can be managed by the Tenda CloudFi cloud platform. You can configure and check the parameters of the router on the web UI of the Tenda CloudFi cloud platform (https://cloudfi.tendacn.com) or Tenda CloudFi App.

Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Cloud Maintenance** to enter the page. On this page, you can configure the cloud maintenance function of the router.

This function is disabled by default. The following displays the page when the function is enabled.


Cloud Maintenance

Cloud Maintenance ● Enable ○ Disable

After the Cloud Maintenance function is enabled, a device can be associated by the CloudFi Platform.

Management Mode: Cloud Hosting

Cloud Hosting: It supports functions configuration through cloud and local web UI.
Local Hosting: The device can be normally associated with the cloud, but the cloud configuration information cannot be obtained. Configurations can be modified only after local login.

Unique Cloud Code:

Unique Cloud Code is used to associate the device to your Tenda cloud platform account. You can obtain this code on Tenda CloudFi web UI (https://cloudfi.tendacn.com)

Device Info Report ○ Enable ● Disable

Note: If the Device Info Report function is disabled, the device cannot be managed by the cloud, and relevant functions in Cloud Maintenance are not available.

Parameter description

Parameter	Description
Cloud Maintenance	Used to enable or disable the cloud maintenance function.
Management Mode	Specifies the management mode of cloud maintenance. – **Cloud Hosting**: It is applicable to unified managed projects that are maintained on the Tenda CloudFi cloud platform. The router can be managed by the Tenda CloudFi cloud platform and the configuration information of relevant functions is delivered by the CloudFi cloud platform. When logging in to the web UI of the router locally, you can also configure the functions. – **Local Hosting**: It is applicable for scenarios where the project is centrally managed and viewed. The router can be managed on the Tenda CloudFi cloud platform, but all function configurations need to be set on the web UI of the router.
Unique Cloud Code	Specifies the CloudFi cloud platform account associated with the device. You can obtain it from Tenda CloudFi cloud platform (https://cloudfi.tendacn.com) or Tenda CloudFi App.
Device Info Report	Used to enable or disable the device info report function. If the **Device Info Report** function is enabled, the router can be managed by the CloudFi cloud platform. The configuration information of the router will be reported to the cloud platform.

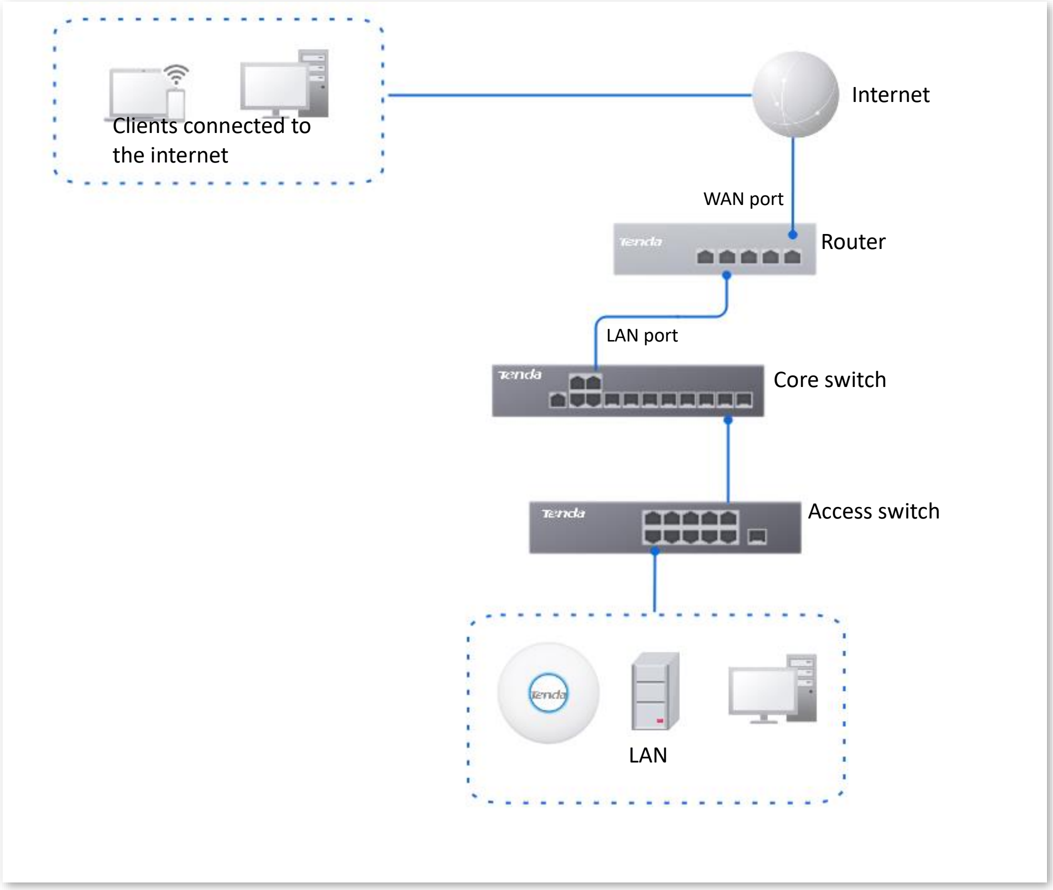
Example of configuring cloud maintenance on CloudFi cloud platform

Networking requirements

An enterprise uses the enterprise router to set up a network and has connected to the internet. The requirements are managing the router remotely and delivering related configurations.

Solution

You can use the cloud management function of the router and Tenda CloudFi cloud platform web UI (https://cloudfi.tendacn.com) to meet the requirements.



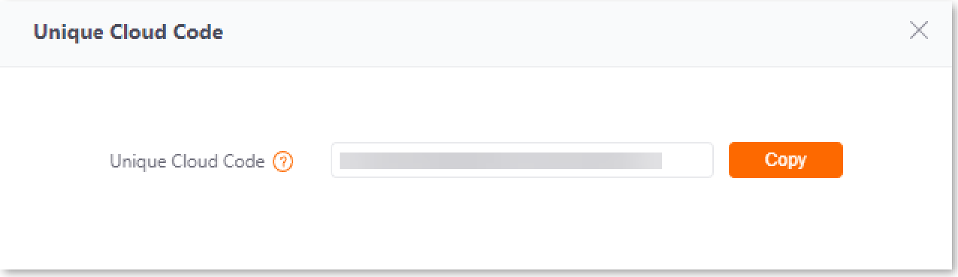
Configuration procedure

TIP

Before configuring the cloud maintenance function of the router, ensure that the router is connected to the internet.

Step 1 Obtain unique cloud code.

1. On a client connected to the internet (such as a computer), start a web browser, visit https://cloudfi.tendacn.com, and log in to the web UI of Tenda CloudFi cloud platform.
2. Click **Add** at the upper right corner and select **Unique Cloud Code**, and copy the unique cloud code.

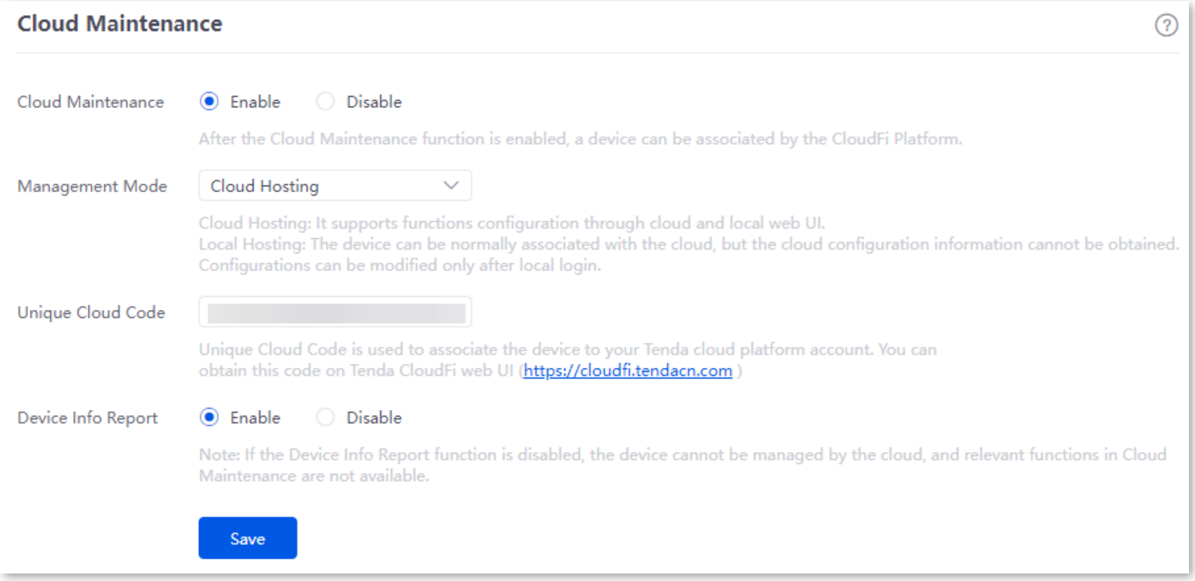


Unique Cloud Code

Unique Cloud Code [redacted] Copy

Step 2 Enable the cloud maintenance function for the router.

1. Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Cloud Maintenance**.
2. Enable the **Cloud Maintenance** function, and set **Management Mode** as required (**Cloud Hosting** takes as an example here).
3. Enter the **Unique Cloud Code**, enable the **Device Info Report** function, and click **Save**. Confirm the prompt information (if it pops up) and click **OK**.



Cloud Maintenance

Cloud Maintenance ● Enable ○ Disable

After the Cloud Maintenance function is enabled, a device can be associated by the CloudFi Platform.

Management Mode: Cloud Hosting

Cloud Hosting: It supports functions configuration through cloud and local web UI.
Local Hosting: The device can be normally associated with the cloud, but the cloud configuration information cannot be obtained. Configurations can be modified only after local login.

Unique Cloud Code [redacted]

Unique Cloud Code is used to associate the device to your Tenda cloud platform account. You can obtain this code on Tenda CloudFi web UI (https://cloudfi.tendacn.com)

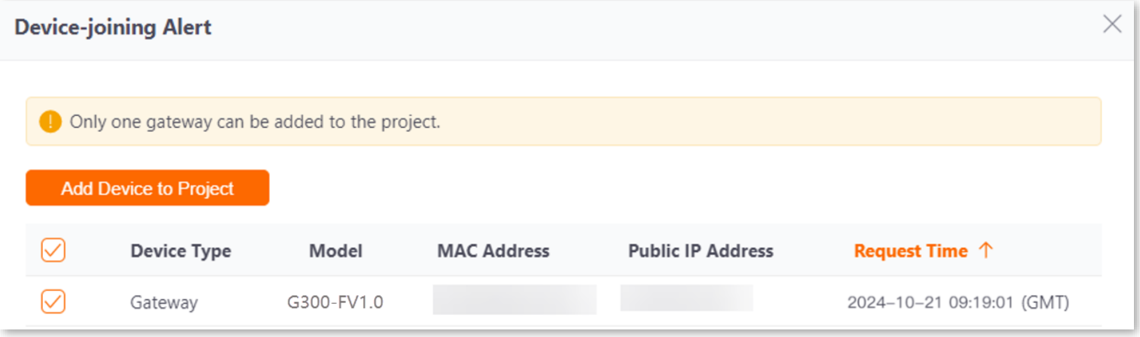
Device Info Report ● Enable ○ Disable

Note: If the Device Info Report function is disabled, the device cannot be managed by the cloud, and relevant functions in Cloud Maintenance are not available.

Save

Step 3 Add the router to the project on the Tenda CloudFi cloud management system.

1. Log in to the web UI of Tenda CloudFi cloud platform (https://cloudfi.tendacn.com), and navigate to **Add** > **Device-joining Alert**.
2. Select the router to be added to the project and click **Add Device to Project**. The following figure is for reference only.



Device-joining Alert

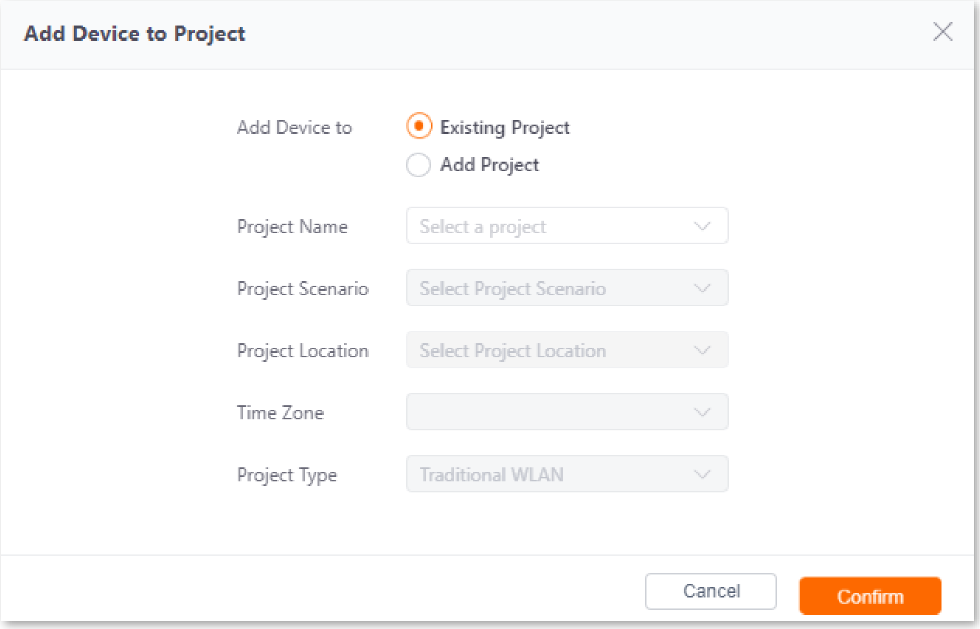
Only one gateway can be added to the project.

Add Device to Project

☑	Device Type	Model	MAC Address	Public IP Address	Request Time ↑
☑	Gateway	G300-FV1.0	[redacted]	[redacted]	2024-10-21 09:19:01 (GMT)

3. Select the project to which you want to add the router. The following figure is for reference only.

   - If the project has already been created, select **Existing Project** and select the corresponding project in the **Project Name** drop-down menu, and then click **Confirm**.



Add Device to Project

Add Device to: ● Existing Project ○ Add Project

Project Name: Select a project

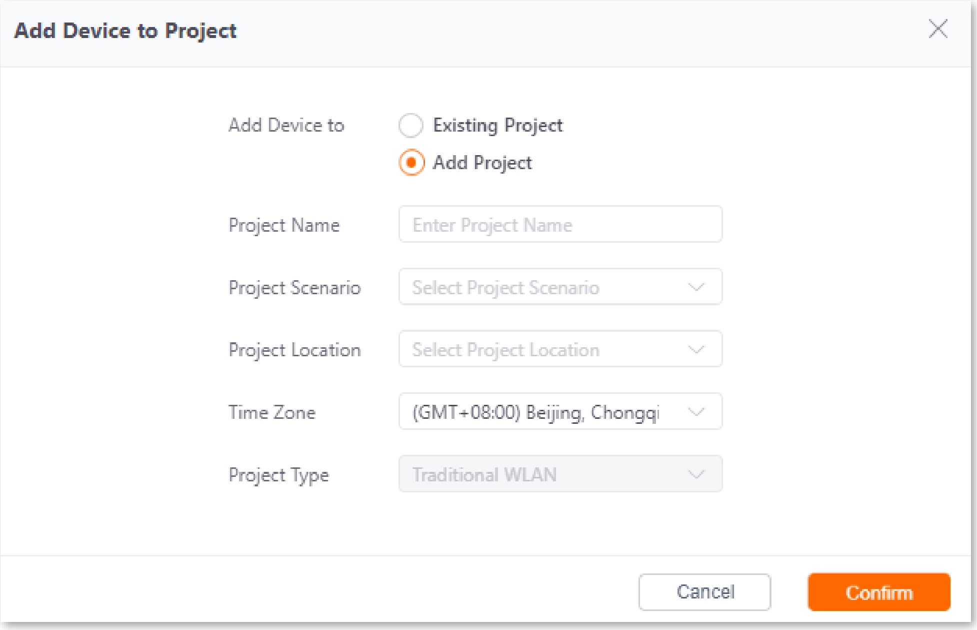
Project Scenario: Select Project Scenario

Project Location: Select Project Location

Time Zone:

Project Type: Traditional WLAN

   - If you want to create a new project, select **Add Project**, set the **Project Name**, **Project Scenario**, **Project Location** and **Time Zone**, and then click **Confirm**.



Add Device to Project

Add Device to: ○ Existing Project ● Add Project

Project Name: Enter Project Name

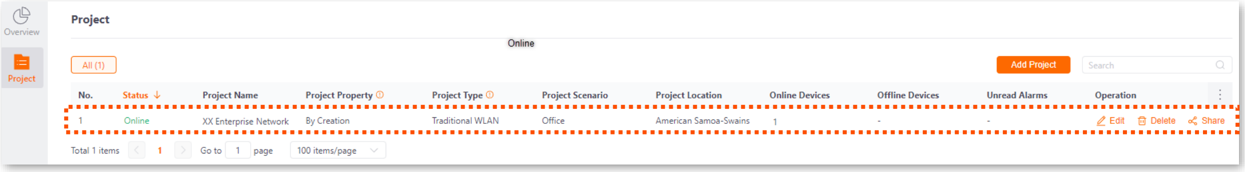
Project Scenario: Select Project Scenario

Project Location: Select Project Location

Time Zone: (GMT+08:00) Beijing, Chongqi

Project Type: Traditional WLAN

Added successfully. You can enter the management page of the project to view details.



No.	Status	Project Name	Project Property	Project Type	Project Scenario	Project Location	Online Devices	Offline Devices	Unread Alarms	Operation
1	Online	XX Enterprise Network	By Creation	Traditional WLAN	Office	American Samoa-Swains	1	-	-	Edit Delete Share

Total 1 items 1 Go to 1 page 100 items/page

---End

Verification

After the configuration is completed, the router can be managed through the Tenda CloudFi cloud management system, and all its configuration information is delivered by the CloudFi cloud platform.

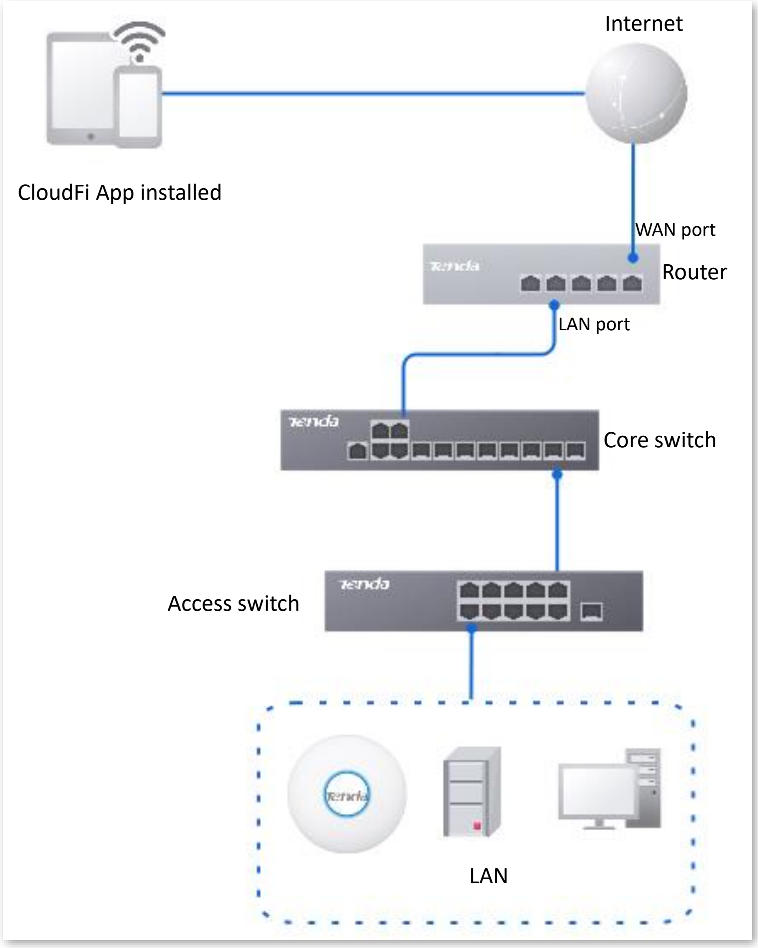
Example of configuring cloud maintenance on CloudFi App

Networking requirements

An enterprise uses the enterprise router to set up a network and has successfully connected to the internet. The requirements are managing the router remotely and delivering related configurations.

Solution

You can use the cloud management function of the router and CloudFi App to meet the requirements.



Configuration procedure (method 1)

TIP

Before configuring the cloud maintenance function of the router, ensure that the router is connected to the internet.

Step 1 Download the CloudFi App to your mobile device by scanning the QR code or searching for **Tenda CloudFi** in **Google Play** or **App Store**. Then log in to the App.

Or

Step 2 Connect your mobile device such as smartphone to the AP's wireless network.

Step 3 Run the Tenda CloudFi App, and add the router to the project.

1. (Skip if performed) Add a project.
2. Enter the project where the router is to be added, tap the pop-up window that shows the router is detected, and then follow the prompts to add the router to the project.

---End

For more details, see **Guide to CloudFi App** at **Help Center** on your app.

Configuration procedure (method 2)

TIP

Before configuring the cloud maintenance function of the router, ensure that the router is connected to the internet.

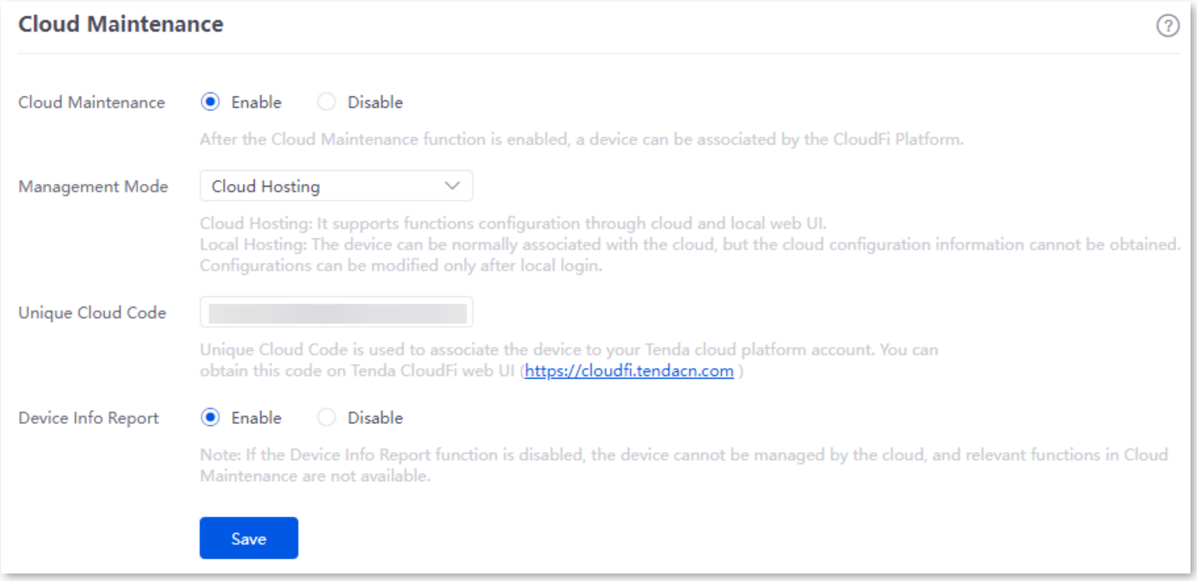
Step 1 Download the CloudFi App to your mobile device by scanning the QR code or searching for **Tenda CloudFi** in **Google Play** or **App Store**.

Or

Step 2 Log in to the CloudFi App and obtain **Unique Cloud Code**.

Step 3 Enable the cloud maintenance function for the router.

1. Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Cloud Maintenance**.
2. Enable the **Cloud Maintenance** function, and set **Management Mode** as required (for example, **Cloud Hosting**).
3. Enter the **Unique Cloud Code**, set **Device Info Report** to **Enable**, and click **Save**. Confirm the prompt information (if it pops up) and click **OK**. Then click **Save**.



Cloud Maintenance

Cloud Maintenance ● Enable ○ Disable

After the Cloud Maintenance function is enabled, a device can be associated by the CloudFi Platform.

Management Mode: Cloud Hosting

Cloud Hosting: It supports functions configuration through cloud and local web UI.
Local Hosting: The device can be normally associated with the cloud, but the cloud configuration information cannot be obtained. Configurations can be modified only after local login.

Unique Cloud Code: [redacted]

Unique Cloud Code is used to associate the device to your Tenda cloud platform account. You can obtain this code on Tenda CloudFi web UI (https://cloudfi.tendacn.com)

Device Info Report ● Enable ○ Disable

Note: If the Device Info Report function is disabled, the device cannot be managed by the cloud, and relevant functions in Cloud Maintenance are not available.

Step 4 (Skip if performed) Add a project on the CloudFi App.

Step 5 Add the router to the project as instructed.

---End

For more details, see **Guide to CloudFi App** at **Help Center** on your app.

Verification

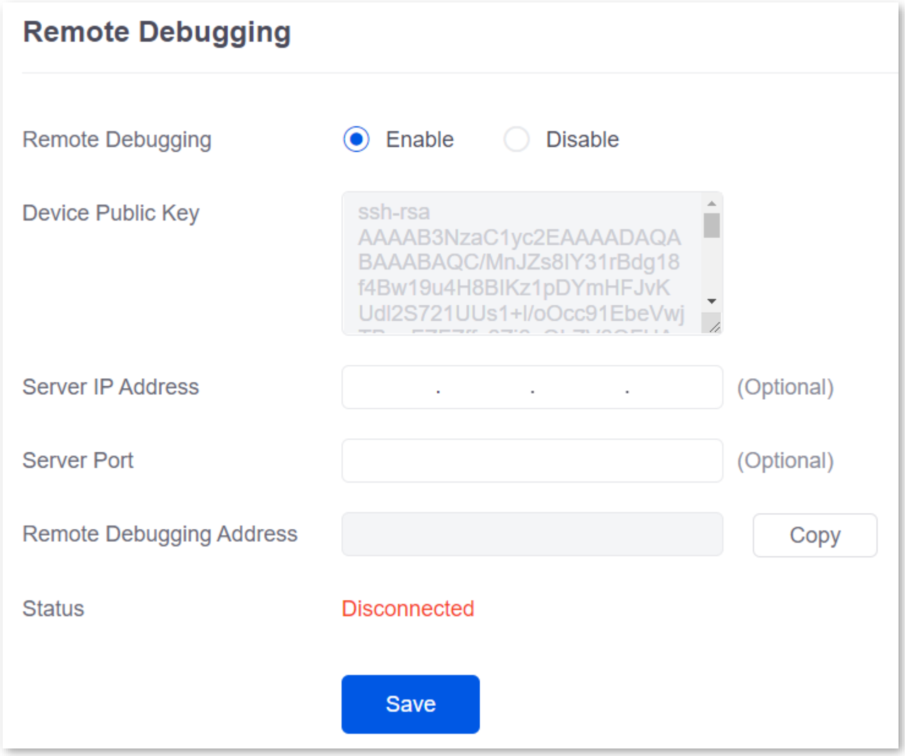
After the configuration is completed, the router can be managed through the Tenda CloudFi cloud management system, and all its configuration is delivered by the CloudFi cloud platform.

10.3.4 Remote debugging

Overview

This function can be used for remote network debugging by professional engineers. After enabling this function, professional engineers can remotely connect to the router through SSH and perform remote debugging.

Log in to the web UI of the router, and navigate to **More** > **Maintenance Service** > **Remote Debugging** to enter this page. On this page, you can configure the remote debugging function. By default, this function is disabled and the following figure shows an example with the function enabled.



Remote Debugging

Remote Debugging ● Enable ○ Disable

Device Public Key
```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQA
BAAABAQC/MnJZs8lY31rBdg18
f4Bw19u4H8BIKz1pDYmHFJvK
Udl2S721UUs1+l/oOcc91EbeVwj
```

Server IP Address . . . (Optional)

Server Port (Optional)

Remote Debugging Address

Status Disconnected

Parameter description

Parameter	Description
Remote Debugging	Used to enable or disable the remote debugging function.
Device Public Key	Specifies the RSA public key of the device. The device public key has been preset in the authorization list in the default server. If the default server is not used, you need to add the device public key on the customized server.
Server IP Address	Specifies the IP address of the external server, which must be a public IP address. When it is left blank, the default server is used.
Server Port	Specifies the service port of the external server. When it is left blank, the default server port is used.
Remote Debugging Address	Specifies the address for remotely accessing this device using SSH.
Status	Specifies the connection status between this device and the server.

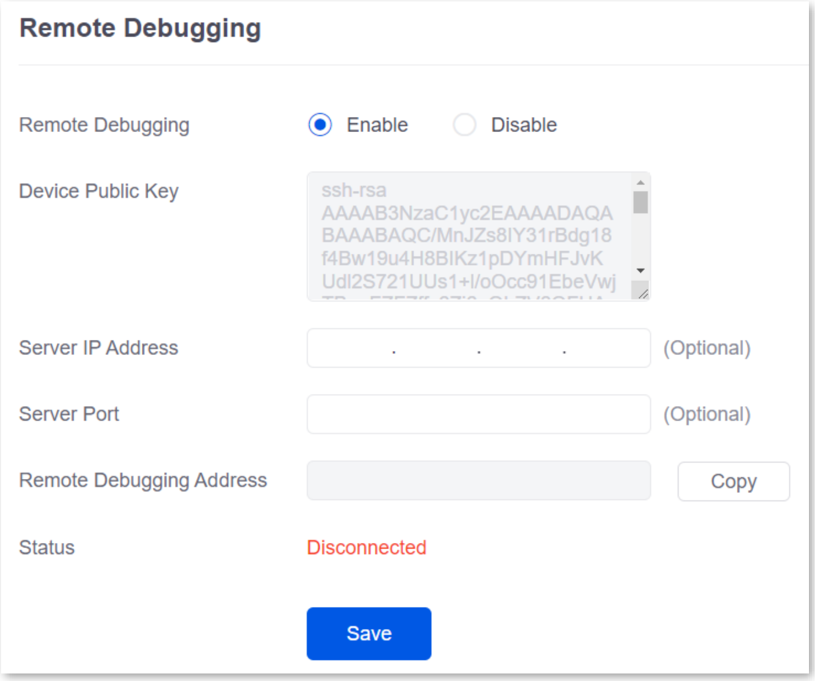
Remotely connect to the router using an SSH tool

Enable the remote debugging function

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **More** > **Maintenance Service** > **Remote Debugging**.

Step 3 Enable the **Remote Debugging** function. Retain default settings for other parameters and click **Save**.



Remote Debugging

Remote Debugging ● Enable ○ Disable

Device Public Key
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQA
BAAABAQC/MnJZs8IY31rBdg18
f4Bw19u4H8BIKz1pDYmHFJvK
Udl2S721UUs1+l/oOcc91EbeVwj

Server IP Address . . . (Optional)

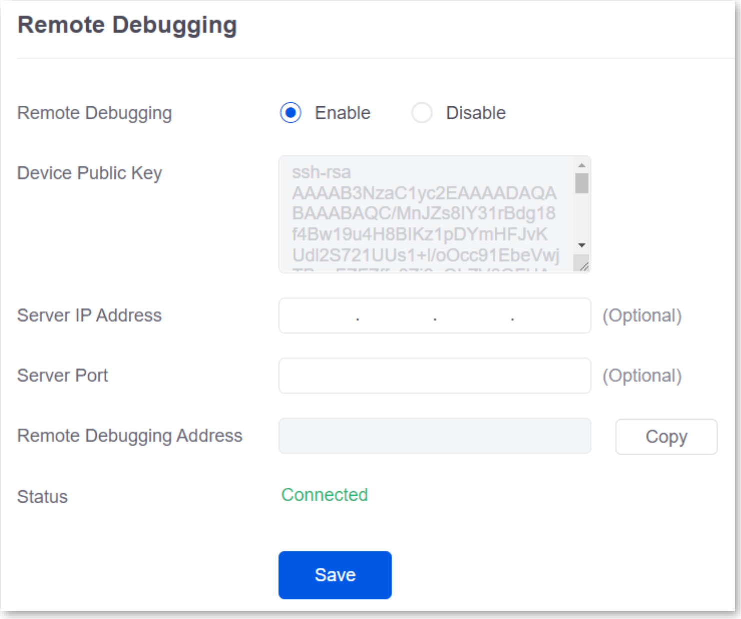
Server Port (Optional)

Remote Debugging Address Copy

Status Disconnected

Save

Wait for a moment. When **Status** is displayed as **Connected**, you can remotely connect to the router by entering destination IP address in the SSH tool.



Remote Debugging

Remote Debugging ● Enable ○ Disable

Device Public Key
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQA
BAAABAQC/MnJZs8IY31rBdg18
f4Bw19u4H8BIKz1pDYmHFJvK
Udl2S721UUs1+l/oOcc91EbeVwj

Server IP Address . . . (Optional)

Server Port (Optional)

Remote Debugging Address Copy

Status Connected

Save

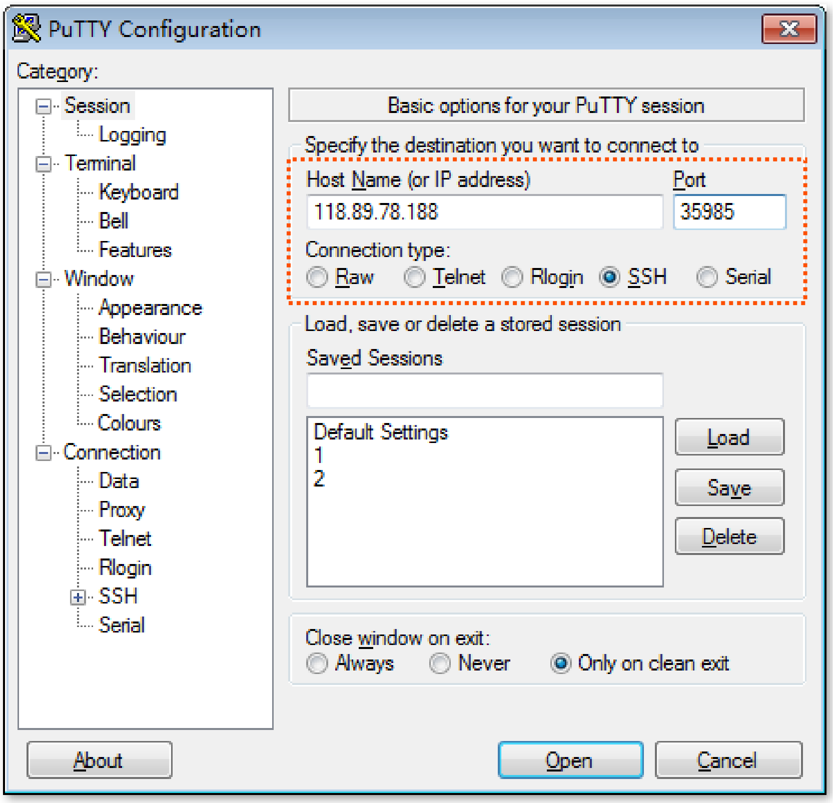
Remotely connect to the router using an SSH tool

Step 1 Run an SSH client tool (Example: PuTTY) on a computer connected to the network.

Step 2 Set **Connection Type** to **SSH**.

Step 3 Set **Host Name (or IP address)** to the remote debugging address and port to be accessed. The following figure shows an example.

Step 4 Click **Open**.



Host Name (or IP address): 118.89.78.188

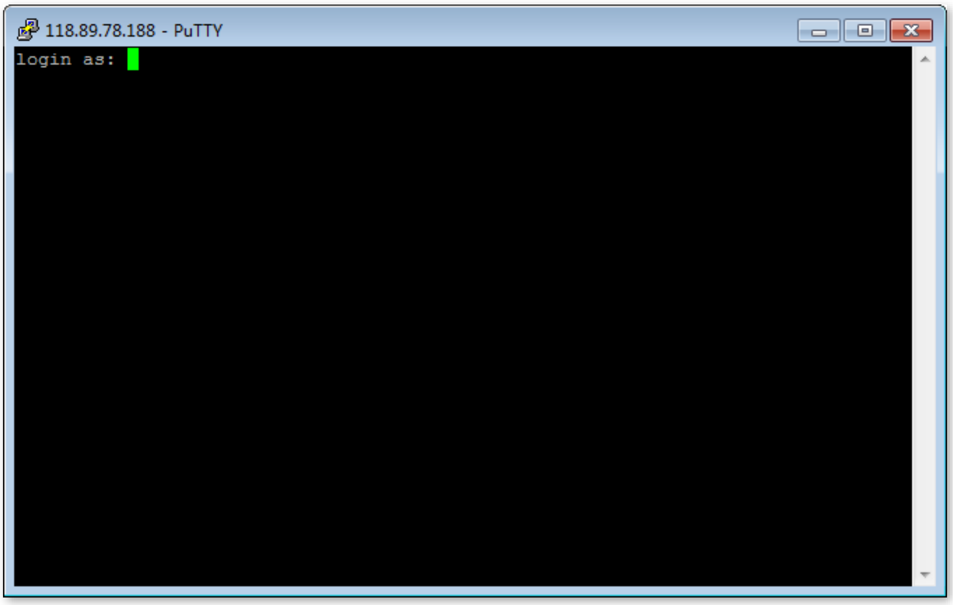
Port: 35985

Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

Close window on exit: ○ Always ○ Never ● Only on clean exit

----End

If the following figure is displayed, you connect to the router successfully.



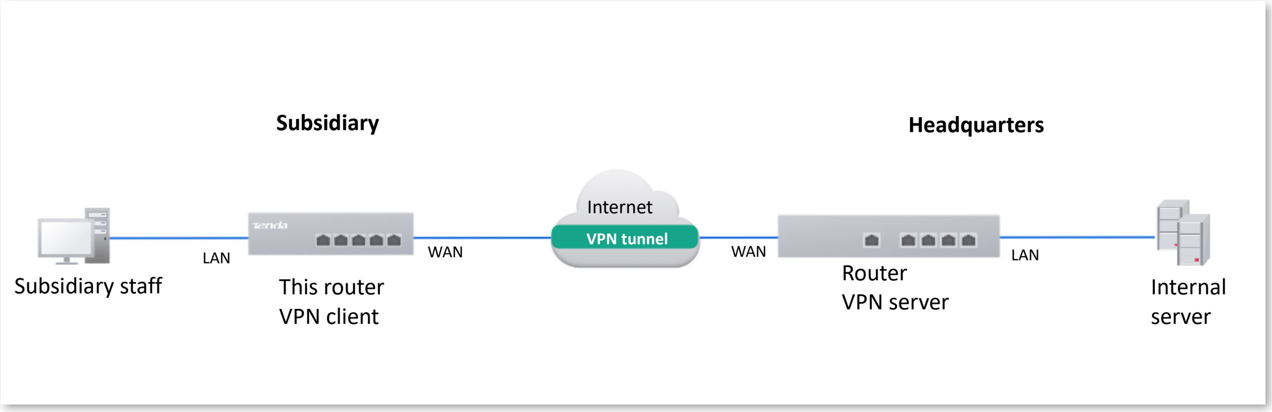
```
login as:
```

10.4 VPN

10.4.1 Overview

VPN, abbreviated for Virtual Private Network, is a special network set up on the public network (generally the internet). It exists only logically and does not have any physical lines. The VPN technology is widely used in enterprise networks and is used to achieve resource sharing between a subsidiary and the headquarters, and at the same time, protects these resources from being exposed to other users on the internet.

The typical network topology of VPN is as follows:



This router supports Point to Point Tunneling Protocol (PPTP) server, Layer 2 Tunneling Protocol (L2TP) server and IP Security (IPSec).

- **Layer-2 VPN channel protocol: PPTP, L2TP**

Layer-2 VPN channel protocol is used to transmit Layer-2 (data link layer) network protocol, where frames at the data link layer are transmitted in the tunnel.

PPTP encapsulates Point to Point Protocol (PPP) frames into IP data packets and transmits data over the internet. L2TP encapsulates PPP frames into different data packets for transmission according to different network types.

- **Layer-3 VPN channel protocol: IPSec**

Layer-3 VPN channel protocol is used to transmit Layer-3 (network layer) network protocol, where groups at the network layer are transmitted in the tunnel.

IPSec encapsulates data in a tunneling protocol and relies on the third layer to transmit the networks only for TCP/IP.

Compared with the Layer-2 VPN channel protocol, the Layer-3 VPN channel protocol has better security and reliability. The second-layer tunnel is generally terminated on the user-side device, which has high requirements for the security of the client and firewall technology. While the third-layer tunnel is generally terminated at the Internet Service Provider (ISP) gateway, which does not have high requirements for the security of the client.

10.4.2 PPTP/L2TP

Overview

- **PPTP protocol**

PPTP is a layer 2 tunneling technology based on the PPP, which supports on-demand and multi-protocol VPN. PPTP enables secure remote access connections by creating a VPN across TCP/IP-based data networks.

The implementation of PPTP is based on the Client/Server (C/S) model, and a PPTP tunnel is established between the client and the server. The client uses the account information provided by the server to dial up to connect to the server. The server listens for services on TCP port 1723 by default to realize the communication between the two parties.

The communication of PPTP needs to establish two connections, namely Control Connection and Data Connection. The control connection uses TCP as the transmission protocol, which is used for call control and management, and is responsible for establishing, maintaining and dismantling the data tunnel between the client and the server. The data connection uses the PPP protocol to encapsulate the original packets and uses the enhanced Generic Routing Encapsulation (GRE) protocol as a tunneling protocol, and adds new IP headers for data routing on the internet.

In terms of security, PPTP uses the authentication mechanism provided by PPP, and supports Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft Challenge Handshake Authentication Protocol (MS-CHAP) and other authentication methods. Microsoft Point-to-Point Encryption (MPPE) protocol can be selected for encryption. MPPE encryption technology supports encryption with three lengths of 40, 56 and 128 bits, and its security is generally considered to be relatively weak. Therefore, if sensitive data transmission is involved, PPTP VPN is generally not recommended.

- **L2TP protocol**

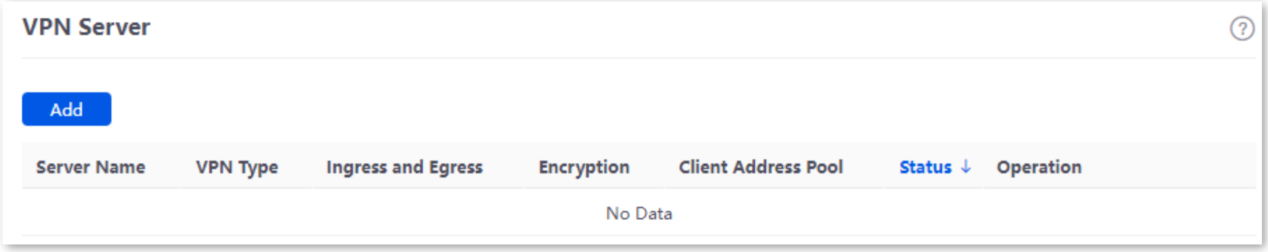
L2TP is a Layer 2 VPN tunneling protocol. The implementation of L2TP is based on the Client/Server (C/S) model, and an L2TP tunnel is established between the client and the server. The client chooses an idle port to send the message to the UDP port 1701 of the server. After the server receives the message, it also chooses an idle port to send the message back to the client. The port selection of both parties remains unchanged during the time that the tunnel is connected.

The L2TP protocol does not provide connection security, but it can rely on the authentication provided by PPP (such as CHAP and PAP), which means L2TP has all the security features that PPP has. L2TP can be combined with IPSec to achieve data security, which makes the data transmitted through L2TP more difficult to attack. L2TP can also use tunnel encryption technology, end-to-end data encryption or application layer data encryption and other schemes on top of L2TP to improve data security according to specific network security requirements.

Configure PPTP or L2TP server

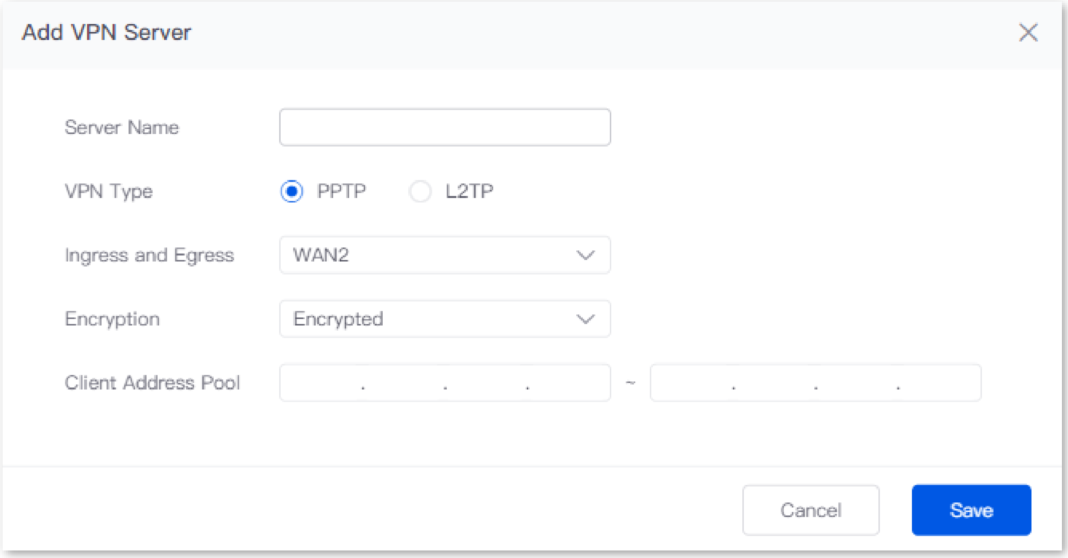
The router works as a PPTP or L2TP server and can connect to PPTP or L2TP clients.

Log in to the web UI of the router, and navigate to **More** > **VPN Service > VPN Server** to enter the page.


VPN Server

Server Name	VPN Type	Ingress and Egress	Encryption	Client Address Pool	Status ↓	Operation
No Data						

You can click **Add** to configure parameters and then click **Save**.


Add VPN Server

Server Name:

VPN Type: ● PPTP ○ L2TP

Ingress and Egress: WAN2

Encryption: Encrypted

Client Address Pool: . . . ~ . . .

Parameter description

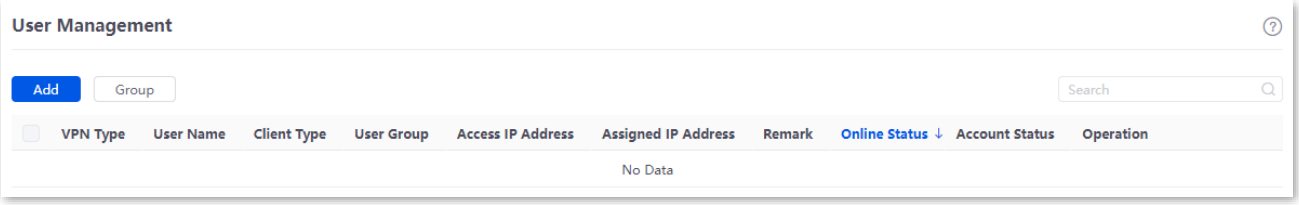
Parameter	Description
Server Name	Specifies the name of the VPN server.
VPN Type	Specifies the VPN server type of the router, including **PPTP** and **L2TP**. Both PPTP and L2TP are Layer 2 VPN tunneling protocols, use Point-to-Point Protocol (PPP) for data encapsulation, and add additional headers to the data. – **PPTP**: The router works as a PPTP server and can connect to PPTP clients. – **L2TP**: The router works as a L2TP server and can connect to L2TP clients.
Ingress and Egress	Specifies the WAN port used for the connection between the VPN server and VPN client. The IP address or domain name of the WAN port is the **Server IP Address/Domain Name** of the VPN client.
Encryption	– **PPTP**: Specifies whether to enable the 128-bit data encryption. The encryption settings of PPTP server and PPTP client must be consistent. Otherwise, communications cannot be conducted normally. – **L2TP**: Specifies whether to encrypt data packets by enabling the IPSec. The encryption settings of L2TP server and L2TP client must be consistent. Otherwise, communications cannot be conducted normally.

Parameter	Description
Pre-shared Key	Specifies the pre-shared key of the L2TP server and the L2TP client. When the L2TP tunnel uses IPSec for encryption, both the L2TP client and the L2TP server use this pre-shared key to authenticate each other. The pre-shared key of the L2TP client and the L2TP server should be the same.
Client Address Pool	Specifies the IP address range within which the VPN server can assign IP addresses to VPN clients.
Status	Specifies the current status of the VPN server policy, including **Enabled** and **Disabled**.

Configure user management

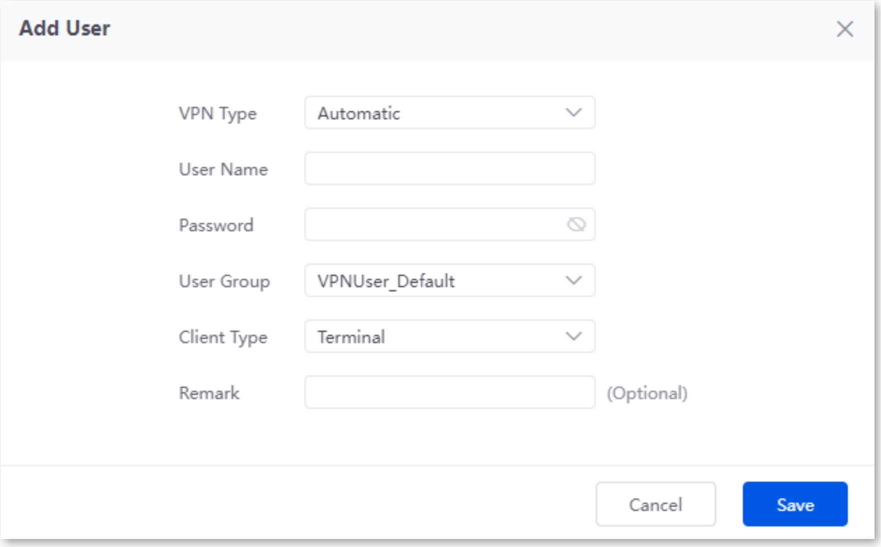
Log in to the web UI of the router, and navigate to **More** > **VPN Service > User Management** to enter the page.

On this page, you can configure PPTP or L2TP user accounts. When the PPTP or L2TP server is enabled, VPN users need to use accounts to dial up the VPN on the router.


User Management

VPN Type	User Name	Client Type	User Group	Access IP Address	Assigned IP Address	Remark	Online Status ↓	Account Status	Operation
No Data									

You can click **Add** to a new user policy.


Add User

VPN Type	Automatic
User Name	
Password	
User Group	VPNUser_Default
Client Type	Terminal
Remark	(Optional)

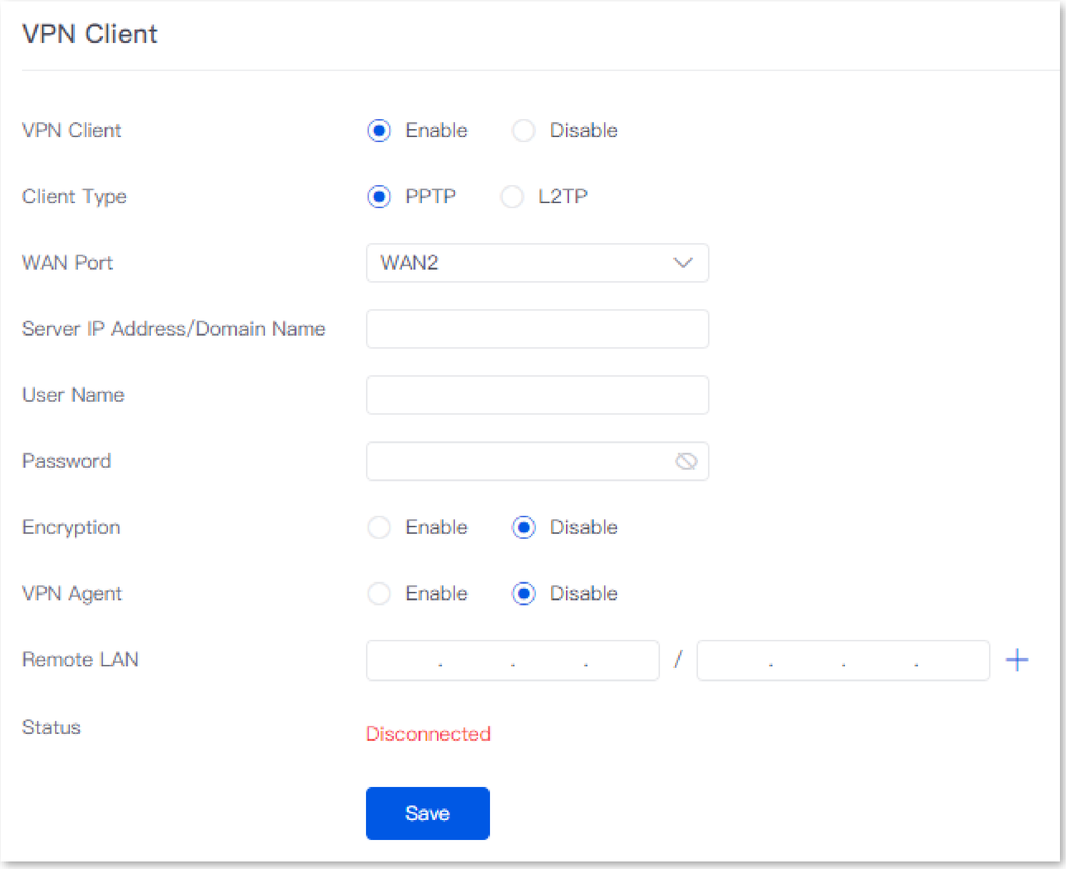
Parameter description

Parameter	Description
VPN Type	Specifies the service type of the client. **Automatic** indicates that the client can be either a PPTP user or a L2TP user.
User Name	Specifies the user name required for the VPN connection.
Password	Specifies the password required for the VPN connection.
User Group	Specifies the user group that the VPN client is added. After the VPN account is added to a user group, the access permission of subsequent users on the internal server is controlled. The user group must be configured in User Group.
Client Type	Specifies the type of the VPN client. – Select **Terminal** when the VPN client is a single host. – Select **Network Device** when the VPN client is a network.
Client Subnet	Specifies the IP address range of the client intranet. It is available only when the **Client Type** is set to **Network Device**.
Access IP Address	Specifies the IP address of the actual physical network adapter of the VPN client.
Assigned IP Address	Specifies the IP address that the server assigns to VPN client.
Remark	Specifies the description of the user policy. The remark is optional.
Online Status	Specifies whether the client is online.
Account Status	Specifies the status of the user policy.
Operation	Used to edit, enable, disable or delete the VPN user policy. ✎ Edit: Used to modify the VPN user policy. ▷ Enable : Used to enable the VPN user policy. ⊘ Disable : Used to disable the VPN user policy. 🗑 Delete : Used to delete the VPN user policy.

Configure PPTP or L2TP client

The router works as a PPTP or L2TP client and can connect to PPTP or L2TP server.

Log in to the web UI of the router, and navigate to **More** > **VPN Client** to enter the page. Set **VPN Client** to **Enable** and configure related parameters. Then click **Save**.



VPN Client

VPN Client	● Enable ○ Disable
Client Type	● PPTP ○ L2TP
WAN Port	WAN2
Server IP Address/Domain Name	
User Name	
Password	
Encryption	○ Enable ● Disable
VPN Agent	○ Enable ● Disable
Remote LAN	. . . / . . . +
Status	Disconnected

Save

Parameter description

Parameter	Description
VPN Client	Used to enable or disable the VPN client function. After this function is enabled, the router works as a VPN client.
Client Type	Specifies the VPN server type of the router, including **PPTP** and **L2TP**. Both PPTP and L2TP are Layer 2 VPN tunneling protocols, use Point-to-Point Protocol (PPP) for data encapsulation, and add additional headers to the data. – **PPTP**: Select **PPTP** when the VPN server is a PPTP server. – **L2TP**: Select **L2TP** when the VPN server is a L2TP server.
WAN Port	Specifies the WAN port of the PPTP or L2TP client for setting up a connection with the PPTP or L2TP server.
Server IP Address/Domain Name	Specifies the IP address or domain name of the VPN server. Generally, it is the IP address or domain name of the WAN port with the PPTP/L2TP server function enabled on the peer VPN router.
User Name	Specify the user name and password assigned by the VPN server to the VPN client.
Password	

Parameter	Description
Encryption	Specifies whether to enable 128-bit data encryption. The value of this parameter must be consistent with that of the server. Otherwise, the client is unable to communicate with the server. Only PPTP VPNs support this parameter.
VPN Agent	With this function enabled, clients in the LAN can obtain IP addresses from the VPN server to access the internet.
Remote LAN	Specifies the network segment of the LAN of the PPTP or L2TP server.
Status	Specifies the current connection status of the VPN client.

10.4.3 Example of configuring a PPTP/L2TP VPN

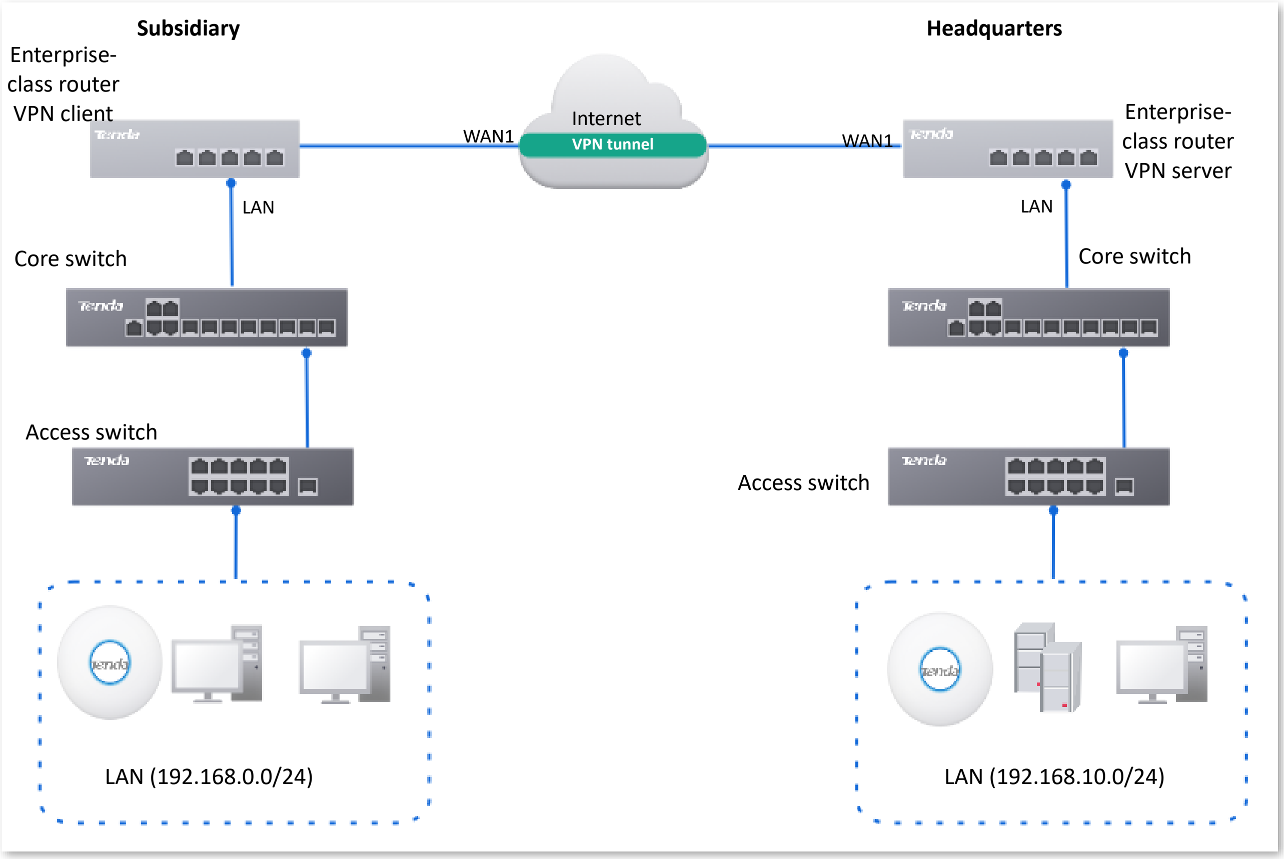
Networking requirements

The headquarters and subsidiary used enterprise-class routers to set up a network and successfully access the internet. The subsidiary staff need to access intranet resources through the internet, such as internal documents, office OA, ERP system, CRM system, and project management system.

Solution

Configure the enterprise-class router of the headquarters as the VPN server and the enterprise-class router of the subsidiary as the VPN client to enable remote users to securely access the intranet through the internet. PPTP VPN is taken as an example here and the configuration of L2TP VPN is similar.

Assume that the WAN1 IP address of the headquarters’ enterprise-class router is 202.105.11.22.



Configuration procedure

Configure a router as the VPN server → Configure the other router as the VPN client

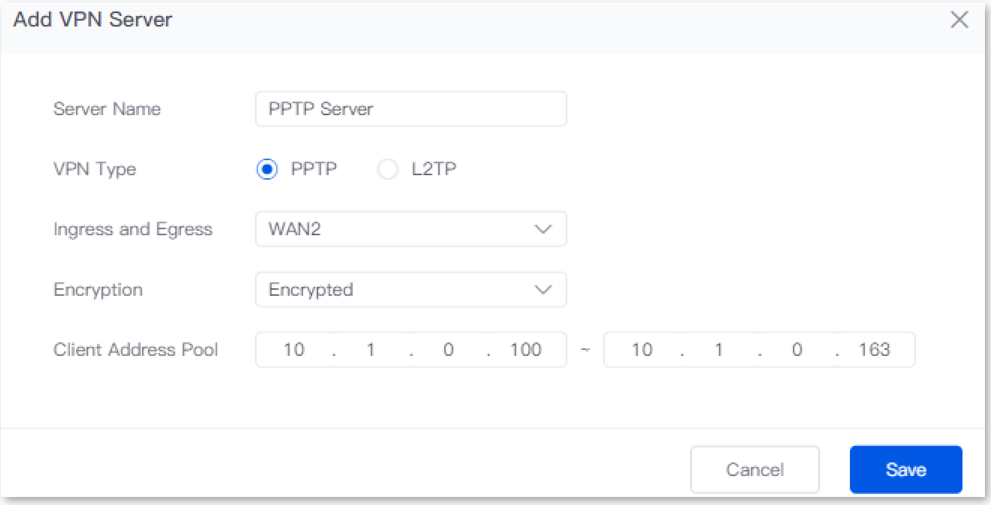
I. Configure the enterprise-class router of the headquarters as the VPN server.

Step 1 Log in to the web UI of the router.

Step 2 Configure the PPTP server.

Server Name	VPN Type	Ingress and Egress	Encryption	Client Address Pool
PPTP Server	PPTP	WAN1	Encrypted	10.1.0.100 - 10.1.0.163

Navigate to **More** > **VPN Service** > **VPN Server**, click **Add** to configure the relevant parameters of the PPTP server, and click **Save**.



Add VPN Server

Server Name: PPTP Server

VPN Type: ● PPTP ○ L2TP

Ingress and Egress: WAN2

Encryption: Encrypted

Client Address Pool: 10 . 1 . 0 . 100 ~ 10 . 1 . 0 . 163

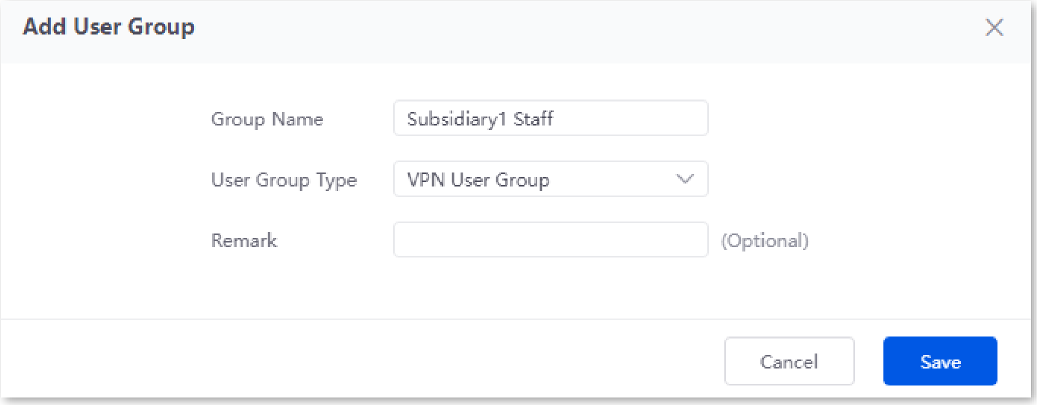
Step 3 Configure the PPTP user.

The following table provides the examples of PPTP user parameters.

VPN Type	User Name	Password	User Group	Client Type	Client Subnet
PPTP	Subsidiary1	Subsidiary1	Subsidiary1 Staff	Network Device	192.168.0.0/24

1. Configure VPN user groups.

Navigate to **Audit** > **Group Policy** > **User Group**, click **Add** to configure VPN user groups for the subsidiary, and click **Save**.



Add User Group

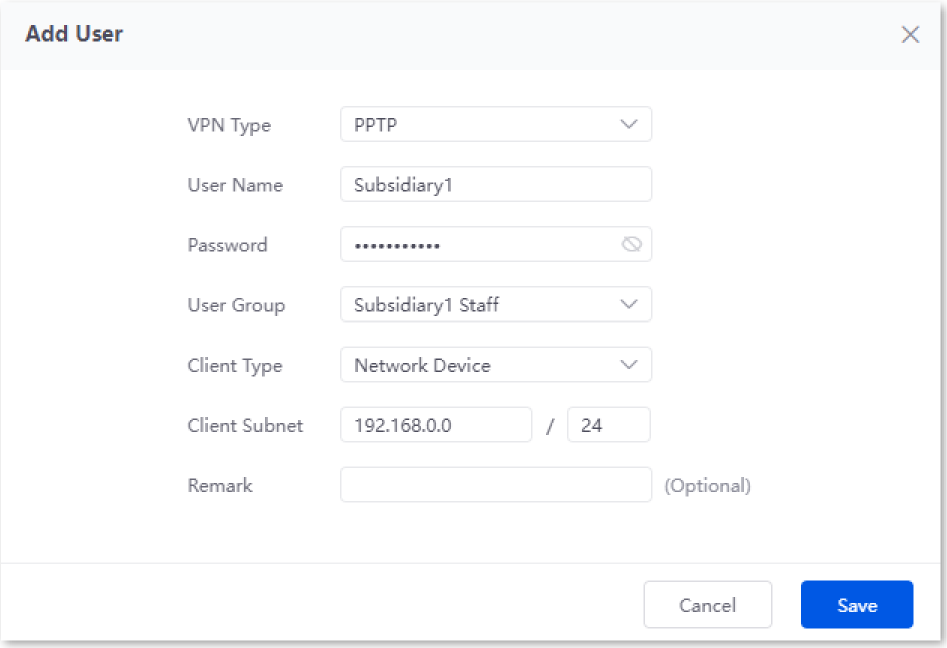
Group Name: Subsidiary1 Staff

User Group Type: VPN User Group

Remark: (Optional)

2. Configure the PPTP user.

Navigate to **More** > **VPN Service** > **User Management**, click **Add** to configure the relevant parameters of the PPTP user, and click **Save**.



Add User

VPN Type: PPTP

User Name: Subsidiary1

Password: •••••••••••

User Group: Subsidiary1 Staff

Client Type: Network Device

Client Subnet: 192.168.0.0 / 24

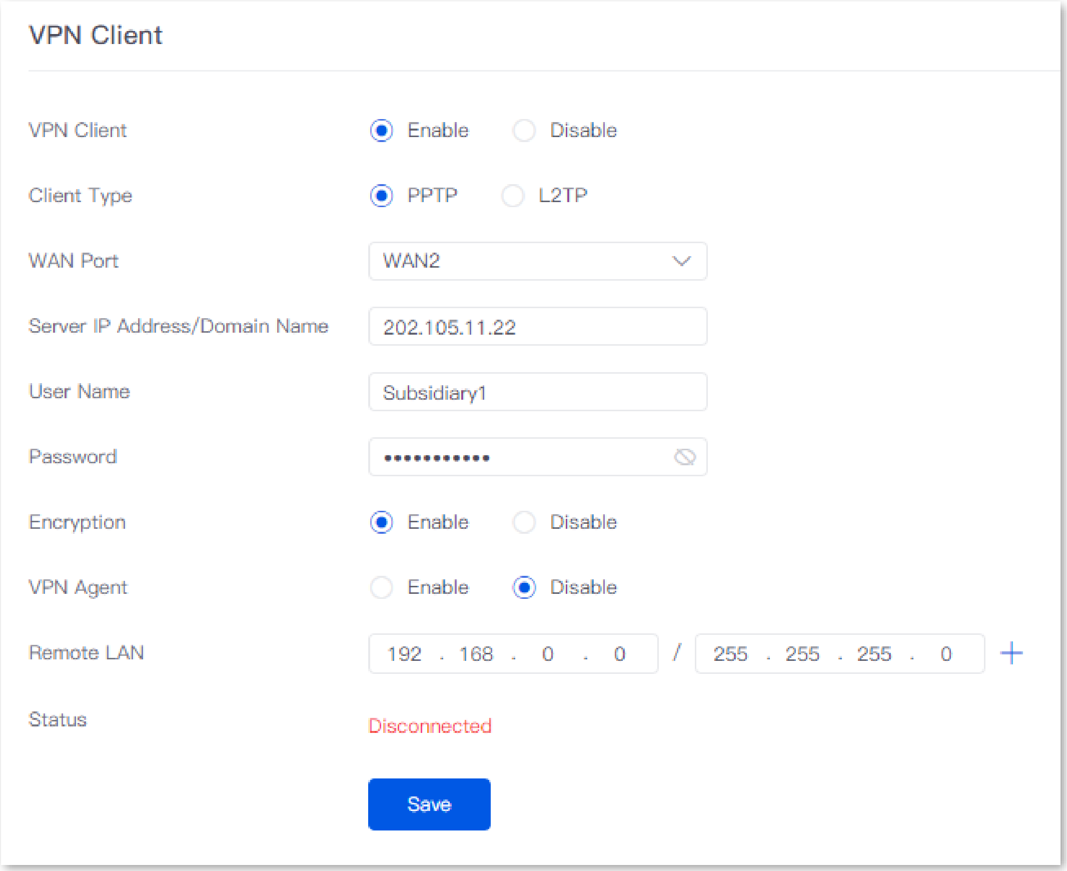
Remark: (Optional)

II. Configure the enterprise-class router of the subsidiary as the VPN client.

Step 1 Log in to the web UI of the router.

Step 2 Configure the PPTP client.

1. Navigate to **More** > **VPN Client**, and enable the **VPN Client** function.
2. Set **Client Type** to be consistent with the VPN server, which is **PPTP** in this example.
3. Set **WAN Port**, which is **WAN2** in this example.
4. Set **Server IP Address/Domain Name**, which is **202.105.11.22** in this example.
5. Set **User Name** and **Password**, which both are **Subsidiary1** in this example.
6. Enable the **Encryption** function.
7. Set **Remote LAN**, which is **192.168.0.0/255 255.255.0** in this example.
8. Click **Save**.



VPN Client

VPN Client	● Enable ○ Disable
Client Type	● PPTP ○ L2TP
WAN Port	WAN2
Server IP Address/Domain Name	202.105.11.22
User Name	Subsidiary1
Password	●●●●●●●●●●●●
Encryption	● Enable ○ Disable
VPN Agent	○ Enable ● Disable
Remote LAN	192 . 168 . 0 . 0 / 255 . 255 . 255 . 0 +
Status	Disconnected

----End

When the status of the page shows **Connected**, the VPN connection is successful.

Staff in the subsidiary and headquarters can securely access each other's LAN resources through the internet.

Verification

Assume that the subsidiary is about to access the FTP server of the headquarters. The headquarters project data is stored on an FTP server and the server information is as follows:

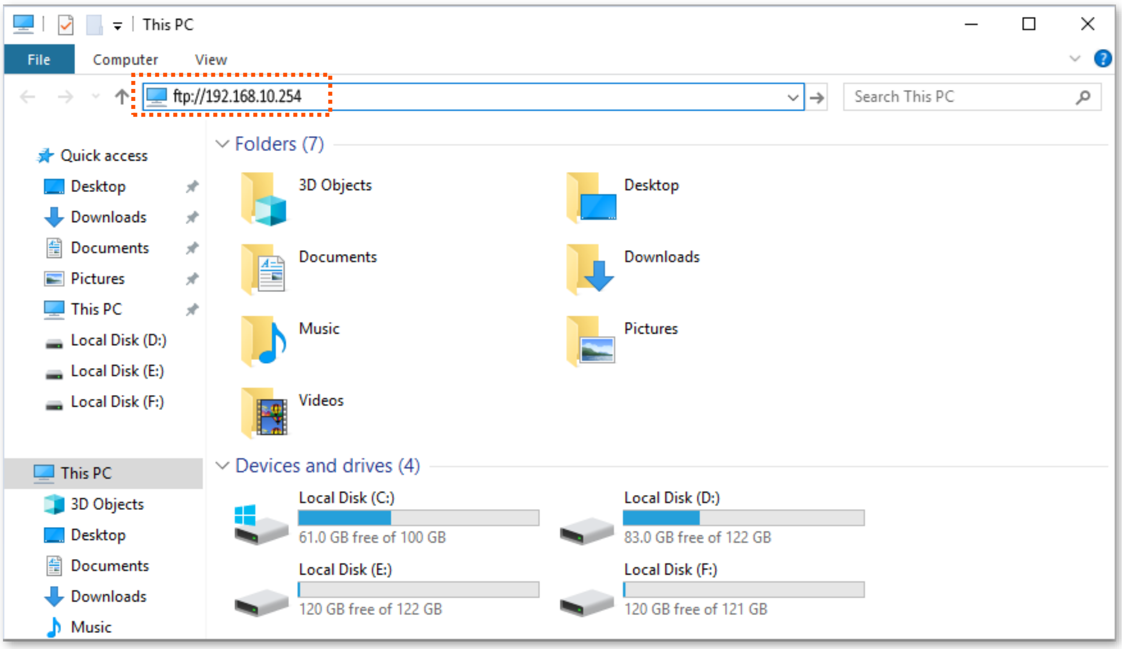
- FTP server IP address: 192.168.10.254
- FTP service port: 21
- Login user name/password: Tom123/Tom123

When the subsidiary staff access the headquarters project materials, perform the following procedure:

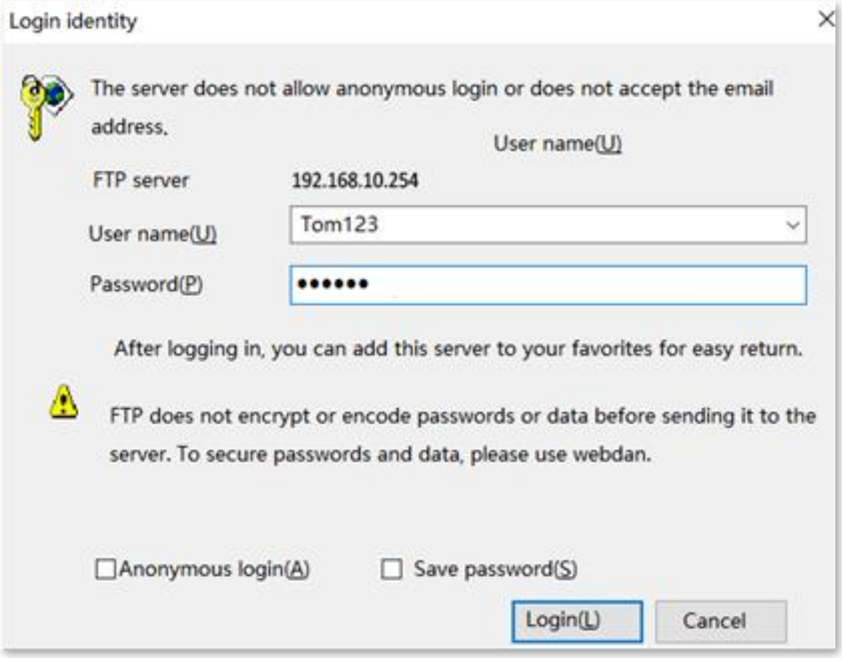
Step 1 Enter **ftp://server IP address** in a browser or **This PC**, which is **ftp://192.168.10.254** in this example.

TIP

If the LAN service port is not the default port number, the access format is **LAN service application layer protocol name://Server IP address:LAN service port**.


ftp://192.168.10.254

Step 2 Enter the user name and password, which are both **Tom123** in this example, and click **Login**.


Login identity

The server does not allow anonymous login or does not accept the email address.

User name(U)

FTP server 192.168.10.254

User name(U) Tom123

Password(P) ••••••

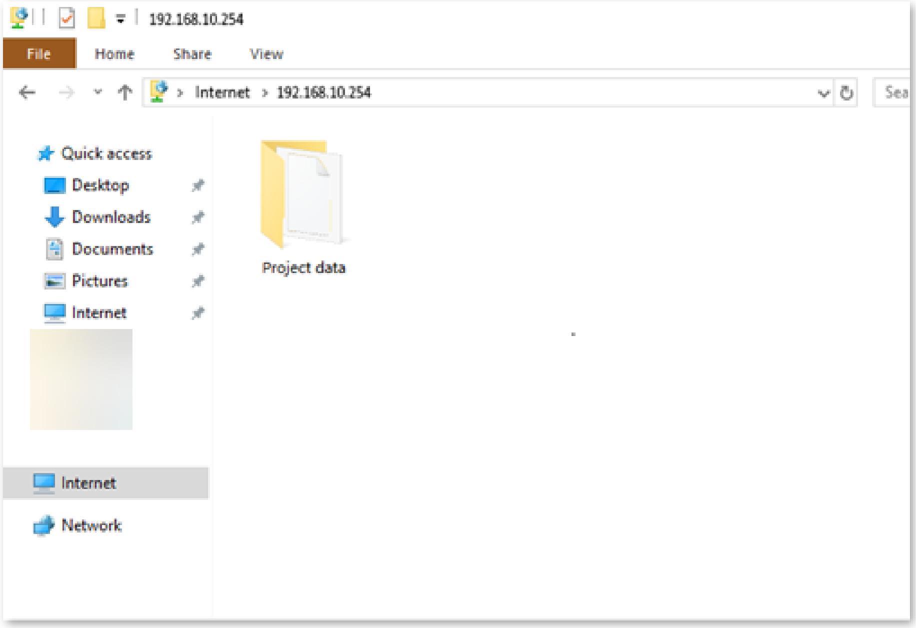
After logging in, you can add this server to your favorites for easy return.

FTP does not encrypt or encode passwords or data before sending it to the server. To secure passwords and data, please use webdan.

□ Anonymous login(A) □ Save password(S)

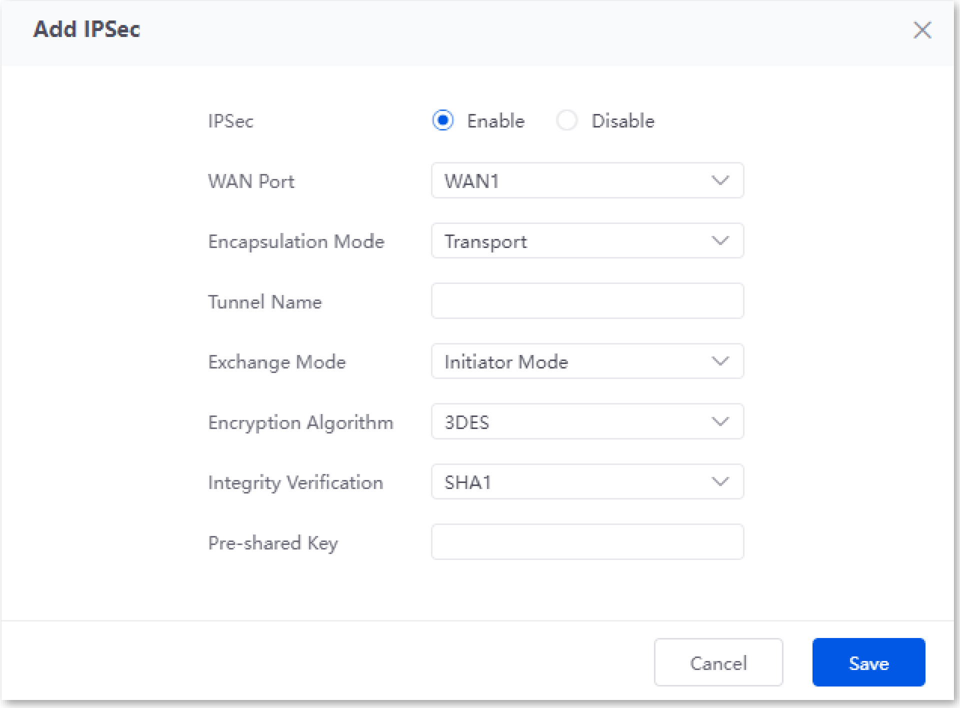
----End

The access is successful. See the following figure.



Configure IPSec-transport mode

Log in to the web UI of the router, and navigate to **More** > **VPN Service** > **IPSec** to enter the page. Click **Add**, select **Transport** for **Encapsulation Mode** on the **Add IPSec** pop-up window, configure other parameters as required, and click **Save**.


Add IPSec

IPSec: ● Enable ○ Disable

WAN Port: WAN1

Encapsulation Mode: Transport

Tunnel Name:

Exchange Mode: Initiator Mode

Encryption Algorithm: 3DES

Integrity Verification: SHA1

Pre-shared Key:

Parameter description

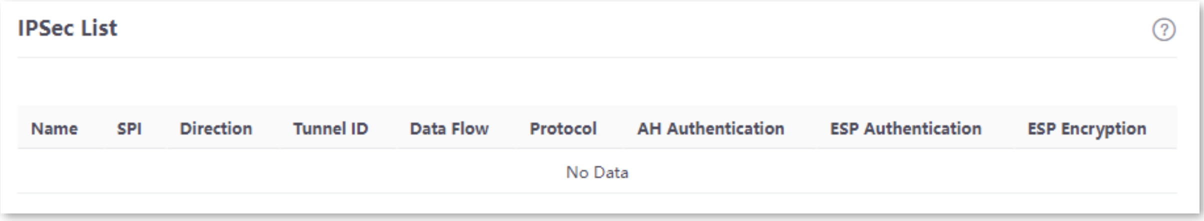
Parameter	Description
IPSec	Used to enable or disable the IPSec function.

Parameter	Description
WAN Port	Specifies the local WAN port assigned to the IPSec function. The IP address of the WAN port must be set as the value of remote gateway of the IPSec peer.
Encapsulation Mode	Specifies the encapsulation mode of IPSec data. – **Tunnel**: Used to protect the whole IP data packet (including IP head and data load), usually used for secure communication between two gateways. – **Transport**: Used to protect data load of the IP data packet, but not the IP head. This mode is generally used for secure communication between hosts and hosts or between hosts and gateways.
Tunnel Name	Specifies the name of the IPSec tunnel.
Exchange Mode	Specifies the negotiation mode of the IPSec tunnel. – **Initiator Mode**: The router initiates connection proactively and asks for access to the peer gateway. – **Responder Mode:** The router waits for the connection request. NOTE Do not set both sides of the IPSec tunnel to **Responder Mode.** Otherwise, you will fail to establish the IPSec tunnel.
Encryption Algorithm	Specifies the IKE session encryption algorithm. The router supports the following algorithms: – **DES**: A 56-bit key is used to encrypt 64-bit data. The last 8 bits of the 64-bit data are used for parity check. 3DES indicates that three 56-bit keys are used for encryption. – **AES**: A 128/192/256-bit key is used for encryption. AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.
Integrity Verification	Specifies the IKE session verification algorithm. – **MD5**: It is abbreviated for Message Digest Algorithm. A 128-bit message digest is generated to prevent message tampering. – **SHA1**: It is abbreviated for Secure Hash Algorithm. A 160-bit message digest is generated to prevent message tampering, leading to higher security than MD5.
Pre-shared Key	Specifies the pre-shared key used for negotiation. The key consists of a maximum of 128 characters and must be the same as that specified on the peer gateway.

View IPSec list

Log in to the web UI of the router, and navigate to **More** > **VPN Service** > **IPSec List** to enter the page.

After the devices at both ends of the IPSec tunnel are configured, you can view the IPSec SA in the IPSec list.



IPSec List

Name	SPI	Direction	Tunnel ID	Data Flow	Protocol	AH Authentication	ESP Authentication	ESP Encryption
No Data								

Parameter description

Parameter	Description
Name	Specifies the name of the IPSec tunnel policy.
SPI	Specifies the Security Parameter Index (SPI) of the current tunnel, which is obtained through automatic IKE negotiation.
Direction	Specifies the direction of the tunnel (in: flow in, out: flow out). Because IPSec rules are one-way, when an IPSec tunnel is successfully established, each tunnel will generate a pair of “in and out” IPSec rules with the same name.
Tunnel ID	Specifies the gateway addresses of two sides of the tunnel.
Data Flow	Specifies the subnet masks of two sides of the tunnel.
Protocol	Specifies the protocol which offers the security service for IPSec. – **AH**: It is abbreviated for Authentication Header. This protocol is used for verifying data integrity. If a packet is tampered during transmission, the receiver discards it during data integrity verification. – **ESP**: It is abbreviated for Encapsulating Security Payload. This protocol is used for verifying data integrity and encrypting data. If a packet processed using this protocol is intercepted during transmission, it is difficult for the intercepting party to obtain the real information contained in the packet. This compatible protocol is widely used in gateway products.
AH Authentication	Specifies the AH authentication algorithm used by the tunnel, which is determined by the proposal of the second phase of IKEv1.
ESP Authentication	Specifies the ESP authentication algorithm used by the tunnel, which is determined by the proposal of the second phase of IKEv1.
ESP Encryption	Specifies the ESP encryption algorithm used by the security protocol, which is determined by the security proposal in the second phase of IKEv1.

10.4.4 Example of configuring an L2TP over IPSec VPN

Networking requirements

An enterprise uses the enterprise router to set up a network and successfully access the internet. The staff on business trip need to access intranet resources through the internet, such as internal documents, office OA, ERP system, CRM system, project management system and so on.

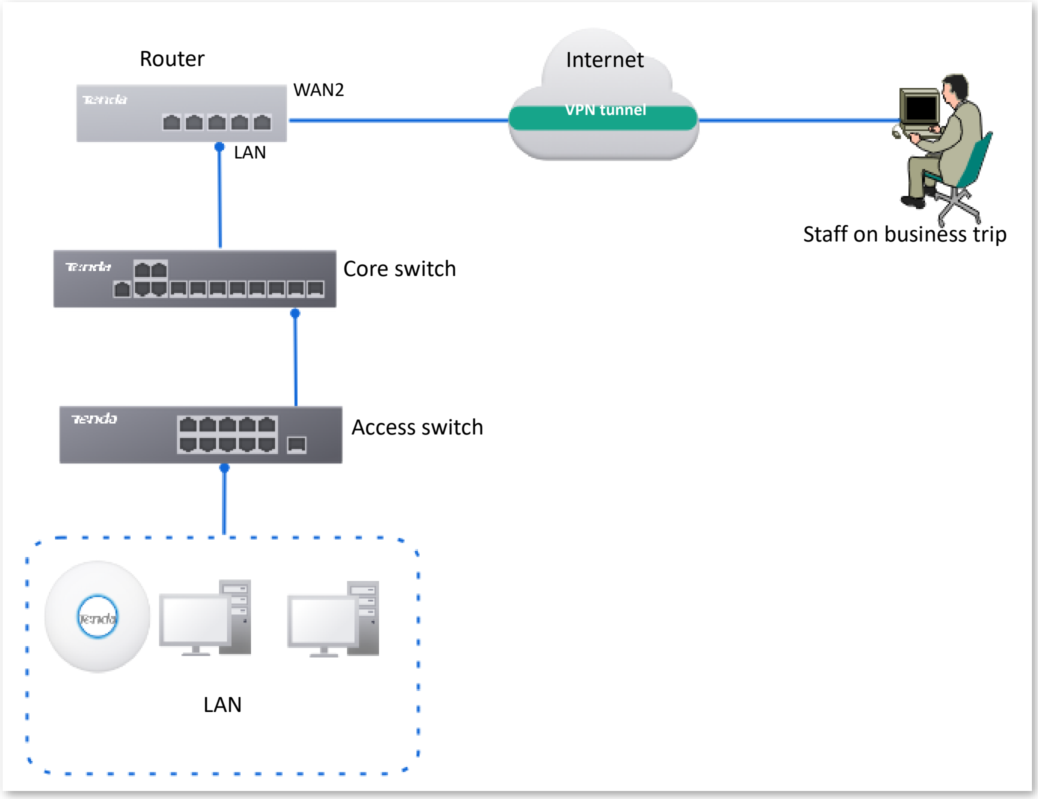
Solution

Configure an L2TP server on the router, and enable IPSec to encrypt data packets, so that remote users can securely access the intranet through the internet.

Assume that the basic information of the L2TP server is as follows:

- The user name and password assigned by the L2TP server are both **Tom123**.
- The L2TP server IP address is **202.105.11.22**.
- L2TP server enables encryption of data.
- The intranet of the L2TP server is **192.168.10.0/24**.
- The port through which the L2TP server establishes the VPN tunnel is **WAN2**.

Assume that when the L2TP server establishes a connection with the L2TP client, the pre-shared key used to authenticate the identity is Tenda123.



Configuration procedure

Configure the L2TP server

Configure the L2TP user

Step 1 Log in to the web UI of the router.

Step 2 Configure the L2TP server.

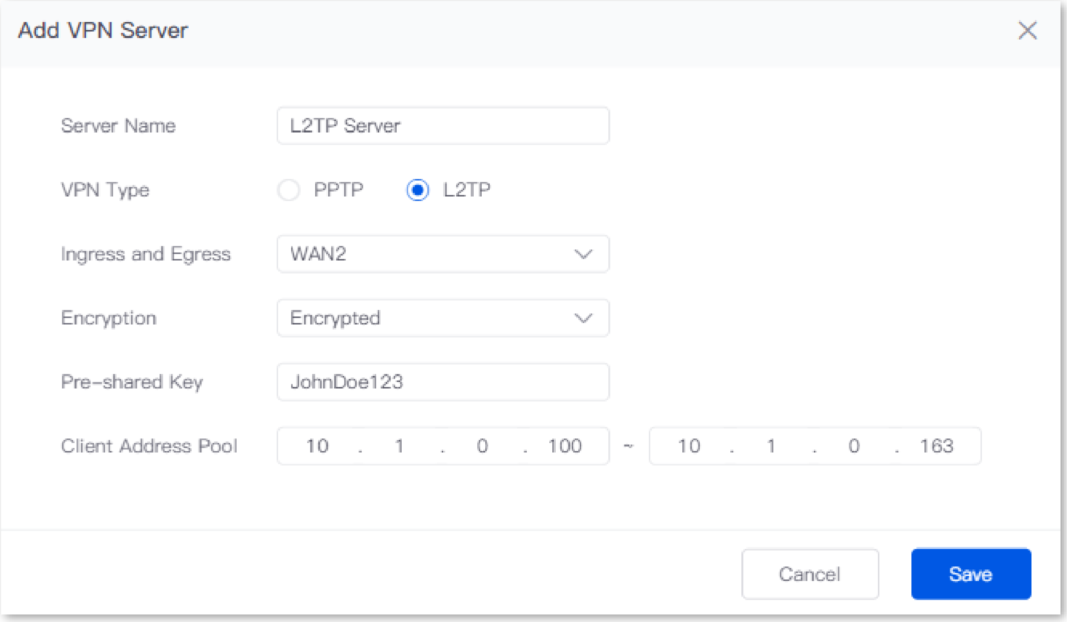
The following table shows the examples of L2TP server parameters.

Server Name	VPN Type	Ingress and Egress	Encryption	Pre-shared Key	Client Address Pool
L2TP Server	L2TP	WAN2	Encrypted	Tenda123	10.1.0.100– 10.1.0.163

Navigate to **More** > **VPN Service** > **VPN Server**. Click **Add** to configure L2TP server related parameters, and click **Save**.

TIP

The **Encryption** is set to **Encrypted**, which means L2TP server uses the IPSec to encrypt.



Add VPN Server

Server Name: L2TP Server

VPN Type: ○ PPTP ● L2TP

Ingress and Egress: WAN2

Encryption: Encrypted

Pre-shared Key: JohnDoe123

Client Address Pool: 10 . 1 . 0 . 100 ~ 10 . 1 . 0 . 163

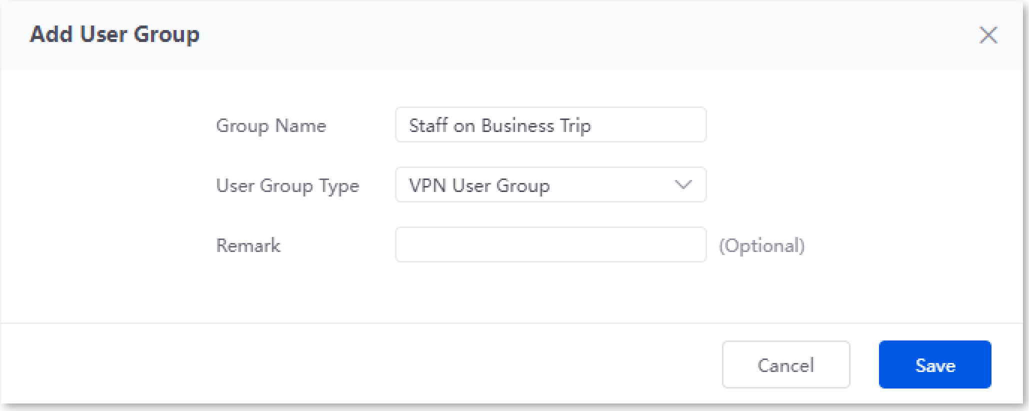
Step 3 Configure the L2TP user.

The following table shows the examples of L2TP user parameters.

VPN Type	User Name	Password	User Group	Client Type
L2TP	Tom123	Tom123	Staff on Business Trip	Terminal

1. Configure VPN user group.

   Navigate to **Audit** > **Group Policy** > **User Group**, click **Add** to configure VPN user group for VPN client, and click **Save**.



Add User Group

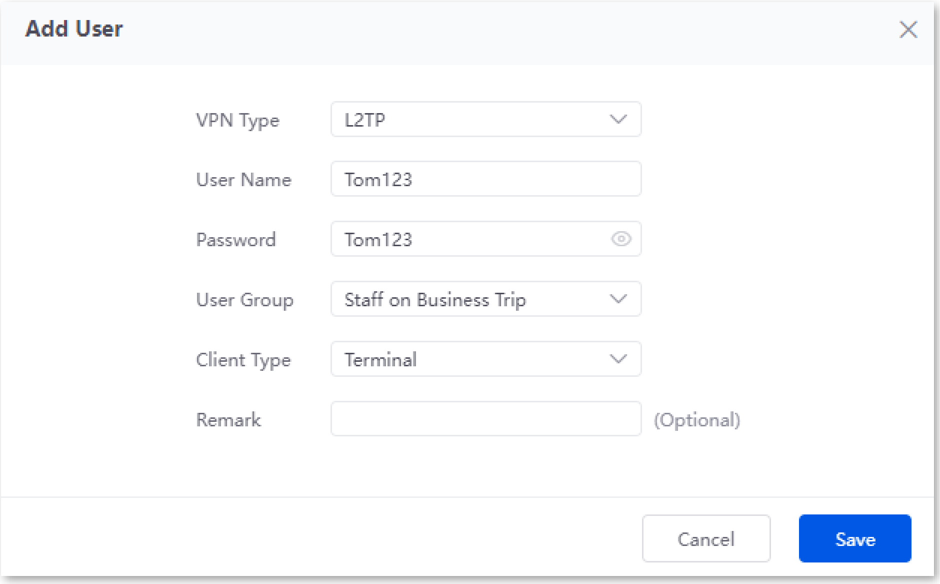
Group Name: Staff on Business Trip

User Group Type: VPN User Group

Remark: (Optional)

2. Configure the L2TP user.

   Navigate to **More** > **VPN Service** > **User Management**. Click **Add** to configure the relevant parameters of the L2TP user, and click **Save**.



Add User

VPN Type: L2TP

User Name: Tom123

Password: Tom123

User Group: Staff on Business Trip

Client Type: Terminal

Remark: (Optional)

----End

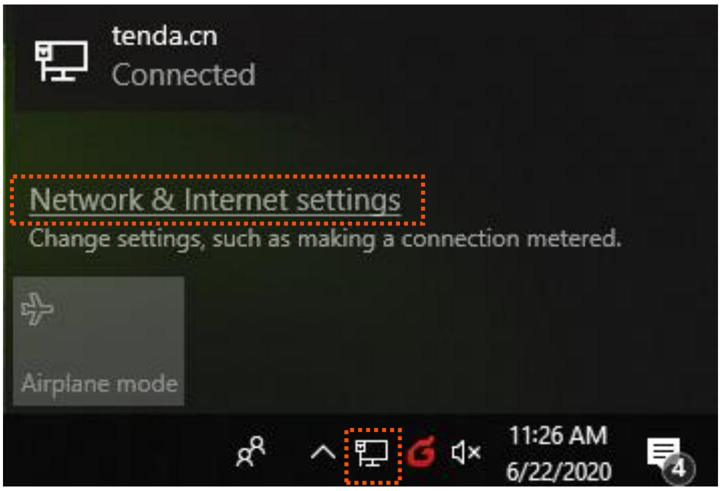
Verification

Staff on business trip use VPN dial-up to access headquarters resources.

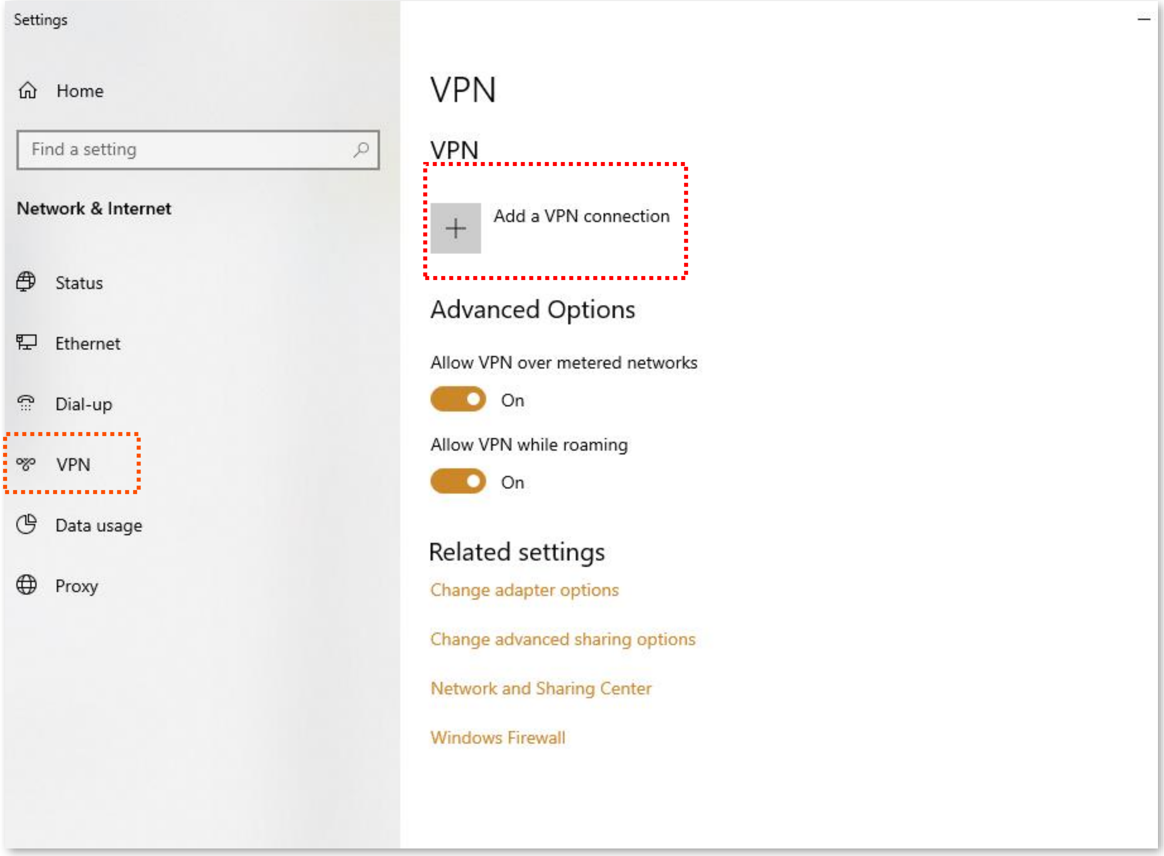
Scenario 1: Staff on business trip access headquarters resources on a computer (Example: Windows 10).

I. Staff creating VPN connection on business trip

Step 1 Click 🖳 in the lower right corner of the desktop, click **Network & Internet settings**.


tenda.cn
Connected
Network & Internet settings
Change settings, such as making a connection metered.
Airplane mode
11:26 AM
6/22/2020

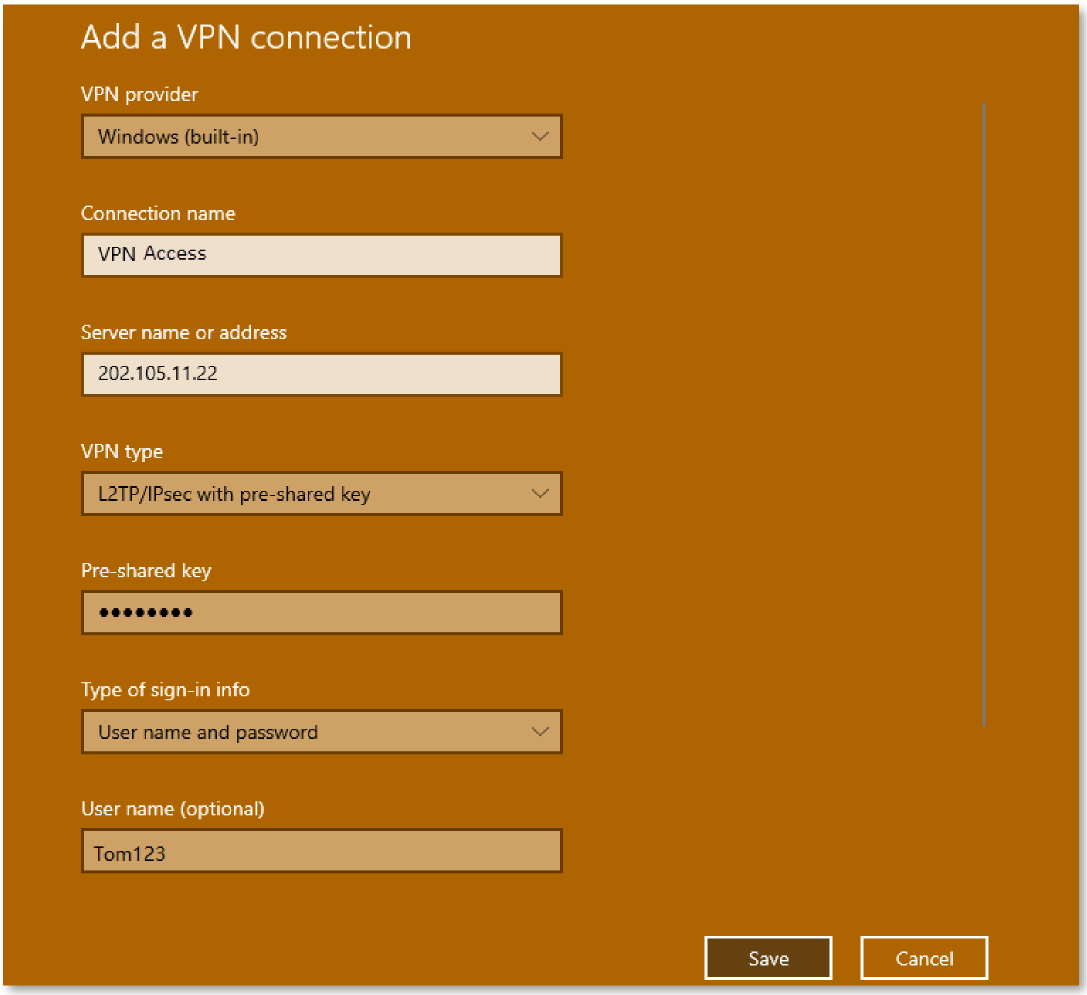
Step 2 Click **VPN** and then **Add a VPN connection**.



Step 3 Set VPN connection parameters, and then click **Save**.

1. Select **VPN provider**, which is **Windows (built-in)** in this example.
2. Set the **Connection name** of VPN, which is **VPN Access** in this example.
3. Set **Server name or address**, which is **202.105.11.22** in this example.
4. Select **VPN type**, which is **L2TP/IPsec with pre-shared key** in this example.
5. Set **Pre-shared key** of the IPSec tunnel, which is **Tenda123** in this example.
6. Pull down the scroll bar, select **Type of sign-in info**, which is **User name and password** in this example.

7. Set **User name** and **Password**, which are both **Tom123** in this example.



Add a VPN connection

VPN provider: Windows (built-in)

Connection name: VPN Access

Server name or address: 202.105.11.22

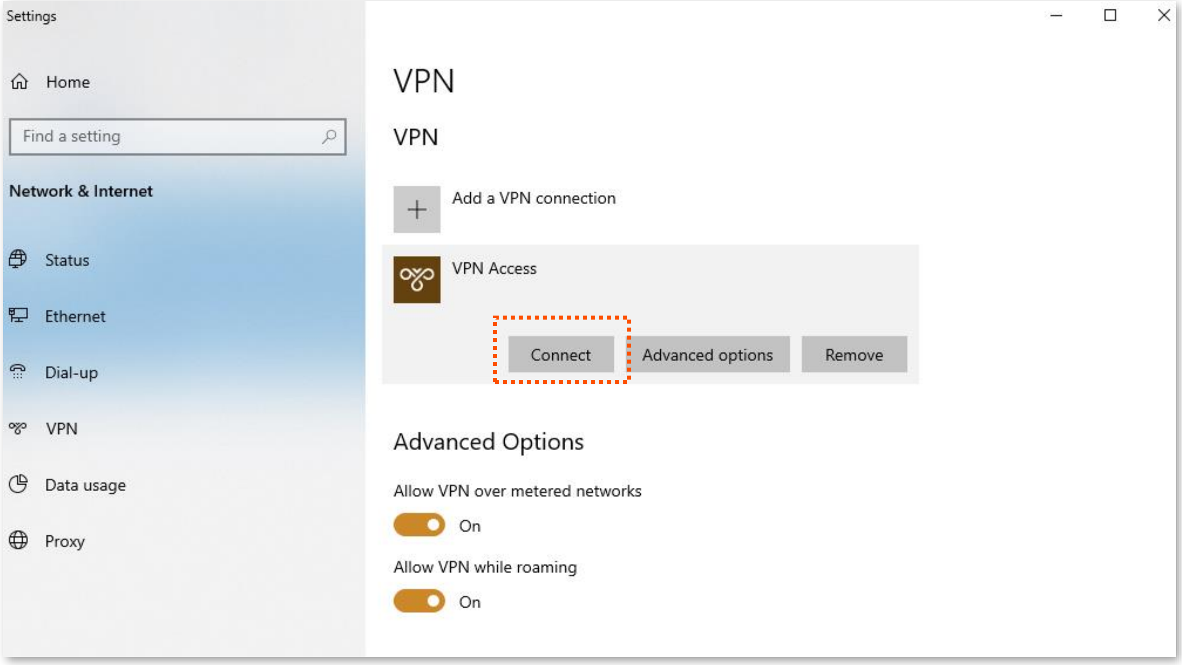
VPN type: L2TP/IPsec with pre-shared key

Pre-shared key: ••••••••

Type of sign-in info: User name and password

User name (optional): Tom123

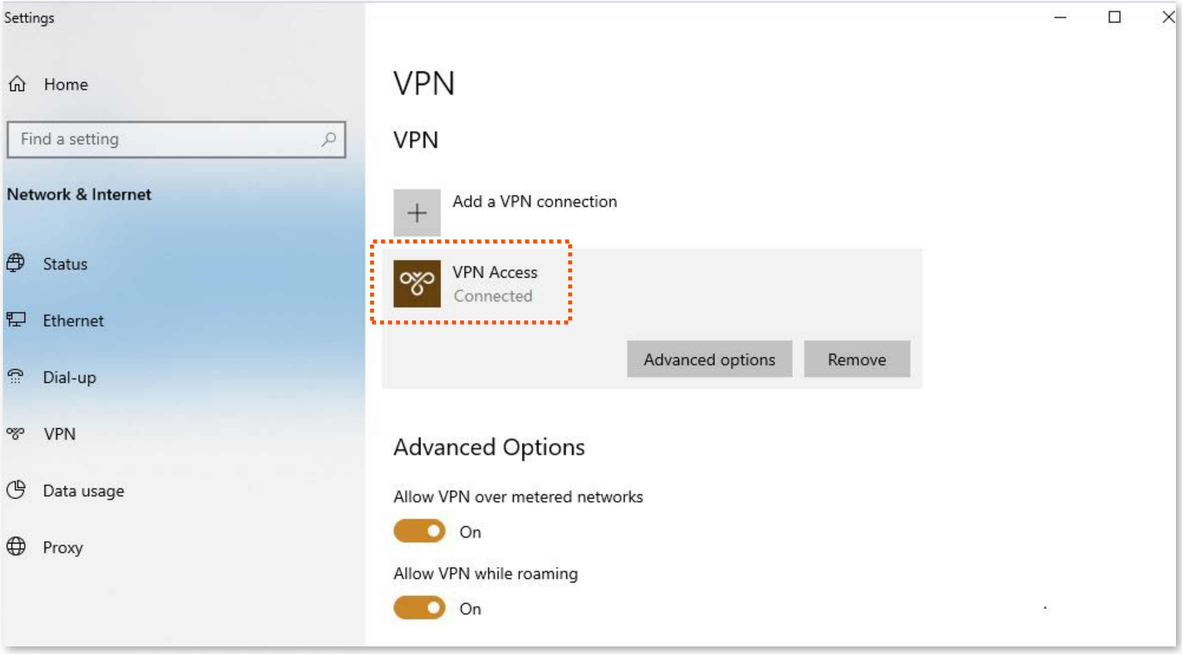
Step 4 Click **VPN Access**, then click **Connect**.



Allow VPN over metered networks: On

Allow VPN while roaming: On

Wait until a connection is established, which can access VPN according to the account information provided by the headquarters.



VPN Access
Connected

Advanced Options

Allow VPN over metered networks: On

Allow VPN while roaming: On

II. Staff accessing headquarters resources on business trip

Assume that the staff on business trip need to access the FTP server of headquarters. The server information is as follows:

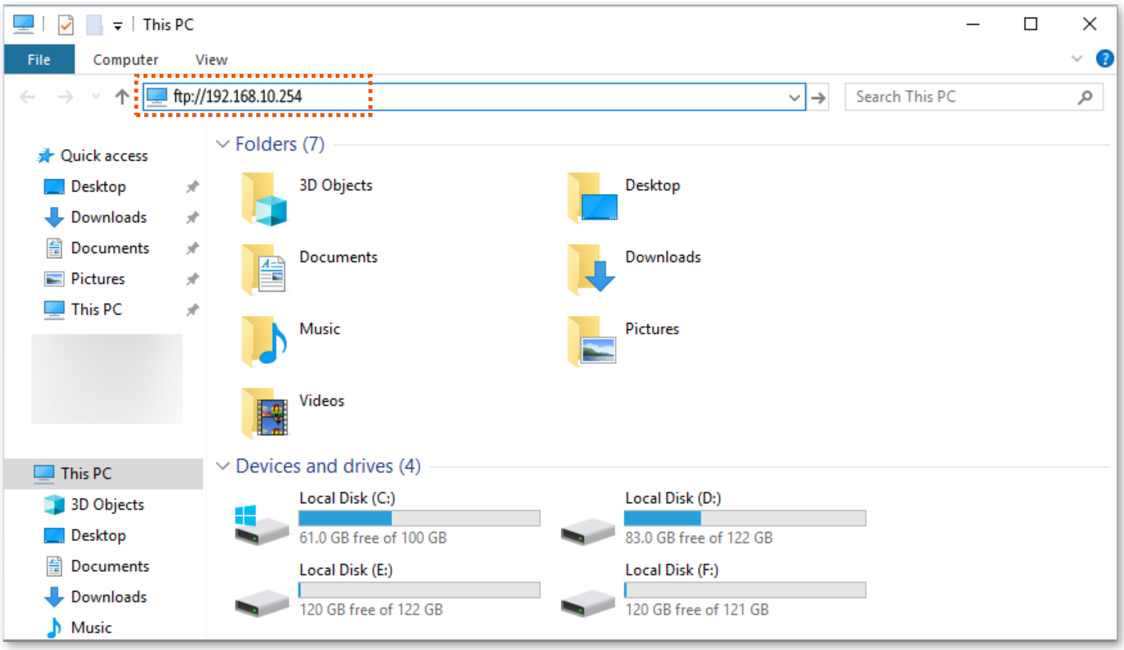
- FTP server IP address: 192.168.10.254
- FTP service port: 21
- Login user name/password: Tom123/Tom123

When the staff on business trip access the headquarters project materials, perform the following procedures:

Step 1 Enter **ftp://server IP address** in a browser or **This PC**, which is **ftp://192.168.10.254** in this example.

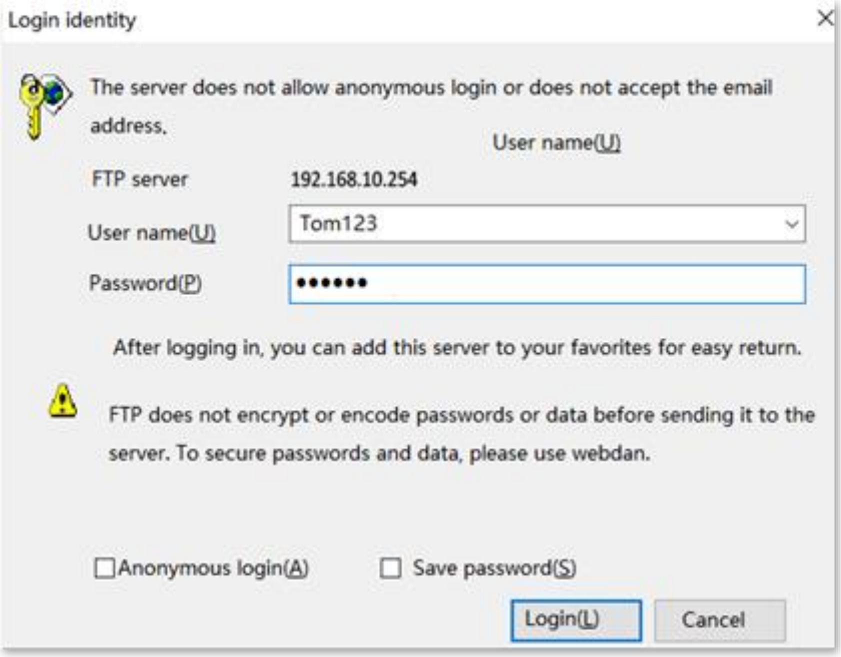
TIP

If the LAN service port is not the default port number, the access format is **LAN service application layer protocol name://Server IP address:LAN service port**.



ftp://192.168.10.254

Step 2 Enter the user name and password, which are both **Tom123** in this example, and click **Login**.



Login identity

The server does not allow anonymous login or does not accept the email address.

User name(U)

FTP server 192.168.10.254

User name(U) Tom123

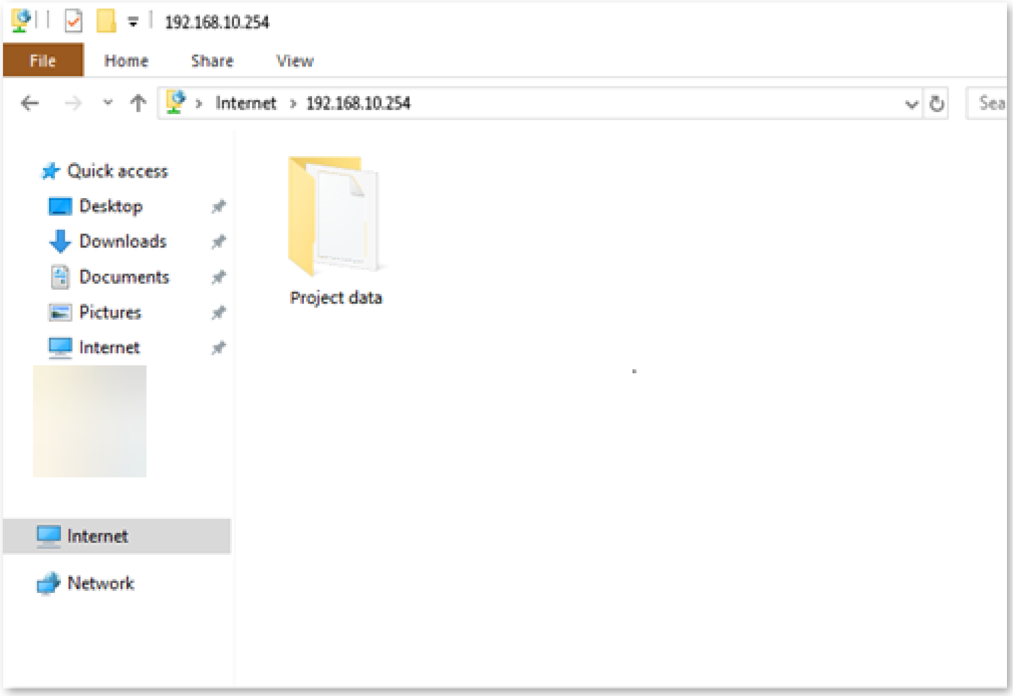
Password(P) ••••••

After logging in, you can add this server to your favorites for easy return.

FTP does not encrypt or encode passwords or data before sending it to the server. To secure passwords and data, please use webdan.

□Anonymous login(A) □ Save password(S)

The access is successful. See the following figure.

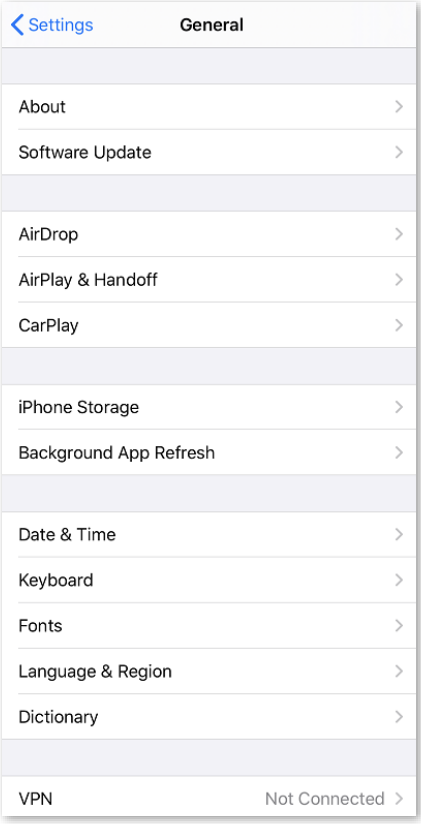


Scenario 2: Staff on business trip access headquarters resources on mobile devices (Example: iOS system)

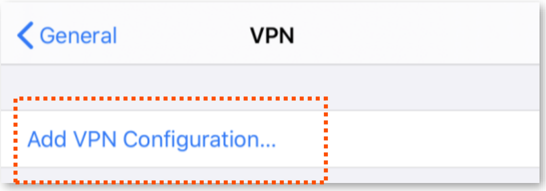
I. Staff creating VPN connection on business trip

Step 1 Click (Settings) on your smartphone.

Step 2 Tap **VPN.**

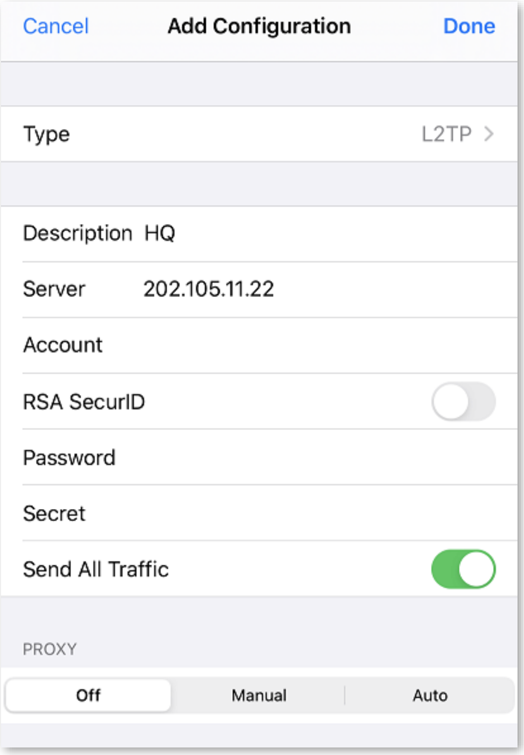


Step 3 Tap **Add VPN Configuration...**.



Step 4 Set the VPN connection parameters.

1. Select the **Type**, which is **L2TP** in this example.
2. Set the name of VPN connection in **Description**, which is **HQ** in this example.
3. Set **Server** (the IP address of L2TP server), which is **202.105.11.22** in this example.
4. Set **Account** and **Password** of L2TP VPN, which are both **Tom123** in this example.
5. Set **Secret** of IPSec tunnel, which is **Tenda123** in this example.
6. Tap **Done**.



Type L2TP

Description HQ

Server 202.105.11.22

Account

RSA SecurID ○

Password

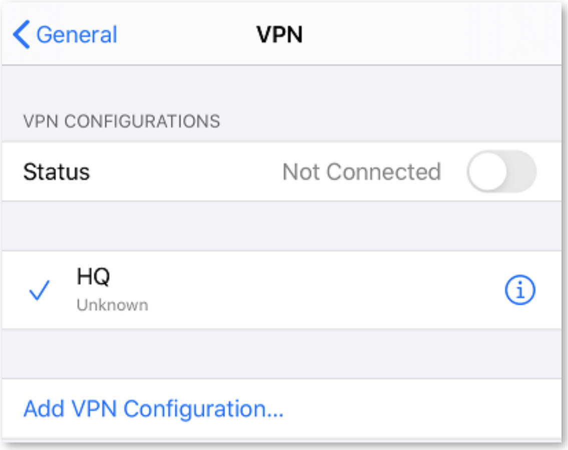
Secret

Send All Traffic ●

PROXY

Off Manual Auto

Step 5 Tap ○.



General

VPN

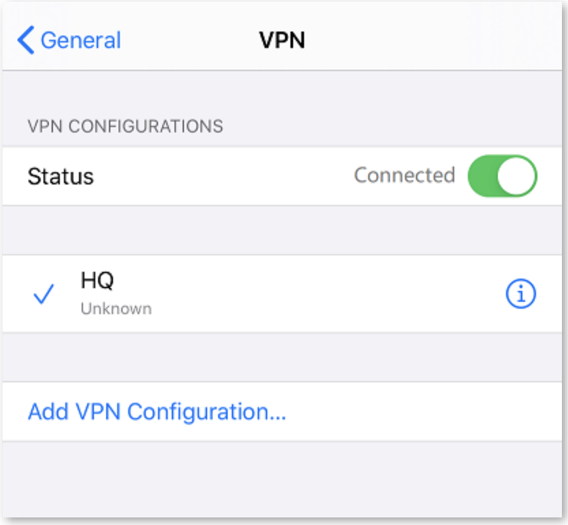
VPN CONFIGURATIONS

Status Not Connected

✓ HQ
Unknown

Add VPN Configuration...

Wait until the **Status** turns to **Connected** ●, the IPSec connection is created successfully.



General

VPN

VPN CONFIGURATIONS

Status Connected

✓ HQ
Unknown

Add VPN Configuration...

II. Staff accessing headquarters resources on business trip

If you want to use the mobile device (such as smartphone and tablet) to access the FTP server, you should install an FTP client on your mobile device first.

10.4.5 IPSec

Overview

IP Security (IPSec) is a protocol suite for transmitting data over the internet in a secure and encrypted manner.

- **Encapsulation mode**

The Encapsulation mode specifies the encapsulation mode of the data transmitted by IPSec. IPsec supports **Tunnel** and **Transport** modes.

- **Tunnel Mode**: This mode adds an additional IP head and is most commonly used between gateways. The whole IP data packet of the user is used to calculate the Authentication Header (AH) or Encapsulating Security Payload (ESP) head. The AH or ESP head and the user data encrypted by ESP are encapsulated in a new IP data packet.
- **Transport Mode**: This mode does not change the original IP head and is most commonly used between hosts. Only the data at the transmission layer is used to calculate the AH or ESP head. The AH or ESP head or the user data encrypted by ESP are placed behind the original IP packet head.

Mode **Protocol**	**Tunnel Mode**	**Transport Mode**
AH	IP AH Data	IP AH IP Data
ESP	IP ESP Data ESP-T	IP ESP IP Data ESP-T
AH +ESP	IP AH ESP Data ESP-T	IP AH ESP IP Data ESP-T

- **Security gateway**

It refers to a gateway (secure and encrypted router) with the IPSec functionality. IPSec is used to protect data exchanged between such gateways from being tampered and peeped.

- **IPSec peer**

The two IPSec clients are called IPSec peers. The two peers (security gateways) can securely exchange data only after a Security Association (SA) is set up between them.

- **SA**

SA specifies some elements of the peers, such as the base protocol (AH, ESP or both), encapsulation mode (transport or tunnel), encryption algorithm (DES, 3DES or AES), shared key for data protection in specified flows and life cycle of the key.

SA has the following features:

- A triplet {SPI, Destination IP address, Security protocol identifier} is used as a unique ID.
- An SA specifies the protocol, algorithm and key for processing packets.
- An SA is unidirectional. At least two SAs are needed to protect data flows in bidirectional communication. If two peers want to use both AH and ESP to protect data flows between them, each peer will construct an independent SA for each protocol.
- An SA can be created manually or generated automatically using Internet Key Exchange (IKE).
  - Manually: The configuration is complex. All the information required to create an SA must be manually configured, and some advanced features (such as regular key update) are not supported. At this time, the SA has no life cycle limit and never expires unless it is manually deleted, which has certain security risks. Typically used in small and static environments, or when the number of peer devices communicating is less.
  - IKE Auto-Negotiation: Simple configuration, which you only need to configure the information of IKE negotiation security policy, and IKE Auto-Negotiation will create and maintain the SA. At this time, the SA has a life cycle and will be updated regularly to enhance security. Generally used in medium and large dynamic network environments.

- **Ways to create SA**

Manually

Manually configure all the information required by the SA, including authentication algorithm, authentication key, encryption algorithm, encryption key, SPI value and so on.

IKE Auto-Negotiation

During the auto-negotiation, to ensure the privacy of information, both parties to the IPSec communication need to use information known to each other to encrypt and decrypt the data, so the two parties need to negotiate the security key at the beginning of the communication, and this process is completed by IKE.

IKE is a hybrid of ISAKMP, Oakley and SKEME protocols.

- ISAKMP: Internet Security Association and Key Management Protocol (ISAKMP) provides a framework for exchanging keys and SA negotiation.
- Oakley: Oakley Key Determination Protocol is a key-agreement protocol that describes the specific mechanism for key exchange.
- SKEME: Secure Key Exchange Mechanism (SKEME) describes another key exchange mechanism that differs from Oakley.

IKE negotiation process is divided into two phases:

- **Phase 1**

The communicating parties will negotiate and exchange security proposals such as authentication algorithms and encryption algorithms, and establish an ISAKMP SA for the secure exchange of more information in Phase 2.

The specific completion process is as follows:

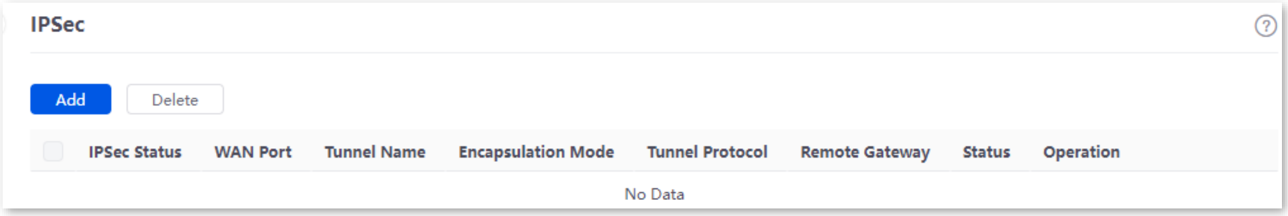
1. Negotiate and confirm a series of algorithms and other security proposals to ensure that both peers use the same security proposals.
2. Calculate the Diffie-Hellman (DH) public value based on the pre-shared key and the negotiated security proposal for key exchange.
3. Peer verification. The router verifies the legitimacy of the peer through the pre-shared key.

- **Phase 2**

This stage mainly negotiates a specific SA for IPSec on the ISAKMP SA established in Phase 1, and establishes an IPSec SA for the secure transmission of IP data.

Configure IPSec-tunnel mode

Log in to the web UI of the router, and navigate to **More** > **VPN Service** > **IPSec** to enter the page. On this page, you can configure the IPSec policy.



IPSec

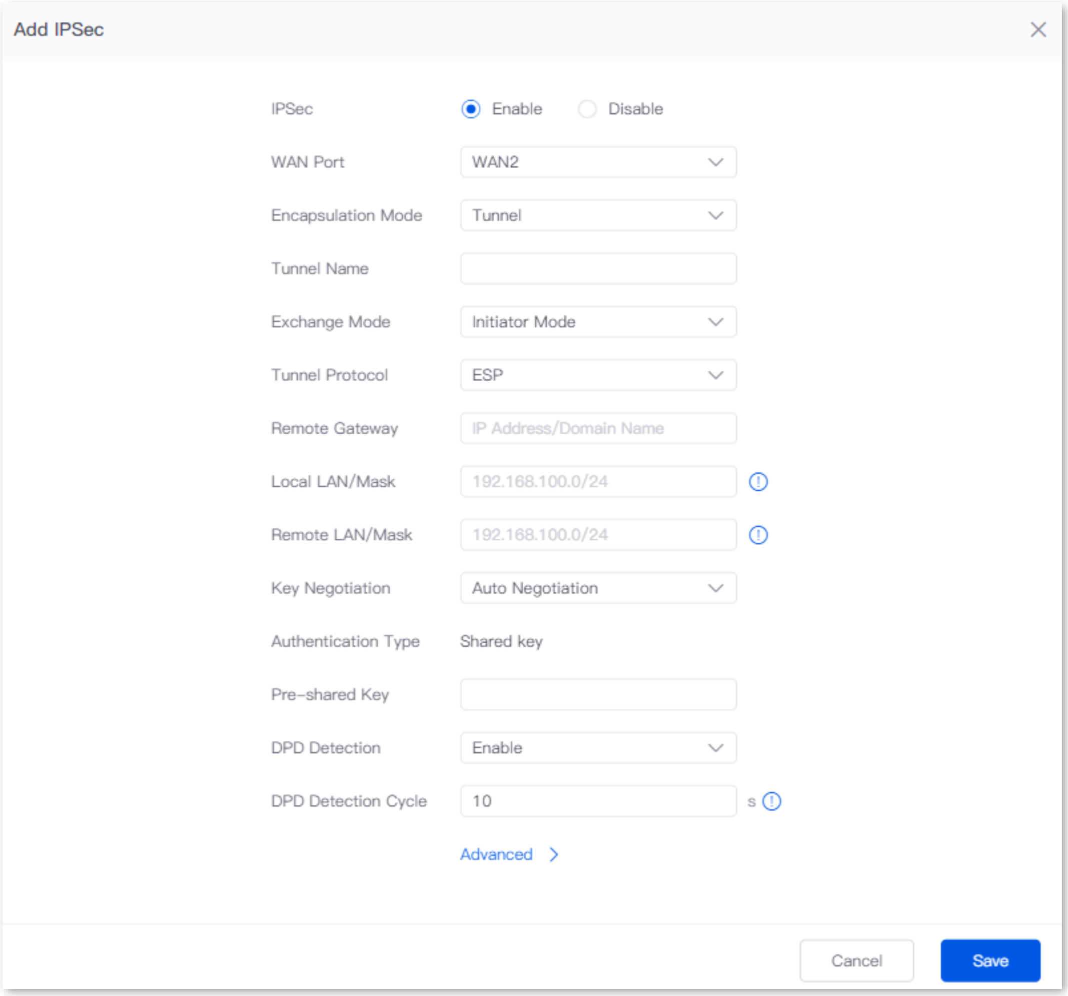
Add Delete

□	IPSec Status	WAN Port	Tunnel Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation

No Data

You can click **Add** to add a new IPSec policy.

IPSec data encapsulation mode includes Tunnel Mode and Transport Mode. It is tunnel mode by default.



Add IPSec

IPSec	● Enable ○ Disable
WAN Port	WAN2
Encapsulation Mode	Tunnel
Tunnel Name	
Exchange Mode	Initiator Mode
Tunnel Protocol	ESP
Remote Gateway	IP Address/Domain Name
Local LAN/Mask	192.168.100.0/24
Remote LAN/Mask	192.168.100.0/24
Key Negotiation	Auto Negotiation
Authentication Type	Shared key
Pre-shared Key	
DPD Detection	Enable
DPD Detection Cycle	10 s

Parameter description

Parameter	Description
IPSec	Used to enable or disable the IPSec function.
WAN Port	Specifies the local WAN port assigned to the IPSec function. The IP address of the WAN port must be set as the value of remote gateway of the IPSec peer.
Encapsulation Mode	Specifies the encapsulation mode of IPSec data. – **Tunnel**: Used to protect the whole IP data packet (including IP head and data load), usually used for secure communication between two gateways. – **Transport**: Used to protect data load of the IP data packet, but not the IP head. This mode is generally used for secure communication between hosts and hosts or between hosts and gateways.
Tunnel Name	Specifies the name of the IPSec tunnel.

Parameter	Description
Exchange Mode	Specifies the negotiation mode of the IPSec tunnel. - **Initiator Mode**: The router initiates connection proactively and asks for access to the peer gateway. - **Responder Mode:** The router waits for the connection request. NOTE Do not set both sides of the IPSec tunnel to **Responder Mode.** Otherwise, you will fail to establish the IPSec tunnel.
Tunnel Protocol	Specifies the protocol which offers the security service for IPSec. - **AH**: It is abbreviated for Authentication Header. This protocol is used for verifying data integrity. If a packet is tampered during transmission, the receiver discards it during data integrity verification. - **ESP**: It is abbreviated for Encapsulating Security Payload. This protocol is used for verifying data integrity and encrypting data. If a packet processed using this protocol is intercepted during transmission, it is difficult for the intercepting party to obtain the real information contained in the packet. This compatible protocol is widely used in gateway products. - **AH+ESP**: Use both of the above protocols simultaneously.
Remote Gateway	Specifies the WAN port IP address or domain name set by the IPSec tunnel peer gateway. TIP When it is set to a domain name, the DDNS function has to be configured in the remote gateway to ensure that the use of IPSec tunnel is not affected by the changeable WAN port IP address of the remote gateway.
Local LAN/Mask	Specifies the network segment and subnet mask of LAN network of the router. For example: Assume that the LAN IP address and subnet mask of this router are 192.168.0.1 and 255.255.255.0 respectively, enter 192.168.0.0/24.
Remote LAN/Mask	Specifies the LAN network segment and subnet mask of the remote gateway of the IPSec tunnel. If the remote gateway is a single host, enter its IP address/32.
Key Negotiation	The key negotiation method to establish an IPSec tunnel. The default mode is Auto Negotiation. – **Auto Negotiation**: It indicates that an SA is set up, maintained, and deleted automatically using IKE (Internet Key Exchange). This reduces configuration complexity and simplifies IPSec usage and management. Such an SA (Security Association) has a life cycle and is updated regularly, leading to higher security. – **Manual**: It indicates that an SA is set up by manually specifying encryption and authentication algorithms and keys. Such an SA does not have a life cycle, and therefore it remains valid unless being manually deleted, leading to a security risks. Generally, this mode is used only for commissioning.

Key negotiation-auto negotiation

During the auto-negotiation, to ensure the privacy of information, both parties to the IPSec communication need to use information known to each other to encrypt and decrypt the data, so the two parties need to negotiate the security key at the beginning of the communication, and this process is completed by IKE.

IKE is a hybrid of ISAKMP, Oakley and SKEME protocols.

- ISAKMP: Internet Security Association and Key Management Protocol (ISAKMP) provides a framework for exchanging keys and SA negotiation.
- Oakley: Oakley Key Determination Protocol is a key-agreement protocol that describes the specific mechanism for key exchange.
- SKEME: Secure Key Exchange Mechanism (SKEME) describes another key exchange mechanism that differs from Oakley.

IKE negotiation process is divided into two phases:

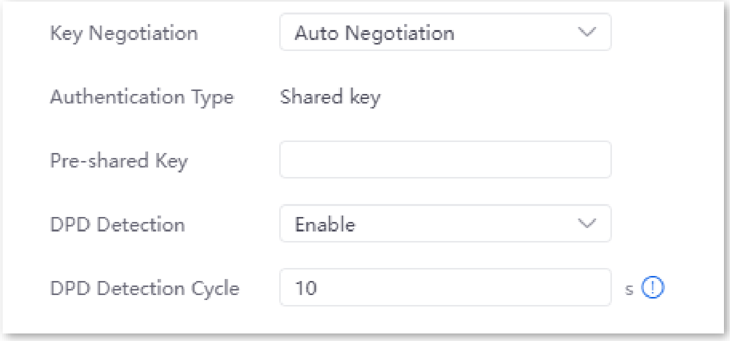
- **Phase 1**

The communicating parties will negotiate and exchange security proposals such as authentication algorithms and encryption algorithms, and establish an ISAKMP SA for the secure exchange of more information in Phase 2.

- **Phase 2**

This stage mainly negotiates a specific SA for IPSec on the ISAKMP SA established in Phase 1, and establishes an IPSec SA for the secure transmission of IP data.

When **Key Negotiation** is set to **Auto Negotiation**, the following figure is for reference only.



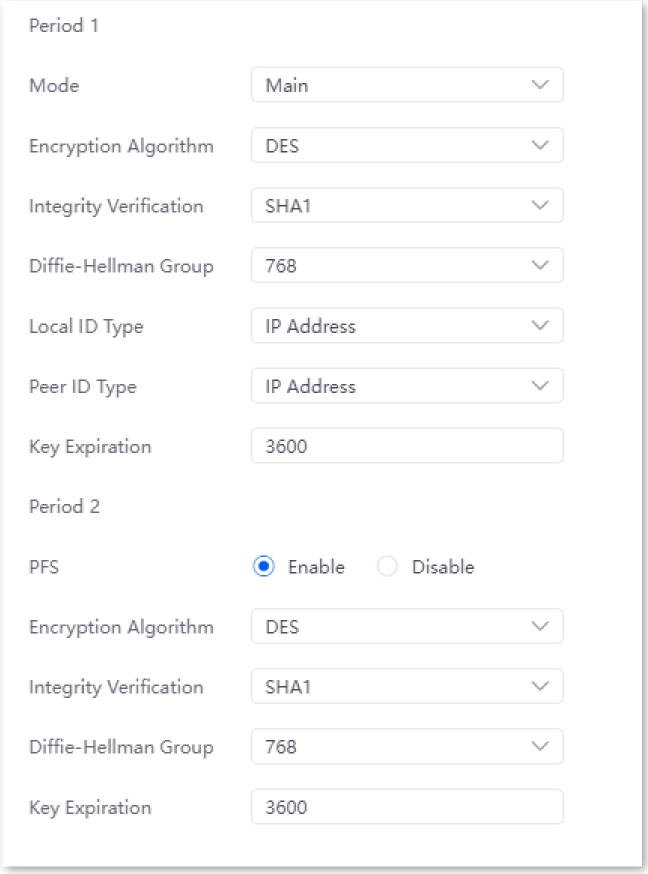
Key Negotiation	Auto Negotiation
Authentication Type	Shared key
Pre-shared Key	
DPD Detection	Enable
DPD Detection Cycle	10 s

Parameter description

Parameter	Description
Authentication Type	When **Shared key** is displayed on the page, it indicates that IPSec peers negotiated a key string shared between them.
Pre-shared Key	Specifies the pre-shared key used for negotiation. The key consists of a maximum of 128 characters and must be the same as that specified on the peer gateway.

Parameter	Description
DPD Detection	Used to enable or disable the Dead Peer Detection (DPD) function. When the DPD function is enabled, the router will periodically send DPD packets to the remote tunnel site to confirm whether the remote site is valid.
DPD Detection Cycle	Specifies the interval at which the router sends DPD frames. The default value is 10. If the router does not receive the confirmation of DPD frames within the valid period, it will initialize the IPSec SA from the local to the remote device.

Click **Advanced** to display the advanced parameters of auto negotiation.



Period 1

Mode: Main

Encryption Algorithm: DES

Integrity Verification: SHA1

Diffie-Hellman Group: 768

Local ID Type: IP Address

Peer ID Type: IP Address

Key Expiration: 3600

Period 2

PFS: ● Enable ○ Disable

Encryption Algorithm: DES

Integrity Verification: SHA1

Diffie-Hellman Group: 768

Key Expiration: 3600

Parameter description

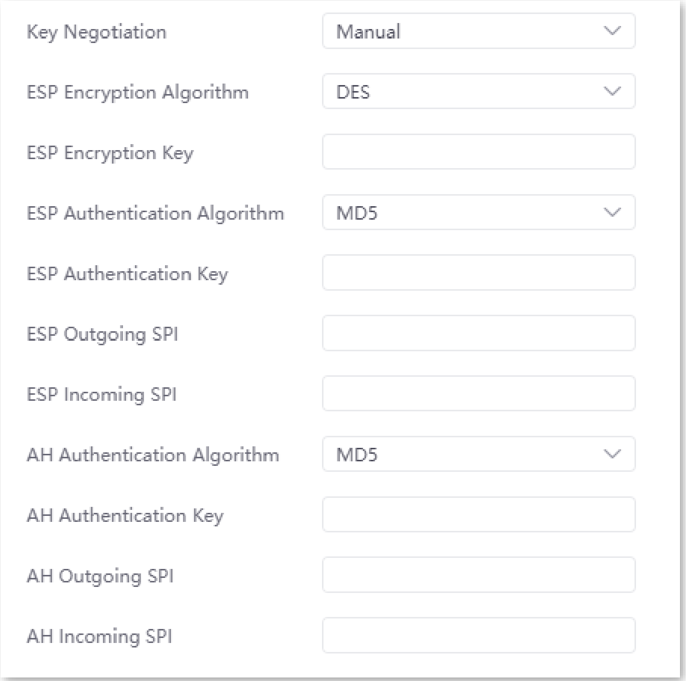
Parameter	Description
Mode	Specifies the mode supported by IKEv1. The mode selected should be consistent with that of the peer device. By default, **Main** mode is selected. – **Main**: Under this mode, packet exchanges are frequent and identity protection is provided. Therefore, this mode is applicable for scenarios that require high level of identity protection. – **Aggressive:** Under this mode, identity protection is not provided and packet exchanges are less with high negotiation speed. Therefore, this mode is applicable for scenarios that require low level of identity protection.

Parameter	Description
Encryption Algorithm	Specifies the IKE session encryption algorithm. – **DES**: It is abbreviated for Data Encryption Standard. A 56-bit key is used to encrypt 64-bit data. The last 8 bits of the 64-bit data are used for parity check. 3DES indicates that three 56-bit keys are used for encryption. – **AES**: It is abbreviated for Advanced Encryption Standard. AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.
Integrity Verification	Specifies the IKE session verification algorithm. – **MD5**: It is abbreviated for Message Digest Algorithm. A 128-bit message digest is generated to prevent message tampering. – **SHA1**: It is abbreviated for Secure Hash Algorithm. A 160-bit message digest is generated to prevent message tampering, leading to higher security than MD5.
Diffie-Hellman Group	Specifies the group information for the Diffie-Hellman algorithm for generating a session key used to encrypt an IKE tunnel. The information should be the same as that of the remote gateway.
Local ID Type	Specifies the ID of local gateway. – **IP Address**: Local router uses the WAN IP address of the remote gateway for negotiation with it. – **FQDN**: It is abbreviated for Fully Qualified Domain Name. You have to manually set a string of characters in the **Local ID.** Local ID should be identical with the peer ID of the remote gateway. TIP Local ID type should be identical with the peer ID type. And you are recommended to modify the **Mode** to **Aggressive** in this case.
Peer ID Type	Specifies the ID of peer gateway. – **IP Address**: The router uses the IP address of the specified WAN port for negotiation with the remote gateway. – **FQDN**: It is abbreviated for Fully Qualified Domain Name. You have to manually set a string of characters in the **Peer ID.** Peer ID should be identical with the local ID of the remote gateway. TIP Local ID type should be identical with the peer ID type. And you are recommended to modify the **Mode** to **Aggressive** in this case.
Key Expiration	Specifies the survival time of IPSec SA.

Parameter	Description
PFS	Specifies the Perfect Forward Secrecy (PFS) property of the IPSec session key. The PFS property must be consistent with the local PFS property. – **Enable PFS**: Phase 2 negotiates to generate a new key material that is not associated with the key material negotiated by Phase 1, even if the IKE1 Phase 1 key is cracked, the Phase 2 key remains secure. – **Disable PFS**: The key of Phase 2 will be generated according to the key material generated by Phase 1. Once the key of Phase 1 is cracked, the Phase 2 key used to protect the communication data is also at risk, which will seriously threaten the communication security of both parties.

Key negotiation-manual

When **Key Negotiation** is set to **Manual**, the following figure is for reference only. (AH+ESP tunnel protocol used as example)



Key Negotiation	Manual
ESP Encryption Algorithm	DES
ESP Encryption Key	
ESP Authentication Algorithm	MD5
ESP Authentication Key	
ESP Outgoing SPI	
ESP Incoming SPI	
AH Authentication Algorithm	MD5
AH Authentication Key	
AH Outgoing SPI	
AH Incoming SPI	

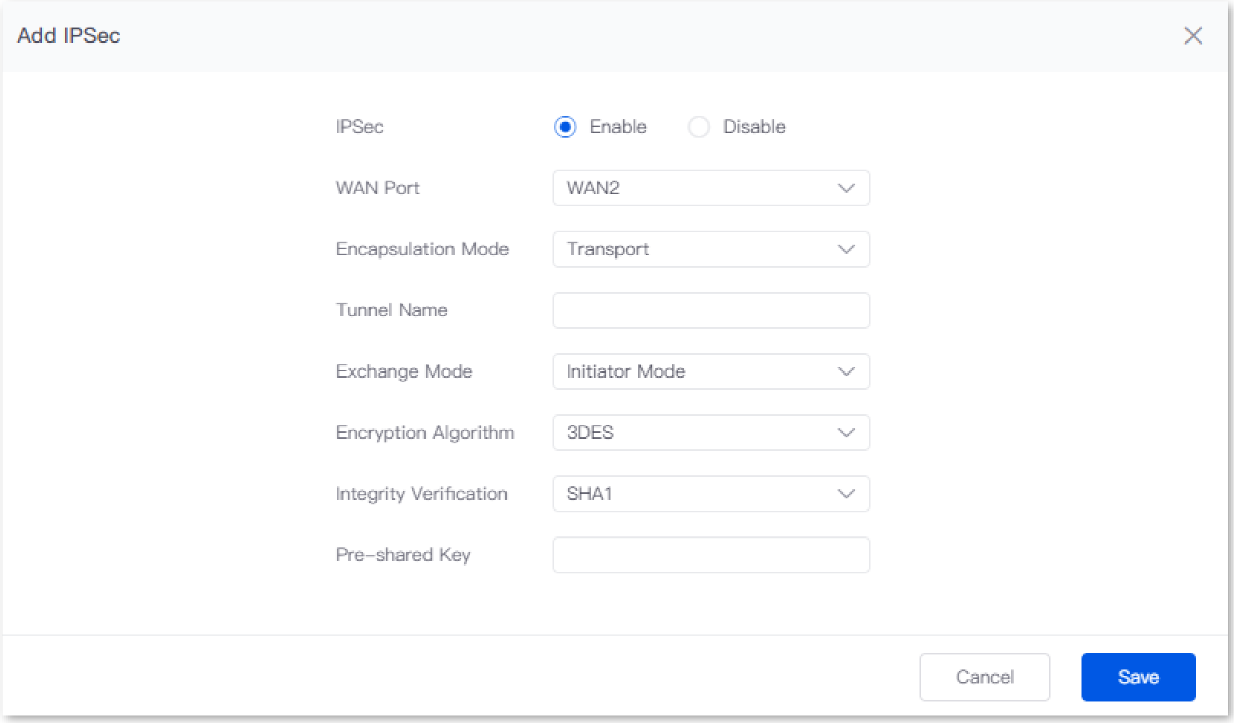
Parameter description

Parameter	Description
ESP Encryption Algorithm	When the Tunnel Protocol is set to ESP, the ESP encryption algorithm is required. The router supports the following algorithms: – **DES**: A 56-bit key is used to encrypt 64-bit data. The last 8 bits of the 64-bit data are used for parity check. 3DES indicates that three 56-bit keys are used for encryption. – **AES**: A 128/192/256-bit key is used for encryption. AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.

Parameter	Description
ESP Encryption Key	Used to set the ESP encryption key. Both IPSec communication parties should have the same key.
ESP/AH Authentication Algorithm	When the **Tunnel Protocol** is set to **ESP** or **AH**, the corresponding encryption algorithm is required. The router supports the following algorithms: – **MD5**: A 128-bit message digest is generated to prevent message tampering. – **SHA1**: A 160-bit message digest is generated to prevent message tampering.
ESP/AH Authentication Key	When the **Tunnel Protocol** is set to **ESP** or **AH**, the corresponding authentication key is required. Both IPSec communication parties should have the same key.
ESP/AH Outgoing SPI	SPI (Security Parameter Index) is used to identify an IPSec SA with the IP address and security protocol of the remote gateway. – **ESP Outgoing SPI**: Keep this value same as the ESP incoming SPI value of the remote gateway. – **ESP Incoming SPI**: Keep this value same as the ESP outgoing SPI value of the remote gateway. – **AH Outgoing SPI**: Keep this value same as the AH incoming SPI value of the remote gateway. – **AH Incoming SPI**: Keep this value same as the AH outgoing SPI value of the remote gateway.
ESP/AH Incoming SPI	

Configure IPSec-transport mode

Log in to the web UI of the router, and navigate to **More** > **VPN Service** > **IPSec** to enter the page. Click **Add**, select **Transport** for **Encapsulation Mode** on the **Add IPSec** pop-up window, configure other parameters as required, and click **Save**.



Add IPSec

IPSec ● Enable ○ Disable

WAN Port: WAN2

Encapsulation Mode: Transport

Tunnel Name:

Exchange Mode: Initiator Mode

Encryption Algorithm: 3DES

Integrity Verification: SHA1

Pre-shared Key:

Parameter description

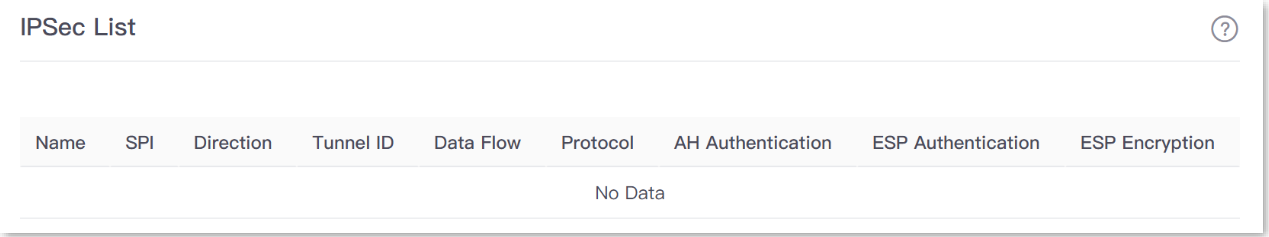
Parameter	Description
IPSec	Used to enable or disable the IPSec function.
WAN Port	Specifies the local WAN port assigned to the IPSec function. The IP address of the WAN port must be set as the value of remote gateway of the IPSec peer.
Encapsulation Mode	Specifies the encapsulation mode of IPSec data. – **Tunnel**: Used to protect the whole IP data packet (including IP head and data load), usually used for secure communication between two gateways. – **Transport**: Used to protect data load of the IP data packet, but not the IP head. This mode is generally used for secure communication between hosts and hosts or between hosts and gateways.
Tunnel Name	Specifies the name of the IPSec tunnel.
Exchange Mode	Specifies the negotiation mode of the IPSec tunnel. – **Initiator Mode**: The router initiates connection proactively and asks for access to the peer gateway. – **Responder Mode:** The router waits for the connection request. TIP Do not set both sides of the IPSec tunnel to **Responder Mode.** Otherwise, you will fail to establish the IPSec tunnel.

Parameter	Description
Encryption Algorithm	Specifies the IKE session encryption algorithm. The router supports the following algorithms: – **DES**: A 56-bit key is used to encrypt 64-bit data. The last 8 bits of the 64-bit data are used for parity check. 3DES indicates that three 56-bit keys are used for encryption. – **AES**: A 128/192/256-bit key is used for encryption. AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.
Integrity Verification	Specifies the IKE session verification algorithm. – **MD5**: It is abbreviated for Message Digest Algorithm. A 128-bit message digest is generated to prevent message tampering. – **SHA1**: It is abbreviated for Secure Hash Algorithm. A 160-bit message digest is generated to prevent message tampering, leading to higher security than MD5.
Pre-shared Key	Specifies the pre-shared key used for negotiation. The key consists of a maximum of 128 characters and must be the same as that specified on the peer gateway.

View IPSec list

Log in to the web UI of the router, and navigate to **More** > **VPN Service** > **IPSec List** to enter the page.

After the devices at both ends of the IPSec tunnel are configured, you can view the IPSec SA in the IPSec list.



IPSec List

Name	SPI	Direction	Tunnel ID	Data Flow	Protocol	AH Authentication	ESP Authentication	ESP Encryption
No Data								

Parameter description

Parameter	Description
Name	Specifies the name of the IPSec tunnel policy.
SPI	Specifies the Security Parameter Index (SPI) of the current tunnel, which is obtained through automatic IKE negotiation.
Direction	Specifies the direction of the tunnel (in: flow in, out: flow out). Because IPSec rules are one-way, when an IPSec tunnel is successfully established, each tunnel will generate a pair of “in and out” IPSec rules with the same name.
Tunnel ID	Specifies the gateway addresses of two sides of the tunnel.

Parameter	Description
Data Flow	Specifies the subnet masks of two sides of the tunnel.
Protocol	Specifies the protocol which offers the security service for IPSec. – **AH**: It is abbreviated for Authentication Header. This protocol is used for verifying data integrity. If a packet is tampered during transmission, the receiver discards it during data integrity verification. – **ESP**: It is abbreviated for Encapsulating Security Payload. This protocol is used for verifying data integrity and encrypting data. If a packet processed using this protocol is intercepted during transmission, it is difficult for the intercepting party to obtain the real information contained in the packet. This compatible protocol is widely used in gateway products.
AH Authentication	Specifies the AH authentication algorithm used by the tunnel, which is determined by the proposal of the second phase of IKEv1.
ESP Authentication	Specifies the ESP authentication algorithm used by the tunnel, which is determined by the proposal of the second phase of IKEv1.
ESP Encryption	Specifies the ESP encryption algorithm used by the security protocol, which is determined by the security proposal in the second phase of IKEv1.

10.4.6 Example of configuring an IPSec VPN

Networking requirements

The headquarters and subsidiary use the enterprise-class routers to set up a network and successfully access the internet. The subsidiary staff need to access intranet resources through the internet, such as internal documents, office OA, ERP system, CRM system, project management system and so on.

Solution

Set up an IPSec tunnel through the two routers to enable remote users to securely access the intranet through the internet.

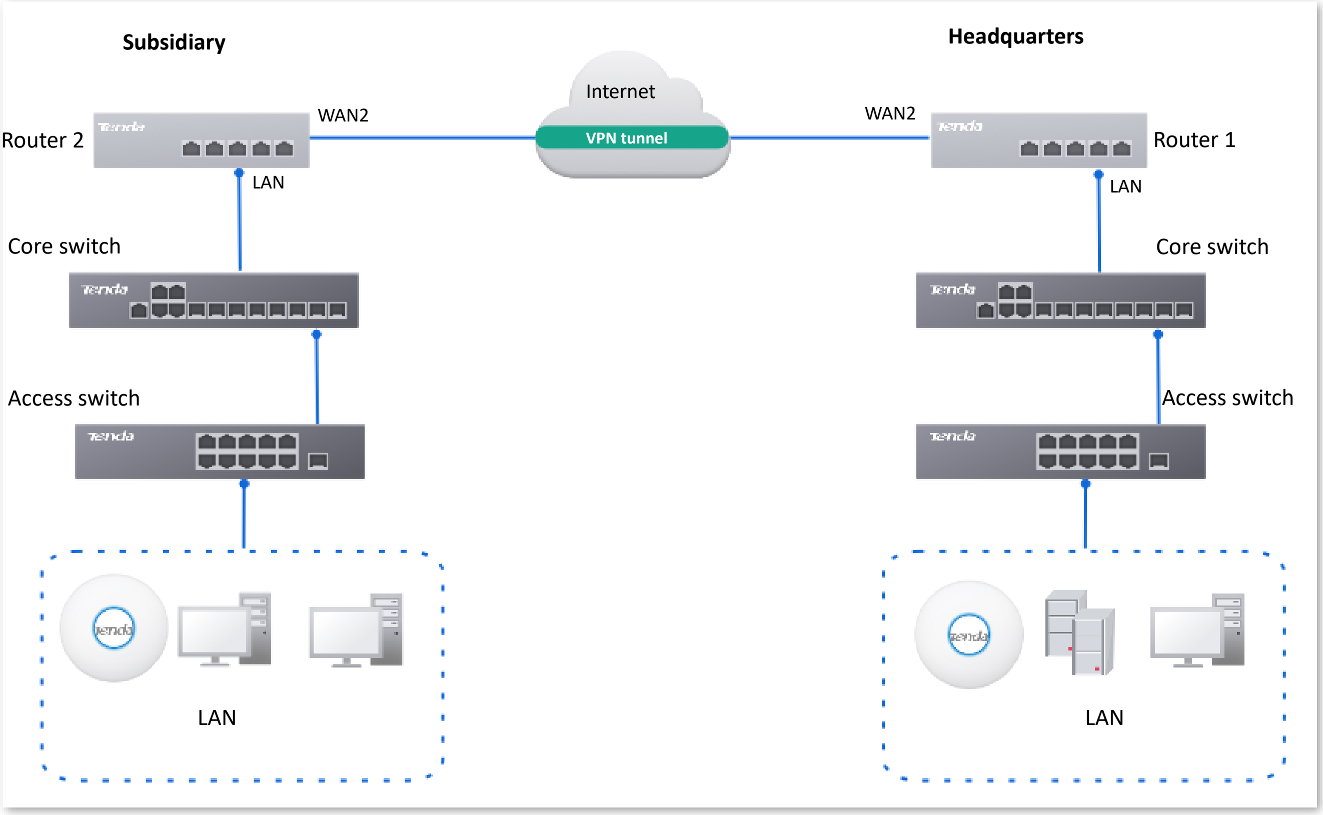
Assume that the router 1 is deployed at the headquarters, the basic information is shown as follows:

- The port on which the IPSec tunnel is established is WAN2.
- The WAN2 IP address is 202.105.11.22.
- The LAN network is 192.168.10.0/24.

Assume that the router 2 is deployed in the subsidiary, the basic information is shown as follows:

- The port on which the IPSec tunnel is established is WAN2.
- The WAN2 IP address is 202.105.88.77.
- The LAN network is 192.168.1.0/24.

Assume that two routers make the IPSec connection, the pre-shared key used to verify the identity is UmXmL9UK.



Configuration procedure

Configure the router 1

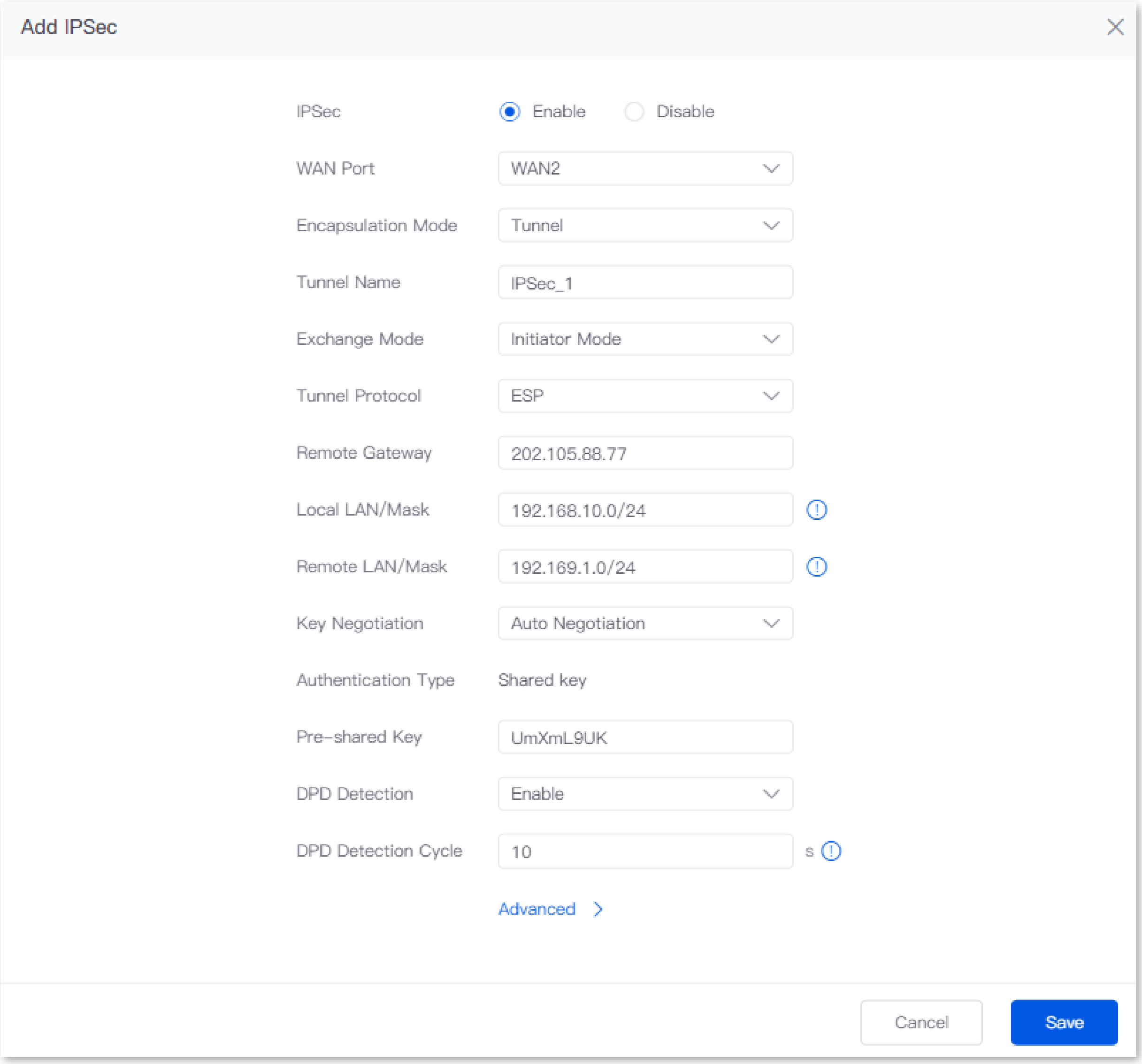
Configure the router 2

NOTE

During the configuration process, if you need to set the advanced options of IPSec connection, keep the setting parameters of the two routers the same.

I. Configure the router 1

Log in to the web UI of the router 1. Navigate to **More** > **VPN Service** > **IPSec**, and click **Add** to configure the following IPSec. The parameter settings are for reference only.



Add IPSec

IPSec ● Enable ○ Disable

WAN Port: WAN2

Encapsulation Mode: Tunnel

Tunnel Name: IPSec_1

Exchange Mode: Initiator Mode

Tunnel Protocol: ESP

Remote Gateway: 202.105.88.77

Local LAN/Mask: 192.168.10.0/24

Remote LAN/Mask: 192.169.1.0/24

Key Negotiation: Auto Negotiation

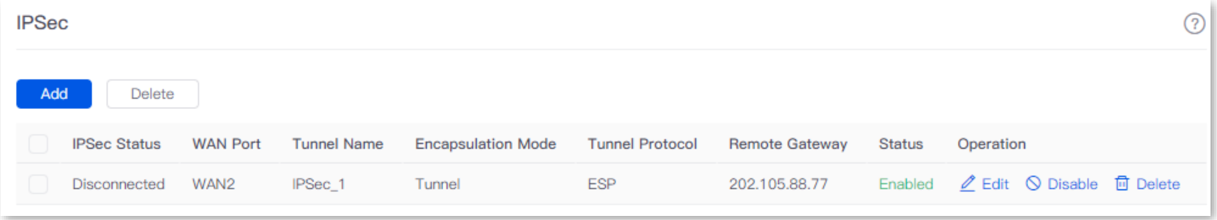
Authentication Type: Shared key

Pre-shared Key: UmXmL9UK

DPD Detection: Enable

DPD Detection Cycle: 10 s

The IPSec policy of router 1 is added successfully.

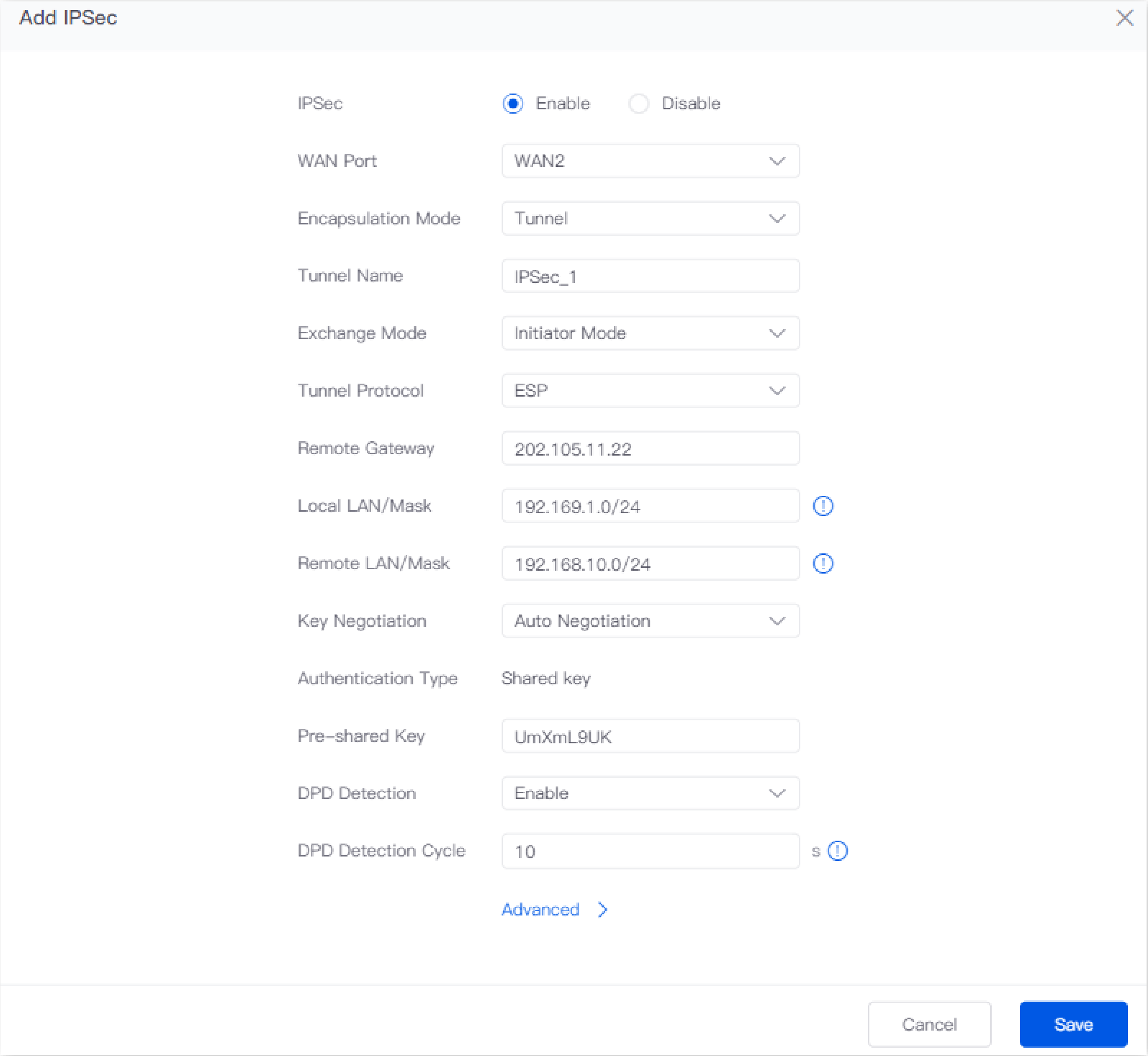


IPSec

□	IPSec Status	WAN Port	Tunnel Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation
□	Disconnected	WAN2	IPSec_1	Tunnel	ESP	202.105.88.77	Enabled	Edit Disable Delete

II. Configure the router 2

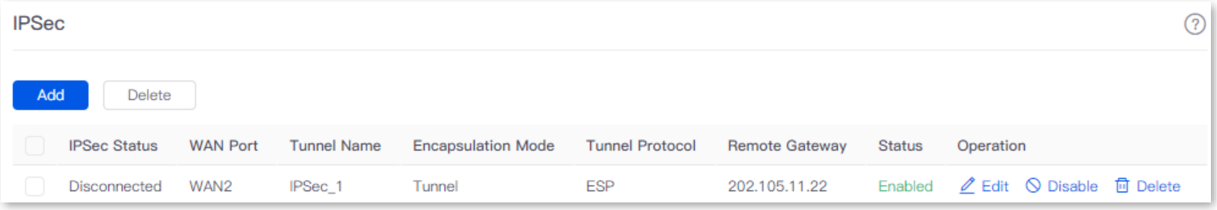
Log in to the web UI of the router 2. Navigate to **More** > **VPN Service** > **IPSec**, and click **Add** to configure the following IPSec. The parameter settings are for reference only.



Add IPSec

IPSec	● Enable ○ Disable
WAN Port	WAN2
Encapsulation Mode	Tunnel
Tunnel Name	IPSec_1
Exchange Mode	Initiator Mode
Tunnel Protocol	ESP
Remote Gateway	202.105.11.22
Local LAN/Mask	192.169.1.0/24
Remote LAN/Mask	192.168.10.0/24
Key Negotiation	Auto Negotiation
Authentication Type	Shared key
Pre-shared Key	UmXmL9UK
DPD Detection	Enable
DPD Detection Cycle	10 s

The IPSec policy of router 2 is added successfully.



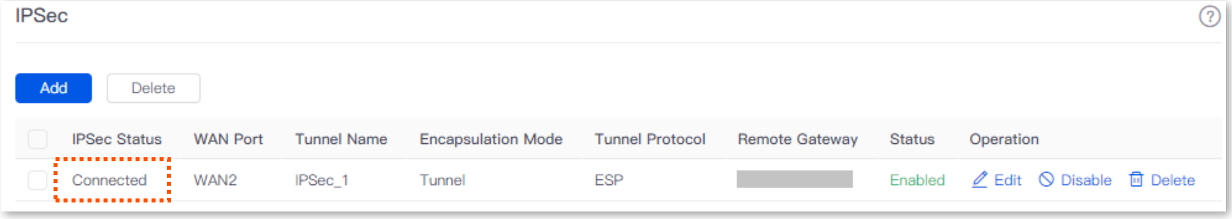
IPSec

□	IPSec Status	WAN Port	Tunnel Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation
□	Disconnected	WAN2	IPSec_1	Tunnel	ESP	202.105.11.22	Enabled	Edit Disable Delete

----End

Verification

When the **IPSec Status** of IPSec policy is **Connected**, the VPN tunnel is set up. The headquarters and subsidiary can securely access each other's LAN resources through the internet.



IPSec

□	IPSec Status	WAN Port	Tunnel Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation
□	Connected	WAN2	IPSec_1	Tunnel	ESP	[redacted]	Enabled	Edit Disable Delete

10.5 IPv6

10.5.1 Overview

IPv6, abbreviated for Internet Protocol Version 6, is the second-generation network layer protocol. IPv6 is an upgraded version of Internet Protocol version 4 (IPv4), which is the solution that addresses the relatively limited number of IP addresses possible under IPv4.

IPv6 address

An IPv6 address is 128 bits long and is arranged in eight groups, each of which is 16 bits. Each group is expressed as four hexadecimal digits and the groups are separated by colons. An IPv6 address is split into two parts:

- Network Prefix: n bits, equivalent to the network ID in the IPv4 address.
- Interface Identifier: 128-n bits, equivalent to the host ID in the IPv4 address.

Basic concept

- **DHCPv6**

Dynamic Host Configuration Protocol for IPv6 (DHCPv6) is a stateful protocol that assigns IPv6 addresses or prefixes and other configuration parameters to hosts.

- **SLAAC**

Stateless Address Autoconfiguration (SLAAC) is a stateless protocol. Hosts automatically generate IPv6 addresses or prefixes and other configuration parameters through Router Advertisement (RA).

10.5.2 Internet

Log in to the web UI of the router, and navigate to **More** > **IPv6** > **Internet** to enter the page. On this page, you can configure the IPv6 address of the corresponding WAN port.

There are two methods to obtain IPv6 addresses. Select the method based on the configuration of the upstream device.

Condition	Selection
The IP address assignment modes of the LAN port on the upstream device are DHCPv6, SLAAC or DHCPv6+SLAA.	Auto
The upstream device is the ISP device, and the ISP provides a PPPoE user name and password that supports IPv6 service.	
The upstream device is the ISP device, and the ISP does not provide specific network parameters.	
The upstream device does not assign IP addresses.	Manual

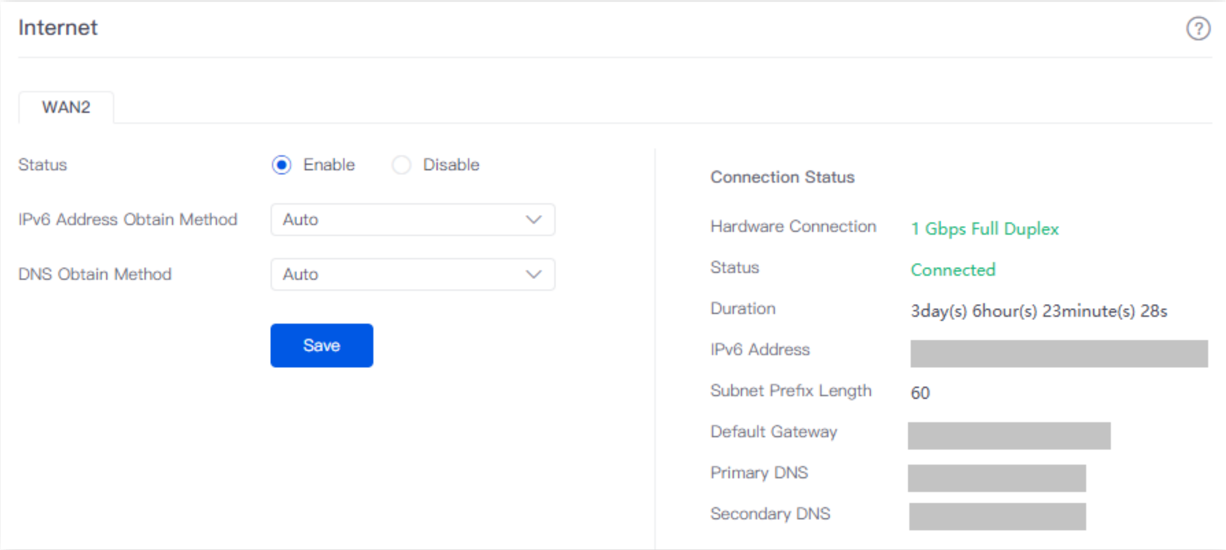
Condition	Selection
The upstream device is the ISP device, and the ISP provides a group of fixed IPv6 addresses for internet access, including the IP address, subnet mask, default gateway and DNS server information.	

NOTE

If the WAN port is directly connected to the ISP network, ensure that you have enabled the IPv6 internet service. If you are not sure, contact your ISP first.

Auto

The WAN port automatically obtains IPv6 internet access information through DHCPv6 or SLAAC. After the IPv6 parameters of the WAN port are configured, you can view the IPv6 networking status in the **Connection Status** module on the right. The following figure is for reference only.



Internet

WAN2

Status ● Enable ○ Disable

IPv6 Address Obtain Method: Auto

DNS Obtain Method: Auto

Connection Status

Hardware Connection: 1 Gbps Full Duplex

Status: Connected

Duration: 3day(s) 6hour(s) 23minute(s) 28s

IPv6 Address: [redacted]

Subnet Prefix Length: 60

Default Gateway: [redacted]

Primary DNS: [redacted]

Secondary DNS: [redacted]

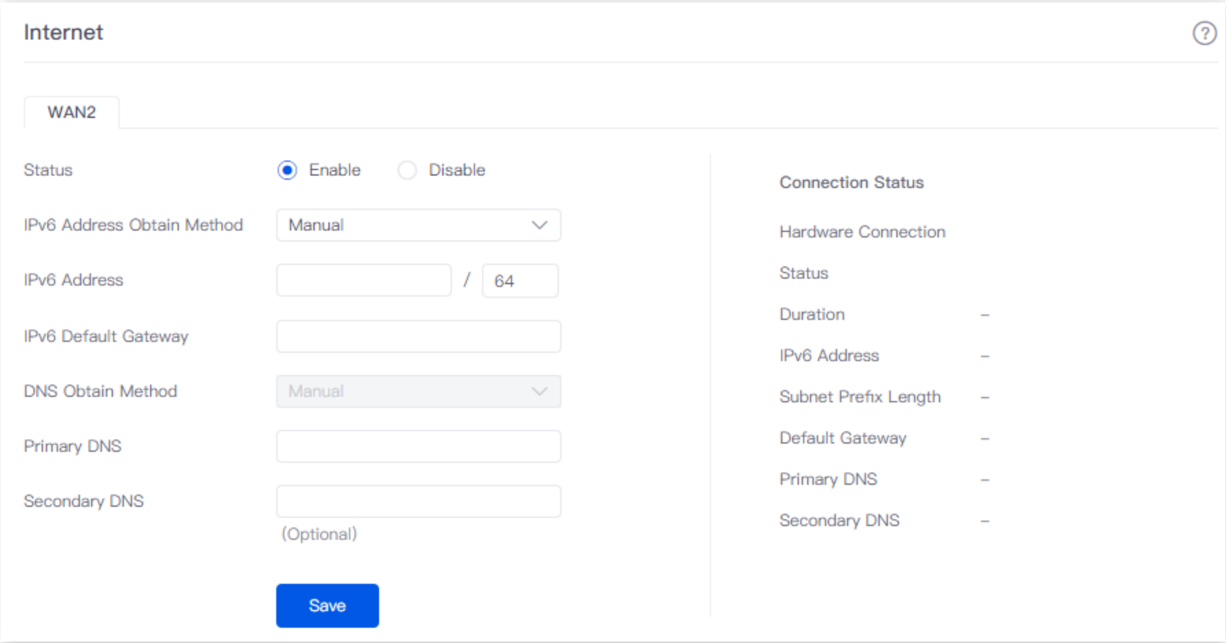
Parameter description

Parameter		Description
Mode	Status	Used to enable or disable the IPv6 function of the corresponding WAN port.
	IPv6 Address Obtain Method	Select **Auto**.
	DNS Obtain Method	Specifies the method of the WAN port to obtain the DNS server address. – **Auto**: The DNS server address is automatically obtained through DHCPv6 or SLAAC. – **Manual**: Enter the DNS server address manually.
	Primary DNS	Enter a correct IPv6 DNS server address.

Parameter		Description
	Secondary DNS	TIP If there is only one DNS address, **Secondary DNS** is not required.
Connection Status	Hardware Connection	Specifies the current rate and duplex mode of the WAN port.
	Status	Specifies the connection status of the WAN port of the router. - **Connected**: The WAN port of the router has been plugged into the Ethernet cable, and the IPv6 address information has been obtained. - **Connecting...**: The router is connecting to the upstream network device. - **Disconnected**: If it is not connected or fails to connect, check the Ethernet cable connection status and internet settings, or contact the ISP for help.
	Duration	Specifies the duration of the WAN port access to the IPv6 network.
	IPv6 Address	Specifies the IPv6 global unicast address of the WAN port.
	Subnet Prefix Length	Specifies the network prefix number of the IPv6 address.
	Default Gateway	Specifies the IPv6 default gateway of the WAN port.
	Primary DNS	Specify the primary or secondary IPv6 DNS server address of the WAN port.
	Secondary DNS	

Manual

Access the internet using the fixed IPv6 address provided by ISP.



Internet

WAN2

Status ● Enable ○ Disable

IPv6 Address Obtain Method: Manual

IPv6 Address: / 64

IPv6 Default Gateway:

DNS Obtain Method: Manual

Primary DNS:

Secondary DNS: (Optional)

Save

Connection Status

Hardware Connection

Status

Duration –

IPv6 Address –

Subnet Prefix Length –

Default Gateway –

Primary DNS –

Secondary DNS –

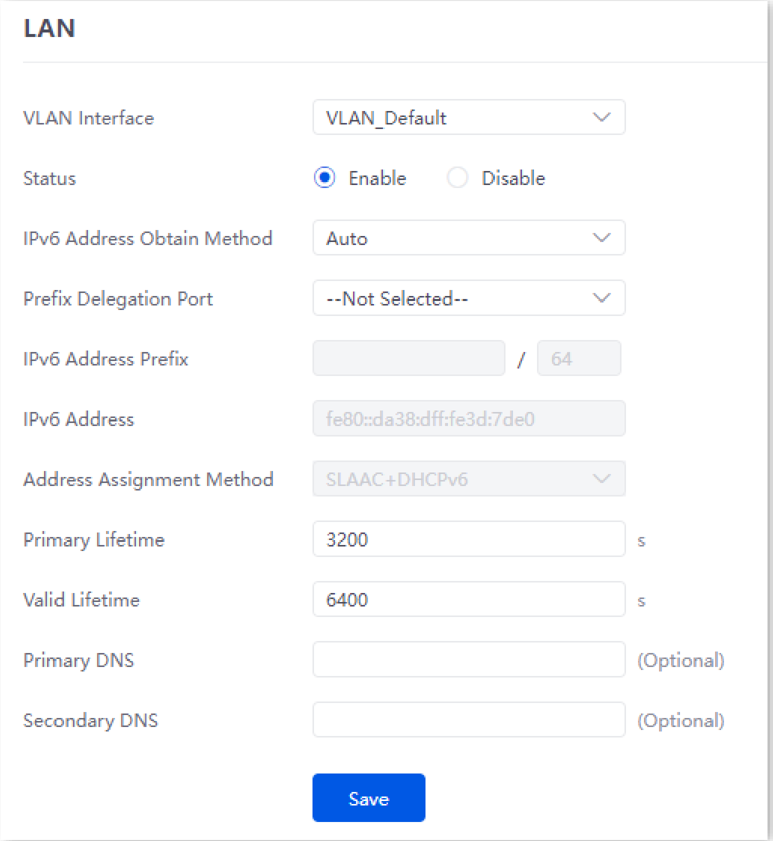
Parameter description

Parameter		Description
Mode	Status	Used to enable or disable the IPv6 function of the corresponding WAN port.
	IPv6 Address Obtain Method	Select **Manual**.
	IPv6 Address	Enter the IPv6 global unicast address provided by ISP.
	IPv6 Default Gateway	Enter the IPv6 default gateway provided by ISP.
	DNS Obtain Method	Specifies the method of the WAN port to obtain the IPv6 DNS server address. Only **Manual** is allowed, which means entering the IPv6 DNS server address manually.
	Primary DNS	Enter a correct IPv6 DNS server address. TIP If there is only one DNS address, **Secondary DNS** is not required.
	Secondary DNS	
Connection Status	Hardware Connection	Specifies the current rate and duplex mode of the WAN port.
	Status	Specifies the connection status of the WAN port of the router. - **Connected**: The WAN port of the router has been plugged into the Ethernet cable, and the IPv6 address information has been obtained. - **Connecting...**: The router is connecting to the upstream network device. - **Disconnected**: If it is not connected or fails to connect, check the Ethernet cable connection status and internet settings, or contact the ISP for help.
	Duration	Specifies the duration of the WAN port access to the IPv6 network.
	IPv6 Address	Specifies the IPv6 global unicast address of the WAN port.
	Subnet Prefix Length	Specifies the network prefix number of the IPv6 address.
	Default Gateway	Specifies the IPv6 default gateway of the WAN port.
	Primary DNS	Specify the primary or secondary IPv6 DNS server address of the WAN port.
	Secondary DNS	

10.5.3 LAN

Log in to the web UI of the router, and navigate to **More** > **IPv6** > **LAN** to enter the page. On this page, you can configure the IPv6 address of the corresponding VLAN so that multiple devices on the LAN can share the broadband server.

The VLAN interface is disabled by default. The following displays the page when the function is enabled.



LAN

VLAN Interface: VLAN_Default

Status: ● Enable ○ Disable

IPv6 Address Obtain Method: Auto

Prefix Delegation Port: --Not Selected--

IPv6 Address Prefix: / 64

IPv6 Address: fe80::da38:dff:fe3d:7de0

Address Assignment Method: SLAAC+DHCPv6

Primary Lifetime: 3200 s

Valid Lifetime: 6400 s

Primary DNS: (Optional)

Secondary DNS: (Optional)

Parameter description

Parameter	Description
VLAN Interface	Specifies the VLAN interface for IPv6.
Status	Used to enable or disable the IPv6 function of the corresponding VLAN.
IPv6 Address Obtain Method	Specifies the method to obtain IPv6 addresses. – **Auto:** The IPv6 address prefix of the VLAN is automatically obtained from upstream device by **Prefix Delegation Port**. The IPv6 address is automatically generated by the router according to the standard. – **Manual:** You need to manually set the IPv6 address prefix, complete IPv6 address and address assignment mode of the VLAN.
Prefix Delegation Port	Specifies the WAN port which obtains the IPv6 address prefix of the VLAN from the upstream device. It needs to be selected when **IPv6 Address Obtain Method** is **Auto**.

Parameter	Description
IPv6 Address Prefix	Specifies the IPv6 address prefix of the VLAN.
IPv6 Address	Specifies the complete IPv6 address of the VLAN address.
Address Assignment Method	Specifies the method that the router uses to assign IPv6 addresses to LAN clients. – **DHCPv6:** The client directly obtains all IPv6 address information from the DHCPv6 server, including the DNS server. – **SLAAC:** The client automatically generates IPv6 address information through RA, including the IPv6 address and DNS server. – **SLAAC+DHCPv6:** The client automatically generates the IPv6 address through RA and obtains other address information from the DHCPv6 server, such as the DNS server.
Start Address	Specify the range of IPv6 addresses assigned by the DHCPv6 server. When **Address Assignment Method** is **DHCPv6**, you need to configure parameters.
End Address	
Primary Lifetime	Specifies the primary lifetime of the IPv6 address lease. If the client does not receive RA within the primary lifetime, it will deactivate the IPv6 address and no longer use the IPv6 address to create new connections, but can still receive messages with this IPv6 address as the destination address.
Valid Lifetime	Specifies the valid lifetime of the IPv6 address lease. After expiration, the IPv6 address will be deleted and invalid, and all sessions will be disconnected.
Primary DNS	Specify the IP address of the primary or secondary DNS server that is assigned to the client. NOTE For the LAN devices to access the internet properly, ensure that the primary DNS you entered is the correct IP address of the DNS server or DNS proxy.
Secondary DNS	

11 System maintenance

This guide is for reference only and does not imply that the product supports all functions described here. Functions may differ with the product models or versions of the same model. The actual product prevails.

11.1 System time

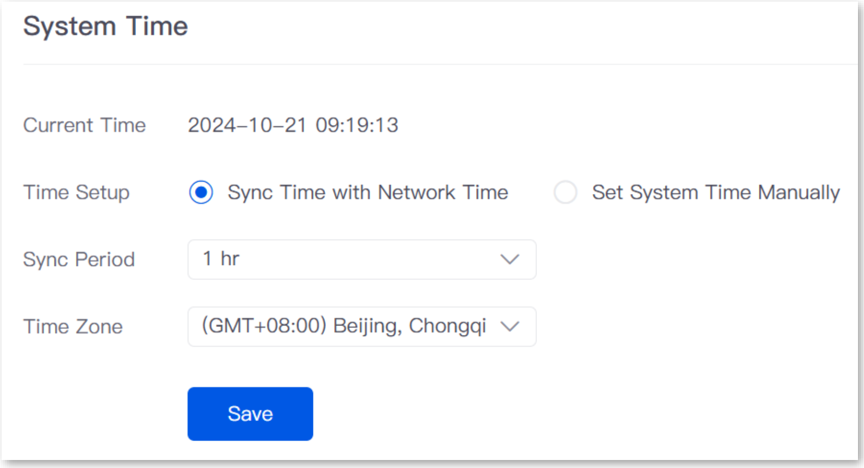
Log in to the web UI of the router, and navigate to **Tool** > **System Time** to enter the page. On this page, you can configure the system time of the router.

To make the time-related functions effective, ensure that the system time of the router is set correctly. The router supports: Sync time with network time and Set system time manually. By default, **Sync Time with Network Time** is selected.

11.1.1 Sync time with network time

If you choose this method, the router automatically synchronizes its system time with the Network Time Server (NTS). As the router is connected to the internet, the system time is correct.

After the configuration is completed, you can refresh the page to check whether the system time of the router is correct.



System Time

Current Time 2024–10–21 09:19:13

Time Setup ● Sync Time with Network Time ○ Set System Time Manually

Sync Period 1 hr

Time Zone (GMT+08:00) Beijing, Chongqi

Parameter description

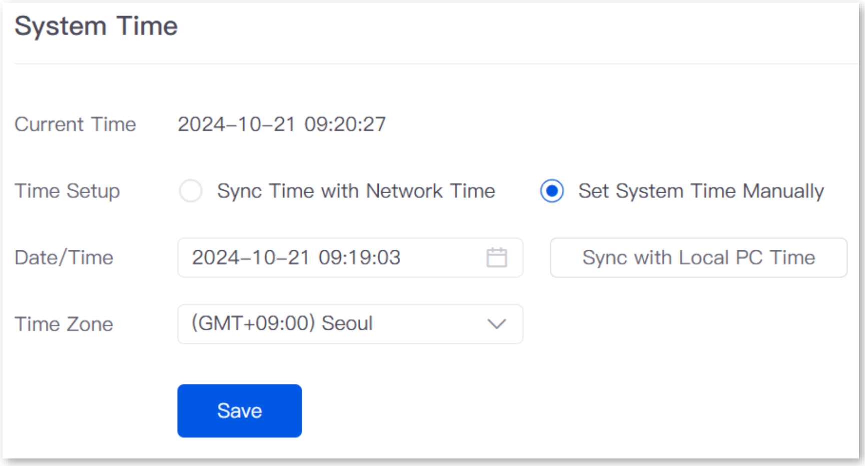
Parameter	Description
Current Time	Specifies the current system time of the router.

Parameter	Description
Time Setup	Specifies the setting mode of the system time. Select **Sync Time with Network Time**.
Sync Period	Specifies the interval at which the router synchronizes the system time with a time server on the internet.
Time Zone	Specifies the standard time zone in which the router is currently located.

11.1.2 Set system time manually

If you choose this method, you can manually set a system time for the router. Every time the router reboots, you need to reconfigure the system time.

After the configuration is completed, you can refresh the page to check whether the system time of the router is correct.



System Time

Current Time 2024-10-21 09:20:27

Time Setup ○ Sync Time with Network Time ● Set System Time Manually

Date/Time 2024-10-21 09:19:03

Time Zone (GMT+09:00) Seoul

Parameter description

Parameter	Description
Current Time	Specifies the current system time of the router.
Time Setup	Specifies the setting mode of the system time. Select **Set System Time Manually**.
Date/Time	Click 📅 to select the correct time, or click **Sync with Local PC Time** to synchronize the time of the router with the computer which is managing the router.
Time Zone	Specifies the standard time zone in which the router is currently located.

11.2 Diagnostic tool

11.2.1 Ping

Ping is used to check whether the connection is correct and the connection quality.

Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can check whether the connection is correct and the connection quality with **Ping**.

Assume that you need to detect whether the link between the router and the Google management network (www.google.com) is unblocked.

To perform Ping test:

Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

Step 2 Select **Ping** from the **Tool** drop-down list box.

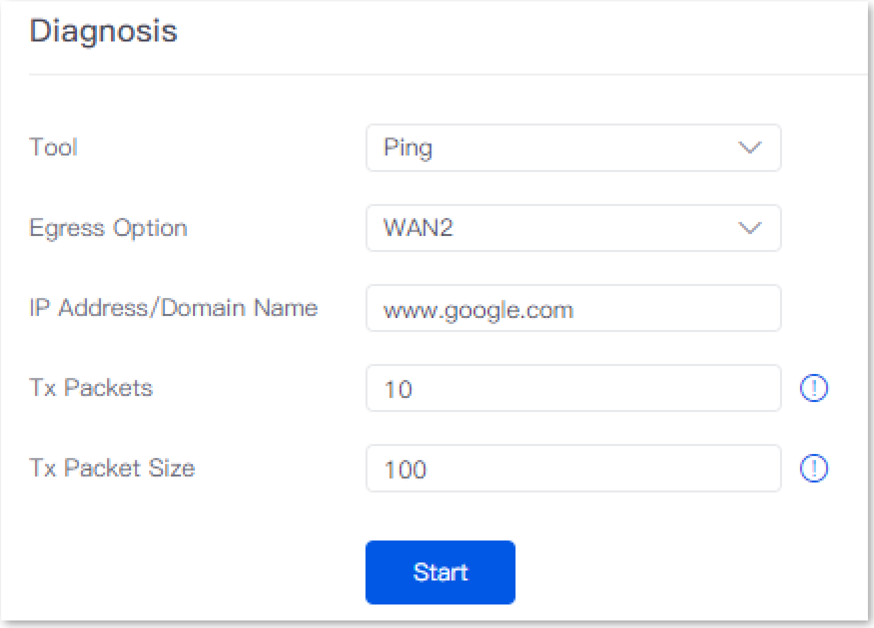
Step 3 Set **Egress Option** to the interface for the test, which is **WAN2** in this example.

Step 4 Enter the IP address or domain name of the ping target, which is **www.google.com** in this example.

Step 5 Set **Tx Packets** to the number of packets sent in the Ping test, which is **10** in this example.

Step 6 Set **Tx Packet Size** to the size of packets sent in the Ping test, which is **100** in this example.

Step 7 Click **Start**.



Diagnosis

Tool: Ping

Egress Option: WAN2

IP Address/Domain Name: www.google.com

Tx Packets: 10

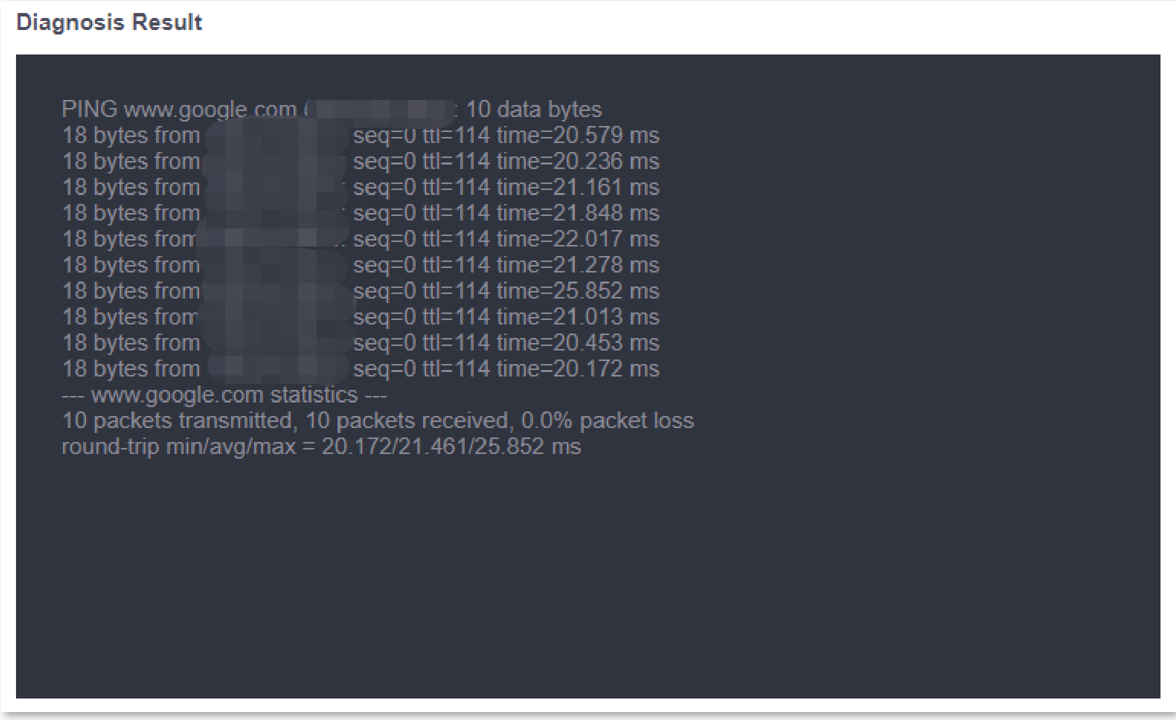
Tx Packet Size: 100

----End

Parameter description

Parameter	Description
Egress Option	Specifies the interface from which the data goes out.
IP Address/Domain Name	Specifies the IP address or domain name of the target host.
Tx Packets	Specifies the number of data packets sent in the Ping test.
Tx Packet Size	Specifies the size of data packets sent in the Ping test.

The diagnosis result is shown in the lower part of the page. See the following figure.



Diagnosis Result

```
PING www.google.com ([redacted]: 10 data bytes
18 bytes from [redacted] seq=0 ttl=114 time=20.579 ms
18 bytes from            seq=0 ttl=114 time=20.236 ms
18 bytes from            seq=0 ttl=114 time=21.161 ms
18 bytes from            seq=0 ttl=114 time=21.848 ms
18 bytes from            seq=0 ttl=114 time=22.017 ms
18 bytes from            seq=0 ttl=114 time=21.278 ms
18 bytes from            seq=0 ttl=114 time=25.852 ms
18 bytes from            seq=0 ttl=114 time=21.013 ms
18 bytes from            seq=0 ttl=114 time=20.453 ms
18 bytes from            seq=0 ttl=114 time=20.172 ms
--- www.google.com statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max = 20.172/21.461/25.852 ms
```

11.2.2 Tracert

Tracert is used to detect the routes that a packet takes from a router to a destination host.

Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can detect the routes that a packet takes from a router to a destination host with **Tracert**.

Assume that you need to detect the routes from the router to the Google management network (www.google.com).

To perform Tracert test:

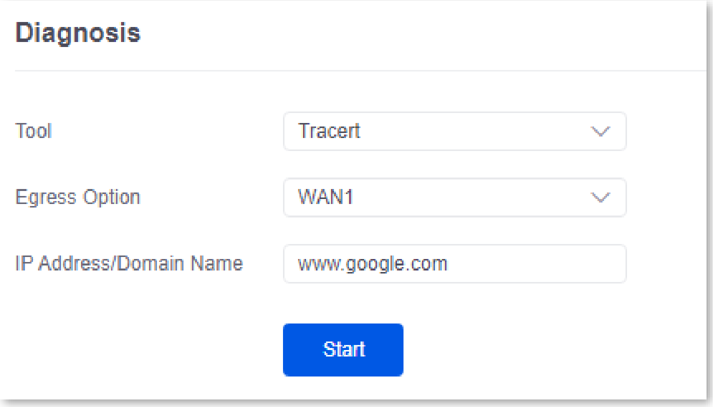
Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

Step 2 Select **Tracert** from the **Tool** drop-down list box.

Step 3 Set **Egress Option** to the interface for the test, which is **WAN1** in this example.

Step 4 Enter **IP Address/Domain Name** of the tracert target, which is **www.google.com** in this example.

Step 5 Click **Start**.



Diagnosis

Tool: Tracert

Egress Option: WAN1

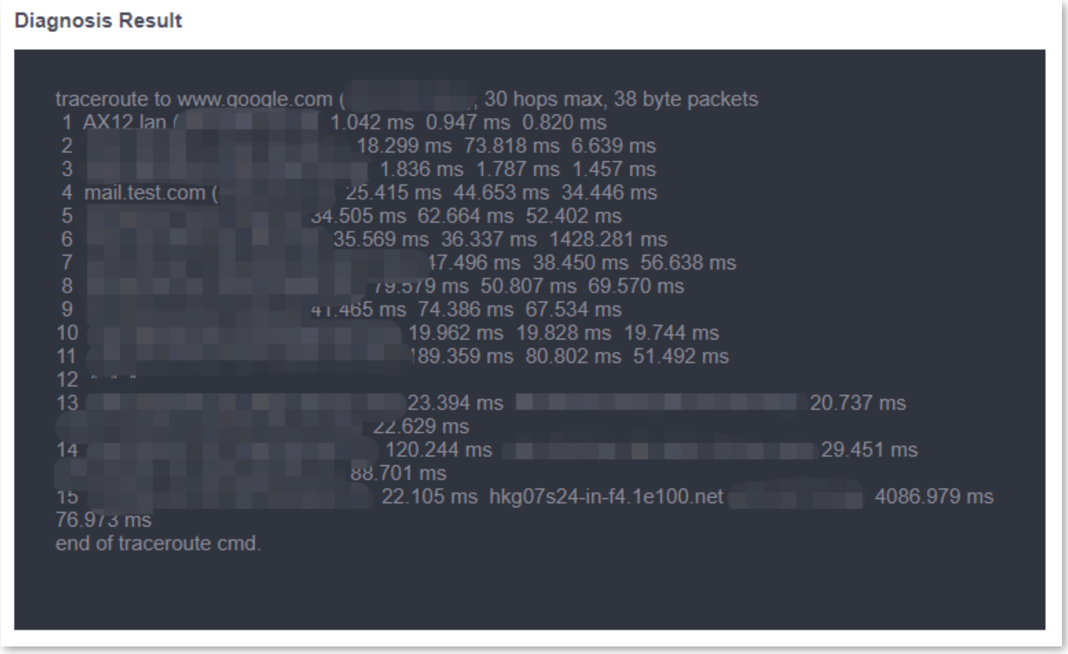
IP Address/Domain Name: www.google.com

----End

Parameter description

Parameter	Description
Egress Option	Specifies the interface from which the data goes out.
IP Address/Domain Name	Specifies the IP address or domain name of the target host.

The diagnosis result is shown in the lower part of the page. See the following figure.



Diagnosis Result

```
traceroute to www.google.com ([redacted], 30 hops max, 38 byte packets
 1  AX12.lan ([redacted] 1.042 ms  0.947 ms  0.820 ms
 2  [redacted] 18.299 ms  73.818 ms  6.639 ms
 3  [redacted] 1.836 ms  1.787 ms  1.457 ms
 4  mail.test.com ([redacted] 25.415 ms  44.653 ms  34.446 ms
 5  [redacted]4.505 ms  62.664 ms  52.402 ms
 6  [redacted] 35.569 ms  36.337 ms  1428.281 ms
 7  [redacted]7.496 ms  38.450 ms  56.638 ms
 8  [redacted]9.579 ms  50.807 ms  69.570 ms
 9  [redacted].465 ms  74.386 ms  67.534 ms
10  [redacted] 19.962 ms  19.828 ms  19.744 ms
11  [redacted]89.359 ms  80.802 ms  51.492 ms
12  [redacted]
13  [redacted] 23.394 ms  [redacted] 20.737 ms
 22.629 ms
14  [redacted] 120.244 ms  [redacted] 29.451 ms
 88.701 ms
15  [redacted] 22.105 ms  hkg07s24-in-f4.1e100.net [redacted]  4086.979 ms
76.973 ms
end of traceroute cmd.
```

11.2.3 Packet capture tool

Packet Capture Tool is a network data collection and analysis tool, which can completely intercept the specified data packets in the network to provide analysis.

Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can intercept the specified data packets of an interface with **Packet Capture Tool**.

Assume that you want to intercept all types of data packets from the router's LAN4 port. The IP address of the LAN4 port is 192.168.0.250, which belongs to **VLAN_Default**.

Configuration procedure:

Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

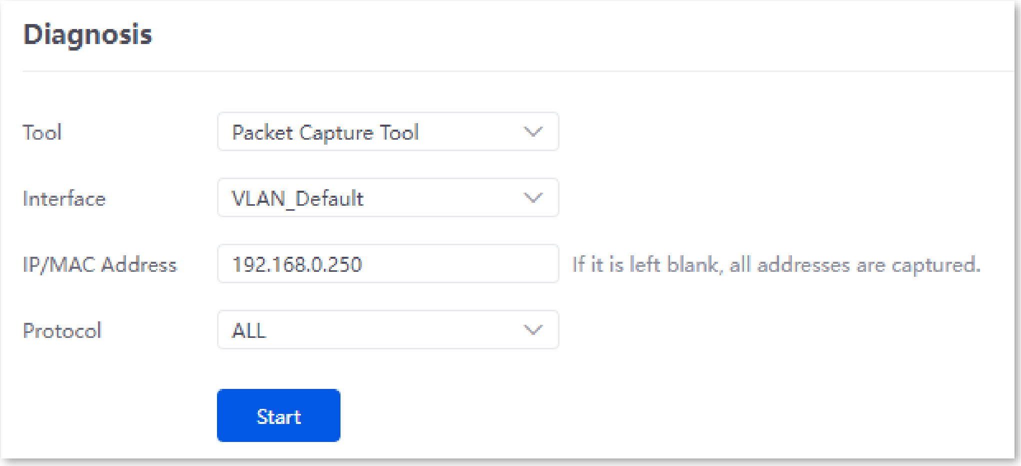
Step 2 Select **Packet Capture Tool** from the **Tool** drop-down list box.

Step 3 Set **Interface** to the VLAN interface to intercept data, which is **VLAN_Default** in this example.

Step 4 Set **IP/MAC Address** of the LAN4 port, which is **192.168.0.250** in this example.

Step 5 Set **Protocol**, which is **ALL** in this example.

Step 6 Click **Start**.



Diagnosis

Tool: Packet Capture Tool

Interface: VLAN_Default

IP/MAC Address: 192.168.0.250

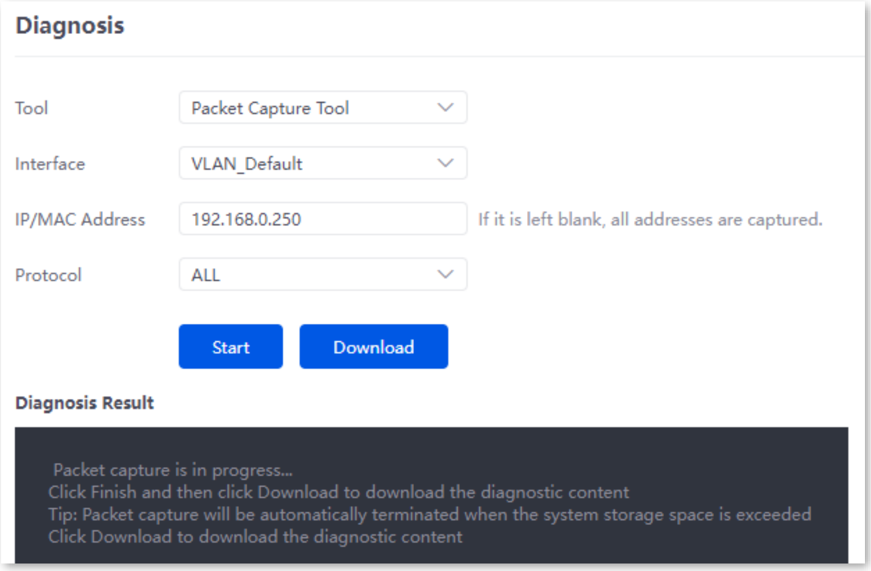
If it is left blank, all addresses are captured.

Protocol: ALL

Step 7 (Optional) During packet capture, click **End** as required.

Step 8 Click **Download**.

The pcap file will be downloaded to the local computer, which can be opened and viewed with the packet capture firmware (such as **WireShark**).



```
Packet capture is in progress...
Click Finish and then click Download to download the diagnostic content
Tip: Packet capture will be automatically terminated when the system storage space is exceeded
Click Download to download the diagnostic content
```

----End

Parameter description

Parameter	Description
Interface	Specifies the VLAN interface whose data will be intercepted.
IP/MAC Address	Specifies the IP address or MAC address whose data will be intercepted. TIP If the IP address or MAC address does not exist in the network or is not under the VLAN, no packets will be intercepted.
Protocol	Specifies the protocol type of data to be intercepted. **ALL** indicates that **ICMP**, **TCP**, **UDP** and **ARP** are all included. – **ICMP**: Abbreviated for Internet Control Message Protocol. It is used to transmit control messages between IP hosts and routers, including whether the network or the host is reachable, and whether the route is available. – **TCP:** Abbreviated for Transmission Control Protocol. The connection is established through the three-way handshaking. When the communication is completed, the connection should be removed. It can only be used for end-to-end communication, such as Telnet and FTP. – **UDP**: Abbreviated for User Datagram Protocol. UDP data includes destination port and source port information. The communication does not require connection, and the broadcast transmission can be realized. Services using **UDP** include DNS and SNMP. – **ARP**: Abbreviated for Address Resolution Protocol. It is a TCP/IP protocol that obtains physical addresses based on IP addresses.

11.2.4 AP diagnosis

Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can view the AP status based on the MAC address, including online status, IP address, and AP group to which it belongs.

Assume that you want to perform diagnosis on an AP (MAC address: D8:38:0D:C2:10:40) in the network, follow the steps below:

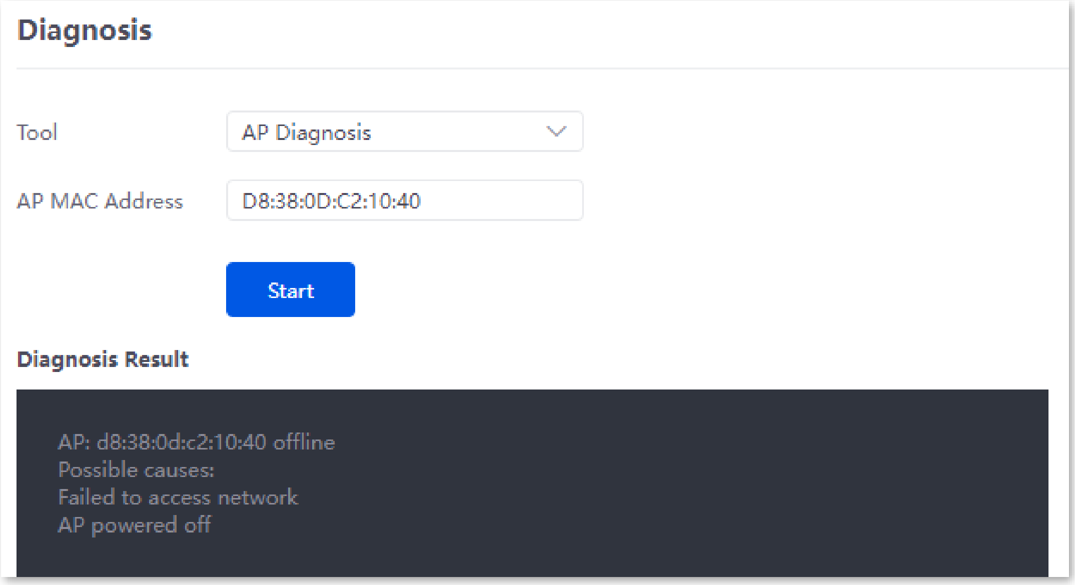
Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

Step 2 Select **AP Diagnosis** from the **Tool** drop-down list box.

Step 3 Set **AP MAC Address** to the MAC address of the AP, which is **D8:38:0D:C2:10:40** in this example.

Step 4 Click **Start**.

The diagnosis result is shown in the lower part of the page. See the following figure.



Tool: AP Diagnosis

AP MAC Address: D8:38:0D:C2:10:40

```
AP: d8:38:0d:c2:10:40 offline
Possible causes:
Failed to access network
AP powered off
```

----End

11.2.5 System diagnosis

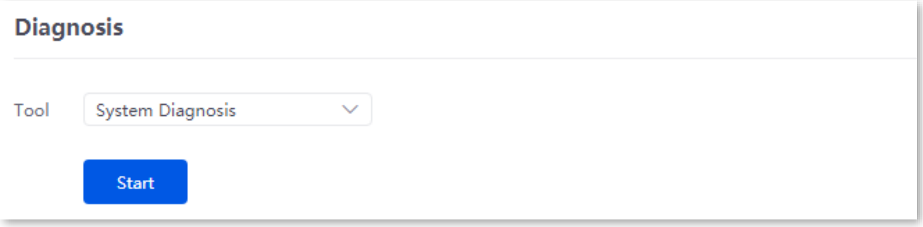
Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can view the status information of all processes in the system.

To perform system diagnosis:

Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

Step 2 Select **System Diagnosis** from the **Tool** drop-down list box.

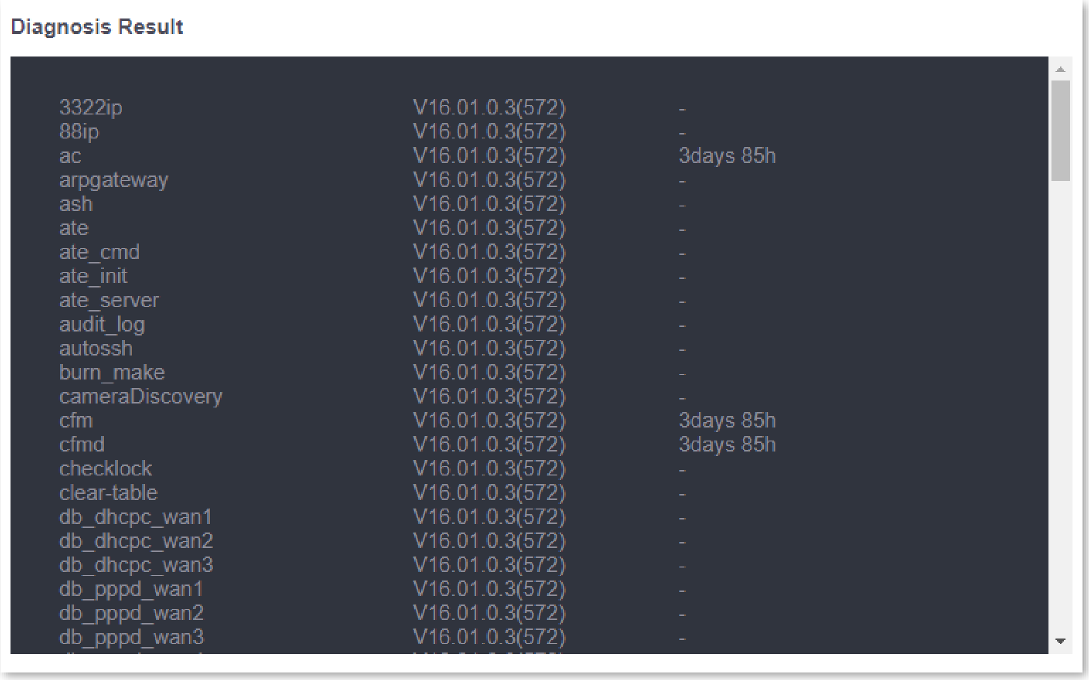
Step 3 Click **Start**.



Tool: System Diagnosis

---End

The diagnosis result is shown in the lower part of the page, and you can pull the scroll bar to see more information. See the following figure.



```
3322ip                  V16.01.0.3(572)      -
88ip                    V16.01.0.3(572)      -
ac                      V16.01.0.3(572)      3days 85h
arpgateway              V16.01.0.3(572)      -
ash                     V16.01.0.3(572)      -
ate                     V16.01.0.3(572)      -
ate_cmd                 V16.01.0.3(572)      -
ate_init                V16.01.0.3(572)      -
ate_server              V16.01.0.3(572)      -
audit_log               V16.01.0.3(572)      -
autossh                 V16.01.0.3(572)      -
burn_make               V16.01.0.3(572)      -
cameraDiscovery         V16.01.0.3(572)      -
cfm                     V16.01.0.3(572)      3days 85h
cfmd                    V16.01.0.3(572)      3days 85h
checklock               V16.01.0.3(572)      -
clear-table             V16.01.0.3(572)      -
db_dhcpc_wan1           V16.01.0.3(572)      -
db_dhcpc_wan2           V16.01.0.3(572)      -
db_dhcpc_wan3           V16.01.0.3(572)      -
db_pppd_wan1            V16.01.0.3(572)      -
db_pppd_wan2            V16.01.0.3(572)      -
db_pppd_wan3            V16.01.0.3(572)      -
```

11.2.6 Interface information

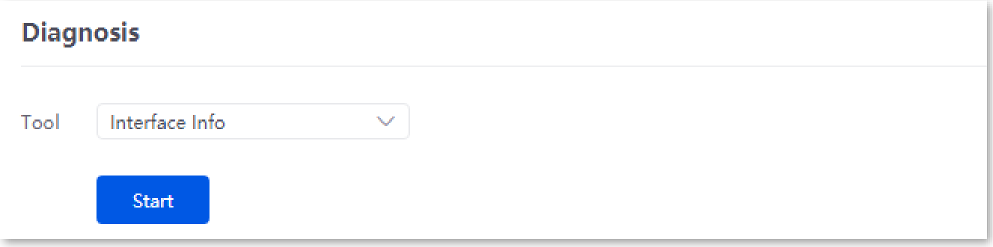
Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis** to enter the page. On this page, you can view the interface information of the router, including the physical interface, bridging interface, tunnel interface and VLAN virtual interface. The bridging interface and the VLAN virtual interface are generated when the VLAN is created, but no VLAN virtual interface is generated when the VLAN is 0. The tunnel interface is generated when the SSID policy is created.

To check the interface information:

Step 1 Log in to the web UI of the router, and navigate to **Tool** > **Diagnosis**.

Step 2 Select **Interface Info** from the **Tool** drop-down list box.

Step 3 Click **Start**.

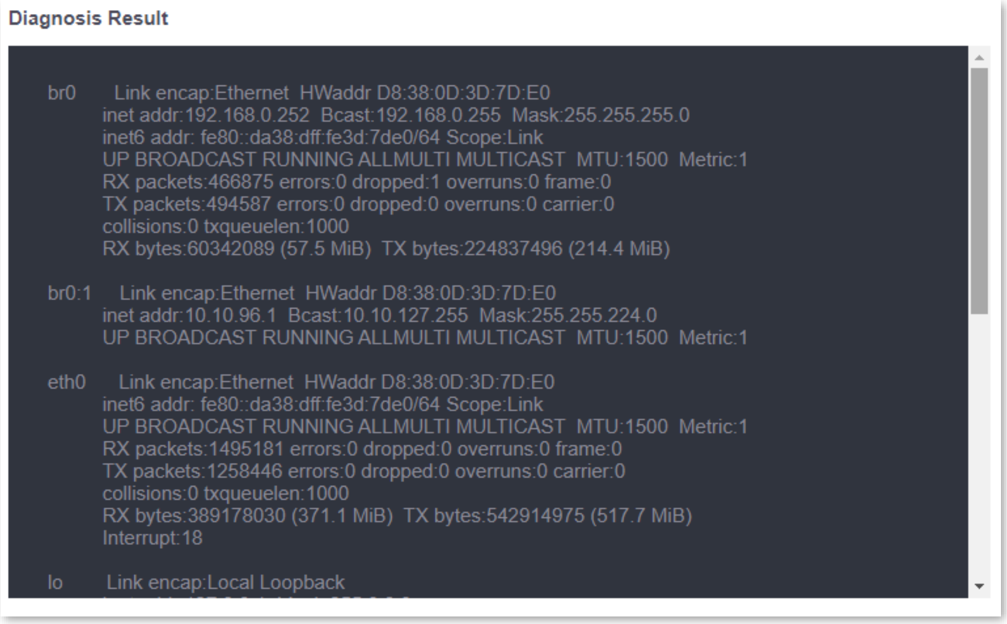


Diagnosis

Tool: Interface Info

---End

The diagnosis result is shown in the lower part of the page, and you can pull the scroll bar to see more information. See the following figure.



Diagnosis Result

```
br0       Link encap:Ethernet  HWaddr D8:38:0D:3D:7D:E0
          inet addr:192.168.0.252  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::da38:dff:fe3d:7de0/64 Scope:Link
          UP BROADCAST RUNNING ALLMULTI MULTICAST  MTU:1500  Metric:1
          RX packets:466875 errors:0 dropped:1 overruns:0 frame:0
          TX packets:494587 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:60342089 (57.5 MiB)  TX bytes:224837496 (214.4 MiB)

br0:1     Link encap:Ethernet  HWaddr D8:38:0D:3D:7D:E0
          inet addr:10.10.96.1  Bcast:10.10.127.255  Mask:255.255.224.0
          UP BROADCAST RUNNING ALLMULTI MULTICAST  MTU:1500  Metric:1

eth0      Link encap:Ethernet  HWaddr D8:38:0D:3D:7D:E0
          inet6 addr: fe80::da38:dff:fe3d:7de0/64 Scope:Link
          UP BROADCAST RUNNING ALLMULTI MULTICAST  MTU:1500  Metric:1
          RX packets:1495181 errors:0 dropped:0 overruns:0 frame:0
          TX packets:1258446 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:389178030 (371.1 MiB)  TX bytes:542914975 (517.7 MiB)
          Interrupt:18

lo        Link encap:Local Loopback
```

11.3 Log center

Log in to the web UI of the router, and navigate to **Tool** > **Log Center** to enter the page. On this page, you can view the log information recorded by the router.

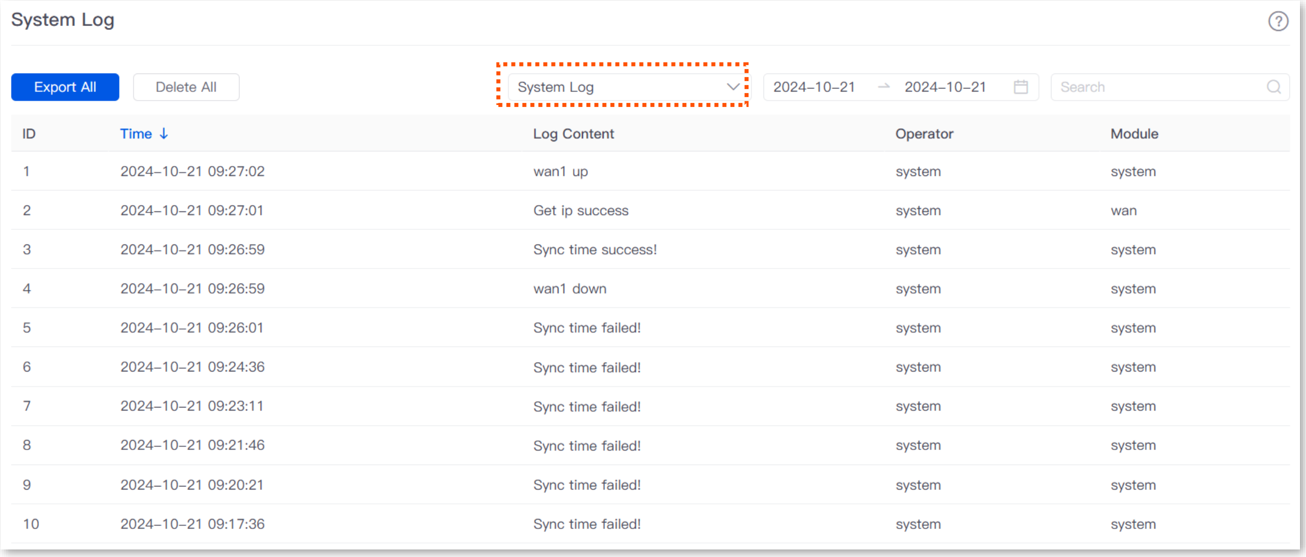
The log center records the **System Log**, **Operating Log** and **Running Log** of the router. In case of network failure, you can use the router's log center to troubleshoot the problem.

The time of the logs depends on the system time of the router. To ensure the time of the logs is correct, set a correct system time of the router first.

11.3.1 System log

The **System Log** records events of the system, such as DHCP log, dial-up log.

Log in to the web UI of the router, and navigate to **Tool** > **Log Center** > **System Log** to enter the page. Click the drop-down list box on this page. You can view certain log information of the router.

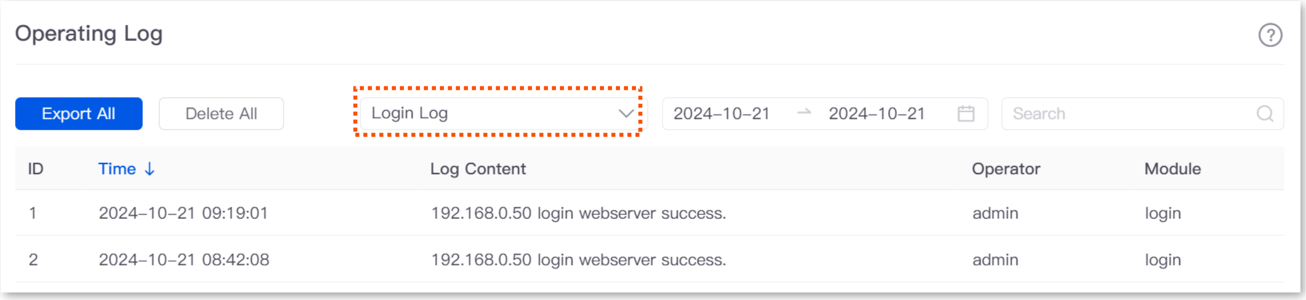


ID	Time ↓	Log Content	Operator	Module
1	2024–10–21 09:27:02	wan1 up	system	system
2	2024–10–21 09:27:01	Get ip success	system	wan
3	2024–10–21 09:26:59	Sync time success!	system	system
4	2024–10–21 09:26:59	wan1 down	system	system
5	2024–10–21 09:26:01	Sync time failed!	system	system
6	2024–10–21 09:24:36	Sync time failed!	system	system
7	2024–10–21 09:23:11	Sync time failed!	system	system
8	2024–10–21 09:21:46	Sync time failed!	system	system
9	2024–10–21 09:20:21	Sync time failed!	system	system
10	2024–10–21 09:17:36	Sync time failed!	system	system

11.3.2 Operating log

The **Operating Log** records the operation information that the user performed in the system, such as login log, configuration modification.

Log in to the web UI of the router, and navigate to **Tool** > **Log Center** > **Operating Log** to enter the page. You can view certain operation information of the router by selecting log types from the drop-down list box highlighted on the following figure.



Login Log

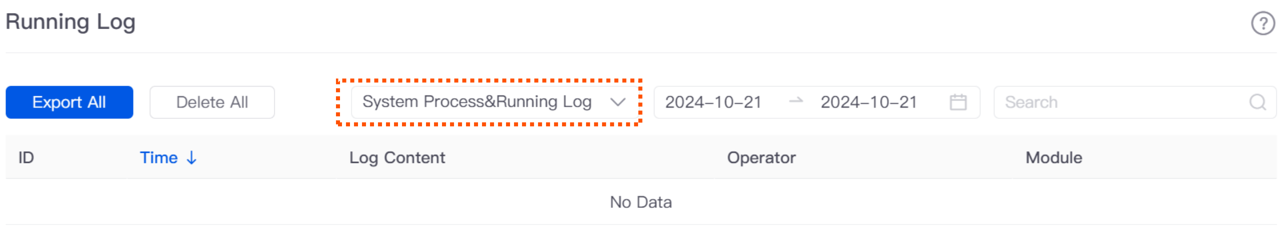
2024–10–21 → 2024–10–21

ID	Time ↓	Log Content	Operator	Module
1	2024–10–21 09:19:01	192.168.0.50 login webserver success.	admin	login
2	2024–10–21 08:42:08	192.168.0.50 login webserver success.	admin	login

11.3.3 Running log

The **Running Log** records the information of the system process running and the AP report.

Log in to the web UI of the router, and navigate to **Tool** > **Log Center** > **Running Log** to enter the page. You can view certain information of the system process running and the AP report of the router by selecting log types from the drop-down list box highlighted on the following figure.



System Process&Running Log

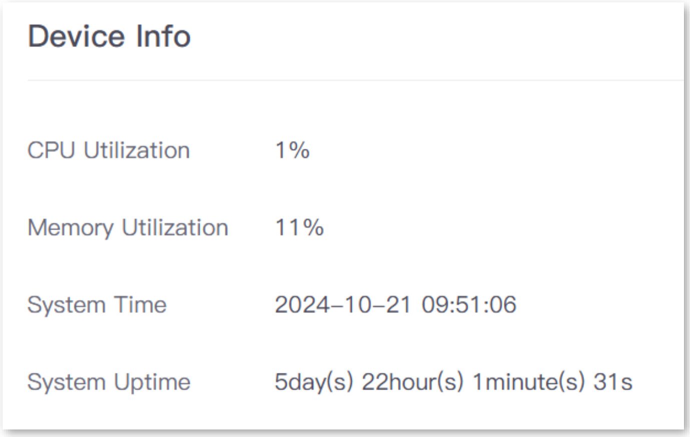
2024–10–21 → 2024–10–21

ID	Time ↓	Log Content	Operator	Module
		No Data		

11.4 Maintenance

11.4.1 Device information

Log in to the web UI of the router, and navigate to **Tool** > **Maintenance** > **Device Info** to enter the page. On this page, you can view the basic composition and usage of current system hardware, as well as system time and running time.



Device Info

CPU Utilization	1%
Memory Utilization	11%
System Time	2024-10-21 09:51:06
System Uptime	5day(s) 22hour(s) 1minute(s) 31s

11.4.2 Restore & Backup

Overview

You can use the backup function to copy the current configurations of the router to the local computer and use the Configuration Restoration function to restore the configurations of the router to the backed-up configurations.

You are recommended to back up the configuration after it is significantly changed. When the performance of your router decreases because of an improper configuration, or after you restore the router to factory settings, you can use this function to restore the configuration that has been backed up.

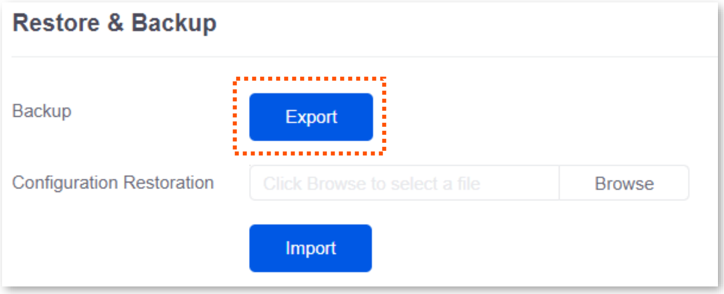
Log in to the web UI of the router, and navigate to **Tool** > **Maintenance** > **Restore & Backup** to enter the page. On this page, you can use the backup and restore function.

Backup

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Tool** > **Maintenance** > **Restore & Backup**.

Step 3 Click **Export**.



----End

The browser will download a configuration file named **RouterCfm.cfg**.

TIP

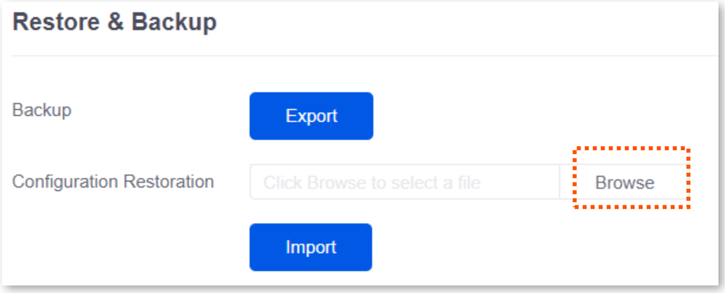
If the message “This type of file can harm your computer. Do you want to keep RouterCfm.cfg anyway?” appears on the page, click **Keep**.

Restore

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Tool** > **Maintenance** > **Restore & Backup**.

Step 3 Click **Browse**, and select the configuration file you have backed up.



Step 4 Click **Import**.

Step 5 Confirm the prompt information, and click **OK**.

----End

A reboot progress bar appears. When the progress bar reaches 100%, the router is restored successfully.

11.4.3 Factory settings restore

Overview

If the internet is inaccessible for unknown reasons, or you forget the login password, you can reset the router to resolve the problems.

The router supports two resetting methods:

- Reset the device using web UI
- Reset the device using the RESET button

After the reset, the default LAN IP address of the router is 192.168.0.252.

NOTE

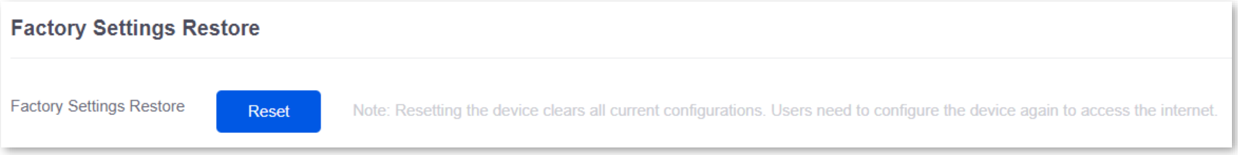
- Resetting the router clears all current configurations. It is recommended to back up the current configurations before the reset.
- After the reset, the router will be restored to factory settings and you can access the internet only after you reconfigure it. Reset the router with caution.
- To avoid damaging the router, ensure that the router is properly powered on throughout the reset.

Reset the device using web UI

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Tool** > **Maintenance** > **Factory Settings Restore**.

Step 3 Click **Reset**.



Factory Settings Restore

Factory Settings Restore Reset

Note: Resetting the device clears all current configurations. Users need to configure the device again to access the internet.

Step 4 Confirm the prompt information, and click **OK**.

----End

A reset progress bar appears. When the progress bar reaches 100%, the router is restored to factory settings successfully. Please configure the router again.

Reset the device using the RESET button

When using this method, you can restore the router to factory settings without logging in to the web UI of the router. The operation method is as follows:

When the **SYS** LED indicator blinks, hold down the reset button (**RESET** or **Reset**) with a needle-like object for about 8 seconds and release it when the **SYS** LED indicator lights solid green. When the **SYS** LED indicator blinks again, the router is reset successfully.

11.5 Upgrade service

11.5.1 Overview

Log in to the web UI of the router, and navigate to **Tool** > **Upgrade Service** to enter the page. On this page, you can upgrade the router's firmware to experience more functions and get a better user experience. The router supports **Local Upgrade** and **Online Upgrade**. The default upgrade mode is **Local Upgrade**.

Parameter description

Parameter	Description
Local Upgrade	Download the upgrading file from the official website (www.tendacn.com) to the local computer, decompress it and upgrade the system using the decompressed file. The format of the decompressed file is suffixed with **.bin**.
Online Upgrade	When the router is connected to the internet, it will automatically detect whether there is a new program for upgrading and show the relevant information about the upgrading firmware detected. After you click **Upgrade**, the router will automatically download the upgrading file and perform upgrading. Do not power off the device during the process.

11.5.2 System firmware upgrade

NOTE

– To avoid damage to the router, ensure that the correct upgrade file is used. Generally, a firmware upgrade file is suffixed with **.bin**.

– During the upgrade, do not power off the router.

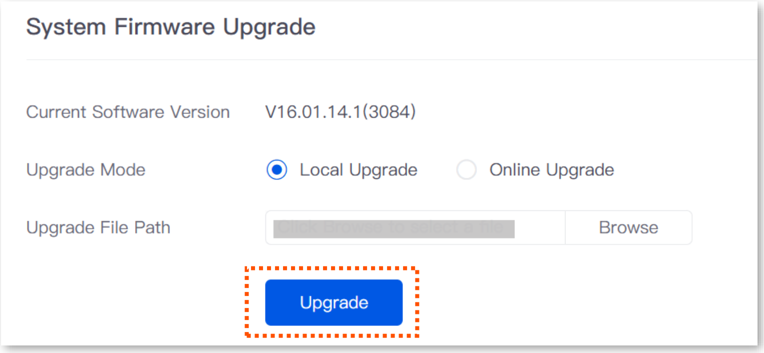
Log in to the web UI of the router, and navigate to **Tool** > **Upgrade Service** > **System Firmware Upgrade** to enter the page. On this page, you can upgrade the firmware of the router.

Step 1 Visit www.tendacn.com, download the upgrade firmware of the corresponding model to your computer and unzip it.

Step 2 Log in to the web UI of your router, and navigate to **Tool** > **Upgrade Service** > **System Firmware Upgrade**.

Step 3 Select **Local Upgrade** for **Upgrade Mode**.

Step 4 Click **Browse**. Select and upload the firmware that has been downloaded to your computer in **Step 1**, and click **Upgrade**.



System Firmware Upgrade

Current Software Version V16.01.14.1(3084)

Upgrade Mode ● Local Upgrade ○ Online Upgrade

Upgrade File Path

Step 5 Confirm the prompt information, and click **OK**.

----End

After the progress bar completes, you can log in to the router again and check whether **Current Software Version** in **Tool** > **Upgrade Service** > **System Firmware Upgrade** is the one that you upgraded. If yes, the upgrade is successful.

11.5.3 Feature-Library upgrade

NOTE

- To avoid damage to the router, ensure that the correct upgrade file is used. Generally, a firmware upgrade file is suffixed with **.bin**.
- During the upgrade, do not power off the router.

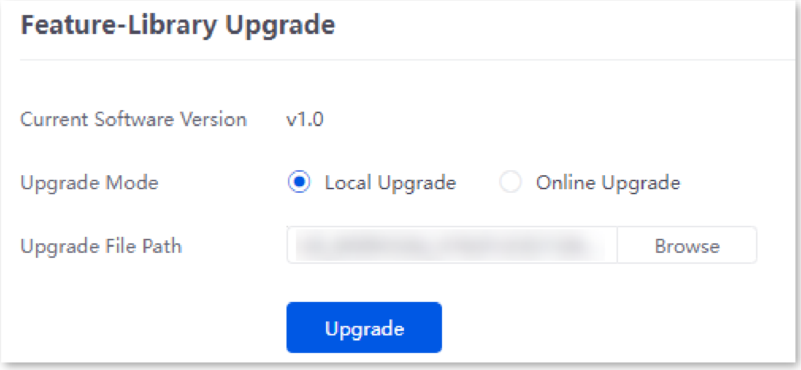
Log in to the web UI of the router, and navigate to **Tool** > **Upgrade Service** > **Feature-Library Upgrade**. On this page, you can upgrade the router's feature-library.

Step 1 Visit www.tendacn.com, download the latest feature-library file of the corresponding model and save it to your computer.

Step 2 Log in to the web UI of your router, and navigate to **Tool** > **Upgrade Service** > **Feature-Library Upgrade**.

Step 3 Select Local Upgrade for Upgrade Mode.

Step 4 Click **Browse**. Select and upload the feature-library file that has been downloaded to your computer in step 1, and click **Upgrade**.



Feature-Library Upgrade

Current Software Version v1.0

Upgrade Mode ● Local Upgrade ○ Online Upgrade

Upgrade File Path

----End

After the progress bar completes, you can log in to the router again and check whether **Current Software Version** in **Tool** > **Upgrade Service** > **Feature-Library Upgrade** is the one that you upgraded. If yes, the upgrade is successful.

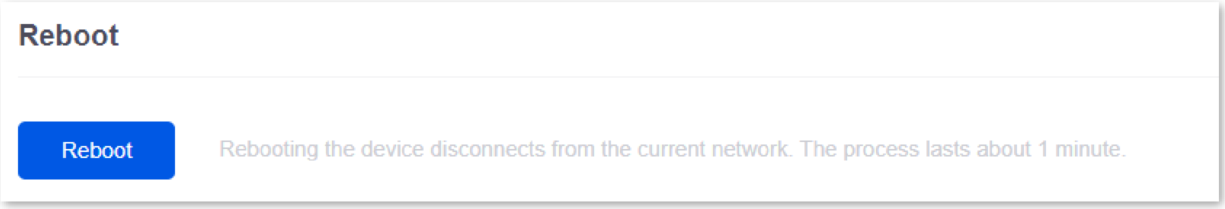
11.6 Reboot services

11.6.1 Reboot

Log in to the web UI of the router, and navigate to **Tool** > **Reboot Services** > **Reboot** to enter the page. On this page, you can reboot the router to make certain settings take effect and improve the performance of the router. Rebooting the device disconnects from the current network. The process lasts about 1 minute. It is recommended to reboot the device when the network is relatively idle.

Reboot steps:

Navigate to **Tool** > **Reboot Services** > **Reboot** to enter the page, and click **Reboot**.


Reboot

Rebooting the device disconnects from the current network. The process lasts about 1 minute.

11.6.2 Scheduled reboot

Log in to the web UI of the router, and navigate to **Tool** > **Reboot Services** > **Scheduled Reboot** to enter the page. On this page, by setting the router to reboot periodically during leisure time, you can prevent the decreasing of performance and instability of the router after running for a long period.

TIP

The time of reboot depends on the system time of the router. To ensure the time of the reboot is correct, set a correct system time of the router first.

Scheduled reboot steps:

Step 1 Log in to the web UI of the router.

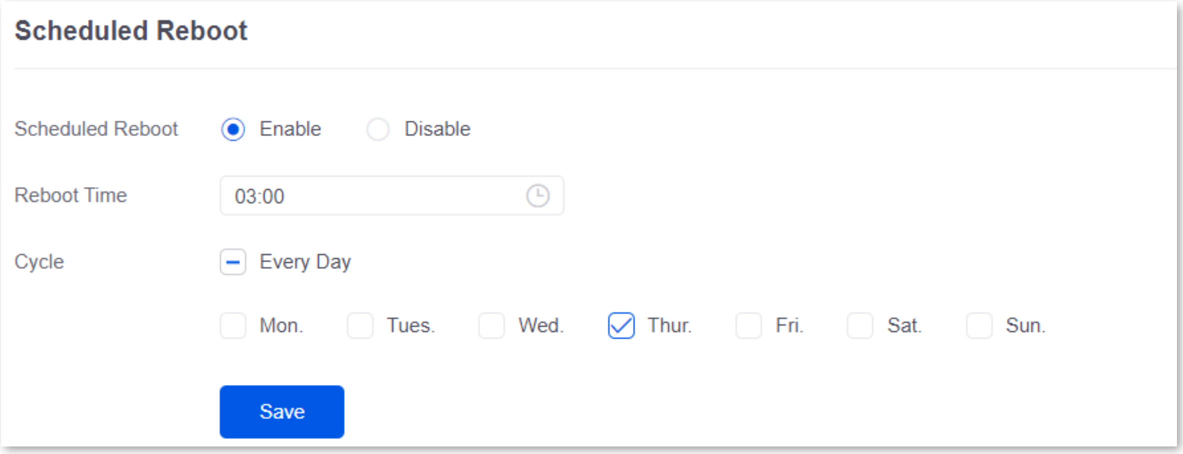
Step 2 Navigate to **Tool** > **Maintenance** > **Scheduled Reboot**.

Step 3 Enable the **Scheduled Reboot** function.

Step 4 Select the time when the router will automatically reboot, which is **03:00** in this example.

Step 5 Select the reboot date, which is **Thur.** in this example.

Step 6 Click **Save**.



Scheduled Reboot

Scheduled Reboot ● Enable ○ Disable

Reboot Time 03:00

Cycle ⊟ Every Day

☐ Mon. ☐ Tues. ☐ Wed. ☑ Thur. ☐ Fri. ☐ Sat. ☐ Sun.

----End

After the above settings are completed, the router will automatically reboot at 3:00 am every Thursday.

11.7 Network diagnosis

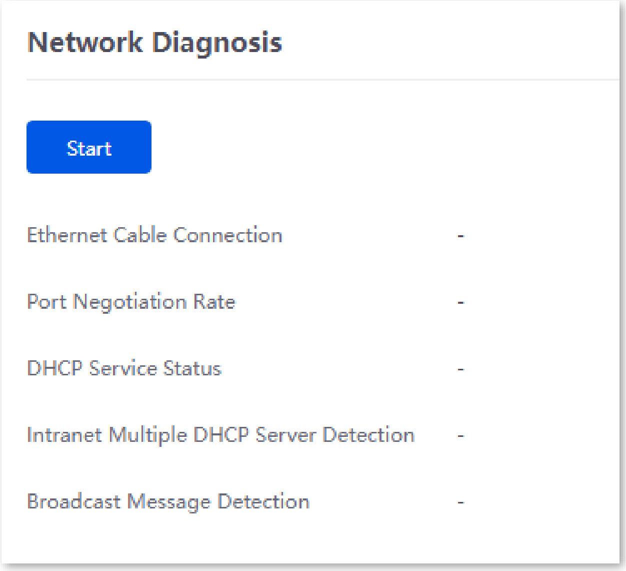
11.7.1 Configure network diagnosis

Log in to the web UI of the router, and navigate to **Tool** > **Network Diagnosis** > **Network Diagnosis** to enter the page.

On this page, you can detect the network status of the router. If a network abnormality is detected, it will be reported to the network monitoring logs.

NOTE

After **Start** is clicked, the process may last for a period of time and cannot be paused or ended manually. Operate during idle periods.



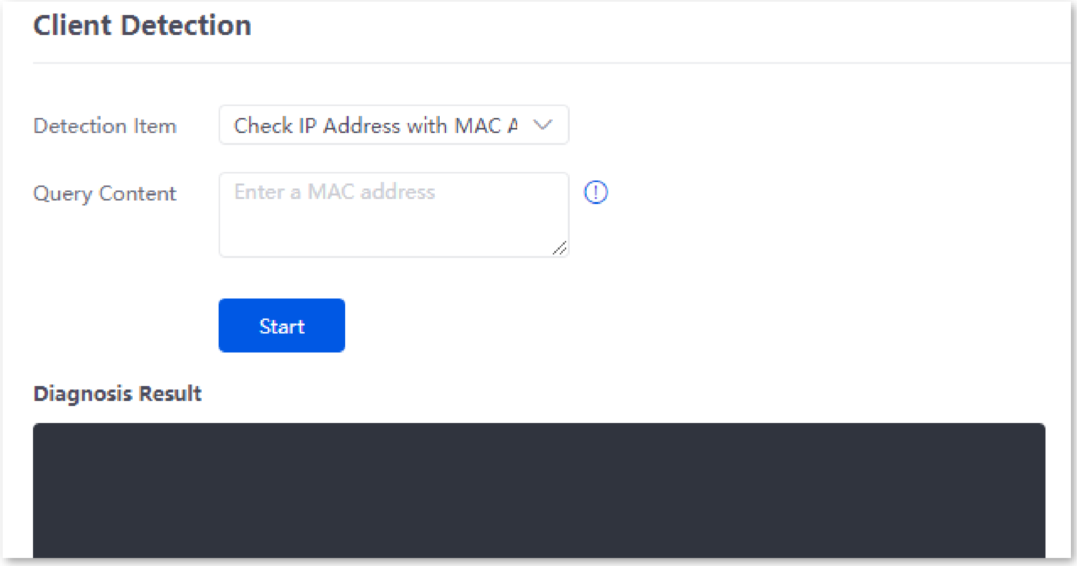
Network Diagnosis

Ethernet Cable Connection	-
Port Negotiation Rate	-
DHCP Service Status	-
Intranet Multiple DHCP Server Detection	-
Broadcast Message Detection	-

11.7.2 Client detection

Log in to the web UI of the router, and navigate to **Tool** > **Network Diagnosis** > **Client Detection** to enter the page.

On this page, you can check the IP address of a client through its MAC address.



Client Detection

Detection Item: Check IP Address with MAC A

Query Content: Enter a MAC address

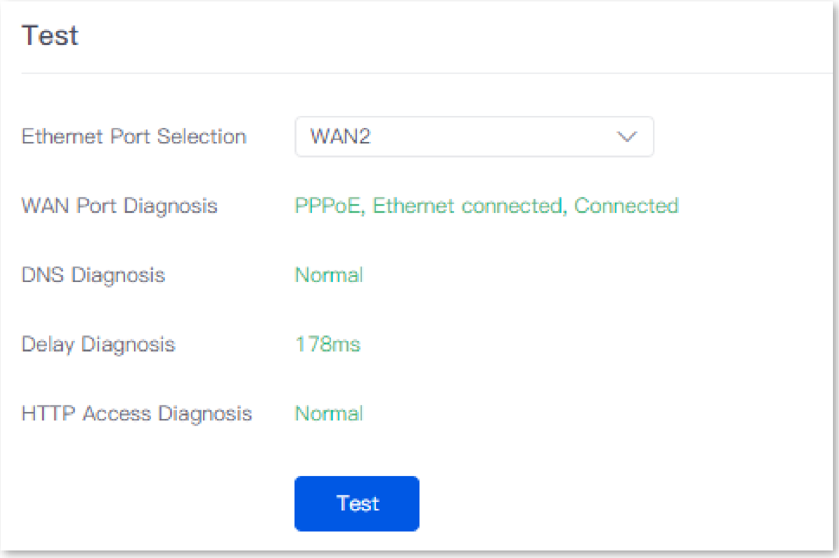
Parameter description

Parameter	Description
Detection Item	Used to check the IP address of a client through its MAC address.
Query Content	Specifies the MAC address of the client whose IP address is to be queried.

11.7.3 WAN port diagnosis

Log in to the web UI of the router, and navigate to **Tool** > **Network Diagnosis** > **WAN Port Diagnosis** to enter the page.

On this page, you can perform a network test on the WAN port of the router.



Test

Ethernet Port Selection: WAN2

WAN Port Diagnosis: PPPoE, Ethernet connected, Connected

DNS Diagnosis: Normal

Delay Diagnosis: 178ms

HTTP Access Diagnosis: Normal

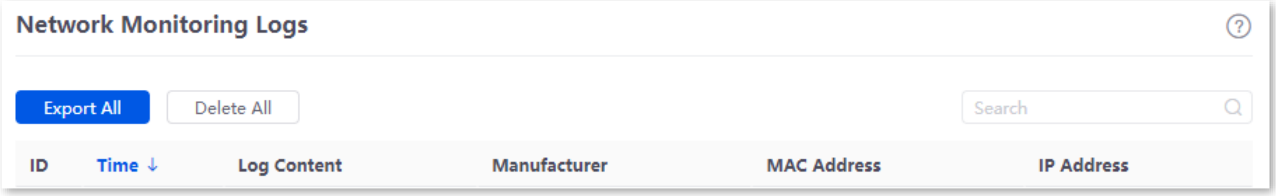
Parameter description

Parameter	Description
Ethernet Port Selection	Specifies the WAN port to be tested.
WAN Port Diagnosis	Used to test the WAN port's connection type, Ethernet cable connection status and internet connection status.
DNS Diagnosis	Used to test whether the WAN port can resolve the domain name properly.
Delay Diagnosis	Used to test the network delay of the WAN port.
HTTP Access Diagnosis	Used to test whether the WAN port can receive HTTP response normally.

11.7.4 Network monitoring logs

Log in to the web UI of the router, and navigate to **Tool** > **Network Diagnosis** > **Network Monitoring Logs** to enter the page.

On this page, you can check the network monitoring logs recorded by the router on this page. If the network is faulty, you can perform troubleshooting using these logs.



Network Monitoring Logs

ID	Time ↓	Log Content	Manufacturer	MAC Address	IP Address

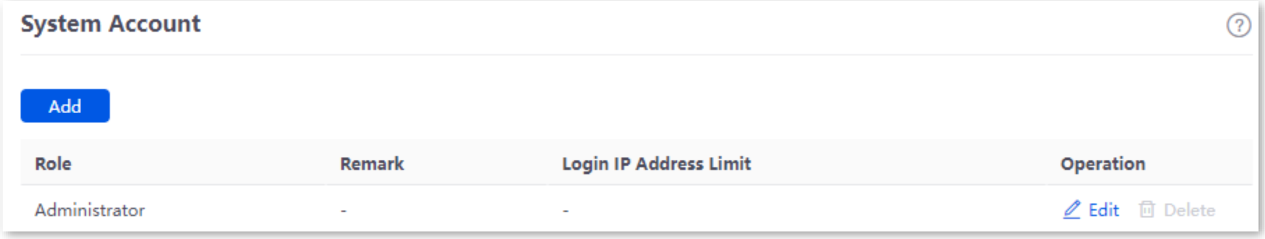
Parameter description

Parameter	Description
Time	Specifies the time when the log is generated.
Log Content	Specifies the content of the abnormal log.
Manufacturer	Specifies the manufacturer of the DHCP server detected in the LAN.
MAC Address	Specifies the MAC address of the DHCP server detected in the LAN.
IP Address	Specifies the IP address of the DHCP server detected in the LAN.

11.8 System account

Log in to the web UI of the router, and navigate to **Tool** > **System Account** to enter the page.

On this page, you can add, modify or delete the administrator and visitor accounts.



System Account

Add

Role	Remark	Login IP Address Limit	Operation
Administrator	-	-	Edit Delete

Parameter description

Parameter	Description
Add	Used to add a new system account.
Role	Specifies the user role in managing the web UI. There is an administrator account by default. The operation authority of corresponding user roles is described as follows: – **Administrator**: Able to view and configure all functions of the router. – **Visitor**: Only able to view configurations of the router except system account information.
Password	Used to set the login password of the account.
Confirm Password	
Remark	Specifies the description for the account. You can enter the description for the operation permission of the account.

Parameter	Description
Login IP Address Limit	Specifies the IP addresses of the users of the account. After the configuration is completed, only users with the IP address or within the IP address range can use the account to access the web UI.
Operation	Used to edit or delete account information. The super-administrator account cannot be added or deleted. ✎ Edit: Used to modify the account information. 🗑 Delete: Used to delete the account information.

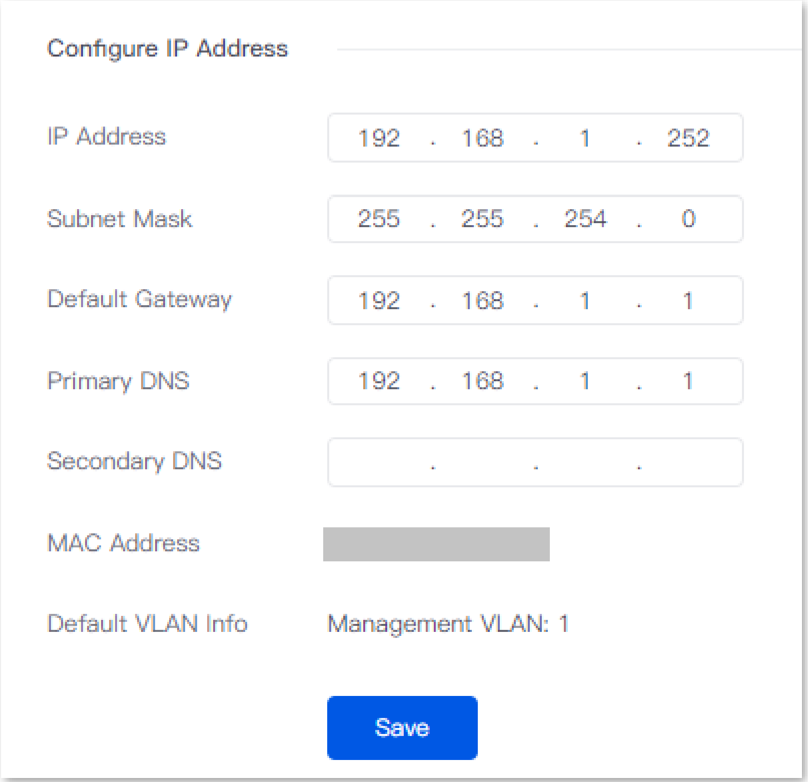
Appendix

A.1 Connect the router in pure AC mode

Step 1 Log in to the web UI of the router.

Step 2 Navigate to **Network** > **LAN Settings**, on the **Configure IP Address** module, configure the LAN port information of the router and click **Save**. The following figure is for reference only.

- Set **IP Address** of the router to one on the same network segment as the LAN IP address of the gateway, and is not occupied by other devices.
- Retain **Subnet Mask** to default settings, which is **255.255.254.0**.
- Set **Default Gateway** to the LAN IP address of the gateway.
- Set **Primary DNS** to the correct IP address of DNS server or DNS proxy.

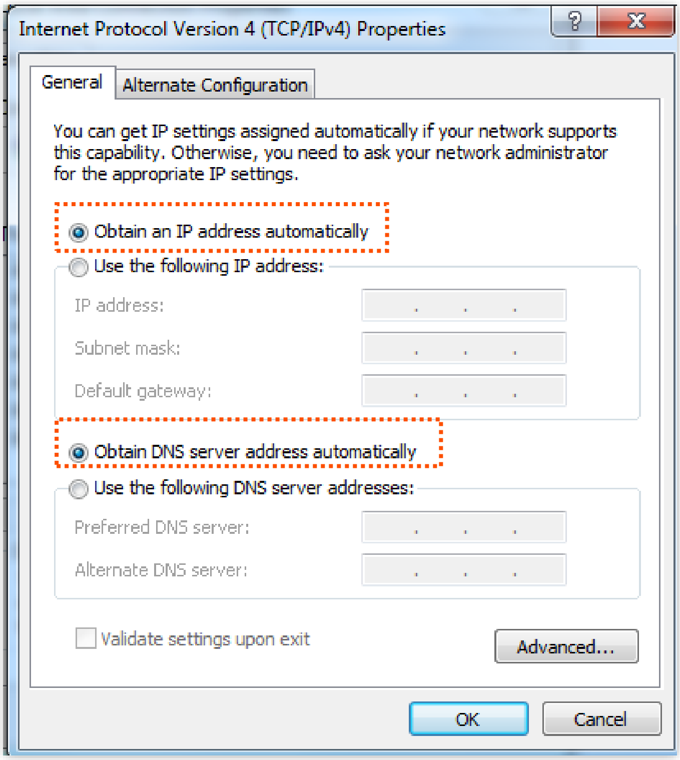


Configure IP Address

IP Address	192 . 168 . 1 . 252
Subnet Mask	255 . 255 . 254 . 0
Default Gateway	192 . 168 . 1 . 1
Primary DNS	192 . 168 . 1 . 1
Secondary DNS	. . .
MAC Address	[redacted]
Default VLAN Info	Management VLAN: 1

----End

To log in to the web UI of the router, set the management computer to **Obtain an IP address automatically** and **Obtain DNS server address automatically**.



Internet Protocol Version 4 (TCP/IPv4) Properties

General | Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

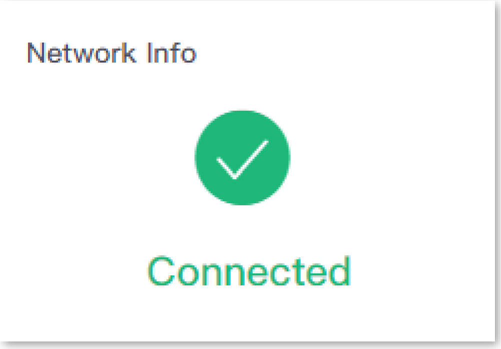
○ Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

□ Validate settings upon exit

Start a web browser and enter the newly set IP address in the address bar to log in to the web UI of the router again. In the **Network Info** module of the **System** page, you can view that the router is connected to the internet.



Network Info

✓

Connected

A.2 Acronyms and abbreviations

Acronym or Abbreviation	Full Spelling
AC	Access Point Controller
ACK	Acknowledge
AES	Advanced Encryption Standard
AH	Authentication Header
AP	Access Point
APSD	Automatic Power Save Delivery
ARP	Address Resolution Protocol
ASCII	American Standard Code for Information Interchange
BW	Bandwidth
CHAP	Challenge Handshake Authentication Protocol
CPU	Central Processing Unit
CSV	Comma Separated Value
DDNS	Dynamic Domain Name Service
DDoS	Distributed Denial of Service
DES	Data Encryption Standard
DH	Diffie-Hellman
DHCP	Dynamic Host Configuration Protocol
DHCPv6	Dynamic Host Configuration Protocol for IPv6
DMZ	Demilitarized Zone
DNS	Domain Name System
DPD	Dead Peer Detection
DTIM	Delivery Traffic Indication Map

Acronym or Abbreviation	Full Spelling
EDCA	Enhanced Distributed Channel Access
ERP	Enterprise Resource Planning
ESP	Encapsulating Security Payload
FTP	File Transfer Protocol
GRE	Generic Routing Encapsulation
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICMP	Internet Control Message Protocol
ID	Identity Document
IEEE	Institute of Electrical and Electronics Engineers
IKE	Internet Key Exchange
IP	Internet Protocol
IPsec	Internet Protocol Security
IPTV	Internet Protocol Television
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
ISAKMP	Internet Security Association and Key Management Protocol
ISP	Internet Service Provider
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
LCP	Link Control Protocol
LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode
MAC	Medium Access Control

Acronym or Abbreviation	Full Spelling
MPDU	Message Protocol Data Unit
MPPE	Microsoft Point-to-Point Encryption
MS-CHAP	Microsoft Challenge Handshake Authentication Protocol
MSDU	Multiple MAC Service Data Units
MTU	Maximum Transmission Unit
NAT	Network Address Translation
NTS	Network time server
ONVIF	Open Network Video Interface Forum
PAP	Password Authentication Protocol
PC	Personal Computer
PFS	Perfect Forward Secrecy
PPP	Point to Point Protocol
PPPoE	Point-to-Point Protocol over Ethernet
PPTP	Point to Point Tunneling Protocol
PVID	Port-based VLAN ID
PoE	Power over Ethernet
QoS	Quality of Service
RA	Router Advertisement
RADIUS	Remote Authentication Dial In User Service
RF	Radio Frequency
RSSI	Received Signal Strength Indicator
RTS	Request to Send
RX	Receive
SA	Security Association

Acronym or Abbreviation	Full Spelling
SDN	Software Defined Network
SKEME	Security Key Exchange Mechanism
SLAAC	Stateless Address Autoconfiguration
SMS	Short Message Service
SMTP	Simple Mail Transfer Protocol
SN	Serial Number
SNMP	Simple Network Management Protocol
SPI	Security Parameter Index
SSH	Secure Shell
SSID	Service Set Identifier
SSL	Secure Sockets Layer
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
TLS	Transport Layer Security
TX	Transmit
UDP	User Datagram Protocol
UI	User Interface
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTF-8	8-bit Unicode Transformation Format
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
VoIP	Voice over Internet Protocol

Acronym or Abbreviation	Full Spelling
WAN	Wide Area Network
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WMM	Wi-Fi Multi-Media
WPA	Wi-Fi Protected Access
WPA-PSK	WPA-Preshared Key