



# **Wireless Hotspot Router User Guide**

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## Preface

Thank you for choosing Tenda! Please read this user guide carefully before you start.

## Conventions

This user guide is applicable to the following routers. W20E is used for illustrations here unless otherwise specified. The contained images and UI screenshots are subject to the actual products.

Product model	Description
W15E	AC1200 Wireless Hotspot Router
W18E	AC1200 Gigabit Wireless Hotspot Router
W20E	AC1350 Gigabit Wireless Hotspot Router

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

Item	Presentation	Example
Cascading menus	>	<b>System &gt; Live Users</b>
Parameter and value	Bold	Set <b>User Name</b> to <b>Tom</b> .
Variable	Italic	Format: <i>XX:XX:XX:XX:XX:XX</i>
UI control	Bold	On the <b>Policy</b> page, click the <b>OK</b> button.
Message	“ ”	The “Success” message appears.

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 highlight a procedure that will save time or resources.

## Acronym and Abbreviation

Acronym and Abbreviation	Full Spelling
AES	Advanced Encryption Standard
AH	Authentication Header
AP	Access Point
ARP	Address Resolution Protocol
ASCII	American Standard Code for Information Interchange

<b>Acronym and Abbreviation</b>	<b>Full Spelling</b>
APSD	Automatic Power Save Delivery
CPU	Central Processing Unit
DDNS	Dynamic Domain Name Server
DDoS	Distributed Denial of Service
DES	Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DPD	Digital Pre-Distortion
DMZ	Demilitarized Zone
DNS	Domain Name System
ESP	Encapsulating Security Payload
GBK	Chinese Internal Code Specification
GMT	Greenwich Mean Time
ICMP	Internet Control Message Protocol
IKE	Internet Key Exchange
IP	Internet Protocol
ISP	Internet Service Provider
IPSec	IP Security
L2TP	Layer 2 Tunneling Protocol
LAN	Local Area Network
MAC	Medium Access Control
MD5	Message Digest 5
MGMT	Management
MTU	Maximum Transmission Unit
NAT	Network Address Translation
PFS	Perfect Forward Secrecy
PoE	Power Over Ethernet

<b>Acronym and Abbreviation</b>	<b>Full Spelling</b>
PPPoE	Point-to-Point Protocol Over Ethernet
PPTP	Point to Point Tunneling Protocol
RSSI	Received Signal Strength Indicator
SA	Security Association
SSID	Service Set Identifier
SHA	Secure Hash Algorithm
Short GI	Short Guard Interval
SMS	Short Message Service
SPI	Security Parameter Index
SYN	Synchronize
SYS	System
TCP	Transmission Control Protocol
TKIP	Temporal Key Integrity Protocol
UDP	User Datagram Protocol
UI	User Interface
UPnP	Universal Plug and Play
URL	Uniform Resource Locator
UTF-8	8-bit Unicode Transformation Format
VPN	Virtual Private Network
WAN	Wide Area Network
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Networks
WMM	Wi-Fi multi-media

## Getting more documents

If you want to get more documents of the device, visit [www.tendacn.com](http://www.tendacn.com) and search for the target product model. The related documents are listed as below:

Document	Description
Quick Installation Guide	It introduces how to set up the device quickly for internet access, the descriptions of LED indicators, ports, and buttons, FAQ, statement information, and so on.
User Guide	It introduces how to set up more functions of the device for more requirements, including all functions on the web UI of the device.
Data Sheet	It introduces the basic information of the device, including product overview, selling points, and specifications.

## Technical Support

If you need more help, contact us by any of the following means. We will be glad to assist you as soon as possible.



**Hotline**

Global: (86) 755-27657180

(China Time Zone)

United States: 1-800-570-5892

(Toll Free: 7 x 24 hours)

Canada: 1-888-998-8966

(Toll Free: Mon - Fri 9 am - 6 pm PST)

Hong Kong: 00852-81931998



**Email**

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# 1 At a glance

## 1.1 Overview

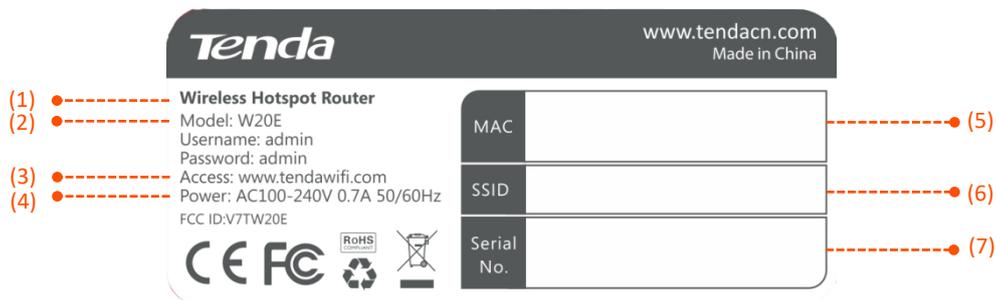
The enterprise router stands out both on hardware and software. With sleek appearance, high-gain antennas, various interfaces, as well as an intuitive web UI that allows you to manage your network to achieve your very specific deployment purpose, such as authentication using captive portal, and VPN connections. You are assured to enjoy stable network and convenient management.

## 1.2 Main features

- At most three 2.4 GHz wireless networks and three 5 GHz wireless networks
- High density user access
- High-gain antennas
- Supports wireless network isolation
- Supports captive portal
- Supports remote web management
- Supports smart and user-defined bandwidth control
- Supports IP/MAC/URL-based filter
- Supports PPTP/L2TP VPN server, PPTP/L2TP VPN client, and IPSec VPN connections
- Up to 3 WAN ports

## 1.3 Label

The label shows the **Default Access, MAC, SSID** and **Serial NO.** of the router. The following is an example of what the router label might look like:



- (1) Product name of the router.
- (2) **Model:** Product model of the router. You can use this model as a key word for searching related supporting materials on our official website.
- (3) **Default Access:** Default domain name or IP address for logging in to the web UI of the router.
- (4) **Power input:** Power specification of the router. It is suggested that you use the included power adapter to power on the router.
- (5) **MAC:** MAC address of the router.
- (6) **SSID:** Default wireless network name of the router.
- (7) **Serial No.:** The unique serial number of the router.

# 2 Quick setup

This chapter introduces how to set up the router to access the internet for the first time.

## Step 1 Connect your router.

1. Connect the included power adapter to the **Power** jack of the router to power it on.
2. Use an Ethernet cable to connect an Ethernet jack or a LAN port of your modem to the WAN port of the router.
3. Either connect your computer to a LAN port of the router, or connect your WiFi-enabled device, such as a smart phone, to the wireless network of the router.



The default SSID is on the bottom [Label](#) of the router. By default, it has no WiFi password.

---

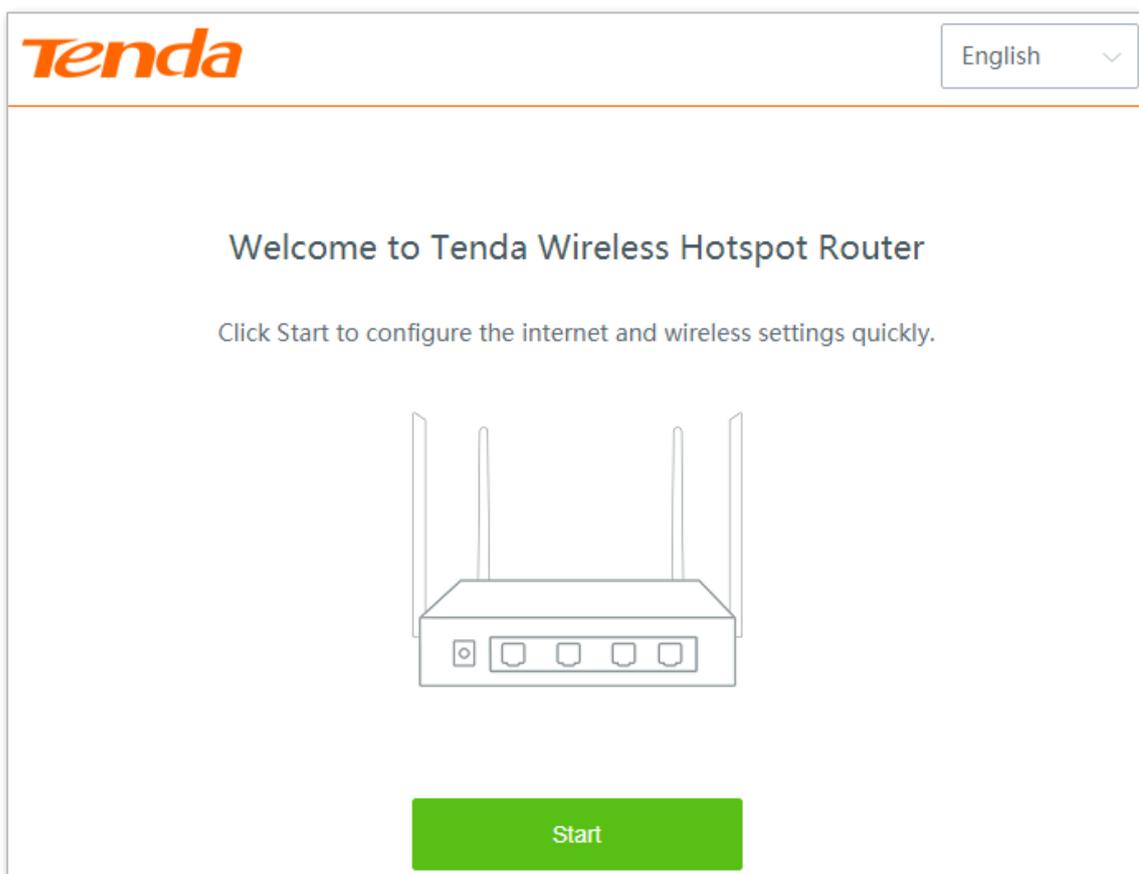
## Step 2 Configure your router.



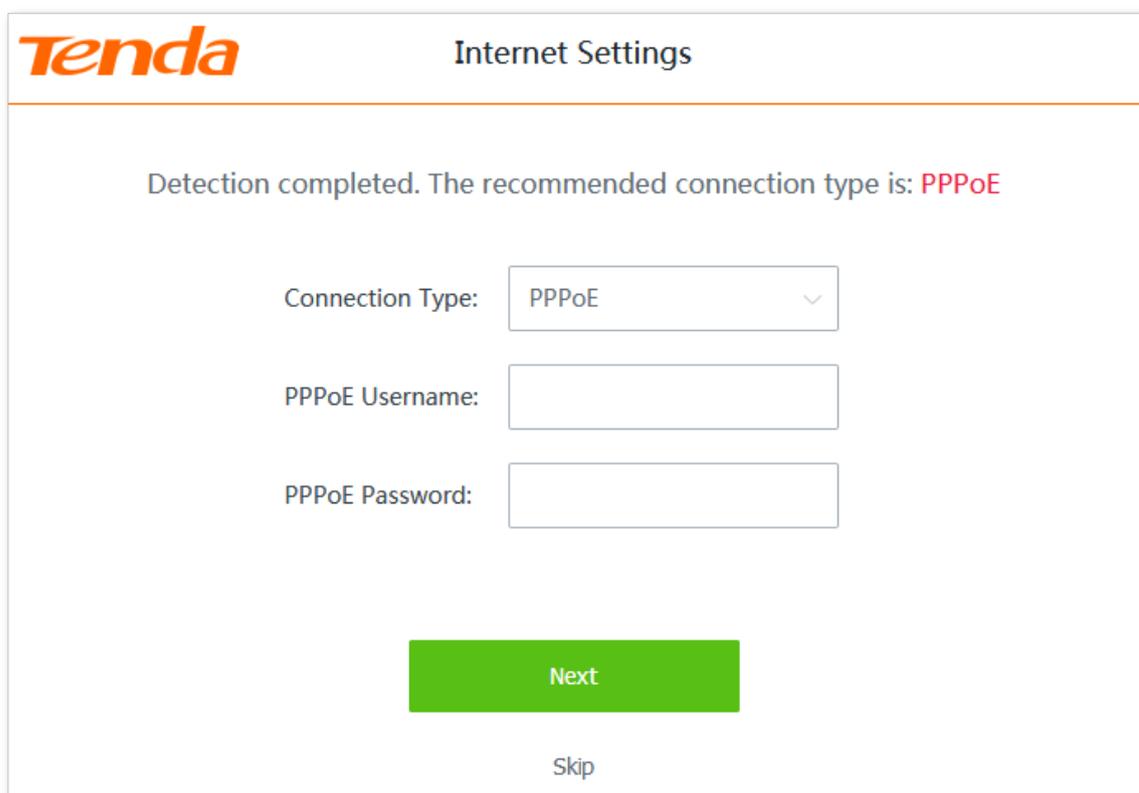
- You can perform quick setup either using a connected computer or a smart phone. The configuration process is the same. The following takes a computer for example.
  - If a smart phone is used, disable its mobile or cellular network function.
- 
1. Start a web browser on the computer connected to the router or the wireless network of the router, and access [tendawifi.com](http://tendawifi.com).



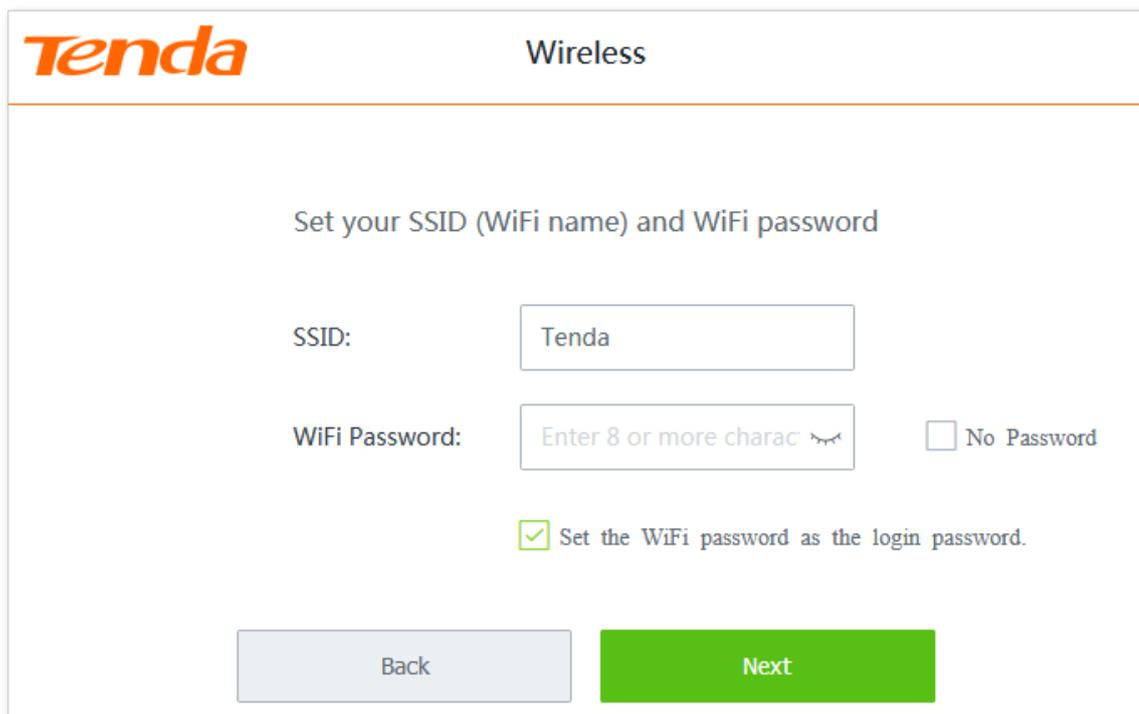
2. Click **Start**. The system automatically starts detecting your internet connection type.



3. After detection completed, just follow the on-screen instructions to set up your router. **PPPoE** is used for illustrating here. Enter the **PPPoE Username** and **PPPoE Password** provided by you ISP, and click **Next**.



4. Customize the **SSID** (wireless network name) and **WiFi password** as needed.



**Tenda** Wireless

Set your SSID (WiFi name) and WiFi password

SSID:

WiFi Password:   No Password

Set the WiFi password as the login password.



- By default, the **WiFi password** is set as the **Login Password**, you can deselect the checkbox and customize them separately.
- **WiFi Password** is used for connecting to your wireless network, while **Login Password** is used for logging into the web UI of the router for management.

5. Click **Next**.

---- End

To access the internet with:

- **Wireless clients:** Connect your wireless devices to the SSID with the WiFi password you set.
- **Wired clients:** Connect the wired devices to LAN ports of the router.

# 3 Login

## 3.1 Login



This section introduces how to log in to the web UI of the router for management. For initial use of the router, refer to [Quick setup](#).

### 3.1.1 Overview

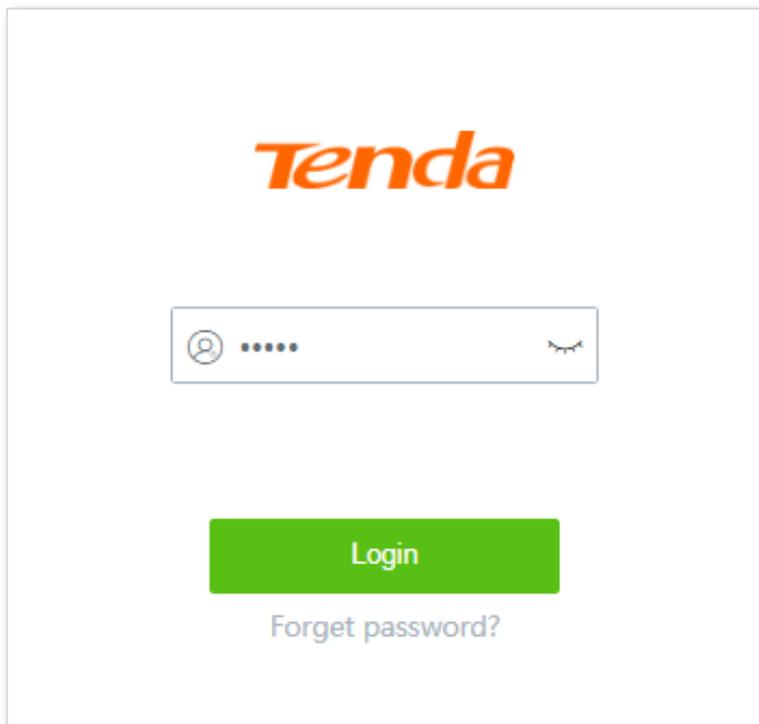
The router supports two account types: **Administrator** and **Authentication**. The **Administrator** account enjoys all access permission of the router, while the **Authentication** account only has permission for accessing **System Status** and **Authentication** modules. For detailed explanation, see [Password Manager](#).

### 3.1.2 Log in to the web UI of the router

**Step 1** Start a web browser on your device connected to the router, and access **tendawifi.com**.

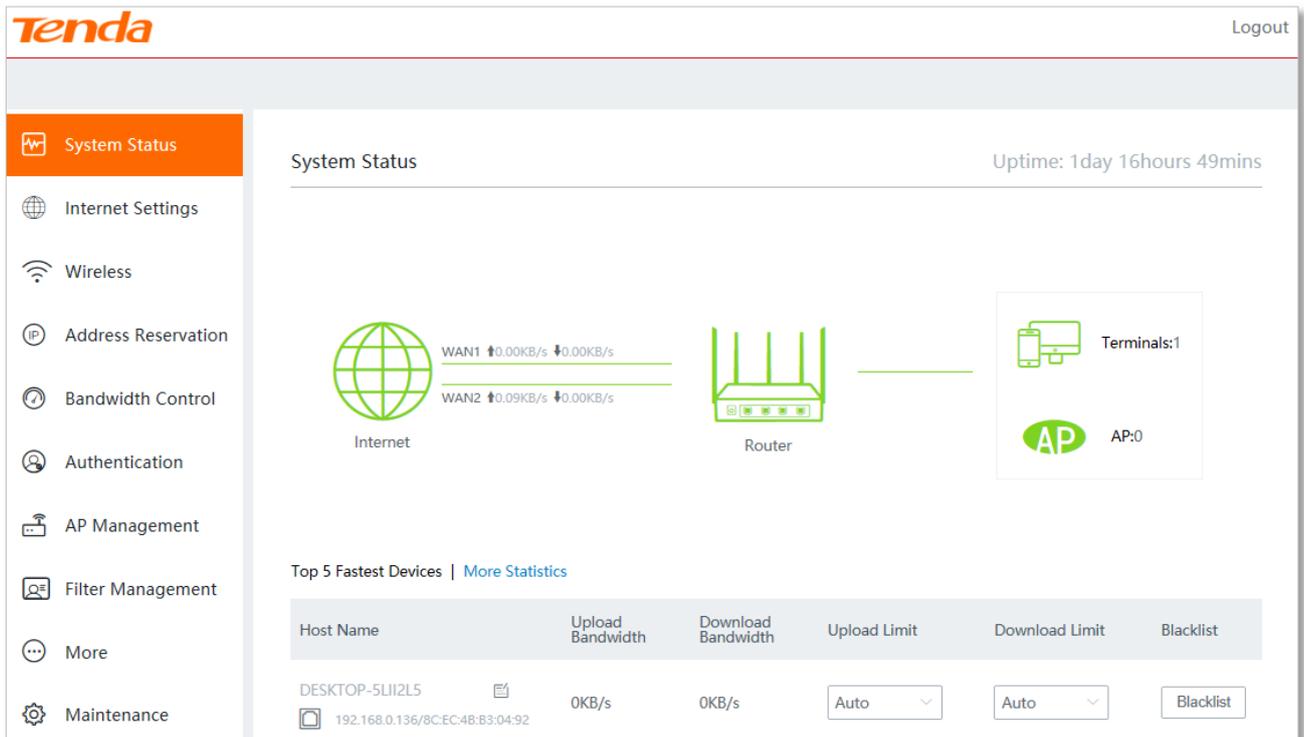


**Step 2** Enter the login password of the router you set, and click **Login**.

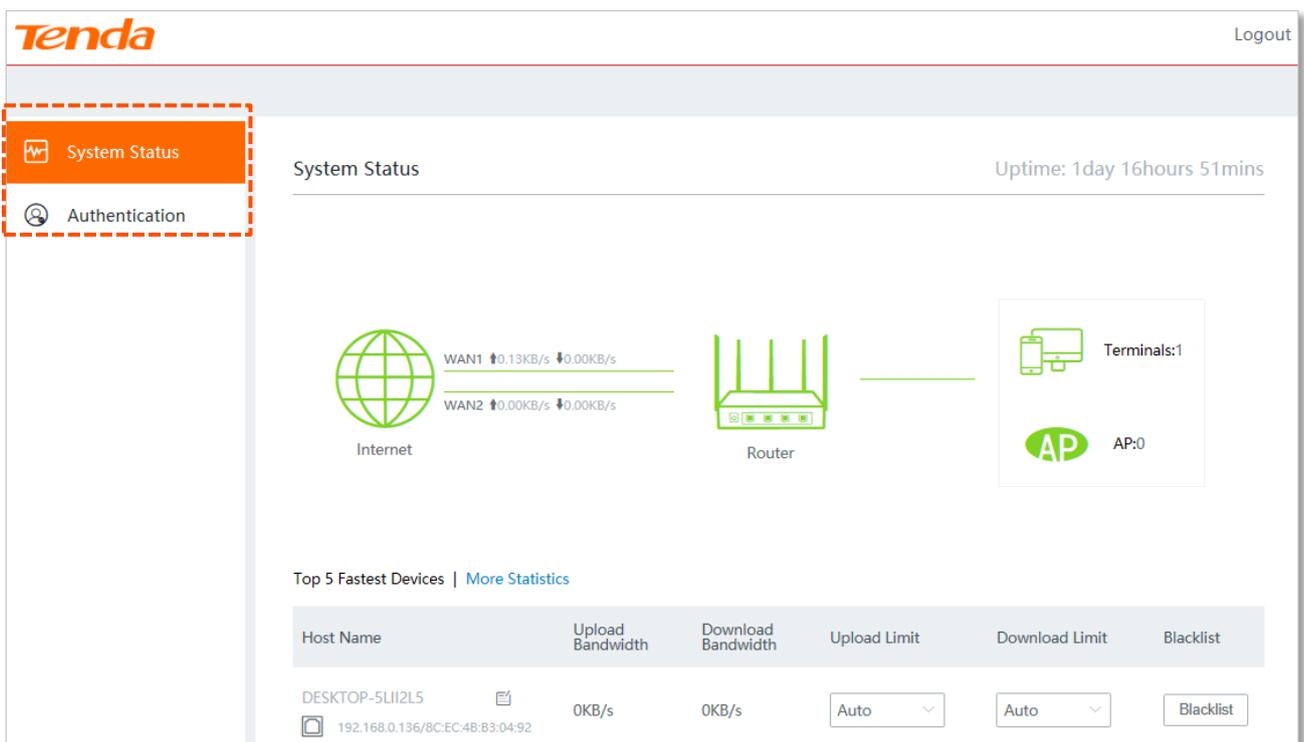


---- End

Log in to the web UI of the router using the **Administrator** account. See the following figure:



Log in to the web UI of the router using the **Authentication** account. See the following figure:



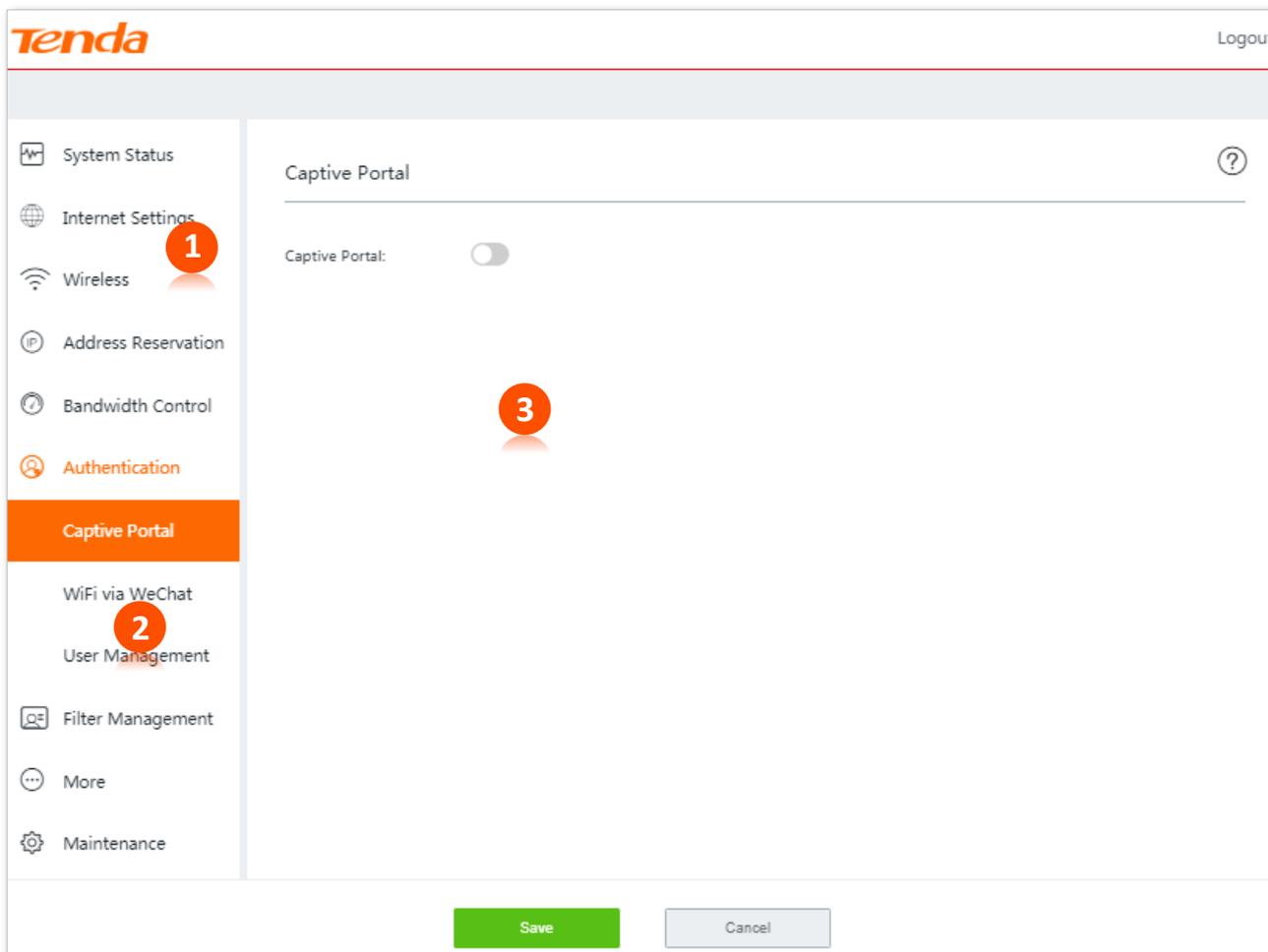
## 3.2 Logout

If you log into the web UI of the router and perform no operation within **20** minutes, the router logs you out automatically.

You can log out by clicking **Logout** on the upper right corner of the web UI as well.

## 3.3 Web UI layout

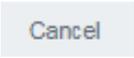
The web UI of the router consists of three sections, including the level-1, and level-2 navigation bar, and the configuration area as well. See the following figure:



SN	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	Configuration area	Used to modify or view your configuration.

## 3.4 Frequently-used buttons

The following table describes the frequently-used buttons available on the web UI of the router.

Button	Description
	Used to save the configuration on the current page and enable the configuration to take effect.
	Used to change the current configuration on the current page back to the original configuration.
	Used to get the online help.

# 4 System status

## 4.1 Check physical connections and system status

To enter the configuration page, choose **System Status**.

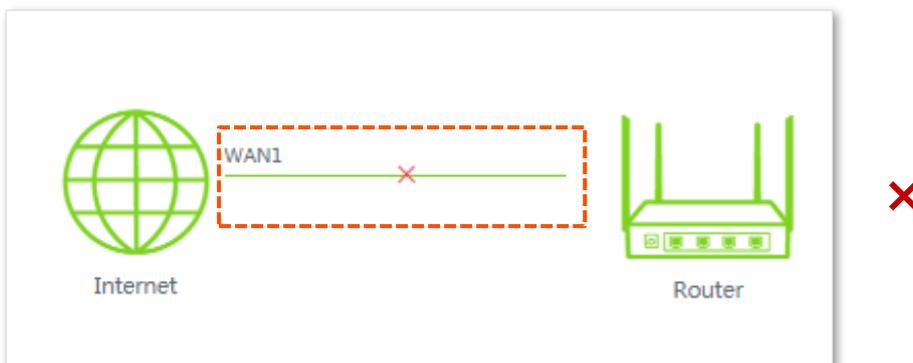
You can check if the physical connections are proper, or the router's system status here.

### 4.1.1 Check physical connections

The following figure indicates that the router is connected to the internet properly through the WAN1 port.



The following figure indicates that connection between the router and the internet is abnormal. Please check if the WAN 1 port of the router is properly connected to the internet, or the internet connection parameters you set are correct.



## 4.1.2 View system status

On **System Status** page, click the **Router** icon , the **Device Info** window pops up.

The **Device Info** window consists of three parts: [Operating Status](#), [LAN Port Status](#), and [WAN Info](#).

### ■ Operating Status

Operating Status	
System Time:	2019-01-16 14:31:24
Uptime:	54:58
Firmware Version:	V15.11.0.4(917)
Device Name:	AC1200 Wireless Hotspot Router
CPU Usage:	4%
Memory Usage:	72%

### Parameter description

Parameter	Description
System Time	It specifies the current system time of the router. You can set system time by navigating to <b>Maintenance</b> > <a href="#">System time</a> .
Uptime	It specifies the time that has elapsed since the router was started last time.
Firmware Version	It specifies the firmware version number of the router.
Device Name	It specifies the name of your router.
CPU Usage	It specifies the current CPU usage of the router.
Memory Usage	It specifies the current memory usage of the router.

## ■ LAN port status

This module shows the LAN IP address and the MAC address of the router.



You can modify LAN settings by navigating to **More** > [LAN settings](#).

### LAN Port Status

IP Address:	192.168.0.1
MAC Address:	50:2B:73:F1:2F:60

## ■ WAN Info

This module displays information about all enabled WAN ports, including **Connection Type**, **Status**, and **IP Address** and so on.

### WAN1 Info

Connection Type:	Dynamic IP
Status:	Plugged
IP Address:	192.168.11.100
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.11.1
Primary DNS:	192.168.11.1
Secondary DNS:	0.0.0.0
Upload Rate:	0.04KB/s
Download Rate:	0.00KB/s

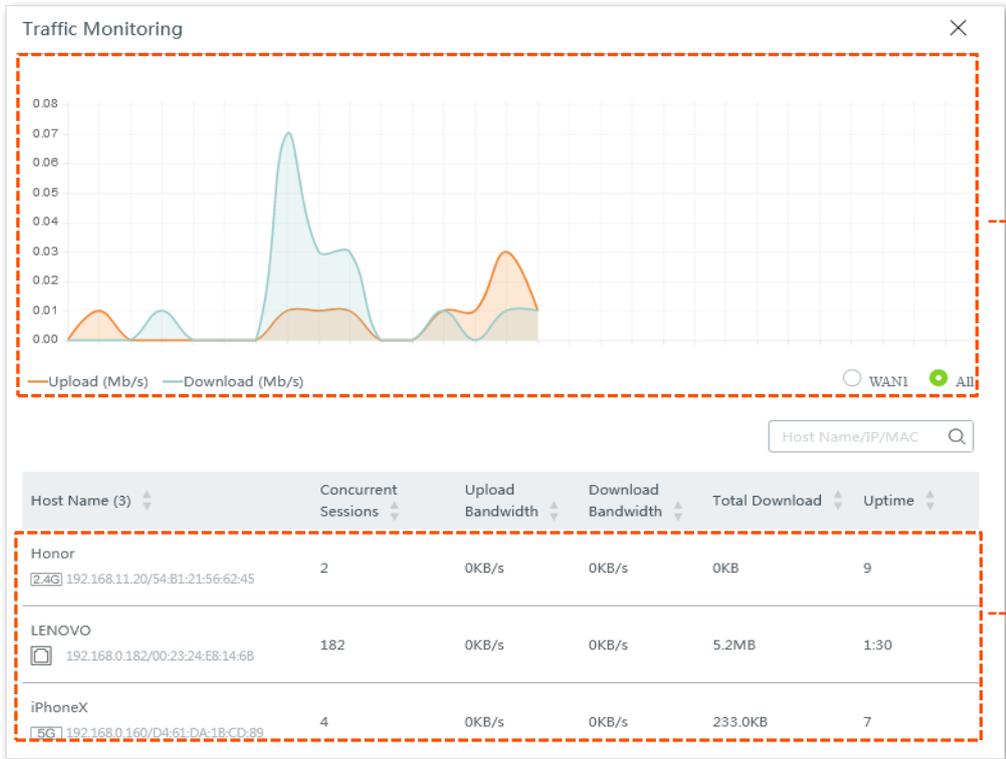
## Parameter description

Parameter	Description
Connection Type	It specifies the internet connection type of the corresponding WAN port.
Status	It specifies whether or not the WAN port is plugged. If <b>Unplugged</b> appears, please check its physical connection.

Parameter	Description
IP Address	It indicates the IP address of the corresponding WAN port.
Subnet Mask	It indicates the subnet mask of the corresponding WAN port.
Default Gateway	It indicates the gateway IP address of the corresponding WAN port. Only forwarding packets through this gateway can clients access the internet.
Primary DNS	The primary/secondary DNS server address of the corresponding WAN port.
Secondary DNS	The <b>Secondary DNS</b> is optional. If you do not set this parameter, it shows <b>0.0.0.0</b> .
Upload Rate	The upload and download rate of the corresponding WAN port.
Download Rate	

## 4.2 Monitor traffic

The router presents the traffic usage in an intuitive way. Click **More Statistics** on **System Status** page, the **Traffic Monitoring** window appears. See the following figure:



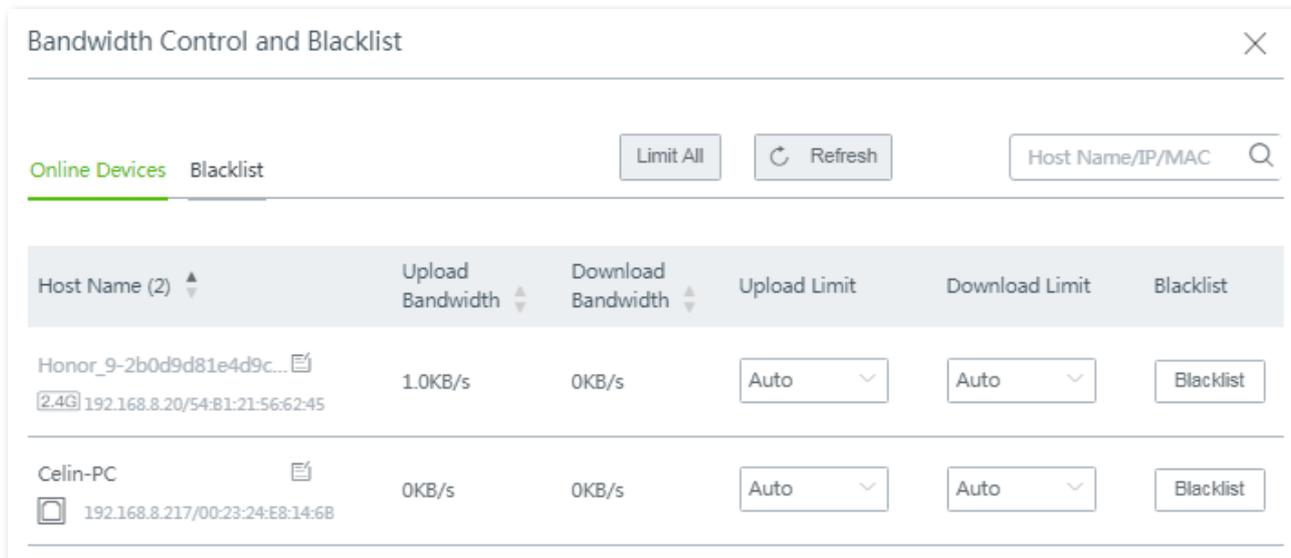
Monitoring traffic of selected WAN port(s).

Monitoring traffic of online client(s).

## 4.3 Manage online devices

To access the configuration page, click the **Connected Devices** icon  on the **System Status** page. The **Bandwidth Control and Blacklist** window appears.

You can edit the name of connected clients, control the connected clients' upload and/or download bandwidth separately or in batch, and block a device from accessing your network.



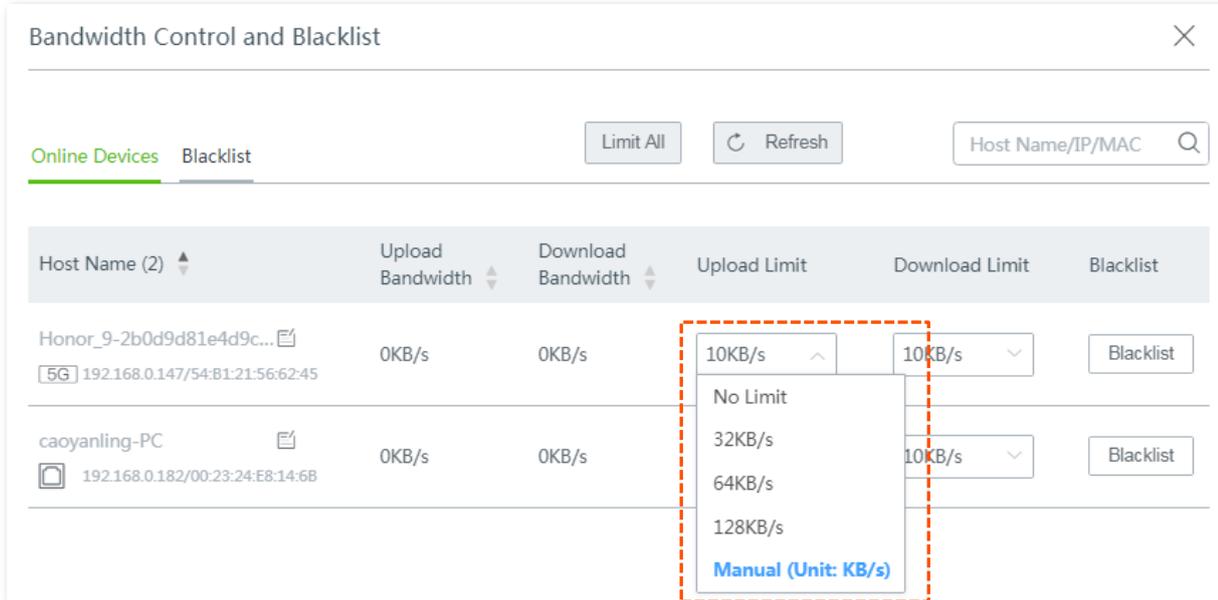
### Parameter description

Parameter	Description
Host Name	<p>It specifies the name of clients connected to the router, connection type, their IP addresses, and MAC addresses. You can click  to personalize the host name for convenient management.</p> <p> <b>NOTE</b></p> <p>For host name-based rules, you need to use the host name here.</p> <p> : The client connects to the router in a wired manner.</p> <p> : The client connects to the router's 2.4 GHz wireless network.</p> <p> : The client connects to the router's 5 GHz wireless network.</p>
Concurrent Sessions	Concurrent sessions established of the corresponding client.
Upload Bandwidth	It indicates the real-time upload/download bandwidth of each client. You can control their maximum upload/download bandwidth manually, refer to <a href="#">Manage online devices</a> .
Download Bandwidth	
Total Download	It specifies the total download traffic utilized by each client.
Uptime	It specifies the connection time of each client. The unit is minute.

### 4.3.1 Control bandwidth of online devices

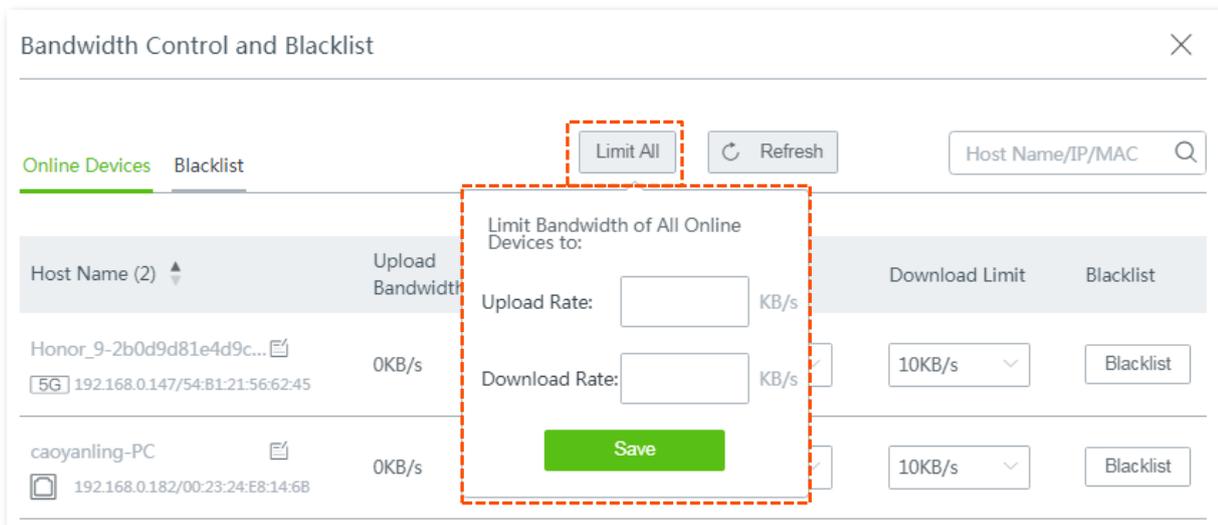
#### Control bandwidth of online devices separately

To limit the upload and/or download bandwidth of one or several devices, select a pre-defined value from the drop-down list menu of **Upload Limit** and/or **Download Limit**, or select **Manual** to specify a value manually.



#### Control bandwidth of online devices in batch

Click **Limit All**, specify the values according to your actual situation, and click **Save** to apply your settings.

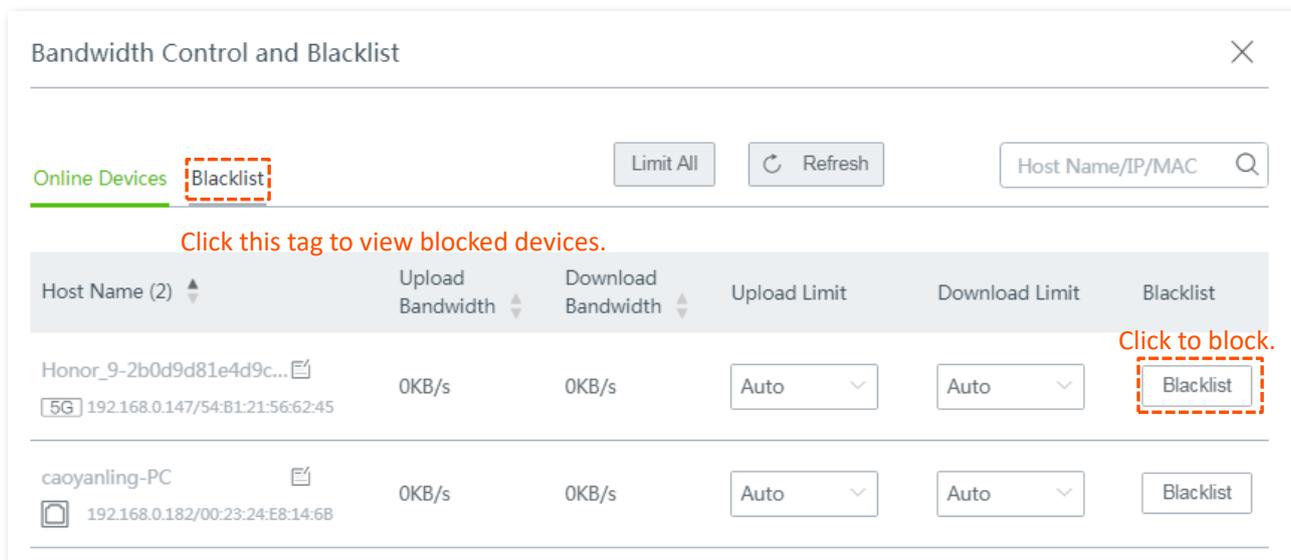


#### NOTE

Upload/download limits of devices that controlled by **Limit by Group** policy cannot be modified here. Refer to [Limit By Group](#) for details.

### 4.3.2 Add devices to blacklist

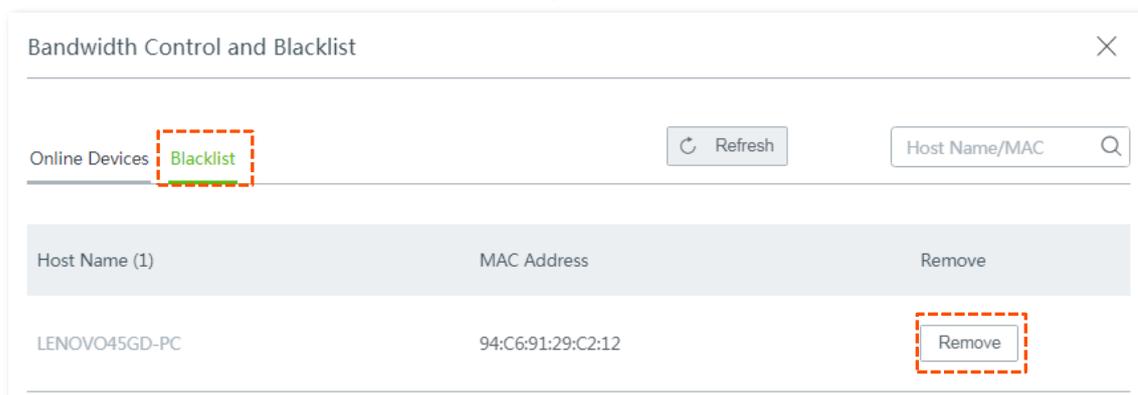
To protect your network from being accessed by unknown devices, click the **Blacklist** button to block them. The blocked devices will be moved to the **Blacklist** section, and cannot connect to your router.



### 4.3.3 Remove devices from blacklist

Follow steps below to unblock devices from the blacklist.

- Step 1** Click the **Connected Devices** icon  on the **System Status** page. The **Bandwidth Control and Blacklist** window appears.
- Step 2** Click the **Blacklist** tag.
- Step 3** Click **Remove** that relates with the device you want to unblock.



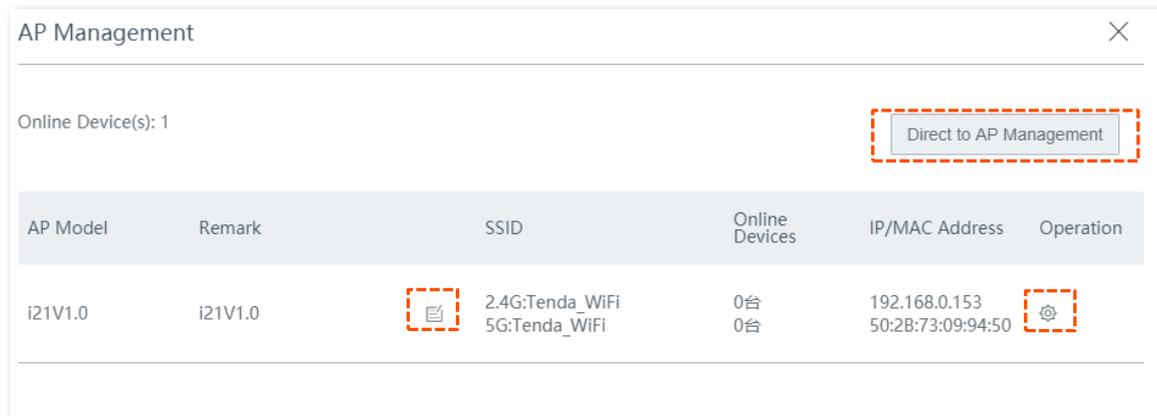
---- End

The unblocked devices can connect to your router again.

## 4.4 Manage APs

This page displays some basic information operations about APs connected to the router. If you want to perform further configurations concerning connected APs, please refer to [AP Mngement](#).

To access the configuration page, choose **System Status**, and click the **AP** icon. The AP Management window appears. See the following figure:



### Parameter description

Parameter	Description
AP Model	It specifies the model of the corresponding AP.
Remark	It specifies the remark name that you leave for the corresponding AP.
SSID	It specifies the WiFi SSID of the corresponding AP, including 2.4G and 5G WiFi. You can change the remark for the AP by clicking 
Online Devices	It specifies the number of online devices of each wireless network.
IP/MAC Address	It specifies the IP address and MAC address of the corresponding AP.
Operation	By clicking  button, you are directed to the web UI of the AP.
Direct to AP Management	By clicking this button, you are directly navigate to the configuration page <b>Basic Setting</b> of the <a href="#">AP Management</a>

# 5 Internet settings

## 5.1 Overview

To enter the configuration page, choose **Internet Settings**.

System Status

**Internet Settings**

Wireless

Address Reservation

Bandwidth Control

Authentication

Filter Management

More

Maintenance

### Internet Settings

**WAN Ports**

WAN Ports: 1

Port Type:

4 3 2 1

WAN WAN/LAN WAN/LAN LAN

WAN1 LAN2 LAN3 LAN4

**WAN1**

Connection Type: PPPoE

PPPoE Username: tjx

PPPoE Password: ...

Server Name: (Optional)

Service Name: (Optional)

Status: **Disconnected**

Save Cancel

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### Parameter description

Parameter	Description
WAN Ports	It specifies how many WAN ports you can set on the router. By default, the router has only one WAN port (the WAN1 port), and you can set <b>3</b> WAN ports at most.
Port Type	It indicates that if the port functions as a WAN port or a LAN port, as well as if a port is connected or not.  : The port is connected properly.  : The port is disconnected or improperly connected.

Parameter	Description
Connection Type	<p>It specifies in which way the router is connected to the internet.</p> <p>The router supports <b>PPPoE</b>, <b>Static IP</b>, and <b>Dynamic IP</b>. Refer to the table <a href="#">Choose your connection type</a> for details.</p> <p> <b>TIP</b></p> <p>The router supports <b>PPPoE Russia</b>, <b>PPTP/PPTP Russia</b>, and <b>L2TP/L2TP Russia</b> as well. These three connection types are only applicable to Russia and its vicinity.</p>
PPPoE Username	<p>These two parameters are required only when your internet connection type is PPPoE.</p> <p> <b>TIP</b></p>
PPPoE Password	<ul style="list-style-type: none"> <li>- You can find them on the receipt provided by your ISP when you subscribed broadband service.</li> <li>- If you cannot find them, consult your ISP.</li> </ul>
Server Name	(Optional) Enter these two parameters provided by your ISP. If not, leave them blank.
Service Name	
IP Address	These parameters are required only when your internet connection type is <b>Static IP</b> . The <b>Secondary DNS</b> parameter is optional.
Subnet Mask	
Default Gateway	<p> <b>TIP</b></p> <ul style="list-style-type: none"> <li>- You can find them on the receipt provided by your ISP when you subscribed broadband service.</li> <li>- If you cannot find them, consult your ISP.</li> </ul>
Primary DNS	
Secondary DNS	
Status	<p>It indicates the connection status of the corresponding WAN port.</p> <ul style="list-style-type: none"> <li>- <b>Authenticated Successfully/Connected:</b> The corresponding WAN port has been connected properly, and obtained an IP address.</li> <li>- <b>Connecting...:</b> The router is connecting to the internet or server.</li> <li>- <b>Disconnected:</b> The port is disconnected, or fails to connect to the internet or server. Please check if the physical connections are proper, or the parameters you entered are correct.</li> </ul>

## 5.2 Configure multiple WAN ports

The router supports **3** WAN ports at most. The multi-WAN port feature lets you aggregate bandwidth, enjoy uninterrupted broadband service even in case of one connection malfunctions, and make ISP route selection, thus getting a better utilization of your bandwidth.

**Assume that:**

**WAN1** internet connection type is **Static IP**, and the static IP information is as follows:

- IP Address: 192.168.97.86
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.97.1
- Primary DNS: 192.168.108.107
- Secondary DNS: 192.168.108.108

**WAN2** internet connection type is **Dynamic IP**.

**Configuration procedure:**



- Parameters for internet access are provided by your ISP. Refer to [Choose your connection type](#) table for detailed description. Values used here are only for examples.
- Modifying number of WAN port makes the router reboot.
- The following procedure describes how to configure 2 WAN ports. You can refer to the following steps to increase or decrease WAN ports as needed.

**Step 1** Select the number of WAN ports from the **WAN Ports** drop-down list menu, which is **2** in this example.

The port marked with **LAN2** changes into **WAN2**, and the WAN2 configuration area appears.

Internet Settings

**WAN Ports**

WAN Ports: 1

Port Type:

1	2	3	4
WAN	WAN/LAN	WAN/LAN	LAN
WAN1	LAN2	LAN3	LAN4

**WAN1**

Connection Type: Dynamic IP

Status: Authenticated successfully

Internet Settings

**WAN Ports**

WAN Ports: 2

Port Type:

1	2	3	4
WAN	WAN/LAN	WAN/LAN	LAN
WAN1	WAN2	LAN3	LAN4

**WAN1**

Connection Type: Dynamic IP

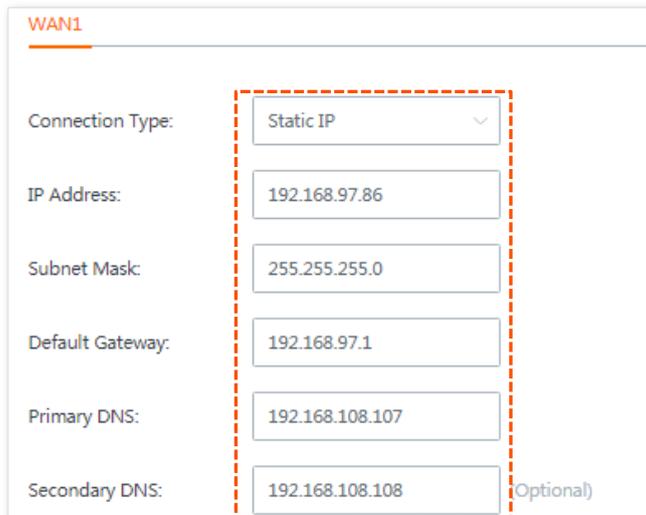
Status: Authenticated successfully

**WAN2**

Connection Type: Dynamic IP

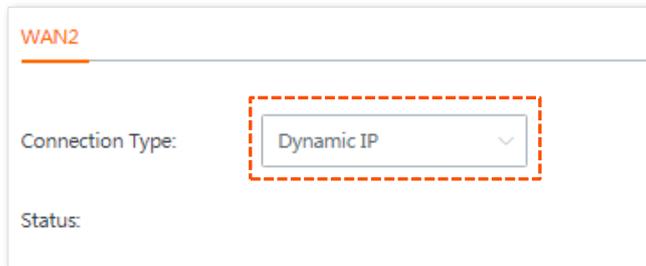
Status:

**Step 2** On **WAN1** configuration area, enter the static IP information provided by your ISP. The following figure is only for example.



The screenshot shows the WAN1 configuration interface. The 'Connection Type' dropdown is set to 'Static IP'. Below it, the IP Address is 192.168.97.86, Subnet Mask is 255.255.255.0, Default Gateway is 192.168.97.1, Primary DNS is 192.168.108.107, and Secondary DNS is 192.168.108.108 (Optional). A dashed orange box highlights the 'Static IP' dropdown and the input fields for IP Address, Subnet Mask, Default Gateway, Primary DNS, and Secondary DNS.

**Step 3** On **WAN2** configuration area, select **Dynamic IP** from the drop-down list menu of **Connection Type**.

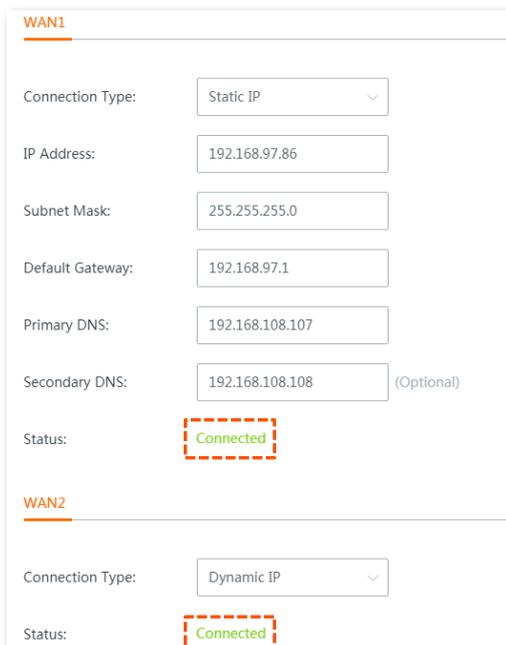


The screenshot shows the WAN2 configuration interface. The 'Connection Type' dropdown is set to 'Dynamic IP'. Below it, the 'Status' field is visible. A dashed orange box highlights the 'Dynamic IP' dropdown menu.

**Step 4** Click **Save** at the bottom of the page.

---- End

Wait a moment. The router performs rebooting to apply your settings. When the status shows **Connected**, your configuration is successful. See the following figure:



The screenshot shows the WAN1 and WAN2 configuration interfaces. The WAN1 section shows the 'Connection Type' set to 'Static IP' and the 'Status' field displaying 'Connected' in green text, highlighted by a dashed orange box. The WAN2 section shows the 'Connection Type' set to 'Dynamic IP' and the 'Status' field displaying 'Connected' in green text, also highlighted by a dashed orange box.

## 5.3 Set up to access the internet

This section describes how to set up to access the internet using different connection types.

Choose the proper connection type according to your actual environment. Use the table below to help you select your internet connection type if you are uncertain about how to select one.

**Choose your connection type:**

Connection Type	Parameters available
PPPoE	Your ISP provided you the PPPoE username and password.
Dynamic IP	Your ISP automatically assigns you a dynamic IP address.
Static IP	Your ISP provided you IP address, subnet mask, default gateway, DNS and so on.

### 5.3.1 Set up to internet access with PPPoE



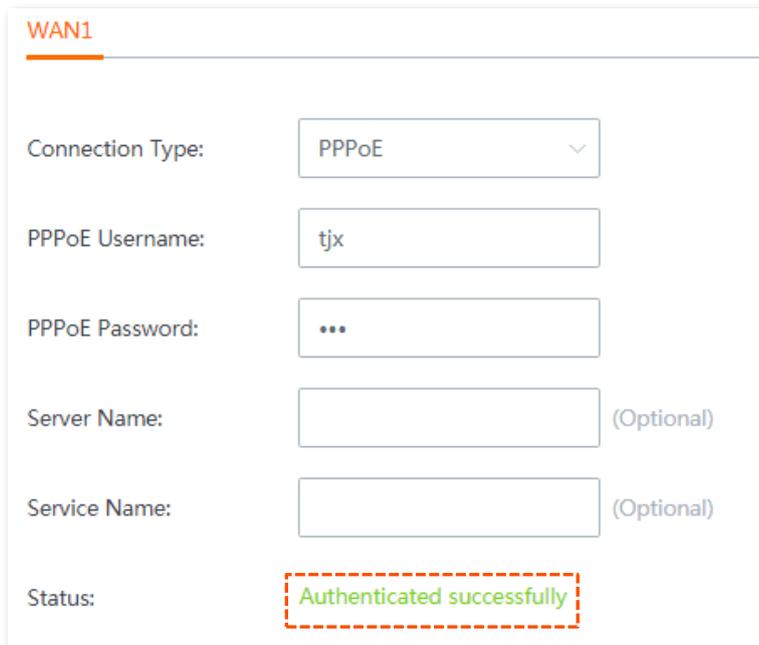
The following takes WAN1 for example.

- Step 1** Choose **Internet Settings**, the configuration page appears.
- Step 2** Select **PPPoE** from the drop-down list menu of **Connection Type**.
- Step 3** Enter the **PPPoE Username** and **PPPoE Password** provided by your ISP.
- Step 4** Click **Save** at the bottom of the page to apply your settings.

The screenshot shows the 'Internet Settings' configuration page for WAN1. The 'WAN Ports' section shows 'WAN1' selected. The 'Port Type' section shows four ports: WAN1, LAN2, LAN3, and LAN4. The 'WAN1' port is highlighted with a green box. Below this, the 'WAN1' configuration is shown, including 'Connection Type' (PPPoE), 'PPPoE Username' (tjx), 'PPPoE Password' (masked with dots), 'Server Name' (Optional), and 'Service Name' (Optional). The status is 'Disconnected'. A red dashed box highlights the PPPoE configuration fields. At the bottom, there are 'Save' and 'Cancel' buttons.

----- End

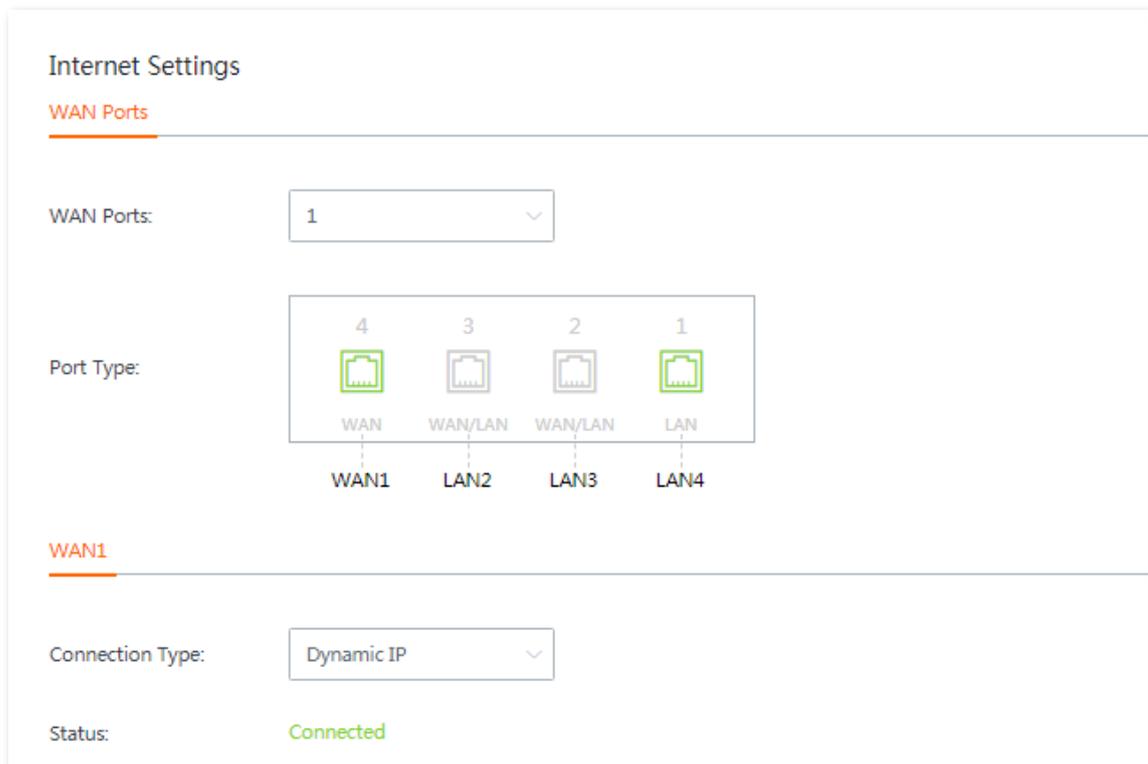
Wait for the router to complete rebooting. The router connects to the internet successfully when the **Status** shows **Authenticated successfully**. Otherwise, check if the parameters you entered are correct.



The screenshot shows the WAN1 configuration page. The 'Connection Type' is set to 'PPPoE'. The 'PPPoE Username' is 'tjx' and the 'PPPoE Password' is masked with three dots. There are optional fields for 'Server Name' and 'Service Name'. The 'Status' is 'Authenticated successfully', which is highlighted with a red dashed box.

### 5.3.2 Set up to internet access with dynamic IP

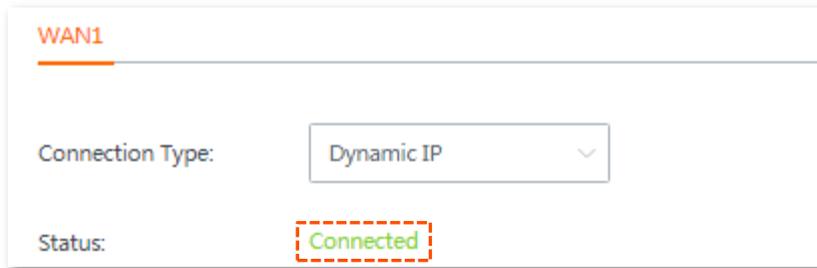
- Step 1** Click **Internet Settings**, the configuration page appears.
- Step 2** Select **Dynamic IP** from the **Connection Type** drop-down list menu.
- Step 3** Click **Save** at the bottom of the page to apply your settings.



The screenshot shows the Internet Settings page. Under 'WAN Ports', the value is '1'. Below this is a 'Port Type' diagram with four ports: Port 4 is 'WAN' (WAN1), Port 3 is 'WAN/LAN' (LAN2), Port 2 is 'WAN/LAN' (LAN3), and Port 1 is 'LAN' (LAN4). The 'WAN1' port is highlighted with a green border. The 'Connection Type' is set to 'Dynamic IP' and the 'Status' is 'Connected'.

---- End

Wait for the router to complete rebooting. The router connects to the internet successfully when the **Status** shows **Connected**. You can enjoy the internet now.



The image shows a configuration panel for WAN1. At the top left, the text "WAN1" is displayed in orange. Below this, there are two rows of configuration options. The first row is labeled "Connection Type:" and has a dropdown menu currently set to "Dynamic IP". The second row is labeled "Status:" and shows the word "Connected" in green text, which is enclosed in a dashed red rectangular box.

### 5.3.3 Set up to internet access with static IP

- Step 1** Click **Internet Settings**, the configuration page appears.
- Step 2** Select **Static IP** from the drop-down list menu of **Connection Type**.
- Step 3** Enter the **IP Address, Subnet Mask, Default Gateway and Primary/Secondary DNS parameters** provided by your ISP. Configurations on the following figure are only used for examples.
- Step 4** Click **Save** at the bottom of the page to apply your settings.

Internet Settings

**WAN Ports**

WAN Ports: 1

Port Type:

4 3 2 1  
WAN WAN/LAN WAN/LAN LAN  
WAN1 LAN2 LAN3 LAN4

**WAN1**

Connection Type: Static IP

IP Address: 192.168.97.86

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.97.1

Primary DNS: 192.168.108.107

Secondary DNS: 192.168.108.108 (Optional)

Status: Connected

Save Cancel

----- End

Wait for the router to complete rebooting. The router connects to the internet successfully when the **Status** shows **Connected**. You can enjoy internet now.

**WAN1**

Connection Type: Static IP

IP Address: 192.168.97.86

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.97.1

Primary DNS: 192.168.108.107

Secondary DNS: 192.168.108.108 (Optional)

Status: **Connected**

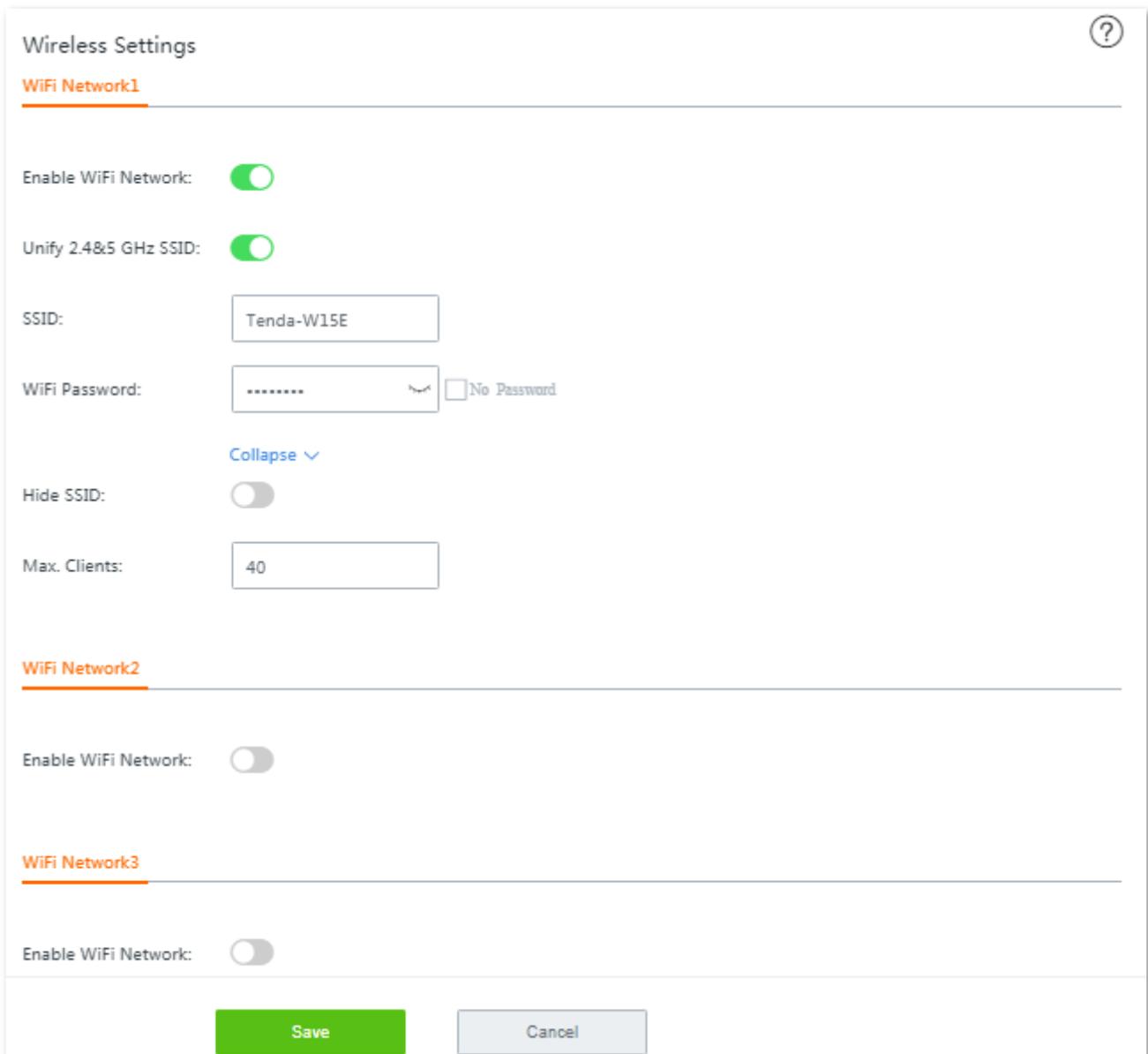
# 6 Wireless

## 6.1 Wireless settings

This dual-band router supports at most three 2.4 GHz wireless networks, and three 5 GHz wireless networks. By default, the 2.4 GHz and 5 GHz SSIDs for a wireless network are unified, and only **WiFi Network1** is enabled.

In this module, you are allowed to set up WiFi network-related configurations, such as view and edit wireless network names (SSID), WiFi passwords, configure 2.4 GHz and 5 GHz WiFi networks separately, hide your WiFi network so that nearby wireless clients cannot detect it, and specify how many wireless clients can connect to a wireless network.

To enter the configuration page, choose **Wireless > Wireless Settings**. See the following figure:



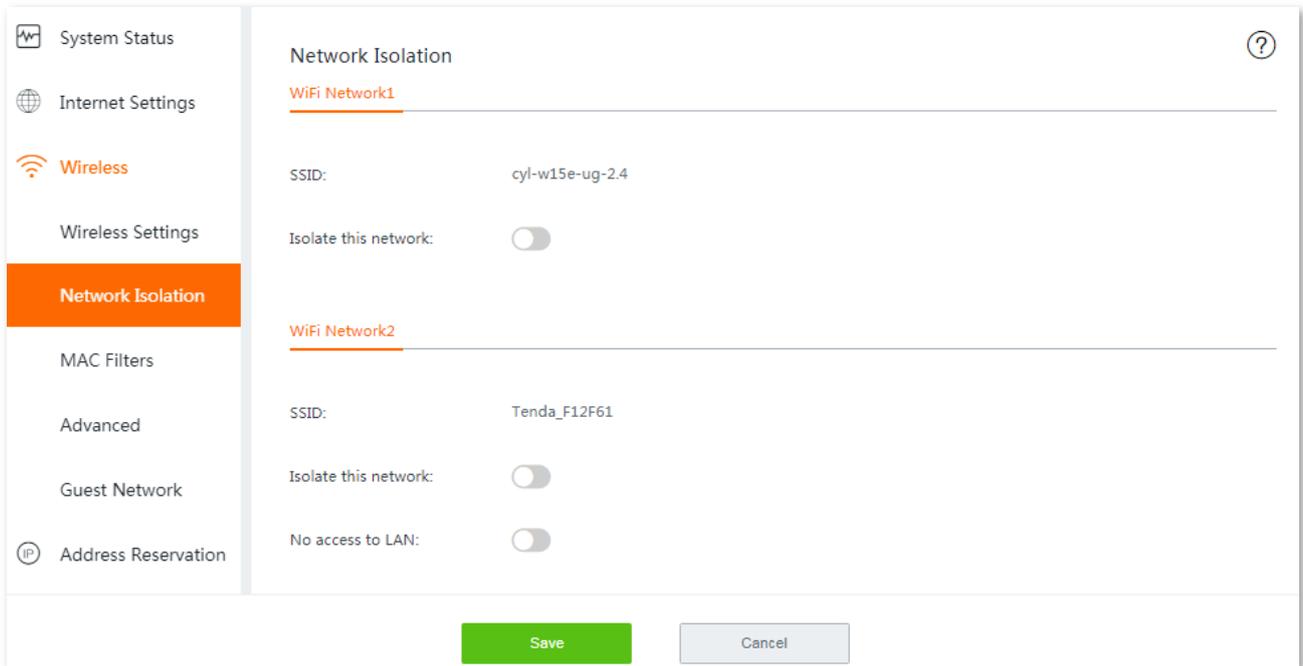
The screenshot shows the 'Wireless Settings' page with a help icon in the top right. It is divided into three sections for 'WiFi Network1', 'WiFi Network2', and 'WiFi Network3'.  
**WiFi Network1:** 'Enable WiFi Network' is turned on (green toggle). 'Unify 2.4&5 GHz SSID' is also turned on (green toggle). The 'SSID' field contains 'Tenda-W15E'. The 'WiFi Password' field has a masked password '\*\*\*\*\*' and a 'No Password' checkbox which is unchecked. Below the password field is a 'Collapse' link with a downward arrow. The 'Hide SSID' toggle is turned off (grey). The 'Max. Clients' field is set to '40'.  
**WiFi Network2:** 'Enable WiFi Network' is turned off (grey toggle).  
**WiFi Network3:** 'Enable WiFi Network' is turned off (grey toggle).  
At the bottom, there are two buttons: a green 'Save' button and a grey 'Cancel' button.

## Parameter description

Parameter	Description
Enable WiFi Network	Used to enable/disable the wireless network of the router.
Unify 2.4&5 GHz SSID	Whether to unify SSIDs for 2.4 GHz and 5 GHz wireless networks.
SSID	Wireless network name of the corresponding WiFi network.
WiFi Password	<p>Password used for wireless internet connection. You are recommended to use the combination of digits, letters and special characters for higher security.</p> <p>Selecting <b>No Password</b> indicates that wireless clients can connect to the wireless network without a password. Select this option only when necessary since it leads to weak network security.</p>
Hide SSID	With this function enabled, nearby wireless clients cannot detect the SSID, and you need to manually enter the SSID on the wireless client to access the wireless network. Disable indicates that nearby wireless clients can detect the SSID. By default, this function is disabled.
Max. Clients	Maximum number of wireless clients that can be connected to the wireless network with the SSID at the same time. After the value is reached, this wireless network denies new connection requests. Clients connected to all the enabled wireless networks (including guest networks) of the router cannot exceed 128 on 2.4 GHz and 5 GHz bands respectively. If you enable multiple SSIDs, plan your maximum number of clients to each SSID first.

## 6.2 Network isolation

Isolating a network makes clients connected to it **cannot** communicate with clients connected to another network. To access the configuration page, choose **Wireless > Network Isolation**. See the following figure:



### Parameter description

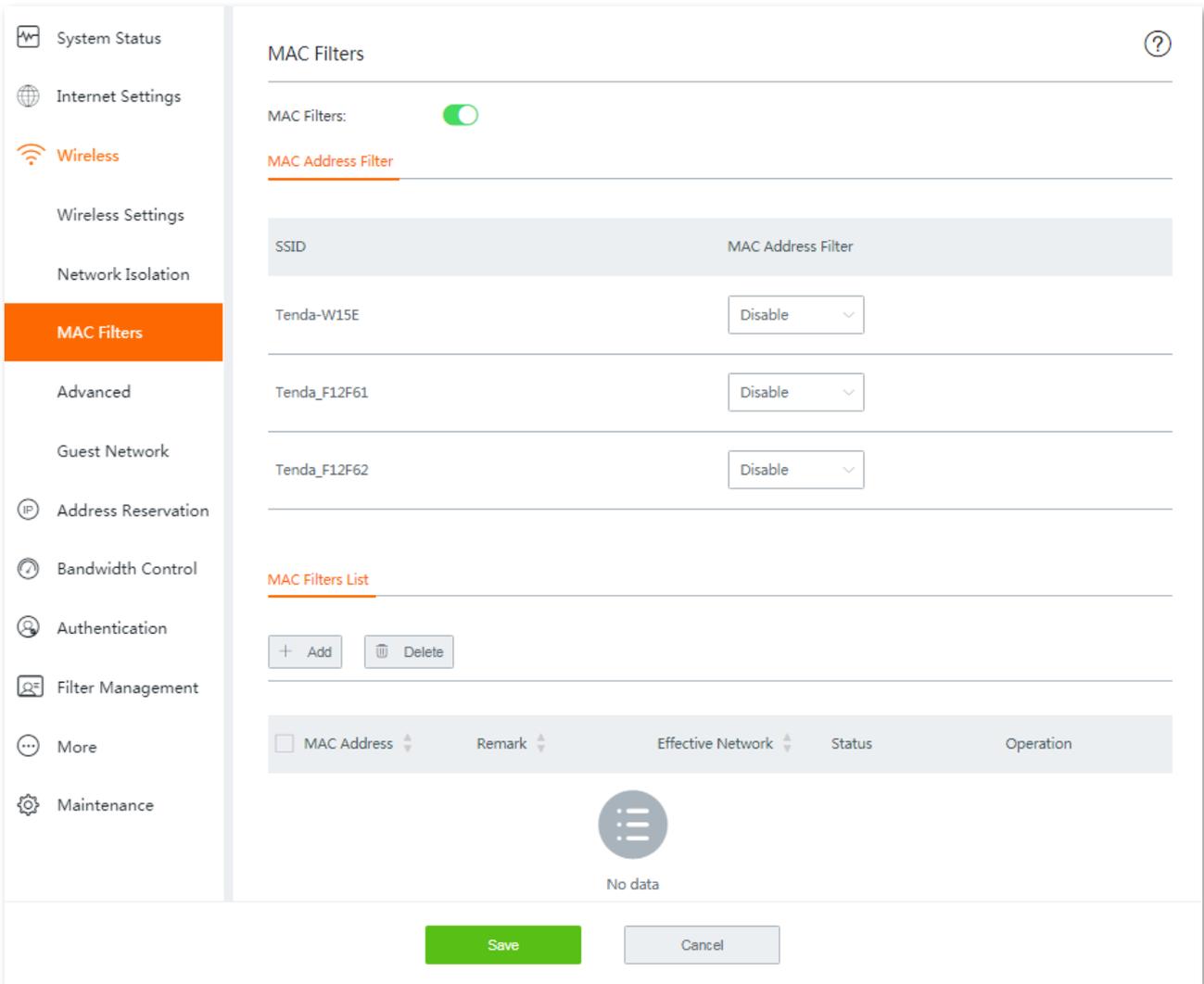
Parameter	Description
SSID	Wireless network name of the corresponding WiFi network.
Isolate this network	With this function enabled, clients connected to different wireless networks of this device cannot communicate with each other, leading to higher wireless network security. By default, this function is disabled.
No access to LAN	This function is only applicable to <b>WiFi Network2/3</b> . With this function enabled, clients connected to this wireless network cannot access the web UI and private network (LAN) of this router, protecting your LAN network security. By default, this function is disabled.

## 6.3 MAC filters

### 6.3.1 Overview

This module allows you to configure MAC address-based wireless access control rules. To enter the configuration page, choose **Wireless > MAC Filters**. By default, this function is disabled.

To enable this function, set the **MAC Filters** to , and click **Save** at the bottom of the page. The following configuration area appears:



SSID	MAC Address Filter
Tenda-W15E	Disable
Tenda_F12F61	Disable
Tenda_F12F62	Disable

MAC Address	Remark	Effective Network	Status	Operation
No data				

#### Parameter description

Parameter	Description
MAC Address Filter	It lists all the <b>main</b> wireless networks that the router supports.
	 <b>TIP</b> If you unify the SSIDs for 2.4 GHz and 5 GHz bands, the corresponding wireless network only displays one SSID here.
MAC Address Filter	It specifies the modes you can perform on the corresponding wireless network. There are three modes for selection: <ul style="list-style-type: none"><li>- <b>Disable</b>: This function is disabled, and all wireless clients can connect to</li></ul>

Parameter	Description
	<p>this wireless network.</p> <ul style="list-style-type: none"> <li>- <b>Only Allow:</b> Only wireless clients with the specified MAC address <b>can</b> connect to this wireless network.</li> <li>- <b>Only Forbid:</b> Only wireless clients with the specified MAC address <b>cannot</b> connect to this wireless network.</li> </ul>
MAC Filters List	It specifies the wireless access control list you configured.
MAC Address	It specifies the MAC address of the client to which the rule applies.
MAC Filters List	Remark (Optional) It specifies the brief description you set for the corresponding MAC address.
Effective Network	It specifies the wireless network(s) to which the wireless client with this MAC address applies.
Status	It specifies whether or not the rule is enabled.

## 6.3.2 Configure a MAC filter rule



- A maximum of **64** rules is allowed for each SSID, and **100** rules for each frequency band.
- The MAC filter rule will be invalidated if the SSID it maps has been changed. You are required to manually choose an enabled wireless network to apply the MAC filter rule.

**Step 1** Enable **MAC Filters**, and click **Save** at the bottom on the page.

**Step 2** Configure MAC address filter mode for each SSID by selecting from the **MAC Address Filter** drop-down list menu.

MAC Filters

MAC Filters:

**MAC Address Filter**

SSID	MAC Address Filter
Test-W15E	Only Allow
OA-W15E	Disable
Finance-W15E	Only Forbid

**Step 3** Add rule(s).

1. Click **Add**. The **Add** configuration window appears.

MAC Address	Remark	Effective Network	Operation
<input type="text"/>	<input type="text"/>	All	<input type="button" value="+"/> <input type="button" value="-"/>

2. Enter the description of the client in **Remark**, and select the wireless network from the drop-down list menu of the **Effective Network**.
3. Click **Save**. The rule appears on the **MAC Filter List**.



Parameters on the following figure are only used for examples. Please specify them based on your actual conditions.

MAC Address	Remark	Effective Network	Status	Operation
<input type="checkbox"/> 54:B1:21:56:62:45	iPhone	All	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

4. Repeat [Add rule\(s\)](#) to add other clients one by one.

MAC Address	Remark	Effective Network	Status	Operation
<input type="checkbox"/> 54:B1:21:56:62:45	Test	All	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
<input type="checkbox"/> 38:89:2C:AB:B5:9F	Ordinary	Finance-W15E	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

---- End

## 6.4 Advanced settings

This section introduces wireless-related advanced settings. To enter the configuration page, choose **Wireless > Advanced**. See the following figure:

The screenshot shows the 'Advanced' configuration page for the 2.4 GHz WiFi Network. The interface includes a sidebar with various system settings and a main configuration area. The '2.4 GHz WiFi Network' section is active, showing options to enable or disable the network, set transmit power (25 dBm), select country/region (China), network mode (11b/g/n), channel bandwidth (20MHz), and channel (Auto). Below this, there are settings for RSSI Threshold (-95 dBm), Deployment Mode (Coverage-oriented), Air Interface Scheduling (Enable), Short GI (Enable), Client Timeout Interval (10 min), and Mandatory/Optional Rate checkboxes. The 'Save' button is highlighted in green.

### Parameter description

Parameter	Description
2.4 GHz WiFi Network	Used to enable or disable the 2.4 GHz wireless network of the router.
5 GHz WiFi Network	Used to enable or disable the 5 GHz wireless network of the router.
Transmit Power	Transmit power of this device. A higher value leads to wider WiFi coverage. However, decreasing the value properly increases performance and security of the wireless network.
Country/Region	It specifies the country/region that you set for the router in order to conform to the

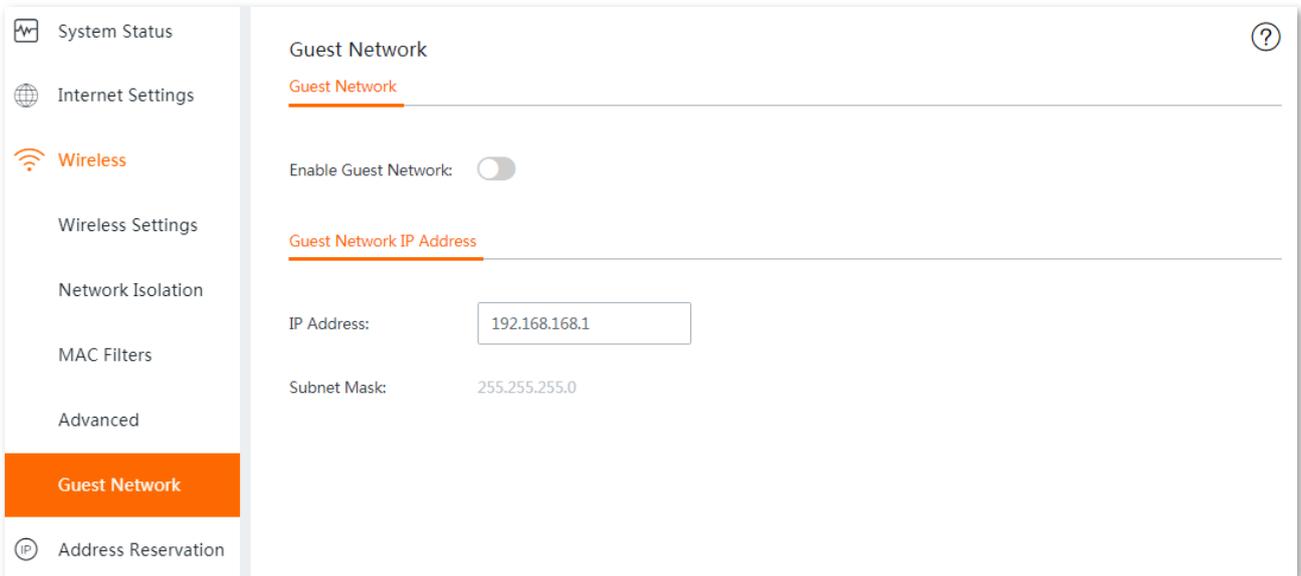
Parameter	Description
	regulations of different countries or regions concerning channels.
Network Mode	<p>It specifies the wireless network mode (also called 802.11 mode, radio mode, or wireless mode) of the router. A proper network mode enables the clients to get the maximum transfer rate and compatibility.</p> <p>Available options for <b>2.4 GHz</b> band: <b>11b</b>, <b>11g</b>, <b>11b/g</b>, and <b>11b/g/n</b> (default).</p> <p>Available options for <b>5 GHz</b> band: <b>11a</b>, <b>11ac</b> (default), and <b>11a/n mixed</b>.</p> <p>You are recommended to keep the default settings.</p>
Channel	Specify the channel in which this device operates. Select one idle channel in the ambient environment to prevent interference. <b>Auto</b> indicates that this device automatically changes to a channel rarely used in the ambient environment to prevent interference.
Channel Bandwidth	<p>Select the channel bandwidth to accommodate higher transmission speed.</p> <p>Available options for <b>2.4 GHz</b> band: <b>20MHz</b> (default), <b>40MHz</b>, and <b>20/40MHz</b>.</p> <p>Available options for <b>5 GHz</b> band: <b>20MHz</b>, <b>40MHz</b>, and <b>80MHz</b> (default).</p>
RSSI Threshold	It specifies the minimum wireless client signal strength acceptable to the router. A mobile client with signal strength lower than this threshold cannot connect to the router. You can set this parameter to ensure that mobile clients connect to router with strong signal strength.
Deployment Mode	<p>It specifies the deployment mode of the router. This parameter is valid only for 2.4 GHz networks. Set this parameter based on the application scenario. The options include:</p> <ul style="list-style-type: none"> <li>- <b>Coverage-oriented</b>: Apply to scenarios with large area, multiple walls, decentralized users and less than 10 SSIDs in ambient environment.</li> <li>- <b>Capacity-oriented</b>: Apply to scenarios with intensive users, open and large areas, and more than 25 SSIDs in ambient environment.</li> </ul>
Prioritize 5 GHz	<p>It specifies that a wireless client uses the 5 GHz SSID first to connect to the device if the wireless client supports both 5 GHz and 2.4 GHz networks and the networks use the same SSID and password.</p> <p> <b>NOTE</b></p> <ul style="list-style-type: none"> <li>- To make this function take effect, the SSID cannot contain any Chinese characters.</li> <li>- The default RSSI threshold to enable this function is <b>-80 dBm</b>. You can adjust the threshold by customizing the <b>Prioritize Threshold 5 GHz</b> parameter.</li> </ul>
Prioritize 5 GHz Threshold	<p>It specifies the RSSI threshold value to trigger the <b>Prioritize 5 GHz</b> function. The default value is <b>-80 dBm</b>.</p> <p>You are recommended to keep the default settings.</p>
Air Interface Scheduling	<p>It specifies whether to enable the air interface scheduling function.</p> <p>This function allows all clients to transmit data for the same duration. If a client transmits data at a low speed and does not finish data transmission within the duration, it can continue transmitting data only in its next data transmission</p>

Parameter	Description
	duration. This prevents some slow clients from occupying excessive airtime resources, so as to improve the overall AP efficiency and effectively ensure AP connections for a larger number of clients and greater throughputs.
APSD	It specifies whether to enable the Automatic Power Save Delivery (APSD) mode. APSD is a WMM power saving protocol created by Wi-Fi Alliance. Enabling APSD helps reduce power consumption. By default, this mode is disabled.
Client Timeout Interval	It specifies the maximum period before a WiFi client is disconnected from the router if the client exchanges no data with the router. When data is exchanged within the period, countdown stops.
Short GI	<p>Short guard interval for preventing data block interference.</p> <p>Propagation delays may occur on the receiver side due to factors such as multipath wireless signal transmission. If a data block is transmitted at an overly high speed, it may interfere with the previous data block. The short GI helps prevent such interference. Enabling the short GI can yield a 10% improvement in wireless data throughput.</p>
Mandatory Rate	<p>It specifies the basic rate sets that wireless clients must meet to connect to the router. Wireless clients are denied by the router if they fail to match the basic rate sets ticked here.</p> <p> <b>NOTE</b></p> <p>You are recommended to keep the default settings. If you need to modify them, please do under professional guidance.</p>
Optional Rate	<p>It specifies that any connected wireless clients that support the data rate options ticked here may communicate with the router using that rate.</p> <p> <b>NOTE</b></p> <p>You are recommended to keep the default settings. If you need to modify them, please do under professional guidance.</p>

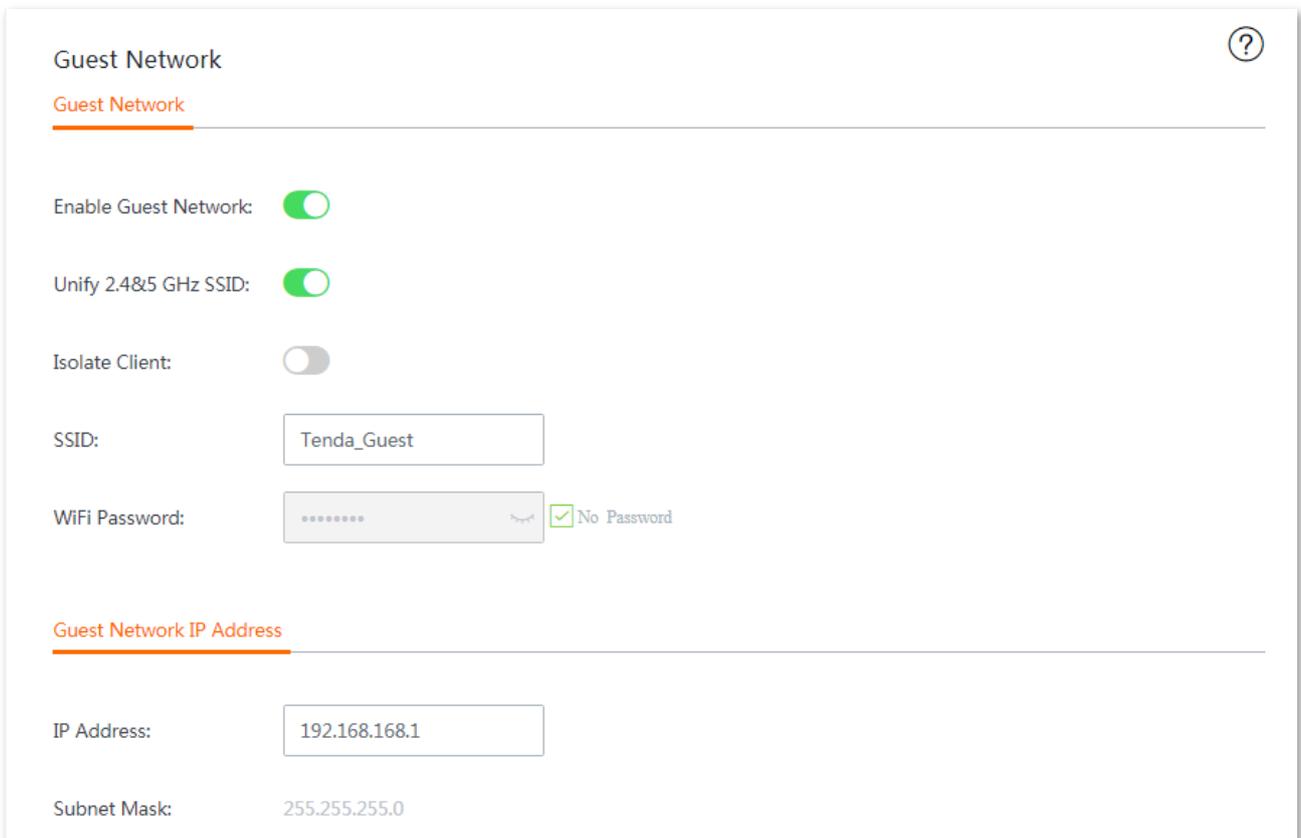
## 6.5 Configure guest network

This section introduces guest network. You can configure a guest network for visitors to protect the security of the main network. In addition, the router allows you to set a guest network segment different from the main network.

To access the configuration page, choose **Wireless > Guest Network**. See the following figure. By default, this function is disabled.



Enable this function, the following page appears:



## Parameter description

Parameter	Description
Enable Guest Network	Used to enable or disable this function.
Unify 2.4&5 GHz SSID	Used to unify SSIDs for 2.4 GHz and 5 GHz guest wireless networks.
Isolate Client	With this function enabled, clients connected to the guest network cannot communicate with each other, leading to higher wireless network security.
Guest Network	SSID  TIP Wireless network name of the guest network. To differentiate the main network and the guest network, you are recommended to set the SSIDs differently.
	WiFi Password Password used for wireless internet connection. You are recommended to use the combination of digits, letters and special characters for higher security.
	No Password Wireless clients can connect to the wireless guest network without a password. Select this option only when necessary since it leads to weak network security.
Guest Network IP Address	IP Address It specifies the IP address (default: <b>192.168.168.1</b> ) of the guest network. The router assigns 192.168.168.X to wireless clients connected to it. You are recommended to keep the default settings.
	Subnet Mask Subnet mask of the guest network.

# 7

# Address reservation

The address reservation function always allows a host, such as a computer, on LAN to receive the same IP address each time when they connect to the DHCP server. If there are some hosts on LAN that require static IP addresses, you can configure the address reservation for this purpose.

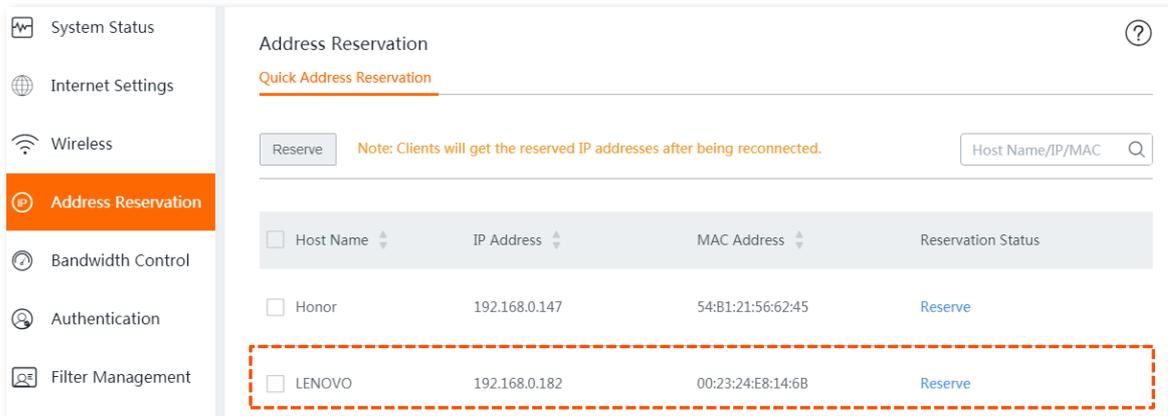
## 7.1 Configure on-line client-based quick address reservation

The router allows you to conveniently reserve static IP addresses for on-line hosts one by one or in batch. Choose your scenario and perform steps below.

### 7.1.1 Configure on-line client-based quick address reservation one by one

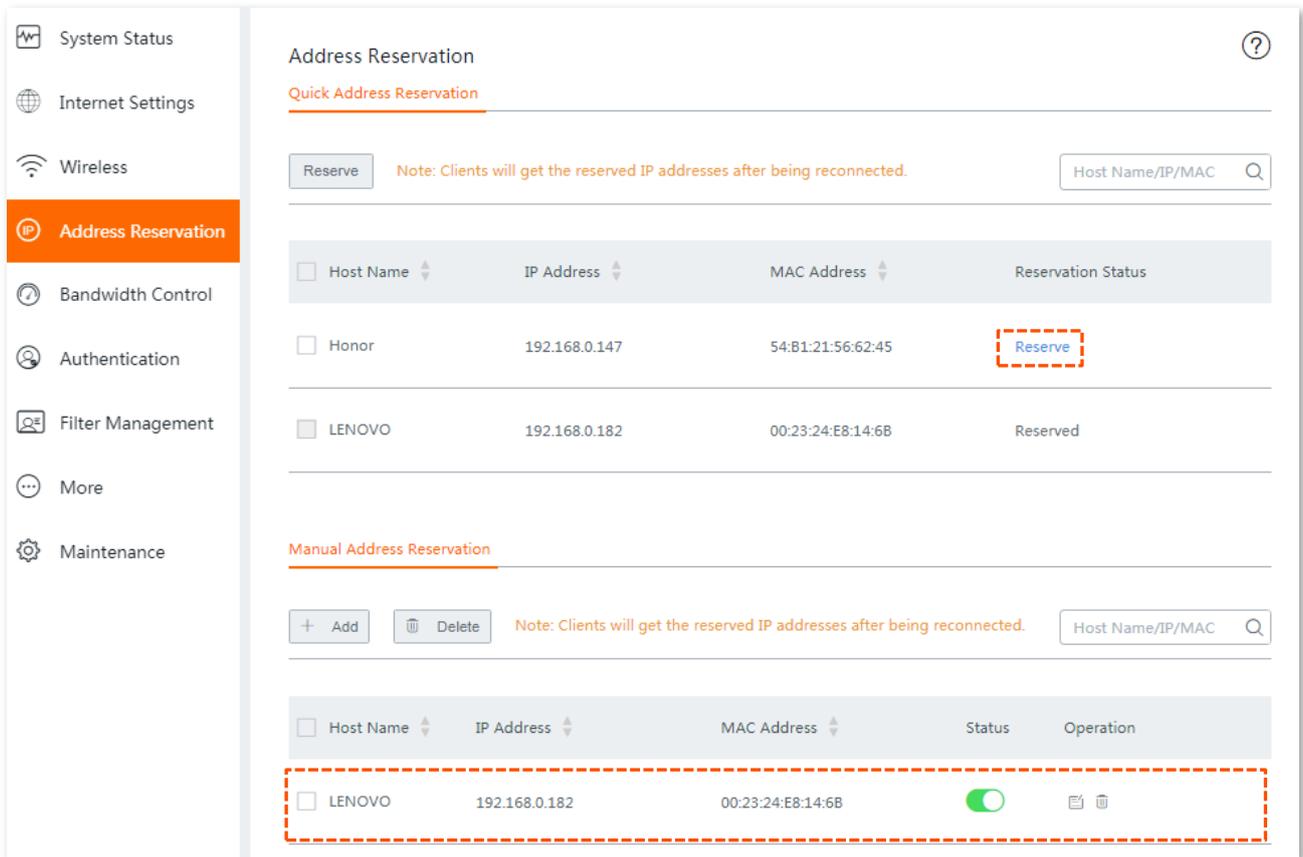
**Step 1** Choose **Address Reservation** to enter the configuration page.

**Step 2** Locate the host you want to reserve a static IP address, which is **LENOVO** in this example, and click **Reserve** next to it.



---- End

The **Reservation Status** of host named **LENOVO** is changed into **Reserved**, and displayed on the lower part of the page. See the following figure. Clients will get the reserved IP addresses after being reconnected.

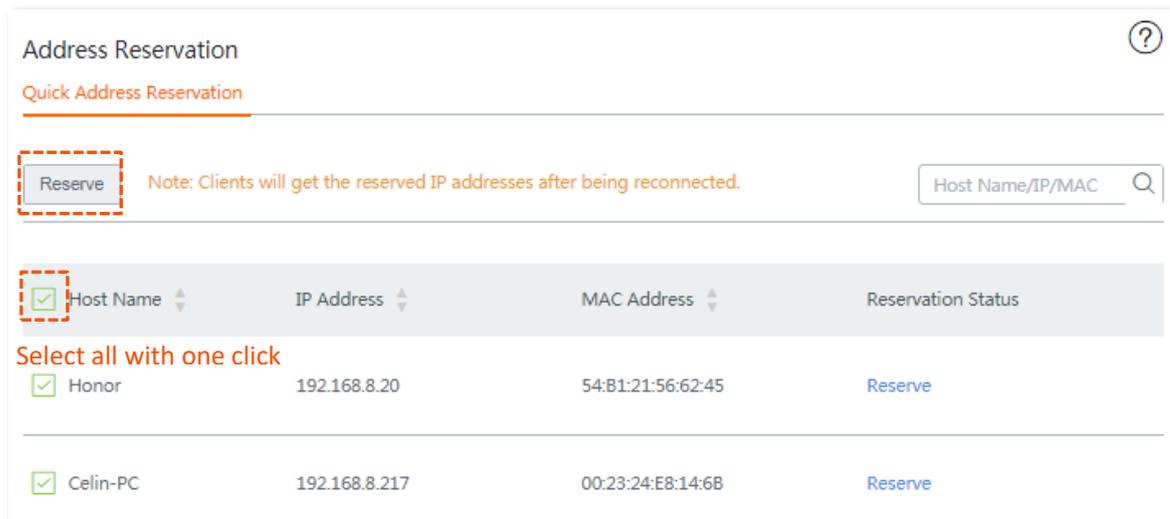


## 7.1.2 Configure on-line client-based quick address reservation in batch

**Step 1** Choose **Address Reservation** to enter the configuration page.

**Step 2** Select hosts you want to reserve a static IP address, and click the **Reserve** button.

Or if you want to select all hosts on the list, check the checkbox next to **Host Name**.



----- End

The **Reservation Status** of hosts are changed into **Reserved**, and displayed on the lower part of the page. See the following figure:

<input type="checkbox"/> Host Name	IP Address	MAC Address	Status	Operation
<input type="checkbox"/> Honor	192.168.8.20	54:B1:21:56:62:45	<input checked="" type="checkbox"/>	 
<input type="checkbox"/> Celin-PC	192.168.8.217	00:23:24:E8:14:6B	<input checked="" type="checkbox"/>	 

## 7.2 Configure address reservation manually

To reserve static IP addresses for hosts disconnected to the router, you can add the rule manually.



If the network segment of LAN IP of the router is modified in [LAN settings](#), the IP address of the manually-reserved host will not change synchronously, but the rule remains effective.

### Before you start

Obtain the IP addresses and MAC addresses of hosts you are going to add.

### Configuration Procedure

**Step 1** Choose **Address Reservation**, and move to the **Manual Address Reservation** configuration area. See the following figure.

Host Name	IP Address	MAC Address	Status	Operation
No data				

**Step 2** Click **+Add**. The **Add** configuration window appears.

**Step 3** Enter the **IP Address** and **MAC Address**, which is **192.168.0.182** and **00:23:24:E8:14:6B** in this example.

**Step 4** (Optional) Add a brief description in the **Remark** filed, which is **Test** in this example.



For convenient management later, you are recommended to enter a brief description to distinguish different hosts.

**Step 5** Click **Save**.

IP Address	MAC Address	Remark	Operation
192.168.0.182	00:23:24:E8:14:6B	Test	+ -

---- End



## 7.3 Export/import your address reservation configuration

The router supports to export the current configuration you set to your local PC for backup, and import the configuration file you backed up to the router, relieving your from repeated laborious efforts for configuration.

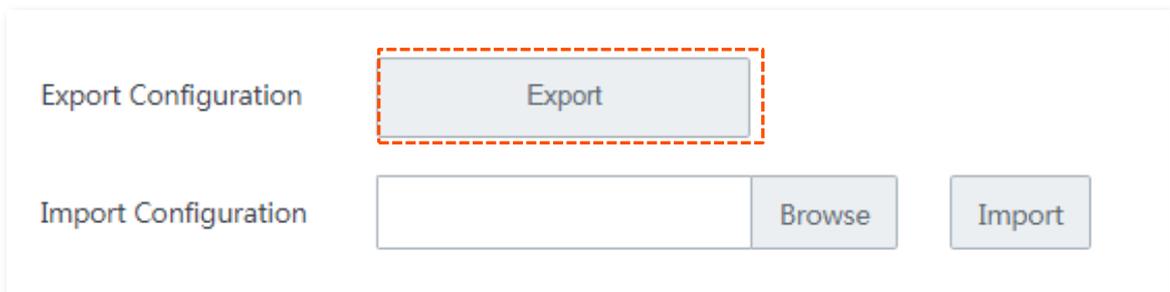
This section introduces:

- Export configuration file to your local PC.
- Import configuration file to your router.

### 7.3.1 Export configuration file to your local PC

**Step 1** Choose **Address Reservation**, and move to the bottom of the page.

**Step 2** Click the **Export** button.



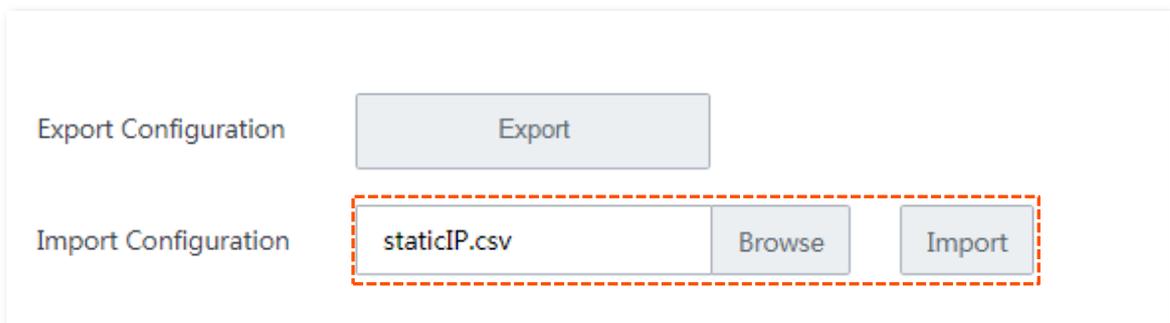
---- End

A file named **staticIP.csv** is exported to your local PC.

### 7.3.2 Import configuration file to your router

**Step 1** On the **Address Reservation** page, click **Browse**, and upload the address reservation configuration file you have backed up to your local PC.

**Step 2** Click the **Import** button.



---- End

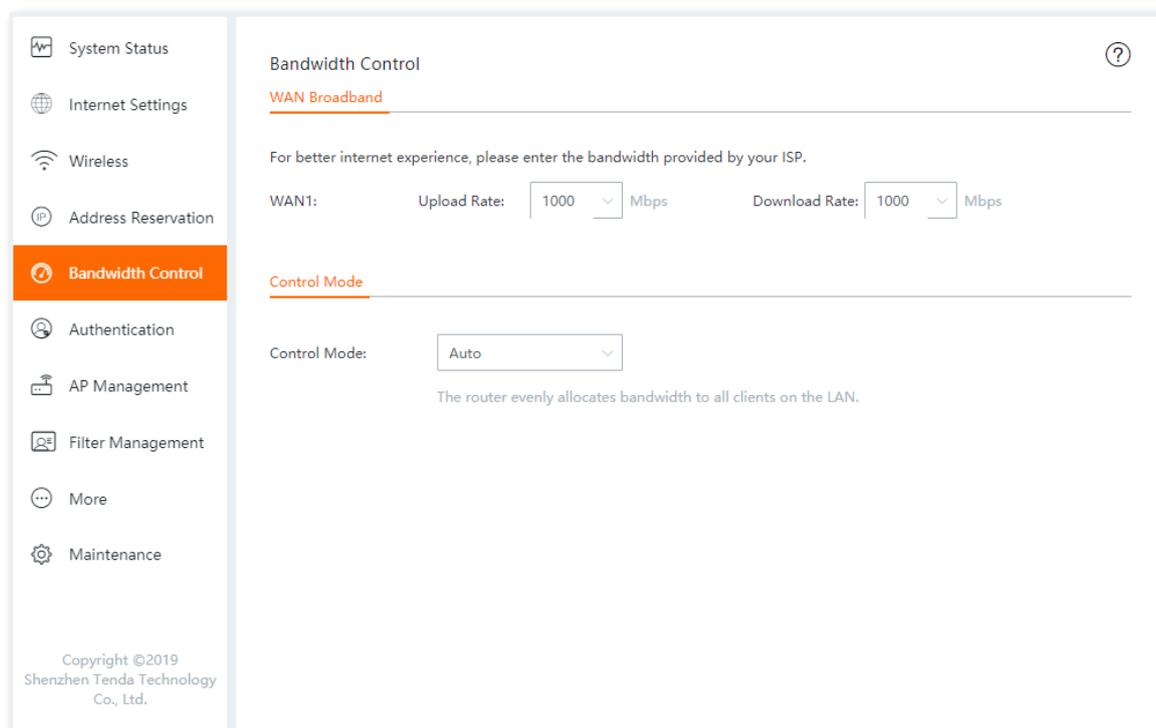
Your address reservation configurations have been imported to your router. You can check the imported configuration on this page.

# 8 Bandwidth control

Internet bandwidth is limited. Well-controlled traffic of users ensures that the bandwidth is properly used to effectively access resources over the internet.

## 8.1 Overview

To enter the configuration page, choose **Bandwidth Control**.



### Parameter description

Parameter	Description
WAN Broadband	Upload Rate
	Download Rate
Control Mode	<a href="#">No Limit</a>
	<a href="#">Manual</a>

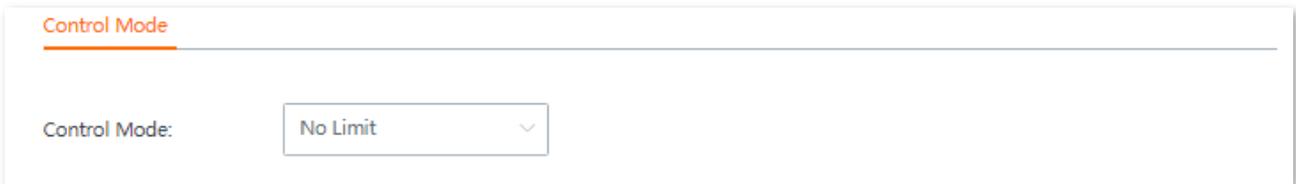
Parameter	Description
<a href="#">Auto</a>	The router evenly allocates bandwidth to all clients on the LAN.
<a href="#">Limit By Group</a>	This mode allows the network administrator to customize control rules based on IP groups and time groups. The concurrent sessions can also be configured here.

## 8.2 Bandwidth control mode

The router allows you to control upload and download bandwidth for both online and offline clients with four control modes, including **No Limit**, **Auto**, **Manual**, and **Limit By Group** to meet your various requirements by unleashing the potential of your WAN broadband services.

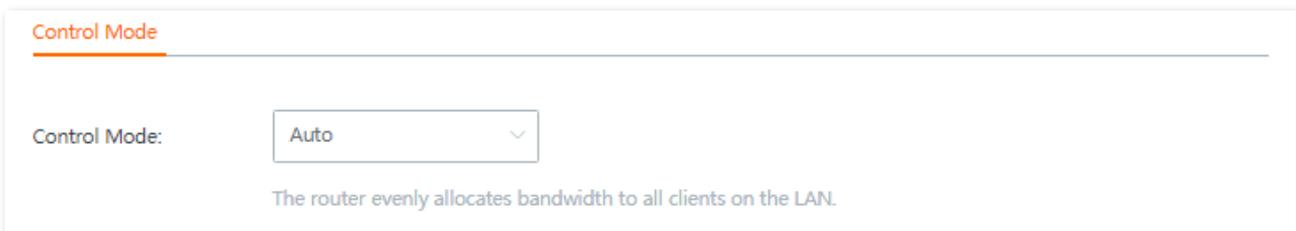
### 8.2.1 No limit

Select **No limit** from the **Control Mode** drop-down list menu, and clients connected to the router compete for bandwidth resources without restriction.



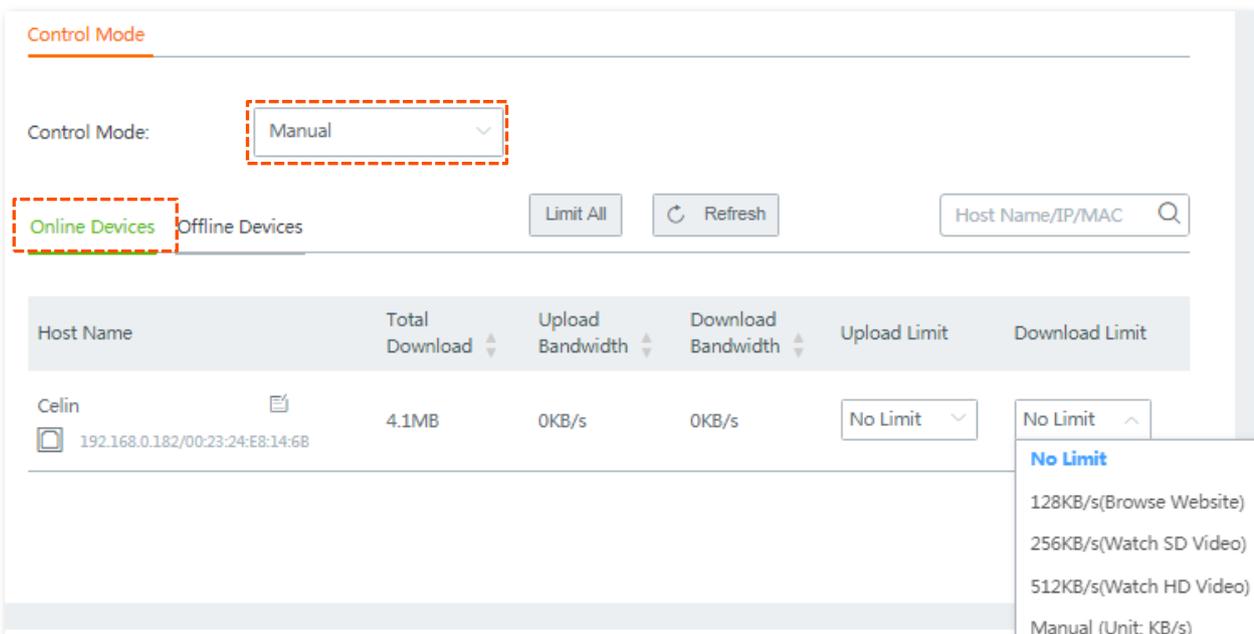
### 8.2.2 Auto (default)

Select **Auto (default)** from the **Control Mode** drop-down list menu, the router evenly allocates bandwidth to all clients connected to it.



### 8.2.3 Manual

Select **Manual** from the **Control Mode** drop-down list menu, the configuration area appears. See the following figure:



Click **Offline Devices** tag, the following configuration area appears:

The screenshot shows the 'Offline Devices' configuration page. At the top, 'Control Mode' is set to 'Manual'. Below, there are buttons for 'Limit All' and 'Refresh', and a search box for 'Host Name/MAC'. A table displays the following data:

Host Name	Total Download	Offline Time	Upload Limit	Download Limit
HUAWEI_nova_2s-74d8fa... A4:93:3F:4D:09:D0	0KB	2019-03-08 10:23:04	No Limit	No Limit

The 'Download Limit' dropdown menu is open, showing the following options:

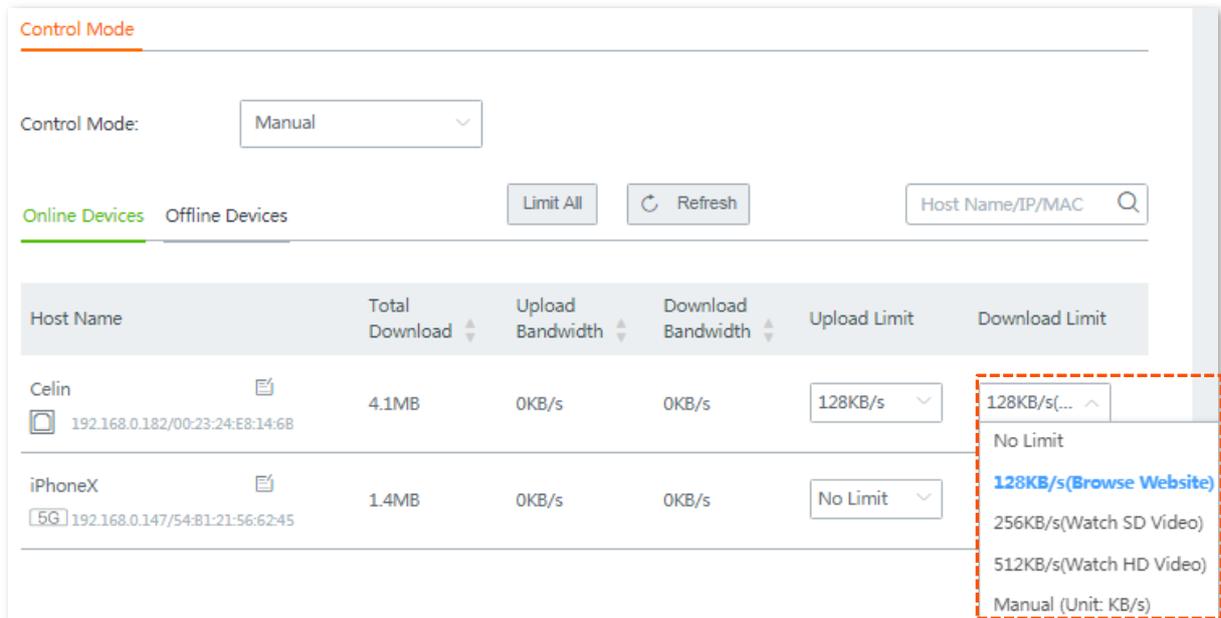
- No Limit
- 128KB/s(Browse Website)
- 256KB/s(Watch SD Video)
- 512KB/s(Watch HD Video)
- Manual (Unit: KB/s)

### Parameter description

Parameter	Description
Host Name	<p>It specifies the name of clients connected to the router. You can click  to personalize the host name for convenient management.</p> <p> <b>NOTE</b></p> <ul style="list-style-type: none"> <li>- Modification of host name here will be applied to the whole system.</li> <li>- For host name-based rules, use host name, you need to use the host name here.</li> </ul>
Total Download	It specifies the total download traffic utilized by each client.
Offline Time	<p>Only available for offline devices.</p> <p>It indicates the time when the client is disconnected.</p>
Upload Bandwidth	It indicates the real-time upload/download bandwidth of each client.
Download Bandwidth	<p> <b>TIP</b></p> <p>1 Mbps=128 KB/s=1024 kb/s.</p>
Upload Limit	The maximum upload/download rate you specified for each client.
Download Limit	<p> <b>TIP</b></p> <p>1 Mbps=128 KB/s=1024 kb/s.</p>

## ■ Control bandwidth of online/offline devices separately

To limit the upload and/or download bandwidth of one or several devices, select a pre-defined value from the drop-down list menu of **Upload Limit** and/or **Download Limit**, or select **Manual** to specify a value manually.

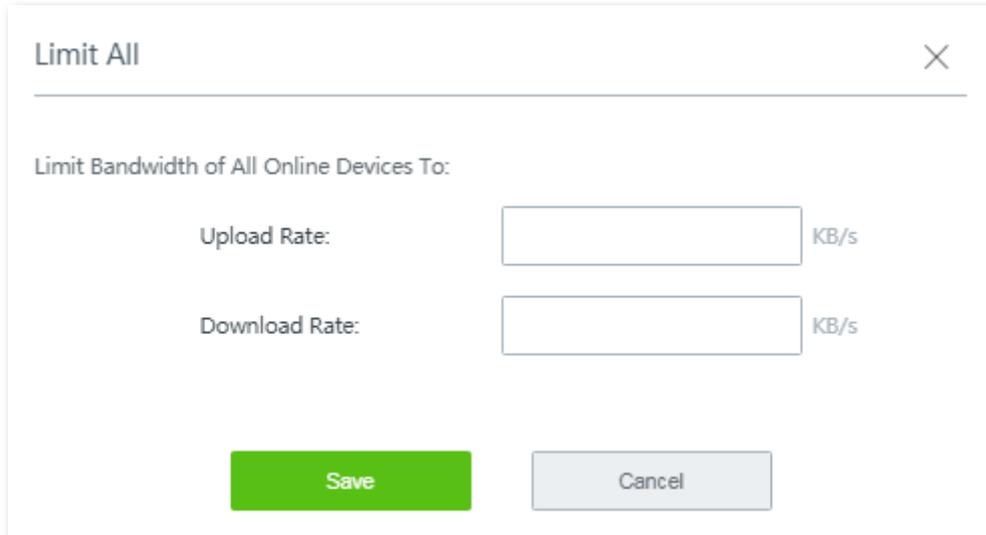


The screenshot shows the 'Control Mode' interface. At the top, 'Control Mode' is set to 'Manual'. Below this, there are tabs for 'Online Devices' and 'Offline Devices', a 'Limit All' button, a 'Refresh' button, and a search box for 'Host Name/IP/MAC'. A table lists online devices with columns for Host Name, Total Download, Upload Bandwidth, Download Bandwidth, Upload Limit, and Download Limit. Two devices are listed: 'Celin' and 'iPhoneX'. The 'Celin' device has a total download of 4.1MB and current upload/download bandwidths of 0KB/s. Its upload limit is set to 128KB/s. The 'iPhoneX' device has a total download of 1.4MB and current upload/download bandwidths of 0KB/s. Its upload limit is set to 'No Limit'. A dropdown menu is open for the 'Celin' device's 'Download Limit', showing options: '128KB/s(...)', 'No Limit', '128KB/s(Browse Website)', '256KB/s(Watch SD Video)', '512KB/s(Watch HD Video)', and 'Manual (Unit: KB/s)'. The '128KB/s(Browse Website)' option is highlighted.

Host Name	Total Download	Upload Bandwidth	Download Bandwidth	Upload Limit	Download Limit
Celin 192.168.0.182/00:23:24:E8:14:6B	4.1MB	0KB/s	0KB/s	128KB/s	128KB/s(...)
iPhoneX 192.168.0.147/54:81:21:56:62:45	1.4MB	0KB/s	0KB/s	No Limit	No Limit

## ■ Control bandwidth of online/offline devices in batch

Click **Online Devices** or **Offline Devices**, then click **Limit All**, specify the values according to your actual situation on the configuration window, and click **Save** to apply your settings.



The 'Limit All' window is shown, titled 'Limit All' with a close button (X) in the top right corner. Below the title bar, the text reads 'Limit Bandwidth of All Online Devices To:'. There are two input fields: 'Upload Rate:' and 'Download Rate:'. Each input field is followed by 'KB/s'. At the bottom of the window, there are two buttons: a green 'Save' button and a grey 'Cancel' button.

## 8.2.4 Limit by group

This mode allows you to customize control rules based on IP groups and time groups. The following describes the configuration procedure.



To control bandwidth based on groups, you need to configure IP group and time group first by navigating to **Filter Management > IP Group/Time Group**. Refer to [Configure IP group and time group](#) for detailed description.

**Step 1** Choose **Bandwidth Control**, and move to the **Control Mode** configuration area.

**Step 2** Set **Control Mode** to **Limit By Group**, the following configuration area appears.

Control Mode:

<input type="checkbox"/>	IP Address Group	Time Group	Concurrent Sessions	Mode	Upload Bandwidth	Download Bandwidth	Status	Operation
No data								

**Step 3** Click **Save** at the bottom of the page.

**Step 4** Click **+Add** to add a bandwidth control policy.

**Step 5** Set required parameters.

Add

IP Group:

Time Group:

Concurrent Sessions:

Control Mode:  Dedicated  Shared

Upload Rate:  KB/s

Download Rate:  KB/s

## Parameter description

Parameter	Description
IP Group	Create or select the IP group to which the rule applies. To create an IP Group, choose <b>Filter Management &gt; IP Group/Time Group</b> .
Time Group	Create or select the time group to which the rule applies. To create a time Group, choose <b>Filter Management &gt; IP Group/Time Group</b> .
Concurrent Sessions	Maximum number of sessions of each device. Recommended value: <b>300</b> .
Control Mode	<p>This device supports the following two control modes:</p> <ul style="list-style-type: none"> <li>- <b>Shared</b>: All clients in the controlled IP groups share the upload/download rate you configured here. In this mode, bandwidth allocated to each client may vary.</li> <li>- <b>Dedicated</b>: Each client in the controlled IP groups exclusively enjoys the upload/download rate you configured here. In this mode, bandwidth allocated to each client is identical.</li> </ul>
Upload Rate	Maximum upload rate a controlled client can reach.
Download Rate	Maximum download rate a controlled client can reach.

**Step 6** Click **Save**.

---- End

Added successfully. See the following figure:

The screenshot shows the 'Control Mode' configuration page. At the top, there is a 'Control Mode' dropdown menu set to 'Limit By Group'. Below this are '+ Add' and 'Delete' buttons. A table lists the configured rules. The table has columns for 'IP Address Group', 'Time Group', 'Concurrent Sessions', 'Mode', 'Upload Bandwidth', 'Download Bandwidth', 'Status', and 'Operation'. One rule named 'Test01' is shown with a status of 'On' (indicated by a green toggle switch) and an 'Operation' column containing 'Edit' and 'Delete' icons. Annotations with red dashed boxes and lines point to various elements: 'Click to select all rules.' points to the checkbox in the first row; 'Click to delete multiple selected rules.' points to the 'Delete' button; 'Toggle the button to enable/disable the rule.' points to the green toggle switch; 'Click to modify the rule.' points to the 'Edit' icon; and 'Click to delete the rule.' points to the 'Delete' icon.

IP Address Group	Time Group	Concurrent Sessions	Mode	Upload Bandwidth	Download Bandwidth	Status	Operation
<input type="checkbox"/>	Test01	300	Shared	64.0KB/s	256.0KB/s	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

## 8.3 Example of configuring group-based control rules

### Networking requirement

An enterprise uses the router to set up a LAN to address the following requirement:

During business hours (08:30 to 18:00 on weekday), each computer with an IP address ranging from 192.168.0.2 to 192.168.0.100 is allocated 1 Mbps upload and download bandwidth, while the bandwidth allocated to the computers with an IP address ranging from 192.168.0.101 to 192.168.0.254 is not limited. See the following table:

Group name	IP range	Effective time	Upload bandwidth	Download bandwidth
IP_group_1	192.168.0.2~100	08:30~18:00 on weekday	1 Mbps	1 Mbps

### Solutions

You can use the **Limit By Group** bandwidth control function of the router to meet this requirement.

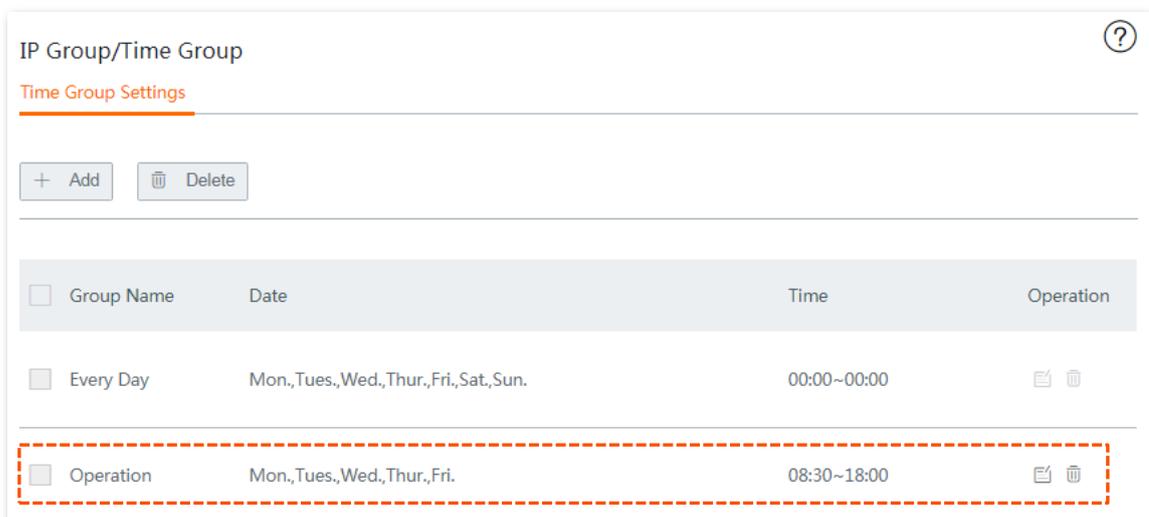
### Configuration description

Step	Task	Description
1	Set a time group	Set the time group on the <b>Filter Management &gt; IP Group/Time Group</b> page.
2	Set IP address group(s).	Set the IP address group on the <b>Filter Management &gt; IP Group/Time Group</b> page.
3	Set bandwidth control rule(s)	Set a rule on the <b>Bandwidth Control</b> page.

### Configuration procedure

**Step 1** Set a time group.

1. Choose **Filter Management > IP Group/Time Group**.
2. Set the time group shown in the following figure.



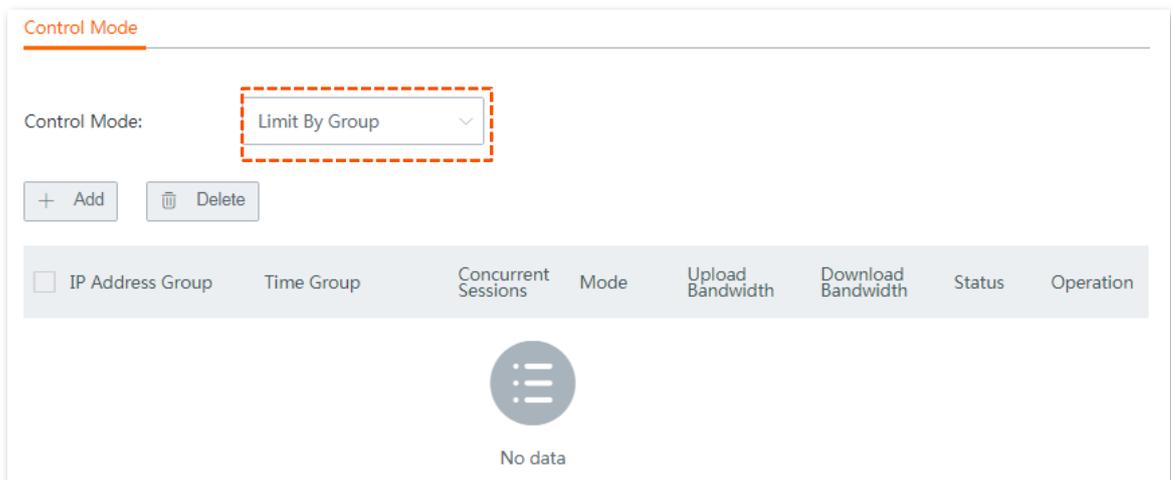
**Step 2** Set IP address group(s).

1. Choose **Filter Management > IP Group/Time Group**.
2. Set the IP address group(s) shown in the following figure.



**Step 3** Set bandwidth control rule(s).

1. On the **Bandwidth Control** page, set **Control Mode** to **Limit By Group**.
2. Click **Save** at the bottom of the page.



3. Click **+Add**. The **Add** configuration window appears.

4. Create a rule shown in the following figure, and click **Save**.

The 'Add' dialog box contains the following fields and options:

- IP Group: IP\_Group\_1
- Time Group: Operation
- Concurrent Sessions: 300
- Control Mode:  Dedicated  Shared
- Upload Rate: 128 KB/s
- Download Rate: 128 KB/s

Buttons: Save (green), Cancel (grey)



1 Mbps = 128 KB/s

---- End

Added successfully. See the following figure:

Control Mode: Limit By Group

+ Add    Delete

<input type="checkbox"/> IP Group	Time Group	Concurrent Sessions	Mode	Upload Bandwidth	Download Bandwidth	Status	Operation
<input type="checkbox"/> IP_Group_1	Operation	300	Dedicated	128.0KB/s	128.0KB/s	<input checked="" type="checkbox"/>	

## Verification

During business hours from 08:30 to 18:00 on weekday, each computer with an IP address ranging from 192.168.0.1 to 192.168.0.100 is allocated 1 Mbps (128 KB/s) upload and download bandwidth, while the bandwidth allocated to the computers with an IP address ranging from 192.168.0.101 to 192.168.0.254 is not limited.

# 9 Authentication

## 9.1 Overview

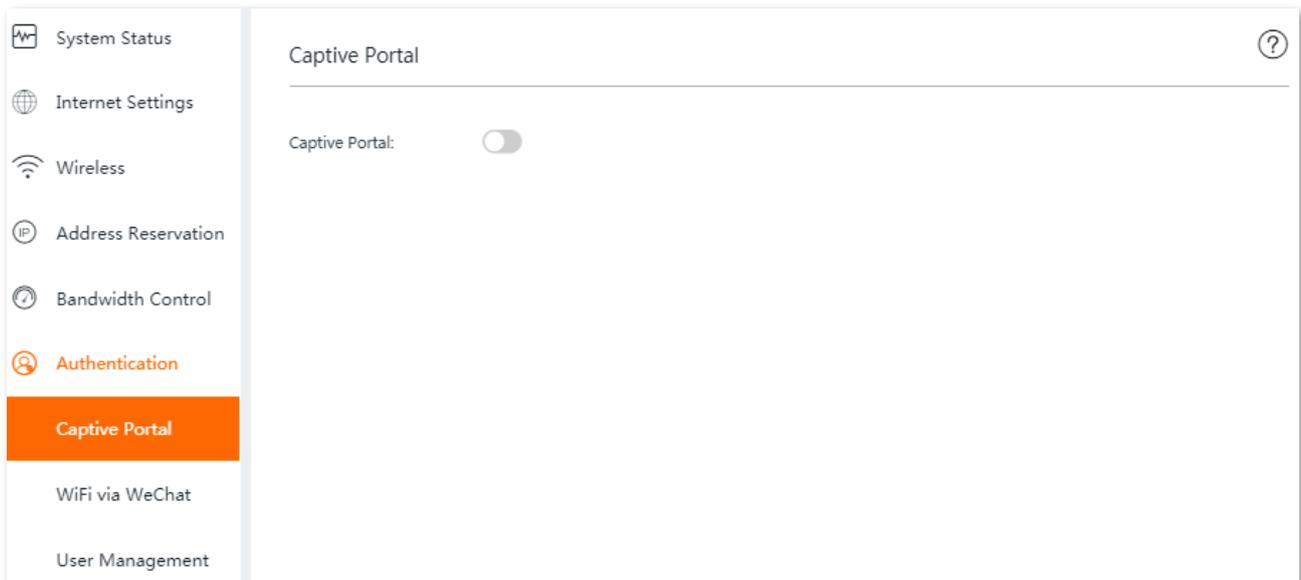
The router supports captive portal. Captive portal can promote your brand visibility and attract more fans.

## 9.2 Configure captive portal

This section introduces how to configure captive portal.

### 9.2.1 Overview

To access the configuration page, choose **Authentication** > **Captive Portal**. By default, this function is disabled. See the following figure:



Enable Captive Portal, the configuration page is shown as below.

Captive Portal
?

---

Captive Portal:

Authentication Type:

Valid Duration:  After expiration, user needs to re-authenticate for internet access.

Apply to:

Authentication Page Settings

---

Logo:    
Logo size cannot exceed 30 KB.

Title:

Background Image:    
Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  
 Specified Page

### Parameter description

Parameter	Description
Captive Portal	It specifies whether or not to enable the captive portal function of the router.
Authentication Type	<p>It specifies the type of the captive portal.</p> <ul style="list-style-type: none"> <li>- <b>Local User Authentication:</b> It allows a user to access the internet with a username and password on the authentication web page. The username and password should be added on <b>Authentication &gt; User Management</b> page.</li> <li>- <b>One-key authentication:</b> It allows a user to access the internet by clicking <b>Connect</b> when receiving an authentication web page.</li> </ul>

Parameter	Description
	<ul style="list-style-type: none"> <li>- <b>WiFi via SMS:</b> It allows a user to access the internet with a verification code sent by SMS when receiving an authentication web page. To enable this authentication type, you need to configure <b>SMS Provider Settings</b> first. The router supports <b>Jixintong</b> and <b>NEXMO</b>, and allows you to <b>customize HTTP interconnection</b> yourself as well.</li> <li>- <b>Email Authentication:</b> It allows a user to access the internet with a verification code sent through email when receiving an authentication web page. To enable this authentication type, you need to configure <b>Email Server Settings</b> first.</li> </ul>
Valid Duration	It specifies the authentication validity period. A user must be re-authenticated for accessing the internet after the period expires.
Apply to	<p><b>Wired network:</b> It specifies that the authentication rule will be applied to the devices connected to the router through the selected ports.</p> <p><b>Wireless network:</b> It specifies that the authentication rule will be applied to the wireless devices connected to the router through the selected WiFi networks.</p> <p> <b>TIP</b></p> <ul style="list-style-type: none"> <li>- To make this function work properly, the WiFi networks to be applied should <b>not</b> be encrypted. Navigate to <b>Wireless &gt; Wireless Settings</b>, select the <b>No Password</b> checkbox beside the applied WiFi networks and click <b>Save</b>.</li> <li>- If the WiFi network name of a WiFi network you selected is modified, the WiFi network will be automatically deselected here. To make the WiFi network effective, you have to re-select the WiFi network name with the new SSID here manually.</li> </ul>
Logo	It allows you to modify the logo displayed on the authentication web page.
Title	It allows you to modify the title displayed on the authentication web page. It is <b>Welcome to Tenda</b> by default.
Background Image	It allows you to modify the background image displayed on the authentication web page.
Change	Click it to change the image.
Delete	Click it to delete the image.
Disclaimer	It allows you to configure the disclaimer information. A maximum of <b>256</b> characters is allowed.
Redirected To	<p>It specifies the website that the client automatically redirects to after passing authentication:</p> <ul style="list-style-type: none"> <li>- <b>Previous Page:</b> When the captive portal is passed, the page would redirect to the previous page the user visited. For example, if a user is visiting Google search page before authentication, the user will stay on Google search page after passing the authentication.</li> <li>- <b>Specified Page:</b> It specifies the website redirected to after passing the captive portal.</li> </ul>

## 9.2.2 Configure SMS authentication

### Configuration description

Step	Task	Description
1	Configure basic settings.	Set authentication type, valid duration, and choose networks to be applied, as well as SMS provider settings.
2	Configure authentication page settings.	Configure the authentication page received by users.

### Before you start

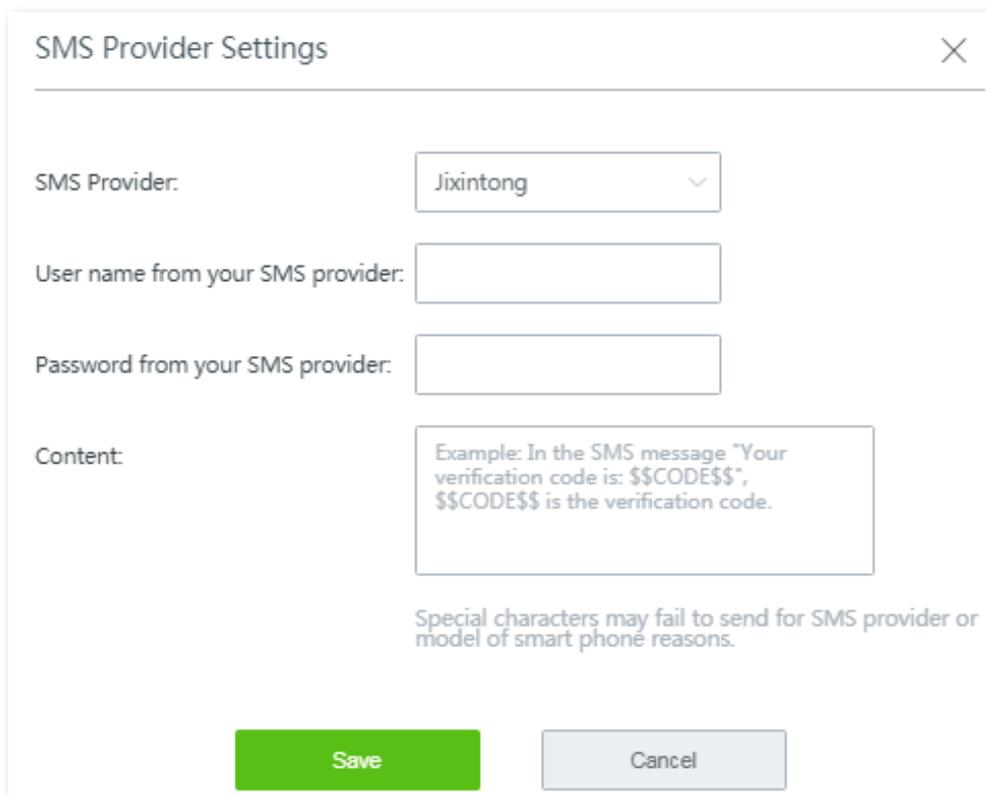
Obtain required information from your SMS provider first.

- Jixintong: **User Name** and **Password** you applied on the Jixintong platform.
- NEXMO: **api\_key** and **api\_secret** you applied on the NEXMO platform.
- Custom HTTP Interconnection: SMS gateway URL interface format defined by your SMS provider, and SMS error code from your SMS provider.

### Configuration procedure

**Step 1** Configure basic settings.

1. Choose **Authentication** > **Captive Portal**, and enable this function.
2. Select **WiFi via SMS** from the **Authentication Type** drop-down list menu.
3. Click **SMS Provider Settings**, the configuration window appears.



The screenshot shows a configuration window titled "SMS Provider Settings" with a close button (X) in the top right corner. The window contains the following fields and options:

- SMS Provider:** A dropdown menu with "Jixintong" selected.
- User name from your SMS provider:** An empty text input field.
- Password from your SMS provider:** An empty text input field.
- Content:** A text area containing the example: "Example: In the SMS message 'Your verification code is: \$\$CODE\$\$', \$\$CODE\$\$ is the verification code."

Below the content field, there is a note: "Special characters may fail to send for SMS provider or model of smart phone reasons."

At the bottom of the window, there are two buttons: a green "Save" button and a grey "Cancel" button.

## Parameter description

Parameter	Description
Jixintong	User name from your SMS provider
	Password from your SMS provider
	Content
NEXMO	api_key
	api_secret
	Content
	Encoding
Customize HTTP Interconnection	Content
	SMS Gateway URL Interface
	SMS Error Code

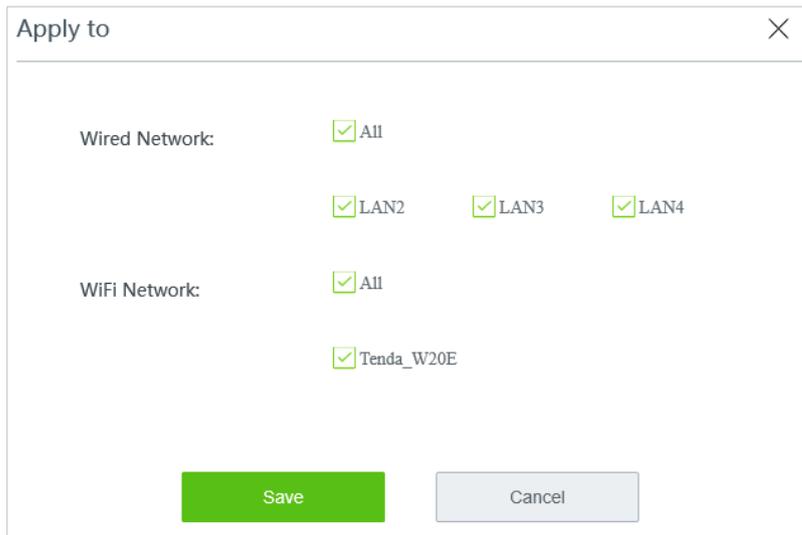
#### 4. Set the required parameters, and click **Save**.



You can click **Validity Test** to test if your SMS service provider configuration is correct.

#### 5. Set **Valid Duration**.

6. Click **Choose**, and choose the network(s) to be applied, and click **Save**.



Apply to

Wired Network:  All  
 LAN2  LAN3  LAN4

WiFi Network:  All  
 Tenda\_W20E

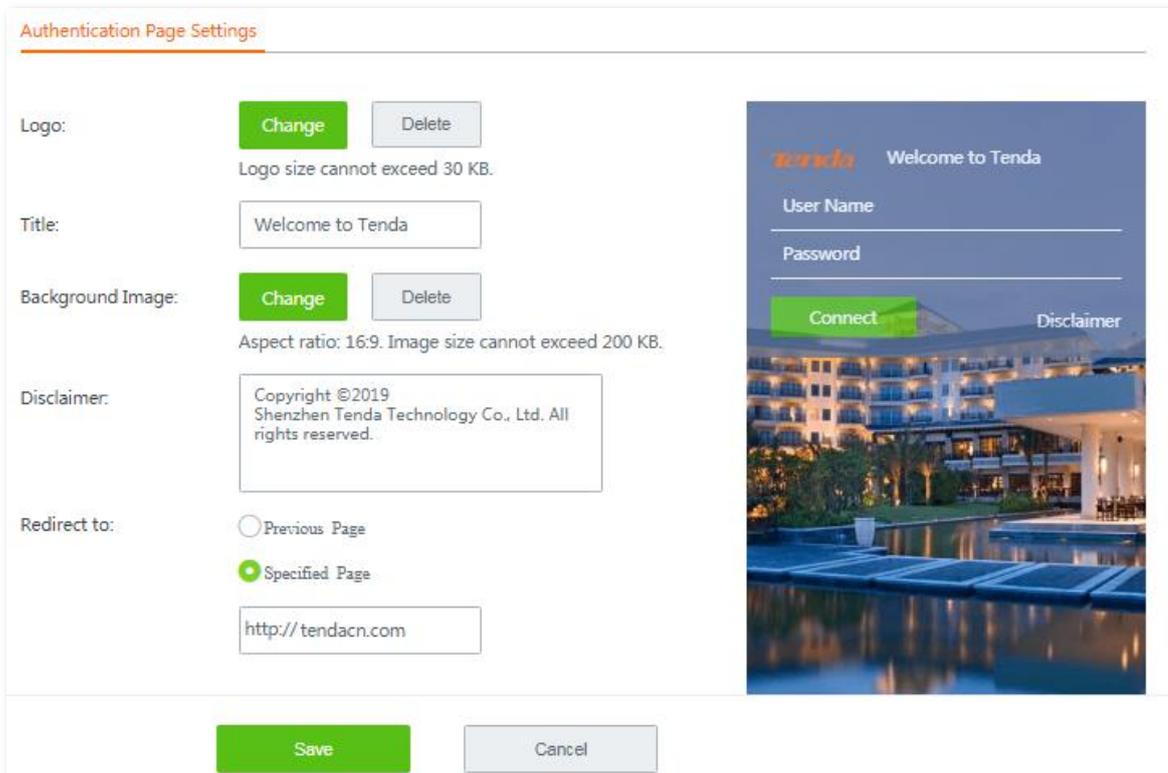
Save Cancel



If the WiFi network name you selected is modified, it will be automatically deselected here. To make the WiFi network effective, you have to re-select the WiFi network with the new SSID here manually.

## Step 2 Configure authentication page settings.

1. Set required parameters for the authentication page by following the on-screen instructions. Configurations on the following figure are only used for examples.



Authentication Page Settings

Logo:    
Logo size cannot exceed 30 KB.

Title:

Background Image:    
Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  Specified Page

Save Cancel

Preview: 

2. Click **Save** at the bottom on the page.

---- End

## 9.2.3 Configure authentication with local user authentication

### Configuration description

Step	Task	Description
1	Configure basic settings.	Set authentication type, valid duration, and choose networks to be applied, as well as the required authentication page.
2	Configure authentication page settings.	Configure the authentication page received by users.

### Configuration procedure

#### Step 1 Configure basic settings.

1. Choose **Authentication > Captive Portal**, and enable this function.
2. Set **Authentication Type** to **Local User Authentication**.
3. Set **Valid Duration** to **No Limit**.
4. Click **Choose**, and choose the network(s) to be applied, and click **Save**.



The selected wireless network(s) cannot be encrypted. Otherwise the user cannot access the authentication page.



If the WiFi network name you selected is modified, it will be automatically deselected here. To make the WiFi network effective, you have to re-select the WiFi network with the new SSID here manually.

#### Step 2 Configure authentication page settings.

1. Set required parameters for the authentication page by following the on-screen instructions. Configurations on the following figure are only used for examples.

**Authentication Page Settings**

Logo:    
Logo size cannot exceed 30 KB.

Title:

Background Image:    
Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  
 Specified Page



The preview image shows a login page for Tenda. It features a dark blue header with the Tenda logo and the text 'Welcome to Tenda'. Below the header are two input fields for 'User Name' and 'Password', each with a white underline. A green 'Connect' button is positioned below the password field. To the right of the 'Connect' button is a 'Disclaimer' link. The background of the page is a photograph of a modern building at night, reflected in a pool of water.

2. Click **Save** at the bottom on the page.

---- End

## 9.2.4 Configure email authentication

### Configuration description

Step	Task	Description
1	Configure basic settings	Set authentication type and valid duration, choose networks to be applied, and set the maximum number of people sharing the same authentication mode.
2	Configure email server settings	Configure the Email used to send authentication code, including <b>Email Address, Email Password, SMTP Server, SMTP Server Port</b> and <b>Account for Test</b> .
3	Configure authentication page settings	Configure the authentication page received by users.

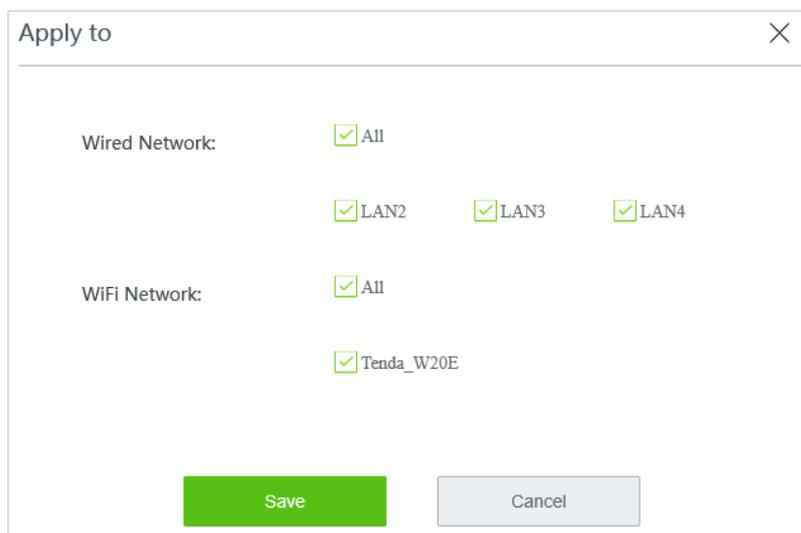
### Configuration procedure

#### Step 1 Configure basic settings

1. Choose **Authentication > Captive Portal**, and enable this function.
2. Select **Email Authentication** from the **Authentication Type** drop-down list menu.
3. Set **Valid Duration**.
4. Click **Choose**, choose the network(s) to be applied, and click **Save**.



The selected wireless network(s) cannot be encrypted. Otherwise the user cannot access the authentication page.



If the WiFi network name you selected is modified, it will be automatically deselected here. To make the WiFi network effective, you have to re-select the WiFi network with the new SSID here manually.

5. Set a number for **People Shared with**.

#### Step 2 Configure email server settings.

1. Enter the **Email Address** and **Email Password** of the email account used to send authentication emails.
2. Enter the **SMTP Server** and **SMTP Server Port** of the email account, select **SSL**.
3. Enter another email address in **Account for Test** box, and click **Test**. The configurations are correct when you receive a notification as follows:



 **NOTE**

- If you failed to send test email, please check the SMTP Server of the email account for sending test email.
- The default **SMTP Server Port** is **25**. If you select **SSL**, the server port will change. Please contact your email service provider for the information.

**Step 3** Configure authentication page settings.

1. Set required parameters for the authentication page by following the on-screen instructions. Configurations on the following figure are only used for examples.

**Authentication Page Settings**

Logo:    
 Logo size cannot exceed 30 KB.

Title:

Background Image:    
 Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  Specified Page

**Preview:** The authentication page features the Tenda logo and 'Welcome to Tenda' text. It includes input fields for 'User Name' and 'Password', a green 'Connect' button, and a 'Disclaimer' link. The background is a night-time photograph of a modern building with a pool.

2. Click **Save** at the bottom on the page.

---- End

## 9.2.5 Configure one-key authentication

### Configuration description

Step	Task	Description
1	Configure basic settings.	Set authentication type, valid duration, and choose networks to be applied.
2	Configure authentication page settings	Configure the page received by users.

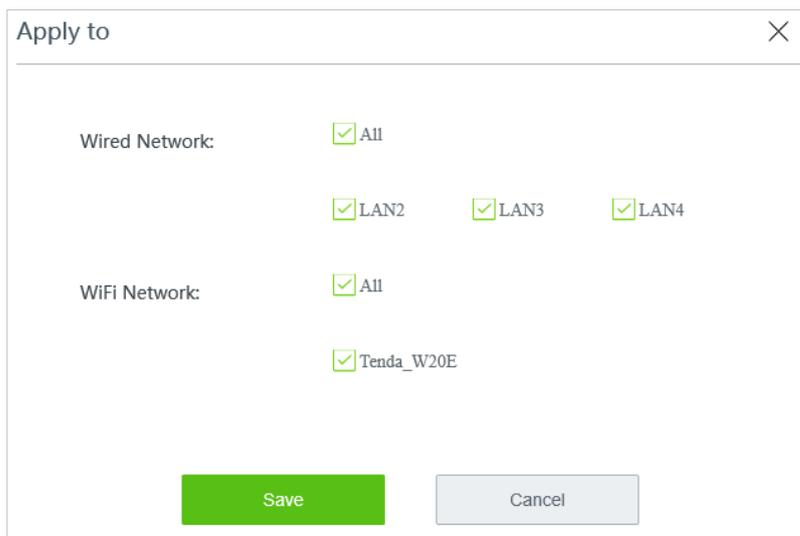
### Configuration procedure

**Step 1** Configure basic settings.

1. Choose **Authentication > Captive Portal**, and enable this function.
2. Select **One-key authentication** from the **Authentication Type** drop-down list menu.
3. Set **Valid Duration**.
4. Click **Choose**, choose the network(s) to be applied, and click **Save**.



The selected wireless network(s) cannot be encrypted. Otherwise the user cannot access the authentication page.



If the WiFi network name you selected is modified, it will be automatically deselected here. To make the WiFi network effective, you have to re-select the WiFi network with the new SSID here manually.

**Step 2** Configure authentication page settings.

1. Set required parameters for the authentication page by following the on-screen instructions. Configurations on the following figure are only used for examples.

**Authentication Page Settings**

Logo:    
Logo size cannot exceed 30 KB.

Title:

Background Image:    
Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  
 Specified Page



The preview image shows a login page for 'Tenda' with the title 'Welcome to Tenda'. It features a 'User Name' and 'Password' input field, a green 'Connect' button, and a 'Disclaimer' link. The background is a night photograph of a modern building with a swimming pool.

2. Click **Save** at the bottom on the page.

---- End

## 9.3 Examples of captive portal

### 9.3.1 Example of configuring SMS authentication

#### Networking requirement

An enterprise wants to establish a network and regulate the use of the network with the router. The requirements include:

- SMS authentication is required for employees who want to access the internet through the LAN port of the router or the wireless network **Tenda\_W20E**.
- Employees are directed to [www.tenda.com.cn](http://www.tenda.com.cn) after being authenticated.
- The network administrator is free from authentication when accessing the internet.

The requirement can be met with SMS authentication.

Assume that:

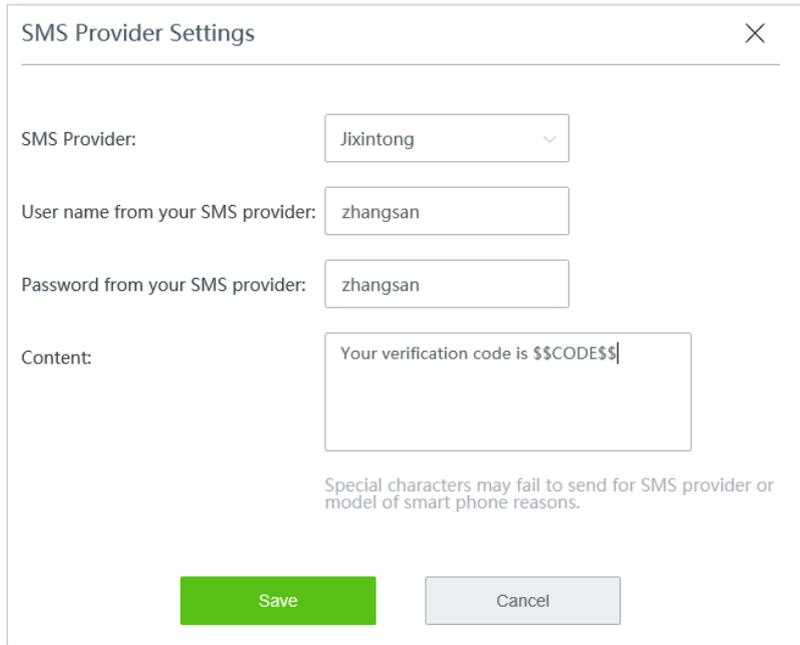
- The MAC address of the network administrator's computer is **44:37:E6:12:34:56**.
- The enterprise has registered on **Jixintong** for the account "**zhangsan**" and password "**zhangsan**".

#### Configuration procedure

**Step 1** Configure SMS authentication settings.

1. Choose **Authentication > Captive Portal**.
2. Enable **Captive Portal**.
3. Select **WiFi via SMS** in the **Authentication Type** drop-down list.
4. Click **SMS Provider Settings**.
5. Configure SMS provider settings.
  - (1) Enter the **User name from your SMS provider**, which is **zhangsan** in this example.
  - (2) **Password from your SMS provider**, which is **zhangsan** in this example.
  - (3) Enter the your customised SMS **Content**. For example "**Your verification code is \$\$CODE\$\$**".

(4) Click **Save**.

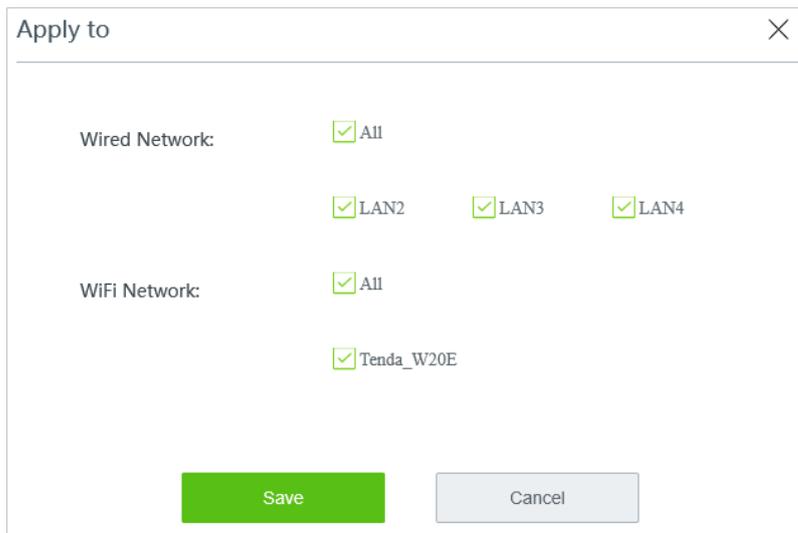


The screenshot shows a dialog box titled "SMS Provider Settings" with a close button (X) in the top right corner. It contains the following fields and controls:

- SMS Provider:** A dropdown menu with "Jixintong" selected.
- User name from your SMS provider:** A text input field containing "zhangsan".
- Password from your SMS provider:** A text input field containing "zhangsan".
- Content:** A text area containing "Your verification code is \$\$CODE\$\$".
- A note below the content field: "Special characters may fail to send for SMS provider or model of smart phone reasons."
- At the bottom, there are two buttons: a green "Save" button and a grey "Cancel" button.

6. Set **Valid Duration**, such as **24 hours**.

7. Select **Choose**, choose the networks that the SMS authentication is applied to, and click **Save**.



The screenshot shows a dialog box titled "Apply to" with a close button (X) in the top right corner. It contains the following options:

- Wired Network:** A checked checkbox for "All", and three checked checkboxes for "LAN2", "LAN3", and "LAN4".
- WiFi Network:** A checked checkbox for "All", and a checked checkbox for "Tenda\_W20E".
- At the bottom, there are two buttons: a green "Save" button and a grey "Cancel" button.

**Step 2** Configure authentication page.

1. Click **Change** to upload a logo image.
2. Customize the **Title** of the authentication page.
3. Click **Change** to upload a background image.
4. Customize a **Disclaimer** for the enterprise, such as "**Copyright ©2019 Shenzhen Tenda Technology Co., Ltd. All rights reserved.**"
5. Select **Specified Page**, enter [www.tenda.com.cn](http://www.tenda.com.cn).

6. Click **Save**.

**Authentication Page Settings**

Logo:    
Logo size cannot exceed 30 KB.

Title:

Background Image:    
Aspect ratio: 16:9. Image size cannot exceed 200 KB.

Disclaimer:

Redirect to:  Previous Page  
 Specified Page

**Authentication Page Preview:**  
Tenda Welcome to Tenda  
User Name  
Password  
Connect Disclaimer  
Image: A modern building at night with a pool in the foreground.

**Step 3** Add authentication-free host.

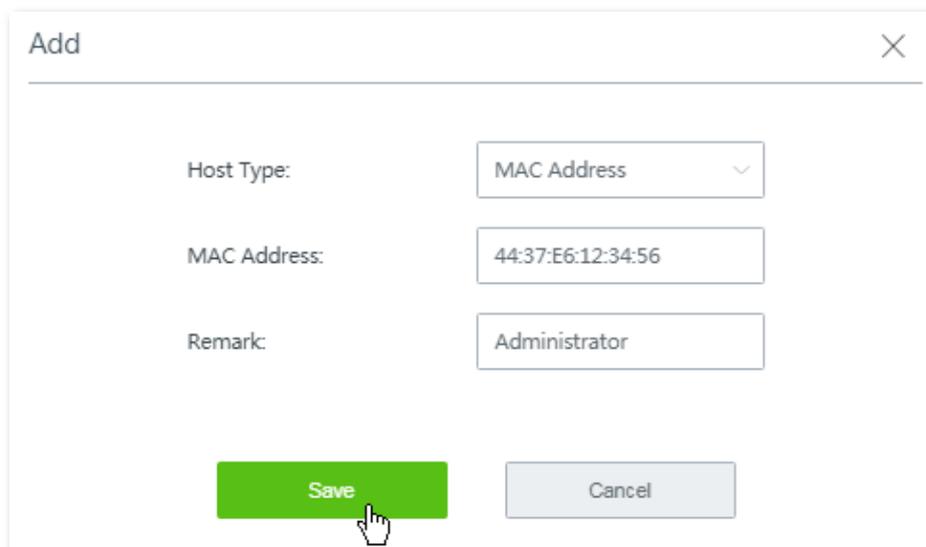
1. Choose **Authentication > User Management**.
2. Navigate to **Authentication-free Host** configuration area, click **+Add**.

**Authentication-free Host**

Host Type	Host Name/IP/MAC	Remark	Operation
No data			

3. Select **MAC Address** for **Host Type**, enter a **MAC Address**, which is **44:37:E6:12:34:56** in this example.
4. Customize a **Remark** for the host, such as **Administrator**.

5. Click **Save**.



---- End

## Verification

The network administrator can access the internet without authentication. Other employees have to perform SMS authentication as follows:

- Step 1** Start a web browser on a smart phone, and visit any website. The authentication page appears.
- Step 2** Enter a valid phone number and tap **Obtain**.
- Step 3** Enter the **Verification Code** in the SMS received.
- Step 4** Tap **Connect**.



After successful authentication, the browser will navigate to [www.tenda.com.cn](http://www.tenda.com.cn).

## 9.3.2 Example of configuring local user authentication

### Networking requirement

An enterprise wants to establish a network and regulate the use of the network with the router. The requirements include:

- Local user authentication with user name and password is required for employees who want to access the internet through the LAN port of the router or the wireless network **Tenda\_W20E**.
- No upload or download rate limit is specified for employees.
- Employees are directed to [www.tenda.com.cn](http://www.tenda.com.cn) after being authenticated.
- The network administrator is free from authentication when accessing the internet.

The requirement can be met with SMS authentication.

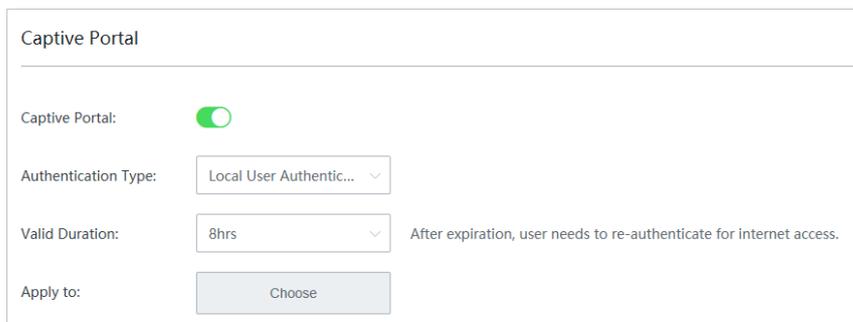
Assume that:

- The MAC address of the network administrator's computer is 44:37:E6:12:34:56.

### Configuration procedure

**Step 1** Configure local user authentication.

1. Choose **Authentication > Captive Portal**.
2. Enable **Captive Portal**.
3. Select **Local User Authentication** in the **Authentication Type** drop-down list.
4. Select **Valid Duration**, such as **8 hours**.
5. Select **Choose**.



Captive Portal

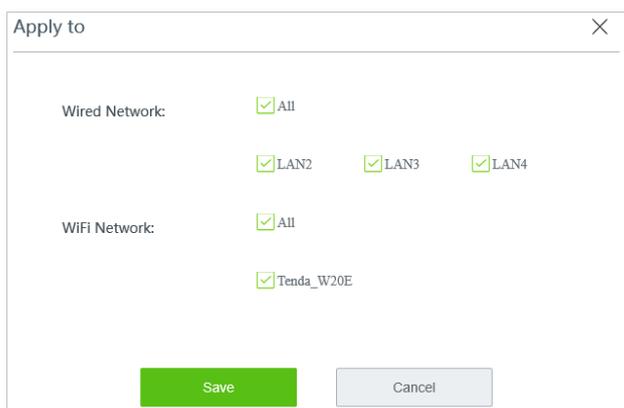
Captive Portal:

Authentication Type: Local User Authentic... ▾

Valid Duration: 8hrs ▾ After expiration, user needs to re-authenticate for internet access.

Apply to: Choose

6. Choose the networks that the local user authentication is applied to, and click **Save**



Apply to

Wired Network:  All  
 LAN2  LAN3  LAN4

WiFi Network:  All  
 Tenda\_W20E

Save Cancel

**Step 2** Configure authentication page.

1. Click **Change** to upload a logo image.
2. Customize the **Title** of the authentication page.
3. Click **Change** to upload a background image.
4. Customize a **Disclaimer** for the enterprise, such as “**Copyright ©2019 Shenzhen Tenda Technology Co., Ltd. All rights reserved.**”
5. Select **Specified Page**, enter [www.tenda.com.cn](http://www.tenda.com.cn).
6. Click **Save**.

The screenshot shows the 'Authentication Page Settings' interface. It includes fields for Logo, Title, Background Image, Disclaimer, and Redirect to. The Logo field has a 'Change' button and a 'Delete' button, with a note that the logo size cannot exceed 30 KB. The Title field contains the text 'Welcome to Tenda'. The Background Image field has a 'Change' button and a 'Delete' button, with a note that the aspect ratio is 16:9 and the image size cannot exceed 200 KB. The Disclaimer field contains the text 'Copyright ©2019 Shenzhen Tenda Technology Co., Ltd. All rights reserved.'. The Redirect to field has two radio buttons: 'Previous Page' (unselected) and 'Specified Page' (selected). Below the radio buttons is a text input field containing 'http:// www.tenda.com'.

**Step 3** Add local user authentication account (s).

1. Choose **Authentication > User Management**, and locate the **Account Management** configuration area.
2. Click **+Add**.

The screenshot shows the 'Account Management' interface. It features a '+ Add' button on the left and a search box labeled 'User Name/Remark' on the right. Below these is a table with the following columns: User Name, Password, Remark, Client Status, Valid Duration, Status, and Operation. The table is currently empty, and a 'No data' message is displayed at the bottom center of the table area.

3. Fill the required parameters.

- (1) Set **User name** and **Password**, such as **zhangsan/zhangsan**,
- (2) Set **Valid Duration** to **Always valid**,
- (3) Set **People Shared with** to **10**,
- (4) Set **Current Sessions** to **600**,
- (5) Set **Upload Rate** and **Download Rate** to **No Limit**.
- (6) Click **Save**.

The screenshot shows a dialog box titled "Add" with a close button (X) in the top right corner. The dialog contains the following fields and values:

- User Name: zhangsan
- Password: zhangsan
- Remark: Optional
- Valid Duration: Always Valid (dropdown menu)
- People Shared with: 10 (with a note "0~300, 0 means no limit")
- Concurrent Sessions: 600
- Upload Rate: No Limit (dropdown menu) KB/s
- Download Rate: No Limit (dropdown menu) KB/s

At the bottom of the dialog, there are two buttons: a green "Save" button and a grey "Cancel" button.

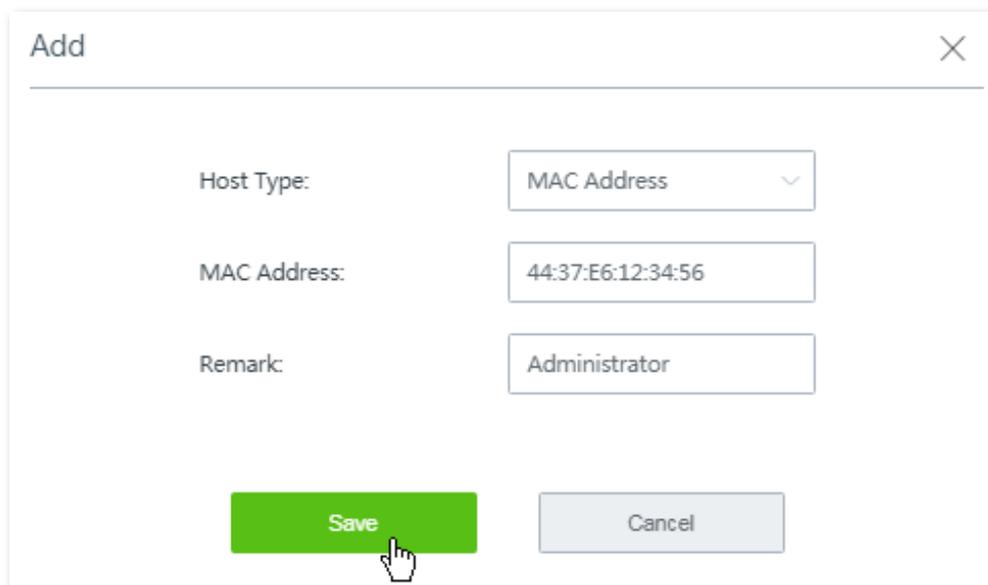
Step 4 Add authentication-free host.

1. Choose **Authentication > User Management**.
2. Navigate to **Authentication-free Host** configuration area, click **+Add**.

The screenshot shows the "Authentication-free Host" configuration area. At the top, there is a title "Authentication-free Host" and a "+ Add" button. Below this is a table with the following columns: "Host Type", "Host Name/IP/MAC", "Remark", and "Operation". The table is currently empty, and a "No data" message is displayed below the table.

3. Select **MAC Address** for **Host Type**, enter a **MAC Address**, which is **44:37:E6:12:34:56** in this example.
4. Customize a **Remark** for the host, such as **Administrator**.

5. Click **Save**.

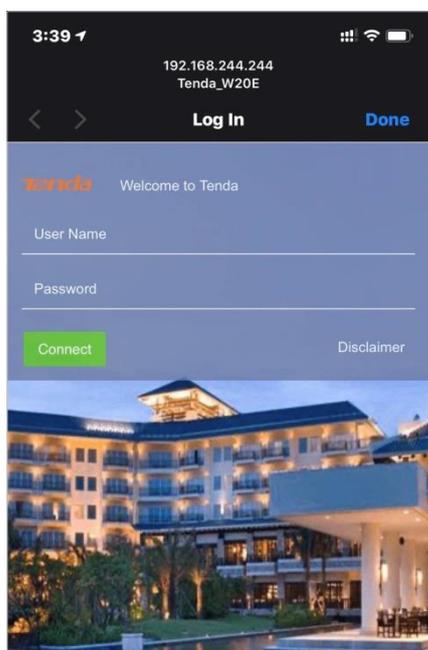


---- End

## Verification

The network administrator can access the internet without authentication. Other employees have to perform local user authentication as follows:

- Step 1** Start a web browser on a smart phone, and visit any website. The authentication page appears.
- Step 2** Enter the correct **User Name** and **Password**.
- Step 3** Tap **Connect**.



After successful authentication, the browser will navigate to [www.tenda.com.cn](http://www.tenda.com.cn).

## 9.3.3 Example of configuring email authentication

### Networking requirement

An enterprise wants to establish a network and regulate the use of the network with the router. The requirements include:

- Email authentication is required for employees who want to access the internet through the LAN port of the router or the wireless network **Tenda\_W20E**.
- No upload or download rate limit is specified for employees.
- Employees are directed to [www.tenda.com.cn](http://www.tenda.com.cn) after being authenticated.
- The network administrator is free from authentication when accessing the internet.

### Solution

The requirement can be met with email authentication.

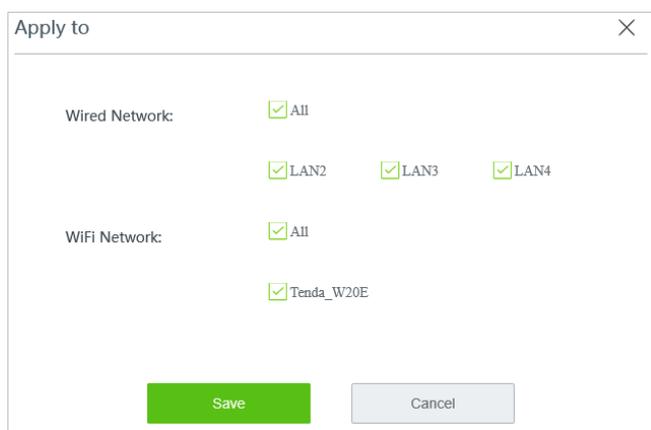
Assume the MAC address of the network administrator's computer is 44:37:E6:12:34:56, and the parameters of the email server are as follows:

- Email address: [zhangsan@163.com](mailto:zhangsan@163.com)
- Email password: abc123456
- SMTP server: [smtp.163.com](mailto:smtp.163.com)
- SMTP server port: 465
- Account for test: [lisi@163.com](mailto:lisi@163.com)

### Configuration procedure

**Step 1** Configure local user authentication.

1. Choose **Authentication > Captive Portal**.
2. Enable **Captive Portal**.
3. Select **Email Authentication** in the **Authentication Type** drop-down list.
4. Set **Valid Duration**, such as **8 hours**.
5. Select **Choose**, choose the networks that the local user authentication is applied to, and click **Save**



**Step 2** Configure email server settings.

1. Fill **zhangsan@163.com** in **Email Address**.
2. Fill **abc123456** in **Email Password**.
3. Fill **smtp.163.com** in **SMTP Server**.
4. Select **SSL**.
5. Fill **465** in **SMTP Server Port**.
6. Enter another email address in **Account for Test**, which is **lisi@163.com** in this example.

**Email Server Settings**

Email Address :

Email Password :

SMTP Server :   SSL

SMTP Server Port :

Account for Test :  Test

7. Click **Test** to check if the configurations are correct.



If the test fails, try the following solutions:

- Check if the SMTP service is enabled for the **Email Address**.
- Check if the **Account for Test** is valid.
- Change the email content.

### Step 3 Configure authentication page.

1. Click **Change** to upload a logo image.
2. Customize the **Title** of the authentication page.
3. Click **Change** to upload a background image.
4. Customize a **Disclaimer** for the enterprise, such as “**Copyright ©2019 Shenzhen Tenda Technology Co., Ltd. All rights reserved.**”

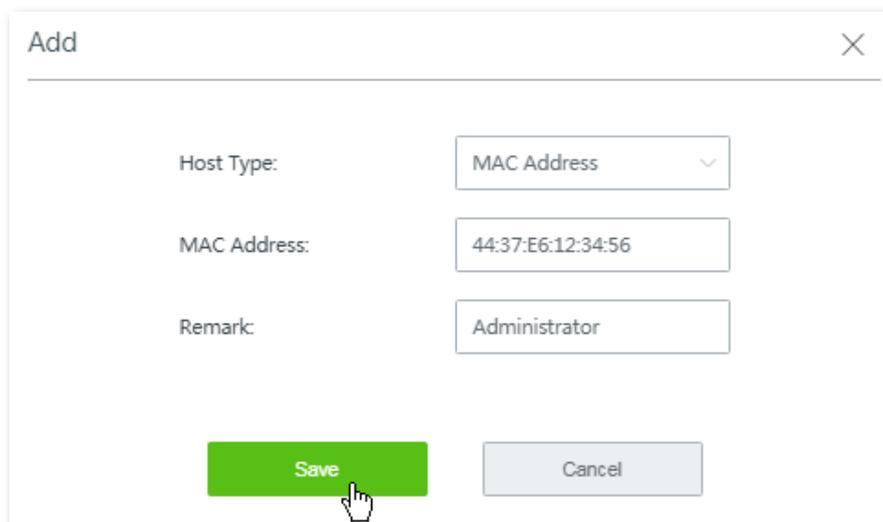
5. Select **Specified Page**, enter [www.tenda.com.cn](http://www.tenda.com.cn).
6. Click **Save**.

**Step 4** Add authentication-free host.

1. Choose **Authentication > User Management**.
2. Navigate to **Authentication-free Host** configuration area, click **+Add**

3. Select **MAC Address** for **Host Type**, enter a **MAC Address**, which is **44:37:E6:12:34:56** in this example.
4. Customize a **Remark** for the host, such as **Administrator**.

5. Click **Save**.

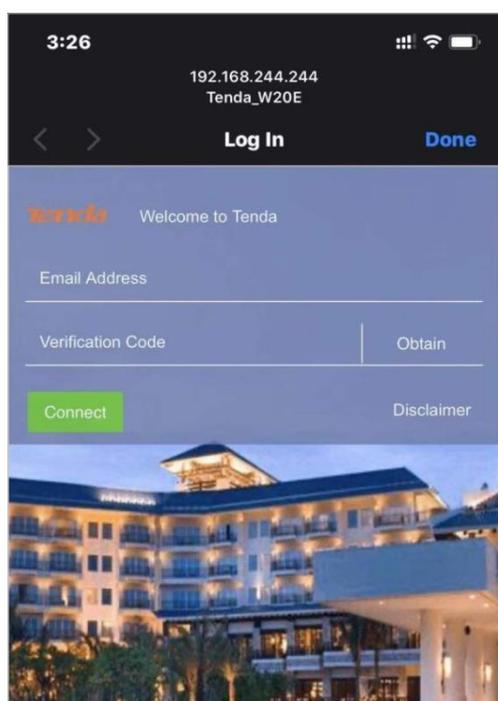


---- End

## Verification

The network administrator can access the internet without authentication. Other employees have to perform email authentication as follows:

- Step 1** Start a web browser on a smart phone, and visit any website. The authentication page appears.
- Step 2** Enter a valid email address in the **Email** box and tap **Obtain**.
- Step 3** Enter the **Verification Code** in the email received.
- Step 4** Tap **Connect**.



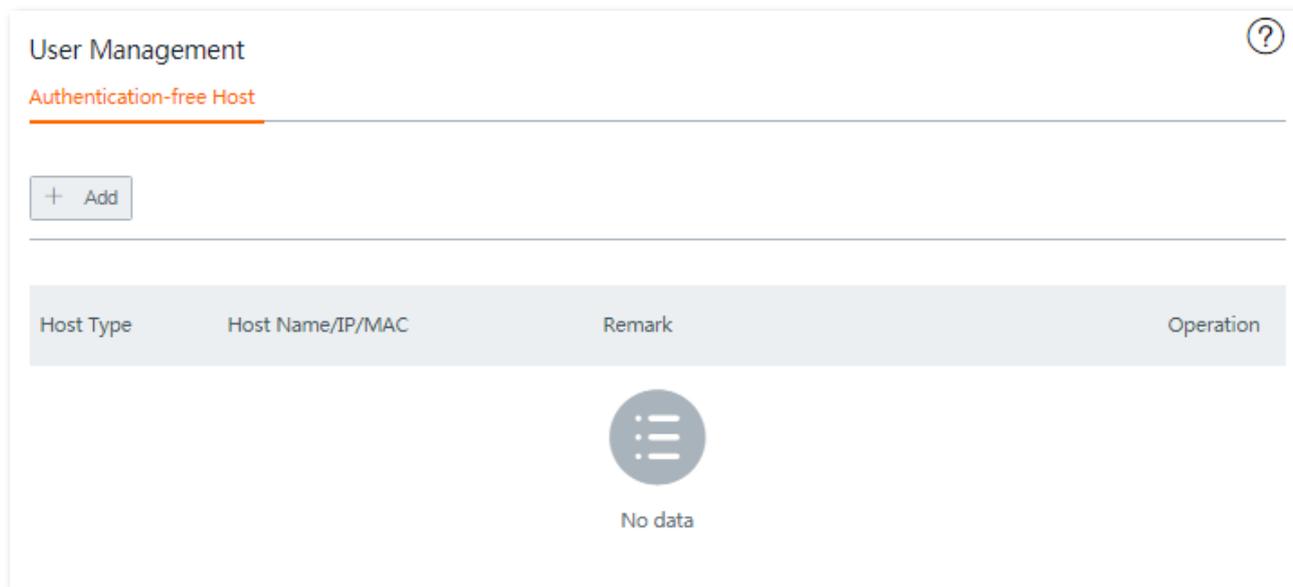
After successful authentication, the browser will navigate to [www.tenda.com.cn](http://www.tenda.com.cn).

## 9.4 User management

### 9.4.1 Overview

To manage users connected to the network of the router, choose **Authentication > User Management**. See the following figure.

In this page you are able to add authentication-free host, add user accounts used for local user authentication and import or export account data of authenticated accounts.



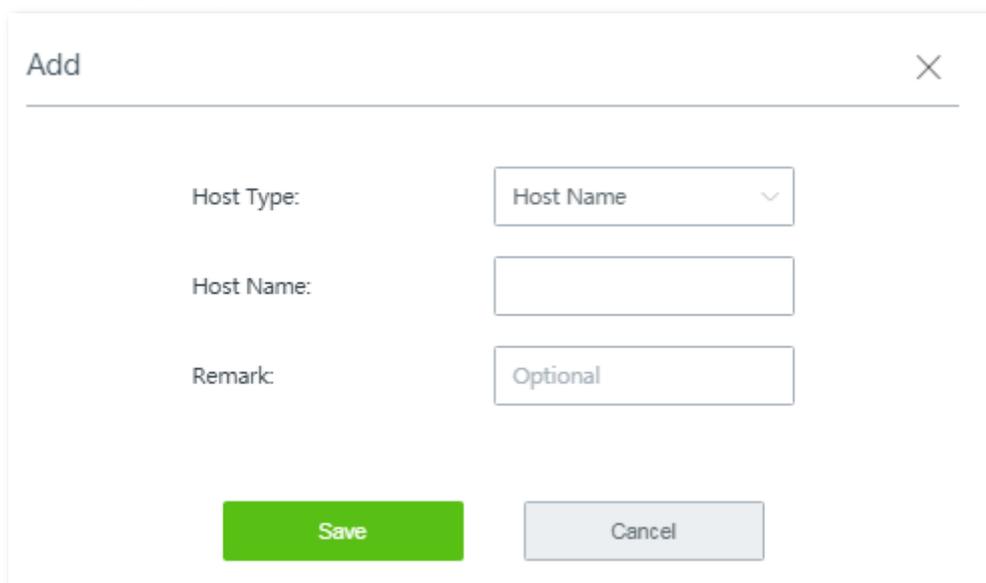
The screenshot shows the 'User Management' page with a sub-section for 'Authentication-free Host'. At the top left is a '+ Add' button. Below it is a table with the following columns: 'Host Type', 'Host Name/IP/MAC', 'Remark', and 'Operation'. The table is currently empty, displaying a 'No data' message with a circular icon containing three horizontal lines.

### 9.4.2 Add authentication-free host

#### Configuration procedure

**Step 1** Click **+Add**.

**Step 2** Set the required parameters.



The 'Add' dialog box contains the following fields and buttons:

- Host Type:** A dropdown menu with 'Host Name' selected.
- Host Name:** A text input field.
- Remark:** A text input field with the placeholder text 'Optional'.
- Buttons:** A green 'Save' button and a grey 'Cancel' button.

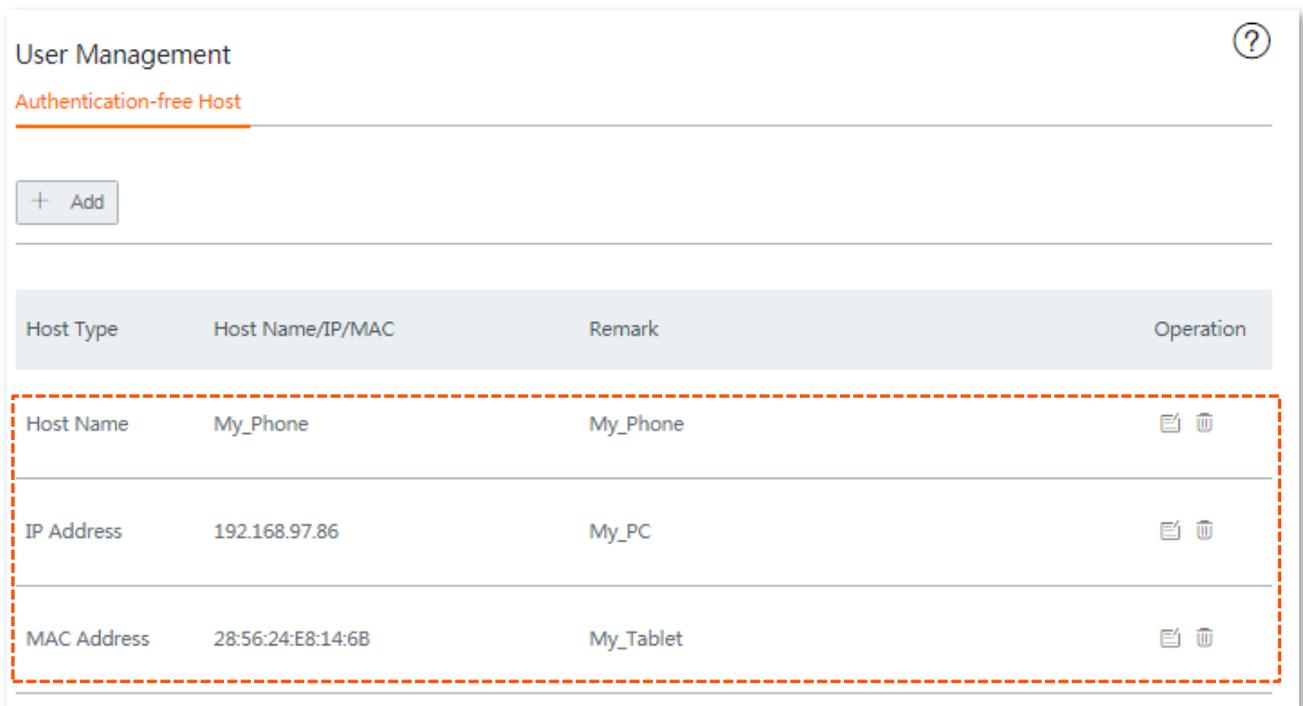
### Parameter description

Parameter	Description
Host Type	It allows you to set a device without authentication based on host name, IP address or MAC address.
Host Name	<p>When the <b>Host Type</b> is set as <b>Host Name</b>, input the host name of the authentication-free device.</p> <p>To get the host name of the device, navigate to <b>System Status &gt; Online Devices</b>.</p> <p> <b>TIP</b></p> <p>Once the host name is modified, the authentication-free rule will be disabled. To make such a rule effective, manually edit the <b>Host Name</b> here simultaneously.</p>
IP Address	When <b>Host Type</b> is set as <b>IP Address</b> , input the IP address of the authentication-free device.
MAC Address	When <b>Host Type</b> is set as <b>MAC Address</b> , input the MAC address of the authentication-free device.
Remark	(Optional) It specifies a brief description of an authentication-free host.

**Step 3** Click **Save**.

---- End

The **User Management** page appears, showing the added hosts. See the following figure:



### 9.4.3 Add user accounts used for local user authentication

You can add user accounts in this page and use it for local user authentication.



You are allowed to create a maximum of **300** accounts.

#### Configuration procedure

**Step 1** Choose **Authentication > User Management**, and locate the **Account Management** configuration area.

User Name	Password	Remark	Client Status	Valid Duration	Status	Operation
-----------	----------	--------	---------------	----------------	--------	-----------

**Step 2** Click **+Add**.

**Step 3** Set required parameters.

User Name:

Password:

Remark:

Valid Duration:

People Shared with:  0~300, 0 means no limit

Concurrent Sessions:

Upload Rate:  KB/s

Download Rate:  KB/s

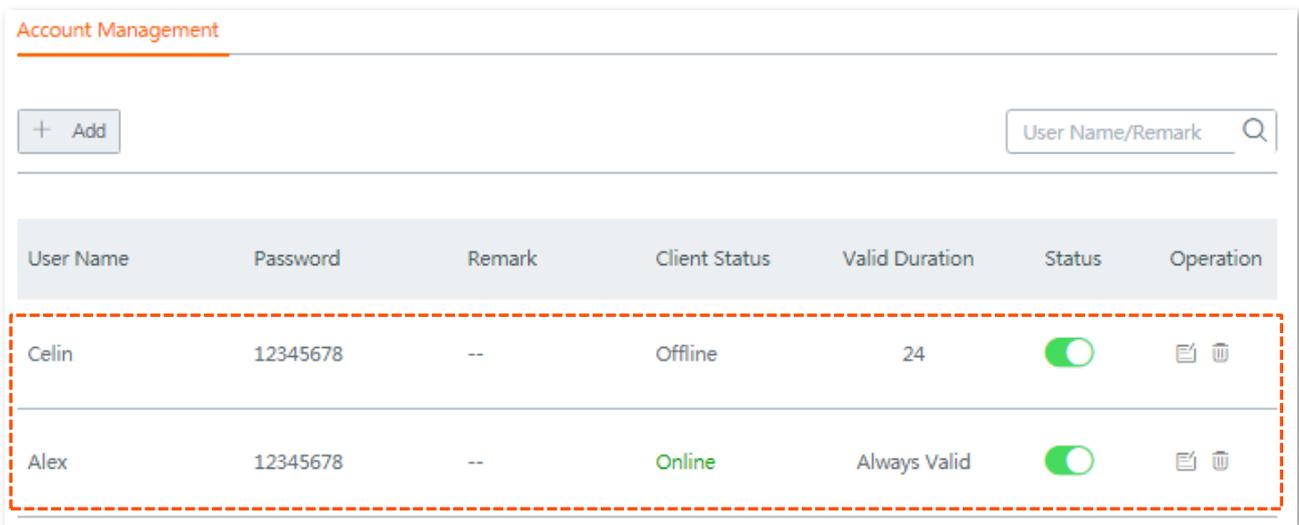
## Parameter description

Parameter	Description
User Name	<b>User Name</b> specifies a user name for captive portal. <b>Password</b> specifies a password for captive portal. If captive portal is enabled, a user must be authenticated with a correct user name and password before accessing the internet.
Password	
Remark	(Optional). It specifies the description of a user account.
Valid Duration	It specifies the validity of a user account. <b>Valid Time:</b> Specify the validity time by hours. <b>Valid Date:</b> Specify the date before the account expires.
People Shared with	It specifies the number of users that the account is allowed for being authenticated.
Concurrent Sessions	It specifies the maximum number of connections that can be set up on each computer covered by the corresponding rule.
Upload Rate	It specifies the device's maximum upload/download rate covered by the corresponding rule.
Download Rate	 <b>TIP</b> 1 Mbps=128 KB/s

**Step 4** Click **Save**.

---- **End**

The **User Management** page appears, showing the added user accounts. See the following figure.



User Name	Password	Remark	Client Status	Valid Duration	Status	Operation
Celin	12345678	--	Offline	24	<input checked="" type="checkbox"/>	 
Alex	12345678	--	Online	Always Valid	<input checked="" type="checkbox"/>	 



Client Status includes:

- **Offline:** The account is not in use.
- **Online:** The account is in use.

## 9.4.4 Export accounts data

**Step 1** Choose **Authentication > User Management**, and move to the bottom of the page.

**Step 2** Click **Export**.

----End

A file named *auth\_user.csv* will be downloaded to your local computer.

## 9.4.5 Import accounts data



A maximum of **300** account data is allowed for importing at one time.

**Step 1** Choose **Authentication > User Management**, and move to the bottom of the page.

**Step 2** Click **Browse**, select and upload a file that you've backed up.



A proper file name may be indicated by *auth\_user.csv*.

**Step 3** Click **Import**.

----End

You can view the imported accounts information on the **Account Management** configuration area.

# 10 AP management

The AP management function of the router enables you to manage Tenda APs centrally.

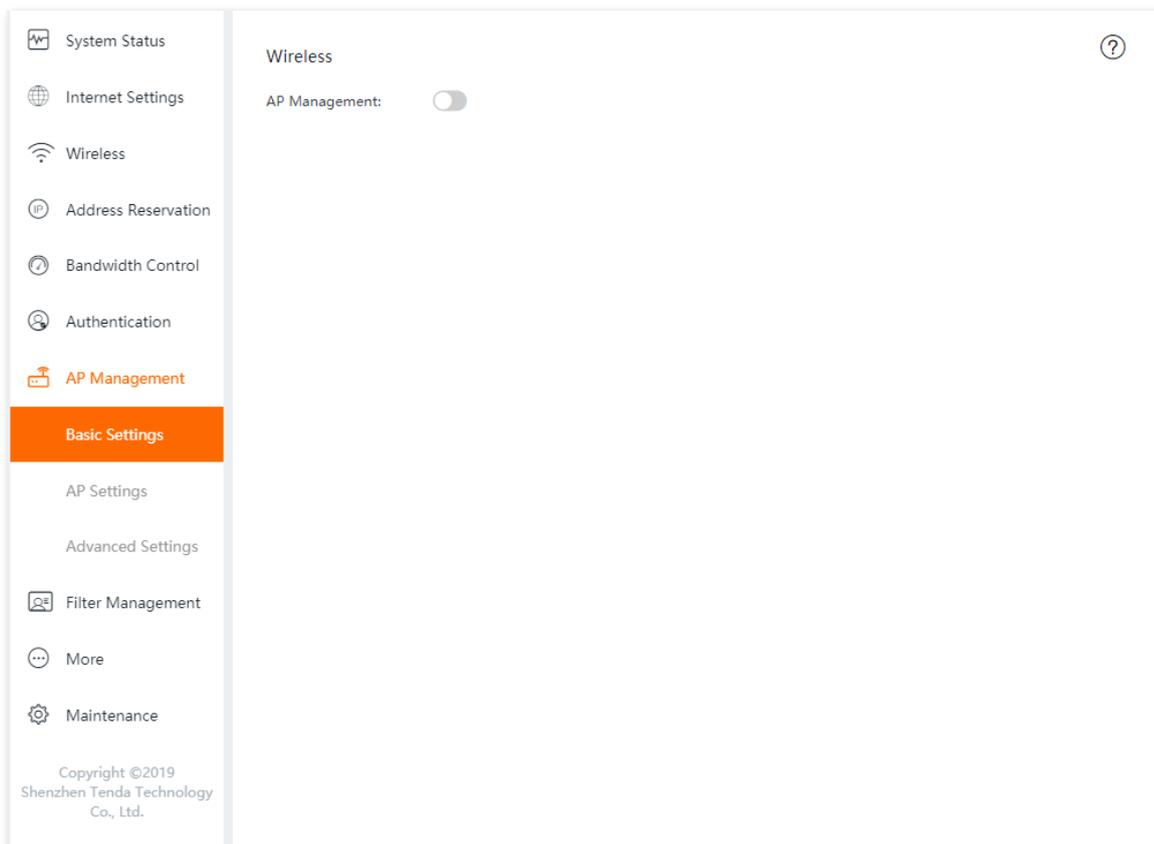


The router can only manage Tenda APs.

## 10.1 Basic settings

### 10.1.1 Overview

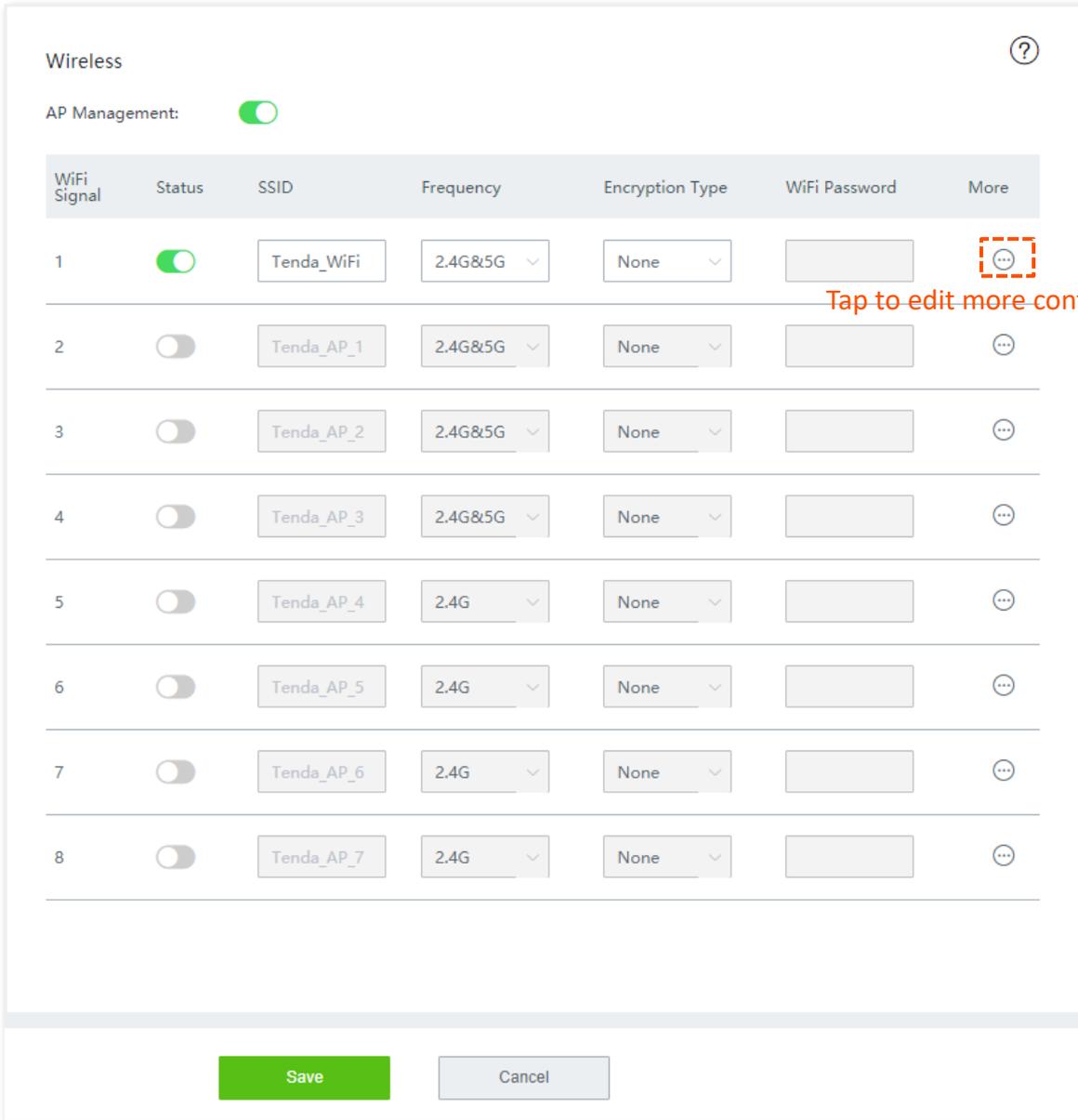
To access the configuration page, choose **AP Management** > **Basic Settings**. By default, this function is disabled. See the following figure:



After the **AP Management** function is enabled, the following configuration page appears. On the page, you are allowed to centrally set up WiFi network-related configurations of APs in your local area network, such as viewing and editing wireless network names (SSID), WiFi passwords, configuring 2.4 GHz and 5 GHz WiFi networks, hiding your WiFi network so that nearby wireless clients cannot detect it, and specifying how many wireless clients can connect to a wireless network at most.

The wireless configuration you configured here will be automatically delivered to the Tenda APs

within the LAN of the router.



### Parameter description

Parameter	Description
WiFi Signal	Serial number of the wireless policies. - 1 to 4 policies: Used to apply to 1 to 4 wireless networks of APs - 5 to 8 policies: Used to apply to 5 to 8 wireless networks of APs.
Status	Used to enable or disable the wireless policy.
SSID	Used to change the wireless network name.
Frequency	Select a band used by the wireless policy which will be delivered to APs. - <b>2.4G</b> : The wireless policy will be applied to the 2.4 GHz wireless networks of APs. - <b>5G</b> : The wireless policy will be applied to the 2.4 GHz wireless networks of APs. - <b>2.4G&amp;5G</b> : The wireless policy will be applied to the 5 GHz wireless networks of APs.

Parameter	Description
	<p>APs.</p> <p> <b>TIP</b></p> <p>If a single band is selected in policies 1 to 4, the wireless networks at the other band will be disabled after the policy is delivered to APs.</p>
Encryption Type	<p>Encryption type of the wireless network.</p> <ul style="list-style-type: none"> <li>- <b>None:</b> Open wireless network. No password is required when a client connects to the wireless network. To secure the network, this option is not recommended.</li> <li>- <b>WPA_PSK:</b> The wireless network adopts the WPA-PSK authentication method (AES encryption rule).</li> <li>- <b>WPA2-PSK:</b> The wireless network adopts the WPA2-PSK authentication method (AES encryption rule).</li> </ul>
WiFi Password	<p>It specifies the pre-shared password for WPA_PSK and WPA2_PSK, as well as the password required for connecting to the wireless network.</p>
More settings	<p>For more settings, tap the  icon and navigate to the configuration page:</p> <ul style="list-style-type: none"> <li>- <b>Isolate Client:</b> With this function enabled, clients connected to the wireless network cannot communicate with each other, improving the security of the wireless network. By default, this function is disabled.</li> <li>- <b>Hide SSID:</b> With this function enabled, nearby wireless clients cannot detect the SSID, and you need to manually enter the SSID on the wireless client to access the wireless network. Disable indicates that nearby wireless clients can detect the SSID. By default, this function is disabled.</li> <li>- <b>Max. Users:</b> Maximum number of wireless clients that can be connected to the wireless network with the SSID. After the value is reached, this wireless network denies new connection requests. Clients connected to all the enabled wireless networks (including guest networks) of the router cannot exceed 128 on 2.4 GHz and 5 GHz bands respectively.</li> <li>- <b>VLAN ID:</b> Not supported in this version.</li> </ul>

## 10.1.2 Distribute wireless policies to APs



When wireless policies are distributed to APs that do not support part of the functions, these unsupported policies will still be received but will not take effect.

For example, when policies concerning 5G network are distributed to APs that do not support 5G, these policies will be received but will not take effect in these APs.

**Step 1** Choose **AP Management > Basic Settings**.

**Step 2** Change wireless configurations.

**Step 3** Click **Save** at the bottom of the page.

The screenshot shows the 'Wireless' configuration page. At the top right is a help icon (?). Below the title, 'AP Management' is toggled on. A table lists two APs with their respective settings.

WiFi Signal	Status	SSID	Frequency	Encryption Type	WiFi Password	More
1	<input checked="" type="checkbox"/>	Tenda_1	2.4G&5G	WPA2-PSK	12345678	⋮
2	<input checked="" type="checkbox"/>	Tenda_2	2.4G&5G	WPA2-PSK	87654321	⋮

-----End

## 10.2 AP settings



This function is available only when the AP Management function is enabled on the **AP Management > Basic Settings** page.

To access the configuration page, choose **AP Management > AP Settings**.

The screenshot shows the 'AP Settings' interface with a search bar and a table of online devices. The table has columns for AP Model, Remark, IP/MAC/Firmware Version, Frequency, Transmit Power, Channel, Online/Limit, Status, and More. One device is listed with IP 192.168.0.153 and status 'Online'.

AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input type="checkbox"/> i21V1.0	<input type="text" value="i21V1.0"/>	<b>192.168.0.153</b> 50:2B:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	5 153	0/48 1/48	Online	⋮

You can configure online APs separately, or upgrade, reset, or reboot APs centrally. The first figure below shows how to configure APs separately, while the other figures show how to configure your APs in batch.

The screenshot shows the 'AP Settings' interface with three online devices. The second device in the table is selected, indicated by a red dashed box around its checkbox and the text 'Select an AP for management' pointing to it.

AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input type="checkbox"/> i21V1.0	<input type="text" value="i21V1.0"/>	<b>192.168.0.254</b> 50:28:73:09:93:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	2 40	0/48 0/48	Online	⋮
<input checked="" type="checkbox"/> i21V1.0	<input type="text" value="i21V1.0"/>	<b>192.168.0.153</b> 50:2B:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	3 157	0/48 0/48	Online	⋮
<input type="checkbox"/> i21V1.0	<input type="text" value="i21V1.0"/>	<b>192.168.0.154</b> 50:28:73:09:99:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

AP Settings ?

Online Device(s): 3

<input type="checkbox"/>	AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.254</b> 50:28:73:09:93:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	2 40	0/48 0/48	Online	⋮
<input checked="" type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.153</b> 50:28:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	3 157	0/48 0/48	Online	⋮
<input checked="" type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.154</b> 50:28:73:09:99:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

Select APs in batch for management

AP Settings ?

Online Device(s): 3

<input checked="" type="checkbox"/>	AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input checked="" type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.254</b> 50:28:73:09:93:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	2 40	0/48 0/48	Online	⋮
<input checked="" type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.153</b> 50:28:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	3 157	0/48 0/48	Online	⋮
<input checked="" type="checkbox"/>	i21V1.0	i21V1.0	<b>192.168.0.154</b> 50:28:73:09:99:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

Select all APs for management

## 10.2.1 Upgrade



To avoid data loss and device damage, DO NOT remove the power of APs and the router during the upgrade.

**Step 1** Download the latest firmware of the AP to your local computer.

1. Visit [www.tendacn.com](http://www.tendacn.com), searching the AP model in the searching bar to enter the product details page.
2. Locate the latest firmware, download it to your computer, and unzip it.

**Step 2** Click **AP Management > AP Settings** to access the configuration page.

**Step 3** Select APs you want to upgrade. You can upgrade APs one by one, or select them in batch. Click the **Upgrade** button.



Only APs of the same model can be upgraded in batch.

AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input checked="" type="checkbox"/>	i21V1.0	192.168.0.153 50:2B:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

**Step 4** Click **Browse** on the pop-up window, select and upload the firmware that has been downloaded to your computer.

Select an upgrade file:  **Browse** **Upload**

Note: If APs with various models are selected, the router only upgrades APs that support the upgrade file.

**Step 5** Click **Upload**. Wait until the progress bar completes.

---- End

## 10.2.2 Reset the APs



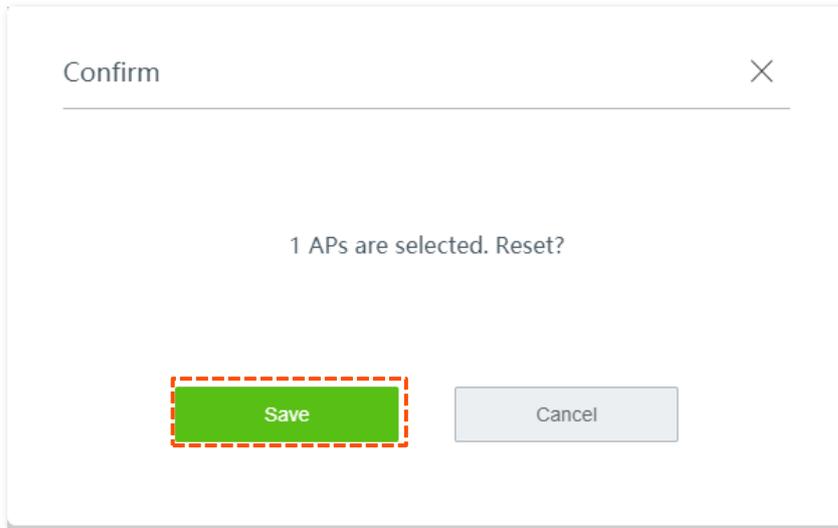
When resetting, do not power off the AP.

**Step 1** Click **AP Management > AP Settings** to access the configuration page.

**Step 2** Select APs you want to reset. You can reset APs one by one, or select multiple APs to reset them in batch. Click the **Reset** button.

AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
<input checked="" type="checkbox"/>	i21V1.0	192.168.0.153 50:2B:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

**Step 3** Click **Save** on the pop-up window. Wait until the progress bar completes.



---- End

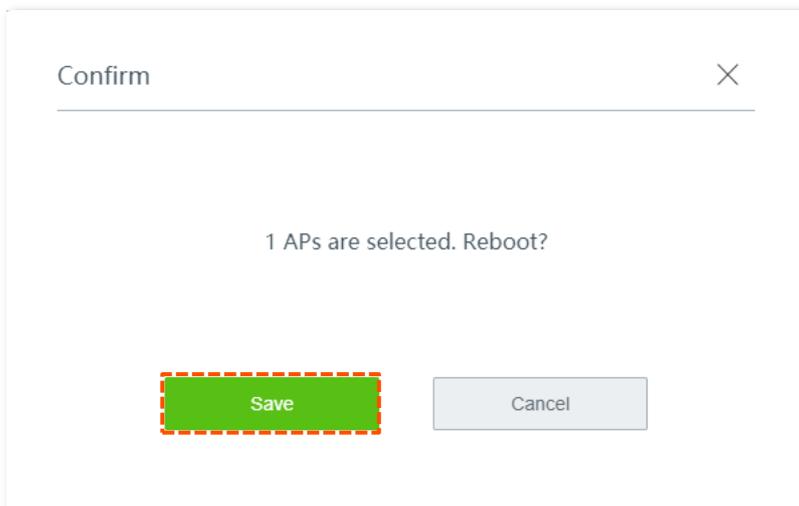
### 10.2.3 Reboot the APs

**Step 1** Click **AP Management > AP Settings** to access the configuration page.

**Step 2** Select APs you want to reboot. You can reboot APs one by one, or select multiple APs to reset them in batch. Click the Reboot button.



**Step 3** Click **Save** on the pop-up window. Wait until the progress bar completes.

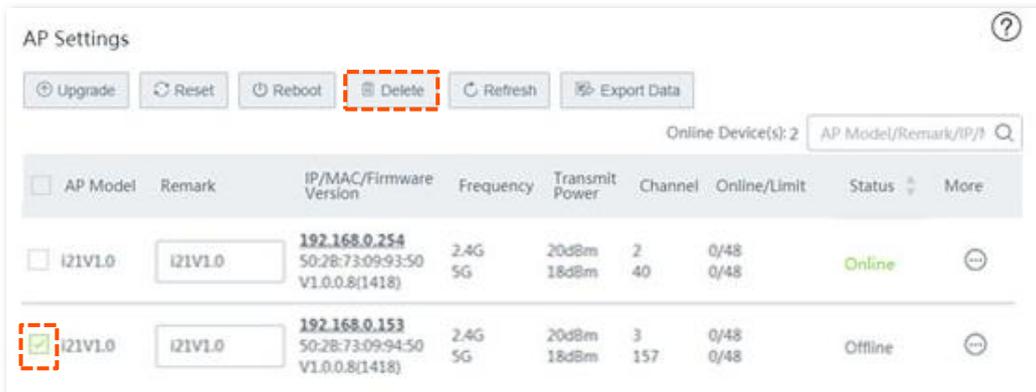


---- End

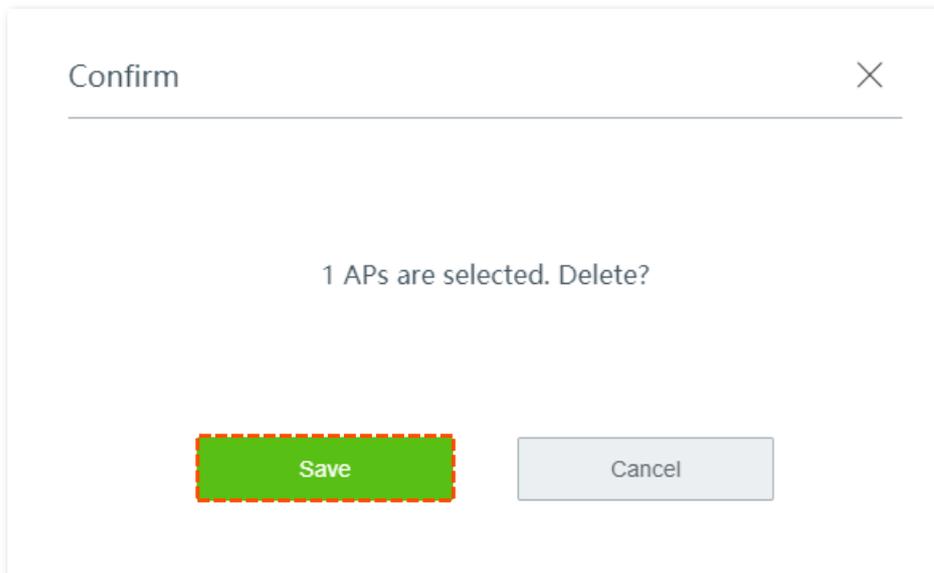
## 10.2.4 Delete the APs

**Step 1** Click **AP Management > AP Settings** to access the configuration page.

**Step 2** Select APs you want to delete. You can delete APs one by one, or select multiple APs to delete them in batch. Click the **Delete** button.



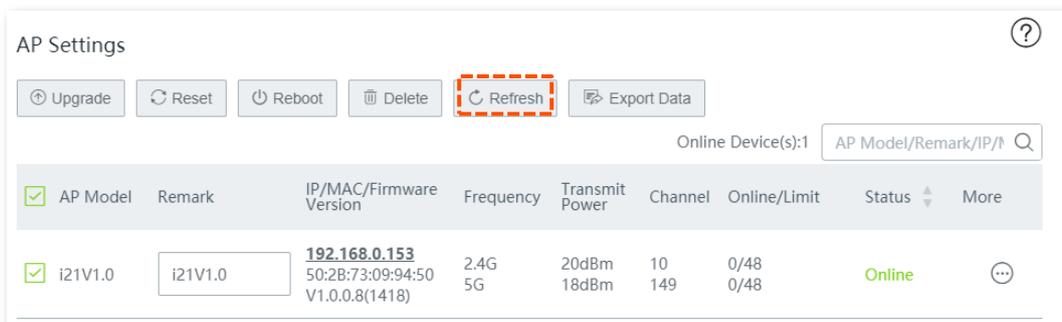
**Step 3** Click **Save** on the pop-up window. Wait until the progress bar completes.



---- End

## 10.2.5 Refresh the page

Click the **Refresh** button to refresh the page.

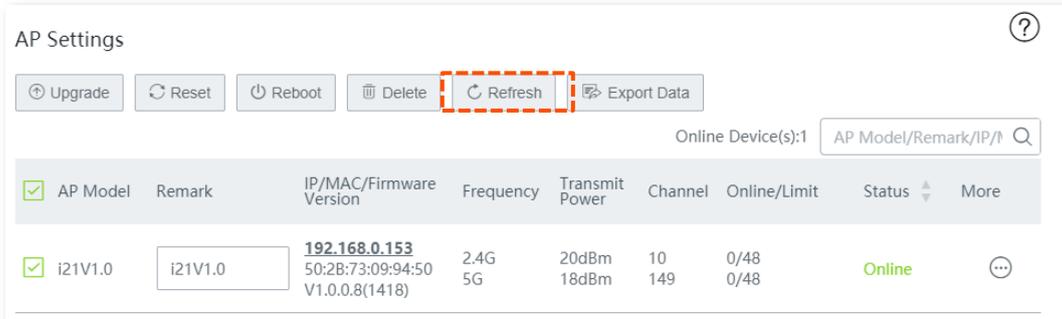


## 10.2.6 Export data

Use **Export Data** button if you want to download your APs' information displayed on the **AP Setting** page as an Excel document to your local computer.

**Step 1** Click **AP Management >AP Settings** to access the configuration page.

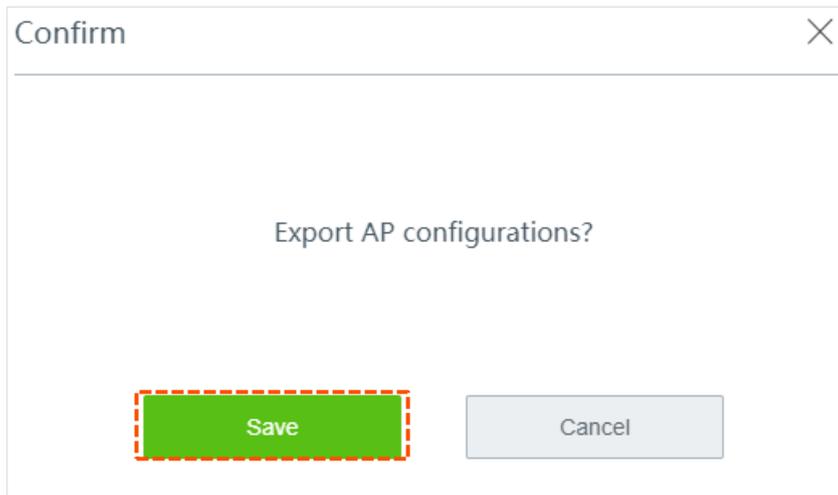
**Step 2** Click the **Export Data** button.



The screenshot shows the 'AP Settings' interface. At the top, there are several action buttons: Upgrade, Reset, Reboot, Delete, Refresh, and Export Data. The 'Export Data' button is highlighted with a red dashed box. Below the buttons, there is a search bar for 'Online Device(s):1' and a table of AP configurations. The table has columns for AP Model, Remark, IP/MAC/Firmware Version, Frequency, Transmit Power, Channel, Online/Limit, Status, and More. One AP is listed with the following details:

AP Model	Remark	IP/MAC/Firmware Version	Frequency	Transmit Power	Channel	Online/Limit	Status	More
i21V1.0	i21V1.0	192.168.0.153 50:2B:73:09:94:50 V1.0.0.8(1418)	2.4G 5G	20dBm 18dBm	10 149	0/48 0/48	Online	⋮

**Step 3** Click **Save** button on the confirm page appears, and then an EXCEL file will be downloaded to your local computer.



The screenshot shows a 'Confirm' dialog box with the text 'Export AP configurations?' and two buttons: 'Save' and 'Cancel'. The 'Save' button is highlighted with a red dashed box.

----- End

## 10.3 Advanced settings



This function is available only when the AP Management function is enabled on the **AP Management > Basic Settings** page.

In this section, you can set up advanced settings for the APs.

To access the configuration page, choose **AP Management > Advanced Settings**. See the following figure:

The screenshot shows the 'Advanced Settings' page for a 2.4 GHz AP. The left sidebar contains navigation options: System Status, Internet Settings, Wireless, Address Reservation, Bandwidth Control, Authentication, AP Management (highlighted), Basic Settings, AP Settings, Advanced Settings (highlighted), Filter Management, More, and Maintenance. The main content area is titled 'Advanced Settings' and has three tabs: '2.4 GHz Advanced Settings' (selected), '5 GHz Advanced Settings', and 'Global Settings'. The settings are as follows:

- Country/Region: China
- Network Mode: 11b/g/n
- Channel Bandwidth:  Auto,  20MHz,  40MHz
- Channel: Auto
- Transmit Power: 30 dBm
- RSSI Threshold: -90 dBm (Range: -90 to -60)
- Client Timeout Interval: 5 minutes
- Air Interface Scheduling:  Enable,  Disable
- Isolate this network:  Enable,  Disable
- WMM:  Enable,  Disable
- APSD:  Enable,  Disable
- Deployment Mode:  Default,  Coverage-oriented,  Capacity-oriented

At the bottom, there are 'Save' and 'Cancel' buttons. Copyright ©2019 Shenzhen Tenda Technology Co., Ltd. is noted at the bottom left.

### Parameter description

#### 2.4 GHz Advanced Settings / 5 GHz Advanced Settings

Parameter	Description
Country/Region	Country or region where this device is located. You can select the country or region to ensure that this device complies with the local regulations.
Channel	Specify the channel in which the AP operates. Select one idle channel for less interference. <b>Auto</b> indicates that this device automatically changes to a channel rarely used in the ambient environment to prevent interference.
Network Mode	Available options for <b>2.4 GHz</b> band: 802.11b, 802.11g, 802.11b/g, and 802.11b/g/n (default). Available options for <b>5 GHz</b> band: 802.11a, 802.11ac (default), and 802.11a/n mixed.

Parameter	Description
	You are recommended to keep the default settings.
Channel Bandwidth	<p>Select the channel bandwidth for the AP.</p> <p>Available options for <b>2.4 GHz</b> band: <b>Auto</b> (default), <b>20MHz</b>, and <b>40MHz</b>.</p> <p>Available options for <b>5 GHz</b> band: <b>20MHz</b>, <b>40MHz</b>, and <b>80MHz</b> (default).</p> <p>You are recommended to keep the default settings.</p>
Channel	Specify the channel in which the AP operates. Select one idle channel for less interference. <b>Auto</b> indicates that this device automatically changes to a channel rarely used in the ambient environment to prevent interference.
Transmit Power	<p>Transmit power of the AP.</p> <p>If the specified transmit power exceeds the limit power of an AP, the actual power is equal to the limit power. For example, if the specified power is greater than the maximum power of an AP, the actual power of the AP is the maximum power after the wireless policy is delivered, and vice versa.</p>
RSSI Threshold	<p>Used to set the minimum received signal strength threshold of wireless clients connected to the AP.</p> <p>After this function is enabled, wireless clients whose received signal strength is lower than this threshold cannot connect to the AP.</p> <p>An appropriate threshold ensures the connection quality of clients.</p>
Client Timeout Interval	<p>If a wireless client does not exchange data with the AP in the specified period, the AP disconnects the client.</p> <p>Available options: <b>1 minutes</b>, <b>5 minutes</b> (default), <b>10 minutes</b>, and <b>15 minutes</b>.</p>
Prioritize 5 GHz	<p>It specifies that a wireless client that compliant with dual-band wireless firstly connects to the 5 GHz band of the device if the corresponding wireless network uses the same SSID and password for both 2.4 GHz and 5 GHz.</p> <p>This function takes effect when:</p> <ul style="list-style-type: none"> <li>- The encryption mode is set to WPA-PSK, WPA2-PSK, or WPA-PSK&amp;WPA2-PSK.</li> <li>- The SSID does not contain Chinese characters.</li> </ul> <p>By default, this function is enabled.</p>
Air Interface Scheduling:	<p>Air interface scheduling allocates equal download data transmission time for each client. In this way, high-speed clients can transmit more data packets and the AP has a higher throughput and client capacity.</p> <p>By default, this function is enabled.</p>
Isolate this network	<p>Whether to disable communications among the clients connected to different wireless networks of this device. This function increases wireless network security.</p> <p>By default, this function is disabled.</p>
WMM	<p>After WMM is enabled, voice and video packets are transmitted with top priority.</p> <p>You are recommended to enable this function for better transmission of</p>

Parameter	Description
	multimedia packets. By default, this function is enabled.
APSD	It specifies whether to enable the Automatic Power Save Delivery (APSD) mode. APSD is a WMM power saving protocol created by Wi-Fi Alliance. Enabling APSD helps reduce power consumption. By default, this mode is disabled.
Deployment Mode	<p>It specifies the deployment mode of the router. This parameter is valid only for 2.4 GHz networks. Select a mode that conforms to your application scenario. Available options:</p> <ul style="list-style-type: none"> <li>- <b>Default:</b> This option is a balance between Coverage-oriented and Capacity-oriented.</li> <li>- <b>Coverage-oriented:</b> This mode applies to scenarios that the network environment is complex, users are scattered, and the interference is weak.</li> <li>- <b>Capacity-oriented:</b> This mode applies to scenarios that the area is open and crowded with users and the interference is strong.</li> </ul>

## Global Settings

Parameter	Description
Ethernet Mode	<p>Select the Ethernet mode for the PoE port of the AP. Available options:</p> <ul style="list-style-type: none"> <li>- <b>Standard (default):</b> This mode features a high data rate but short transmission distance.</li> <li>- <b>10 Mbps Full Half Duplex:</b> This mode features long transmission distance but low data rate. Generally, the negotiated speed is 10 Mbps.</li> </ul> <p>If the Ethernet connecting the LAN port of the AP to the peer device is longer than 100 meters, this mode is recommended. In this case, ensure that the peer device adopts auto negotiation mode.</p>
LED Indicator	Used to turn on/off the LED indicators of this device.
Reboot Schedule	<p>Select the reboot schedule mode for the AP. Available options:</p> <ul style="list-style-type: none"> <li>- <b>Disable (default).</b></li> <li>- <b>Reboot Schedule:</b> the AP reboots at the specified date and time.</li> <li>- <b>Reboot Interval:</b> the AP reboots every interval.</li> </ul>

# 11 Filter management

## 11.1 Overview

The router allows you to configure MAC address-based, port-based, and URL-based filter rules to control the access of certain clients to specified pages.

## 11.2 Configure IP group and time group

To access the page for setting IP address groups and time groups, choose **Filter Management > IP Group/Time Group**. See the following figure.

The screenshot shows the 'IP Group/Time Group' configuration page. The left sidebar contains a navigation menu with 'Filter Management' selected, and 'IP Group/Time Group' highlighted. The main content area is divided into two sections: 'Time Group Settings' and 'IP Group Settings'. The 'Time Group Settings' section has an 'Add' button and a 'Delete' button, followed by a table with columns for Group Name, Date, Time, and Operation. The 'IP Group Settings' section also has 'Add' and 'Delete' buttons, followed by a table with columns for IP Address Group, IP Range, and Operation. A 'No data' message is displayed at the bottom of the page.

Group Name	Date	Time	Operation
Every Day	Mon, Tues, Wed, Thur, Fri, Sat, Sun.	00:00~00:00	

IP Address Group	IP Range	Operation
------------------	----------	-----------

### 11.2.1 Configure time groups



- By default, there is a time rule named **Every Day** which cannot be edited or deleted.
- A time group that has been referenced cannot be deleted.

**Step 1** Choose **Filter Management > IP Group/Time Group** page, and locate the **Time Group**

**Settings** configuration area.

**Step 2** Click **+Add**. The **Add** configuration window appears.

**Add**

Group Name:

Time:  :  ~  :

Date:  All  Custom

Mon.  Tues.  Wed.  Thur.

Fri.  Sat.  Sun.

**Step 3** Set the required parameters.



- Duplicate group names are **not** allowed.
- **00:00~00:00** indicates a whole day.

**Step 4** Click **Save**.

---- End

Added successfully. See the following figure.

IP Group/Time Group

Time Group Settings

Click to delete rules in batch

Click to select all

<input type="checkbox"/>	Group Name	Date	Time	Operation
<input type="checkbox"/>	Every Day	Mon.,Tues.,Wed.,Thur.,Fri.,Sat.,Sun.	00:00~00:00	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
<input type="checkbox"/>	Business_time	Mon.,Tues.,Wed.,Thur.,Fri.	08:00~18:00	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

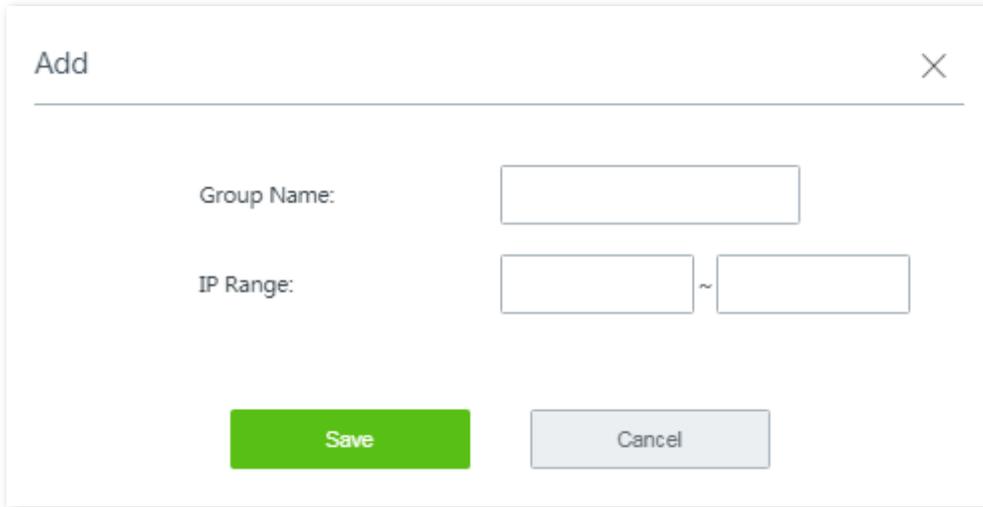
Click to delete a single rule?

Click to modify

## 11.2.2 Configure IP groups

**Step 1** Choose **Filter Management > IP Group/Time Group**, and locate the **IP Group Settings** configuration area.

**Step 2** Click **+Add**. The **Add** configuration window appears.



**Step 3** Set the required parameters.

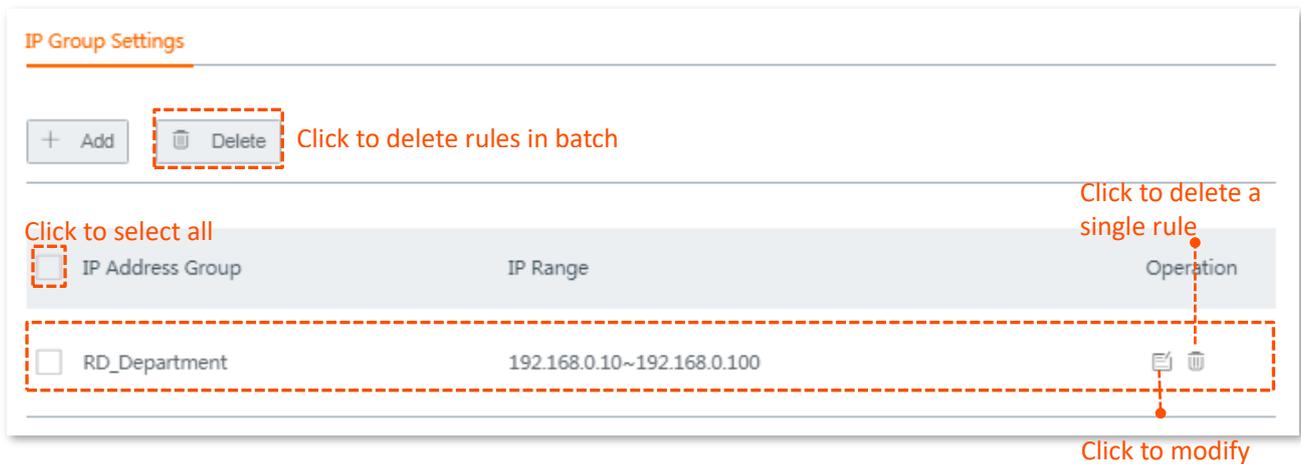


Duplicate group names are **not** allowed.

**Step 4** Click **Save**.

---- **End**

Added successfully. See the following figure.



An IP address group that is in use cannot be deleted.

## 11.3 MAC address filter

This is a time group-related function. You can create MAC address-based rules to decide whether or not clients can access the internet through the router on what time.

### 11.3.1 Configure the MAC address filter

#### Before you start

Set up at least one time group rule. The default time group name is **Every Day**.

#### Configuration procedure

**Step 1** Choose **Filter Management > MAC Address Filter**.

**Step 2** Enable this function, and click **Save**.

The screenshot shows the 'MAC Address Filter' configuration page. On the left is a navigation menu with options: System Status, Internet Settings, Wireless, Address Reservation, Bandwidth Control, Authentication, Filter Management (highlighted), IP Group/Time Group, MAC Address Filter (highlighted), and IP Address Filter. The main content area is titled 'MAC Address Filter' and features a toggle switch for 'MAC Address Filter' which is turned on. Below the toggle are '+ Add' and 'Delete' buttons. A table with columns 'Filter Type', 'MAC Address', 'Time Group', 'Remark', 'Status', and 'Operation' is shown, but it is empty with a 'No data' message. At the bottom, there is a checked checkbox with the text 'Allow clients with disabled status or clients not on the list to access the internet through this device.' and 'Save' and 'Cancel' buttons.

**Step 3** Configuring MAC address filter rule(s).

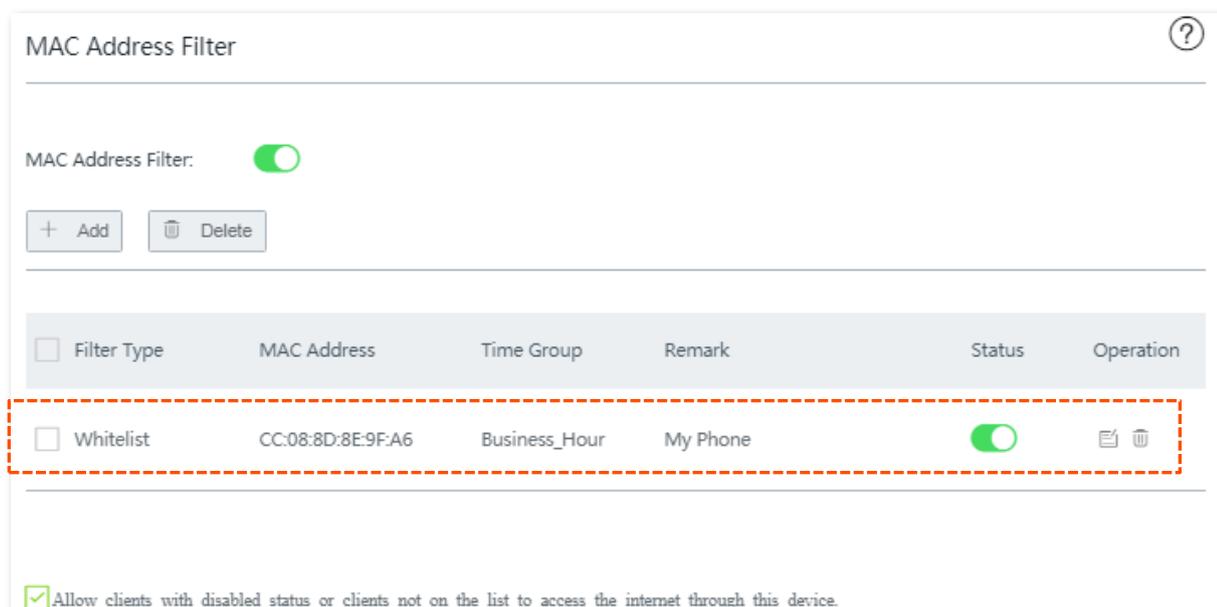
1. Click **+Add**. The **Add** configuration window appears.

The 'Add' configuration window is shown. It has a title bar with 'Add' and a close button. The 'Filter Type' section has two radio buttons: 'Allow access to the internet' (selected) and 'Forbid access to the internet'. The 'Time Group' is a dropdown menu set to 'Every Day'. The 'MAC Address' and 'Remark' fields are text input boxes, with 'Optional' entered in the Remark field. At the bottom are 'Save' and 'Cancel' buttons.

2. Set the required parameters.
3. Click **Save**.

---- End

Added successfully. See the following figure:



## 11.3.2 Example of configuring MAC address filter rule(s)

### Networking requirement

An enterprise uses the router to set up a LAN to address the following requirement:

During business hours (08:00 to 18:00 on weekday), only the purchaser is allowed to access the internet. Assume that the MAC address of the purchaser's computer is CC:3A:61:71:1B:6E.

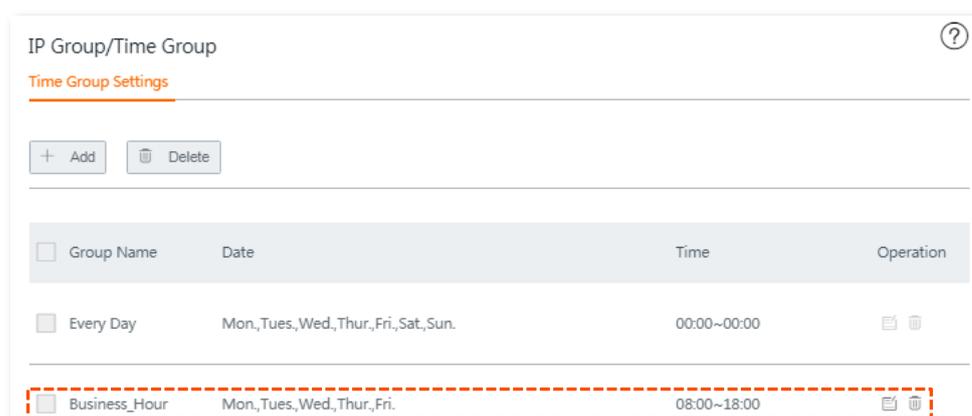
### Solutions

The MAC address filter can meet this requirement.

### Configuration procedure

**Step 1** Set up a time group.

1. Choose **Filter Management > IP Group/Time Group**.
2. Set a time group shown in the following figure.



**Step 2** Set an MAC address filter rule.

1. Choose **Filter Management > MAC Address Filter**, enable this function, and click **Save**.
2. Click **+Add**. The **Add** window appears.
3. Set the required parameter, and click **Save**. See the following figure.

The 'Add' window shows the following configuration:

- Filter Type:  Allow access to the internet,  Forbid access to the internet
- Time Group: Business\_Hour
- MAC Address: CC:3A:61:71:1B:6E
- Remark: Purchaser

Buttons: Save (highlighted with a mouse cursor), Cancel



You are recommended to enter a brief description on the rule in **Remark** field for later management.

4. Deselect **Allow clients with disabled status or clients not on the list to access the internet through this device**.

The MAC Address Filter configuration page shows:

- MAC Address Filter:
- Buttons: + Add, Delete
- Table:

<input type="checkbox"/>	Filter Type	MAC Address	Time Group	Remark	Status	Operation
<input type="checkbox"/>	Whitelist	CC:3A:61:71:1B:6E	Business_Hour	Purchaser	<input checked="" type="checkbox"/>	

At the bottom, a checkbox is checked:  Allow clients with disabled status or clients not on the list to access the internet through this device.

5. Click **Save** at the bottom of the page to apply your settings.

---- End

## Verification

During 08:00 to 18:00 on weekdays, only the purchaser's computer can access the internet.

## 11.4 IP address filter

This is a time group-related function. You can create IP address-based rules to decide whether or not clients can access the internet through the router during certain period of time.

### 11.4.1 Configure the IP address filter

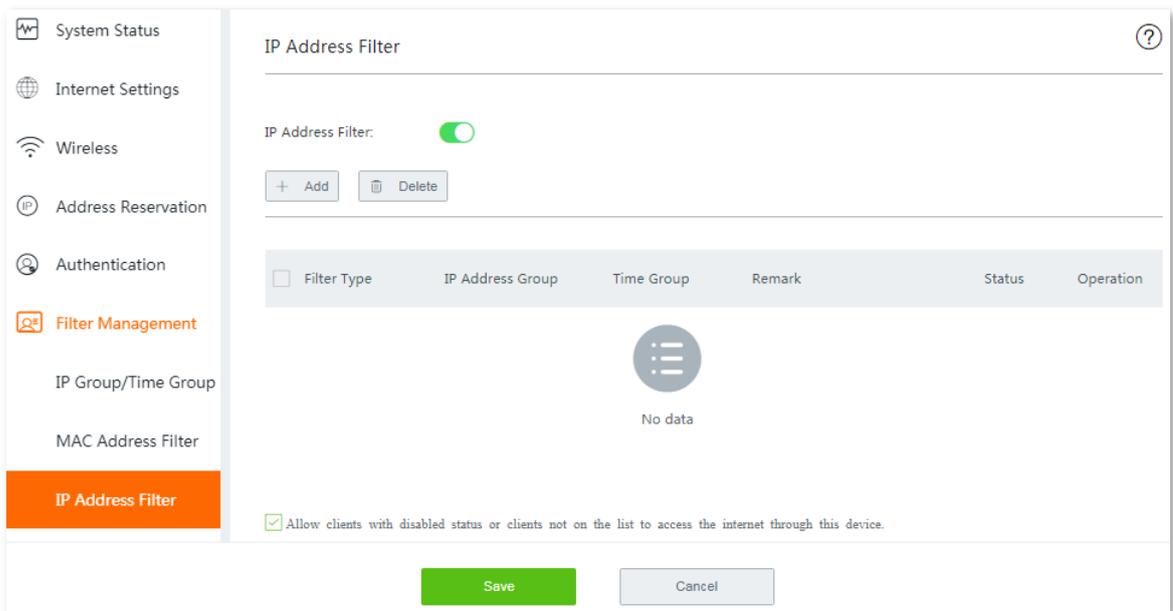
#### Before you start

- Set up at least one time group rule.
- Set up at least one IP group rule.
- To make IP address-based filter rules always take effect, specify a static IP address for the clients.

#### Configuration procedure

**Step 1** Choose **Filter Management > IP Address Filter**.

**Step 2** Enable this function, and click **Save**.



**Step 3** Configure IP address filter rule(s).

1. Click **+Add**. The **Add** configuration window appears.

Filter Type:  Allow access to the internet  
 Forbid access to the internet

Time Group: Every Day

IP Group: IP\_Group\_1

Remark: Optional

Save Cancel

2. Set the required parameters.
3. Click **Save**.

---- End

Added successfully. See the following figure:

IP Address Filter:

+ Add Delete

<input type="checkbox"/>	Filter Type	IP Address Group	Time Group	Remark	Status	Operation
<input checked="" type="checkbox"/>	Whitelist	IP_Group_1	Every Day	Finance	<input checked="" type="checkbox"/>	

Allow clients with disabled status or clients not on the list to access the internet through this device.

## 11.4.2 Example of configuring IP address filter rule(s)

### Networking requirement

An enterprise uses the router to set up a LAN to address the following requirement:

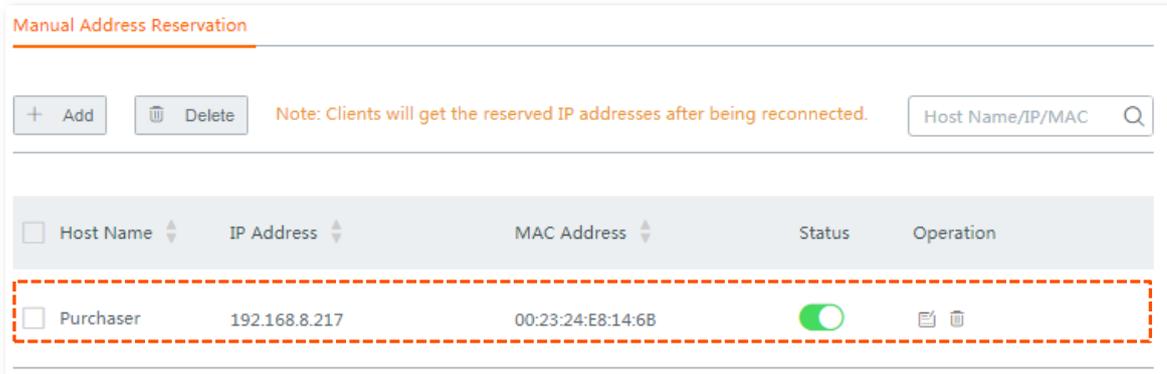
During business hours (08:00 to 18:00 on weekday), only the purchaser is allowed to access the internet. Assume that the IP address of the purchaser's computer is 192.168.8.217.

### Solution

The IP address filter can meet this requirement.

## Configuration procedure

**Step 1** Specify a static IP address for the purchaser's computer, which is **192.168.8.217** in this example.



The screenshot shows the 'Manual Address Reservation' interface. At the top, there are '+ Add' and 'Delete' buttons, a note stating 'Note: Clients will get the reserved IP addresses after being reconnected.', and a search box labeled 'Host Name/IP/MAC'. Below this is a table with columns: Host Name, IP Address, MAC Address, Status, and Operation. A row for 'Purchaser' is highlighted with a dashed orange border. The 'Purchaser' row contains the IP address 192.168.8.217, MAC address 00:23:24:E8:14:6B, a green status toggle, and edit/delete icons.

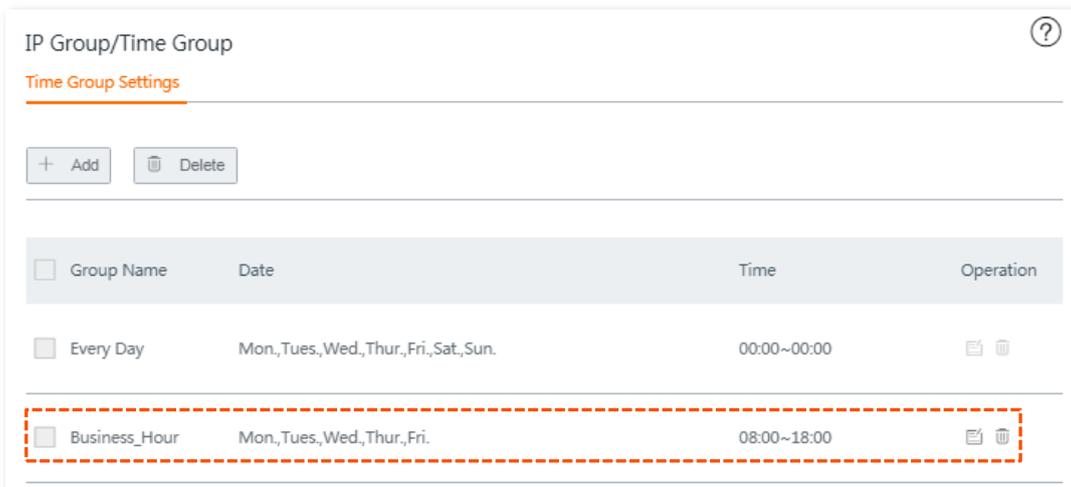
Host Name	IP Address	MAC Address	Status	Operation
Purchaser	192.168.8.217	00:23:24:E8:14:6B	<input checked="" type="checkbox"/>	



Refer to [Address reservation](#) for detailed description of configuration procedure.

**Step 2** Set up a time group.

1. Choose **Filter Management > IP Group/Time Group**.
2. Set a time group shown in the following figure.

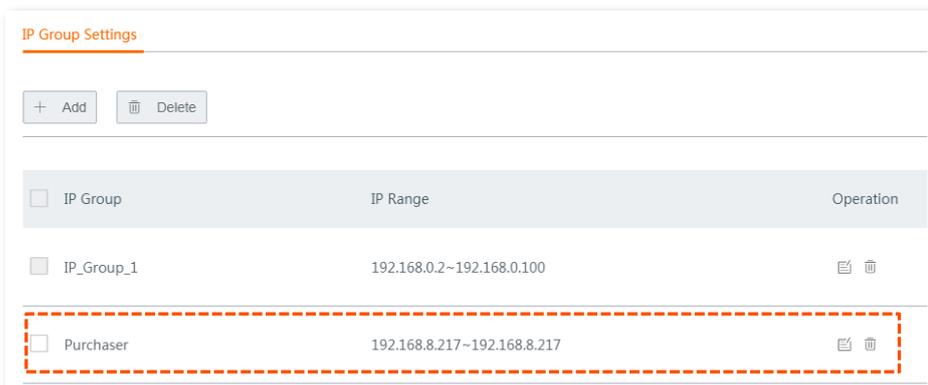


The screenshot shows the 'IP Group/Time Group' interface. It has '+ Add' and 'Delete' buttons. Below is a table with columns: Group Name, Date, Time, and Operation. Two rows are visible: 'Every Day' with 'Mon, Tues, Wed, Thur, Fri, Sat, Sun' and '00:00~00:00'; and 'Business\_Hour' with 'Mon, Tues, Wed, Thur, Fri' and '08:00~18:00'. The 'Business\_Hour' row is highlighted with a dashed orange border.

Group Name	Date	Time	Operation
Every Day	Mon, Tues, Wed, Thur, Fri, Sat, Sun.	00:00~00:00	
Business_Hour	Mon, Tues, Wed, Thur, Fri.	08:00~18:00	

**Step 3** Set up an IP group.

1. Choose **Filter Management > IP Group/Time Group**, and locate the **IP Address Settings**.
2. Set an IP group shown in the following figure.

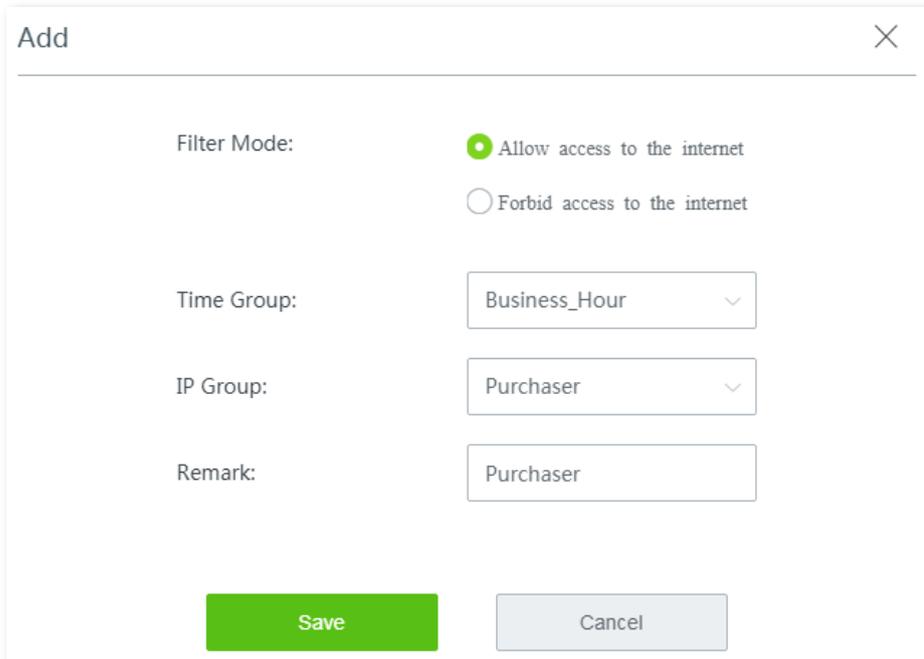


The screenshot shows the 'IP Group Settings' interface. It has '+ Add' and 'Delete' buttons. Below is a table with columns: IP Group, IP Range, and Operation. Two rows are visible: 'IP\_Group\_1' with '192.168.0.2~192.168.0.100' and 'Purchaser' with '192.168.8.217~192.168.8.217'. The 'Purchaser' row is highlighted with a dashed orange border.

IP Group	IP Range	Operation
IP_Group_1	192.168.0.2~192.168.0.100	
Purchaser	192.168.8.217~192.168.8.217	

**Step 4** Set IP address filter rule(s).

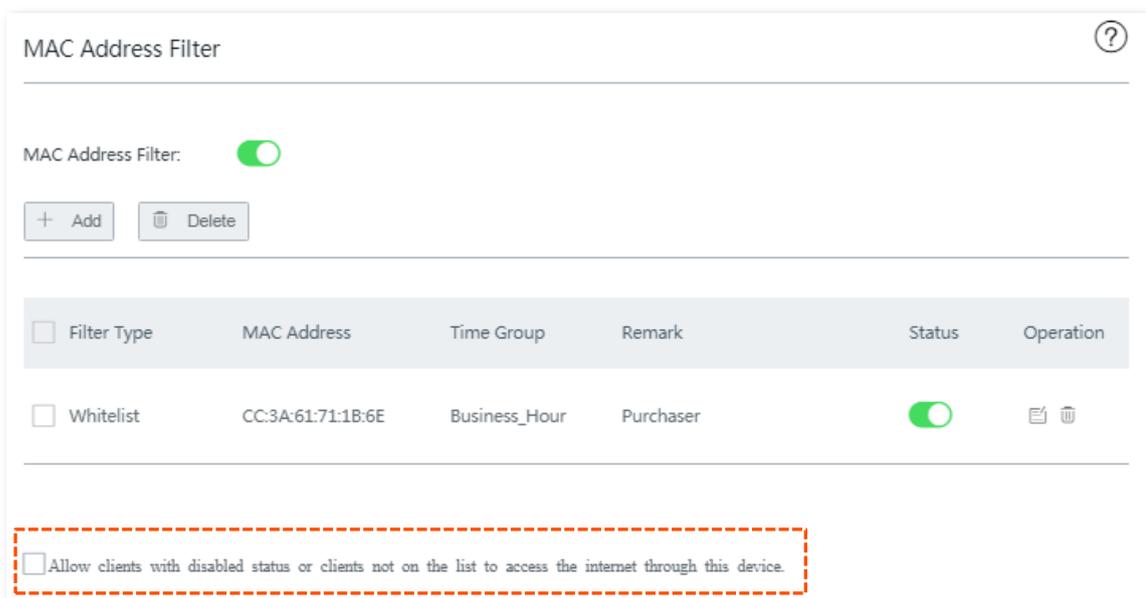
1. Choose **Filter Management > IP Address Filter**.
2. Enable this function, and click **Save**.
3. Click **+Add**. The **Add** window appears.
4. Set required parameter, and click **Save**.



The 'Add' window is a modal dialog with a close button (X) in the top right corner. It contains the following fields and controls:

- Filter Mode:** Two radio buttons. The first is selected and labeled 'Allow access to the internet'. The second is labeled 'Forbid access to the internet'.
- Time Group:** A dropdown menu with 'Business\_Hour' selected.
- IP Group:** A dropdown menu with 'Purchaser' selected.
- Remark:** A text input field containing 'Purchaser'.
- Buttons:** A green 'Save' button and a grey 'Cancel' button at the bottom.

5. Deselect **Allow clients with disabled status or clients not on the list to access the internet through this device**.



The 'MAC Address Filter' page shows the following configuration:

- MAC Address Filter:** A toggle switch is turned on.
- Buttons:** '+ Add' and 'Delete' buttons are visible.
- Table:** A table with columns: Filter Type, MAC Address, Time Group, Remark, Status, and Operation.

<input type="checkbox"/>	Filter Type	MAC Address	Time Group	Remark	Status	Operation
<input type="checkbox"/>	Whitelist	CC:3A:61:71:1B:6E	Business_Hour	Purchaser	<input checked="" type="checkbox"/>	
- Footer:** A checkbox labeled 'Allow clients with disabled status or clients not on the list to access the internet through this device.' is present and is highlighted with a red dashed border.

6. Click **Save** at the bottom of the page to apply your settings.

---- End

## Verification

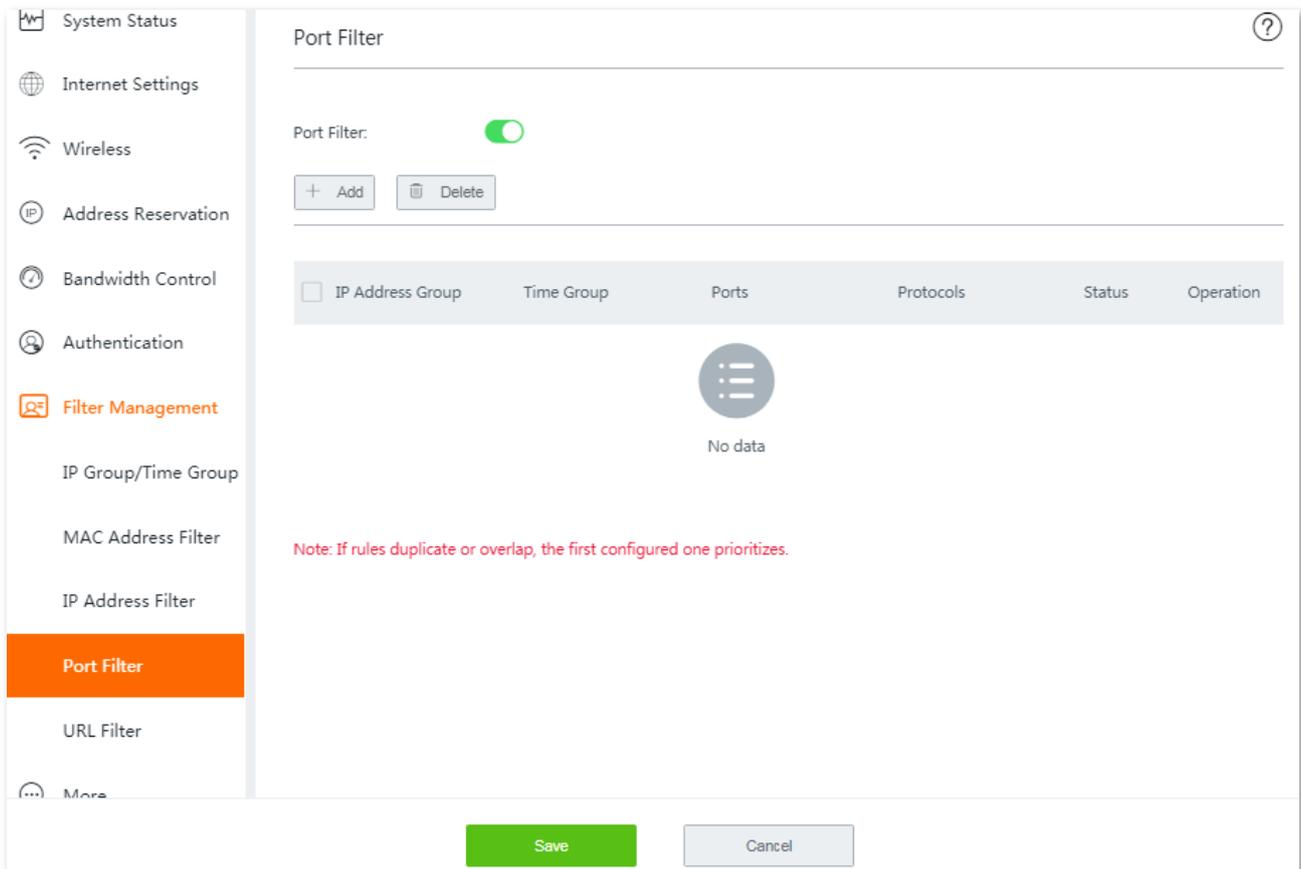
During 08:00 to 18:00 on weekdays, only the purchaser's computer can access the internet.

## 11.5 Port filter

The protocols of various services available over the internet use dedicated port numbers. The common service port numbers range from 0 to 1023 and are generally assigned to specific services.

A port filter prevents LAN users from accessing certain internet services by disabling the users to access the port numbers of the services.

To access the page for setting the port filter, choose **Filter Management > Port Filter**. By default, this function is disabled. Once it is enabled, the following page appears.



### 11.5.1 Configure port filtering rules

#### Before you start

- Set up at least one time group rule.
- Set up at least one IP group rule.

#### Configuration procedure

**Step 1** Choose **Filter Management > Port Filter**.

**Step 2** Enable this function, and click **Save**.

**Step 3** Click **+Add**. The **Add** window appears.

**Step 4** Set the required parameters.

- **To add a single port number:**

Repeat the port number in the second box.

For example, to add the port number 80, enter 80 in the first box. Then repeat it in the second box.

- **To add consecutive port numbers:**

Enter the start port number in the first box, and the end port number in the second box. The start port number cannot be greater than the end port number.

- **To add inconsecutive port numbers:**

The router does not support adding inconsecutive port numbers with one rule. Therefore, to add inconsecutive port numbers, add multiple port number rules that meet your requirements.

The 'Add' dialog box contains the following fields:

- IP Group: RD\_Department
- Time Group: Every Day
- Ports: (Two empty input boxes separated by a colon)
- Protocols: All

Buttons: Save (green), Cancel (grey)

**Step 5** Click **Save**.

---- End

Added successfully. See the following figure:

Port Filter

Port Filter:

+ Add    - Delete

<input type="checkbox"/>	IP Address Group	Time Group	Ports	Protocols	Status	Operation
<input checked="" type="checkbox"/>	RD_Department	Business_Hour	80~80	All	<input checked="" type="checkbox"/>	

Note: If rules duplicate or overlap, the first configured one prioritizes.

## 11.5.2 Example of configuring port filter rules

### Networking requirement

An enterprise uses the router to set up a LAN to address the following requirement:

During business hours (08:00 to 18:00 on weekday), computers with IP addresses ranging from 192.168.0.2 to 192.168.0.100 are not allowed to browse web pages. The default port number of the web service is 80.

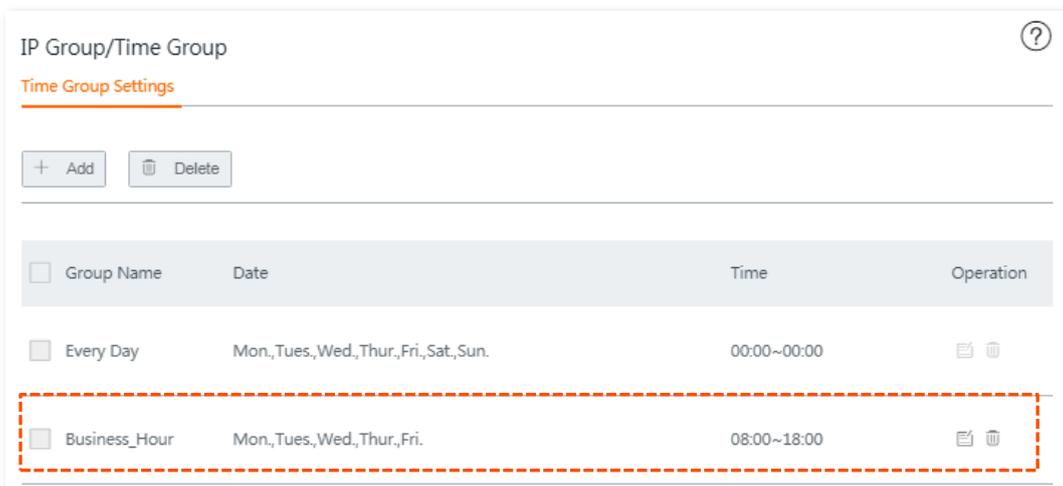
### Solutions

The port filter function of the router can meet this requirement.

### Configuration procedure

**Step 1** Set up a time group.

1. Choose **Filter Management > IP Group/Time Group**.
2. Set a time group shown in the following figure.



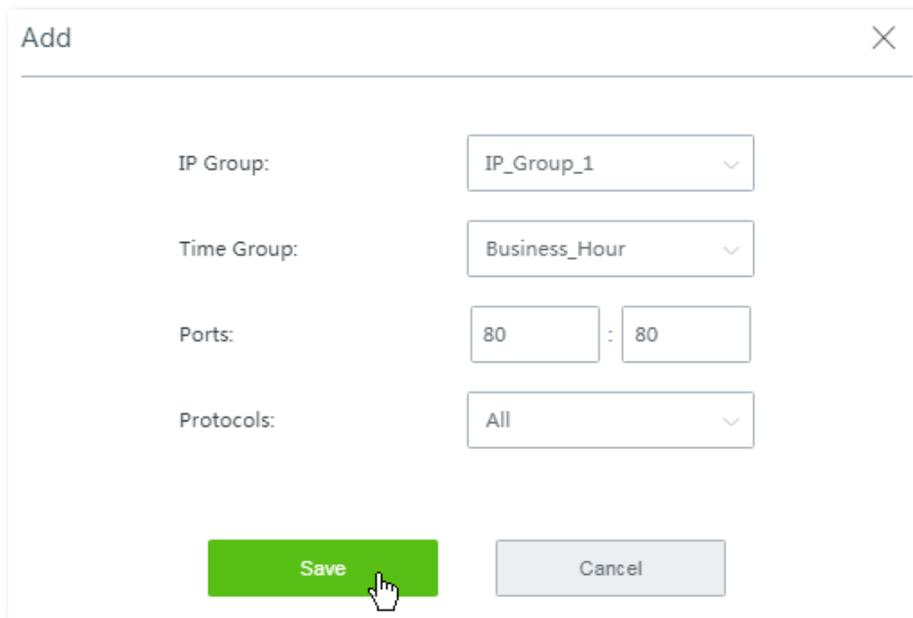
**Step 2** Create an IP group for clients that are disallowed to use web service, which is **192.168.0.2** to **192.168.0.100** in this example.



**Step 3** Set port filter rules.

1. Choose **Filter Management > Port Filter**.
2. Enable this function, and click **Save** at the bottom of the page.
3. Click **+Add**. The **Add** window appears.
4. Set the required parameters. Configurations on the following figure are only used for

examples:



- To add consecutive port numbers, enter the start port number in the first box, and the end port number in the second box. The start port number cannot be greater than the end port number.
- The router does not support to add inconsecutive port numbers with one rule. Therefore, to add inconsecutive port numbers, add multiple port number rules that include your requirement.

5. Click **Save**.

---- End

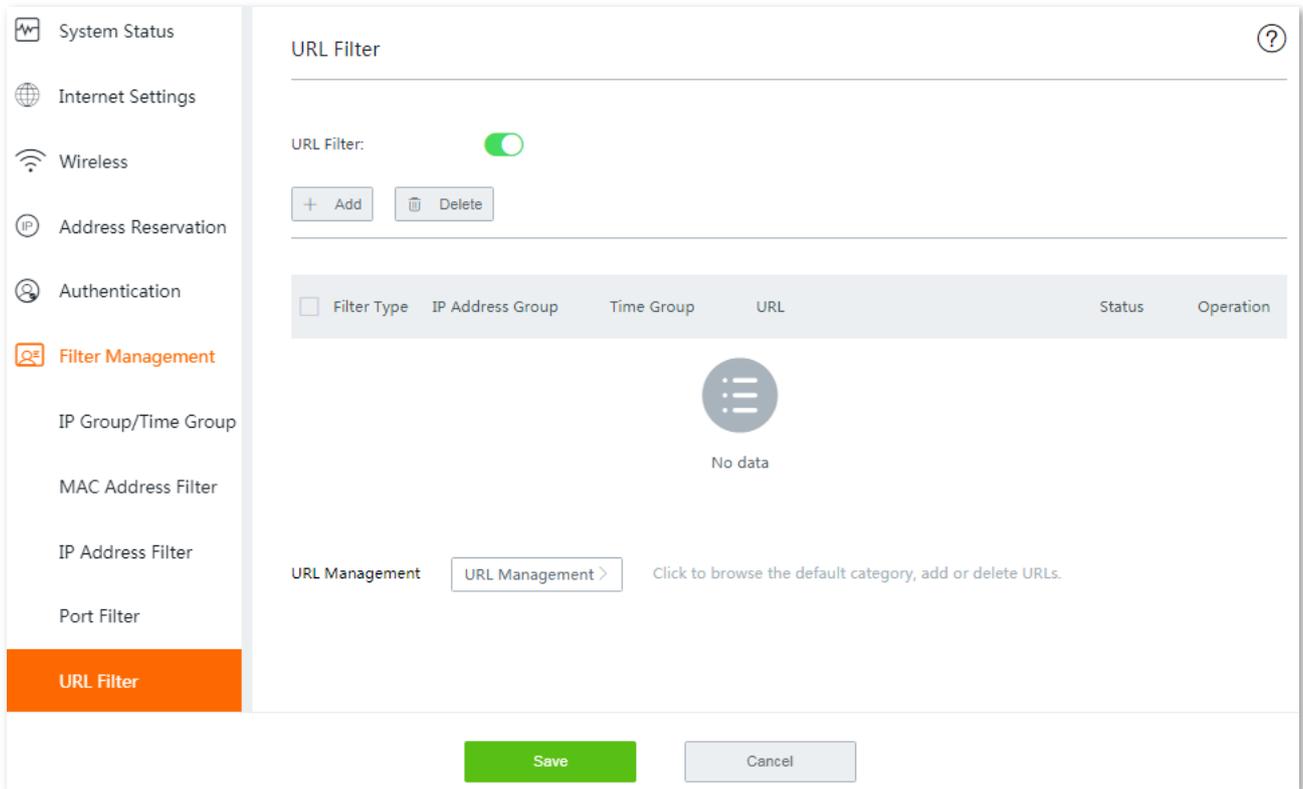
## Verification

During 08:00 to 18:00 on weekdays, verify that the computers with IP addresses ranging from 192.168.0.2 to 192.168.0.100 cannot browse web pages.

## 11.6 URL filter

An URL filter prevents LAN users from accessing specified types of website and controls internet accessibility of LAN users so that they will not spend time on websites irrelevant to their duties. Before you add web filter rules, add web categories.

To access the following page, choose **Filter Management > URL Filter**. By default, this function is disabled. Once it is enabled, the following page appears.



### 11.6.1 Configure URL filter

#### Before you start

- Set up at least one time group rule.
- Set up at least one IP group rule.

#### Configuration procedure

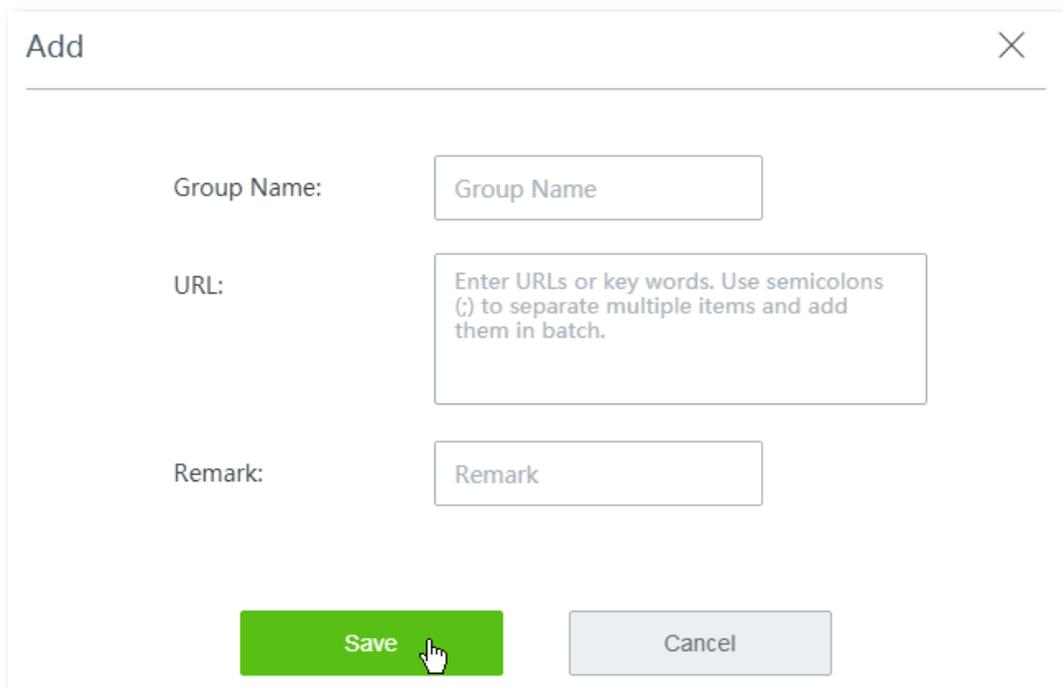
**Step 1** Enable URL Filter.

1. Choose **Filter Management > URL Filter**.
2. Enable this function, and click **Save**.

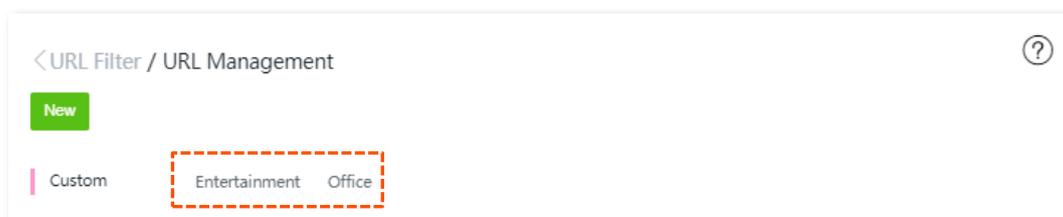
**Step 2** Customize URL library.

1. Click the **URL Management** button. The **URL Management** configuration page appears.

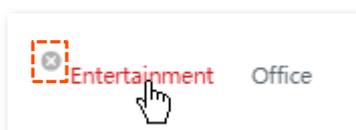
2. Click **New**. The **Add** window appears.



3. Set the required parameters by following the on-screen instructions, and click **Save**. The added URL groups are shown as follows:



- To delete an URL group, move the mouse pointer to it, and click the  on the upper left corner.



- A rule in use cannot be deleted.

### Step 3 Configure an URL filter rule.

1. Click **+Add**. The **Add** window appears.

2. Set the required parameters, and click **Save**.

---- End

Added successfully. See the following figure:

<input type="checkbox"/>	Filter Type	IP Address Group	Time Group	URL	Status	Operation
<input type="checkbox"/>	Whitelist	IP_Group1	Every Day	Entertainment , Office	<input checked="" type="checkbox"/>	

## 11.6.2 Example of configuring URL filter

### Networking requirement

An enterprise uses the router to set up a LAN to address the following requirement:

During business hours (08:00 to 18:00 on weekday), staffs are not allowed to access social medias including Facebook, YouTube, and Tumblr.

## Solutions

The URL filter can meet this requirement.

### Configuration procedure

**Step 1** Set up time groups and IP groups.

1. Choose **Filter Management > IP Group/Time Group**.
2. Set up a time group from **08:00 to 18:00** on weekday, and an IP groups ranging from **192.168.0.2 to 192.168.0.100**. See the following figure:

The screenshot displays two configuration sections: 'Time Group Settings' and 'IP Group Settings'. Each section has an 'Add' and 'Delete' button. The 'Time Group Settings' table lists 'Every Day' and 'Business\_Hour'. The 'IP Group Settings' table lists 'IP\_Group1'. The 'Business\_Hour' row and 'IP\_Group1' row are highlighted with a dashed orange border.

Time Group Settings			
Group Name	Date	Time	Operation
Every Day	Mon,Tues,Wed,Thur,Fri,Sat,Sun.	00:00~00:00	
Business_Hour	Mon,Tues,Wed,Thur,Fri.	08:00~18:00	

IP Group Settings		
IP Address Group	IP Range	Operation
IP_Group1	192.168.0.2~192.168.0.100	



For detailed configuration steps, refer to [Configure IP group and time group](#).

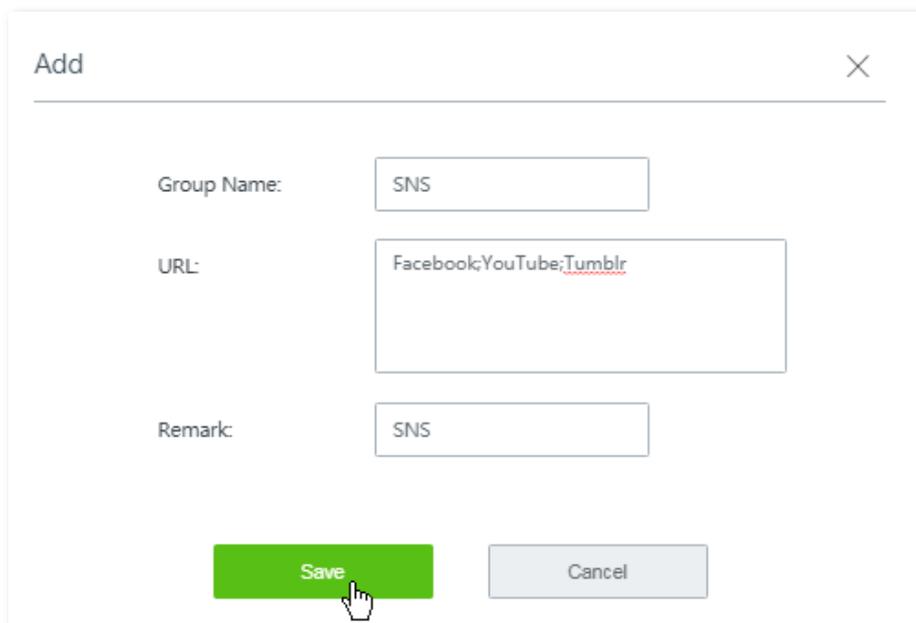
**Step 2** Enable URL Filter.

1. Choose **Filter Management > URL Filter**.
2. Enable this function, and click **Save**.

**Step 3** Customize URL library.

1. Click the **URL Management** button. The **URL Management** configuration page appears.
2. Click **New**. The **Add** window appears.

3. Set the required parameters. See the following figure.

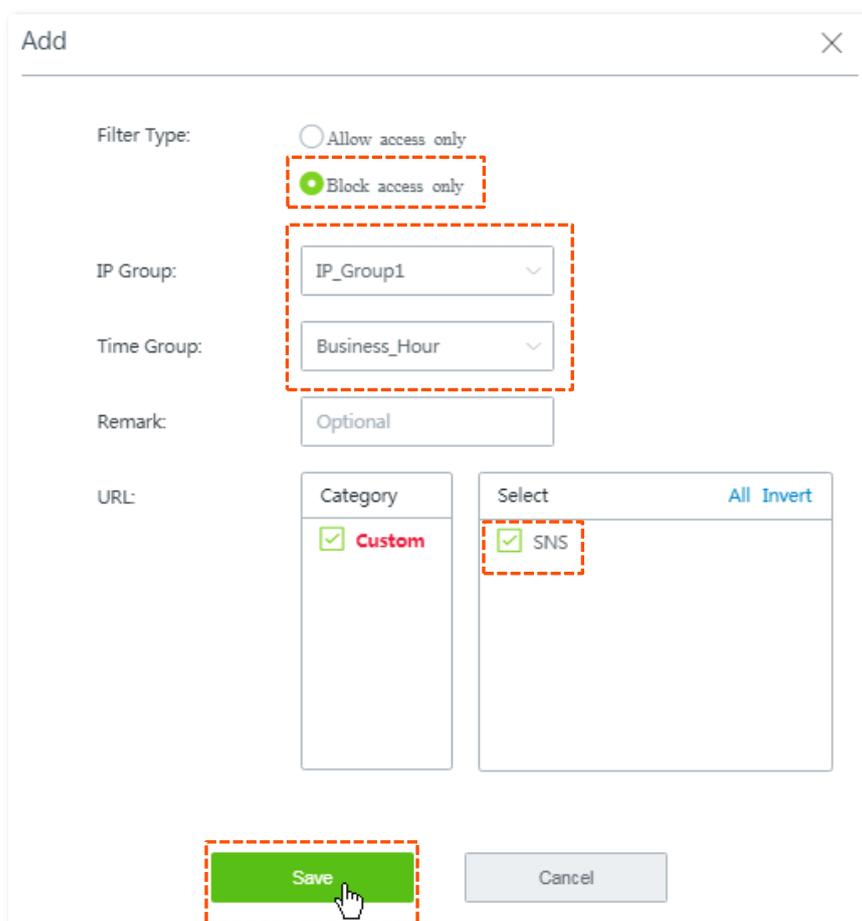


4. Click **Save**.

**Step 4** Configure the URL filter rule.

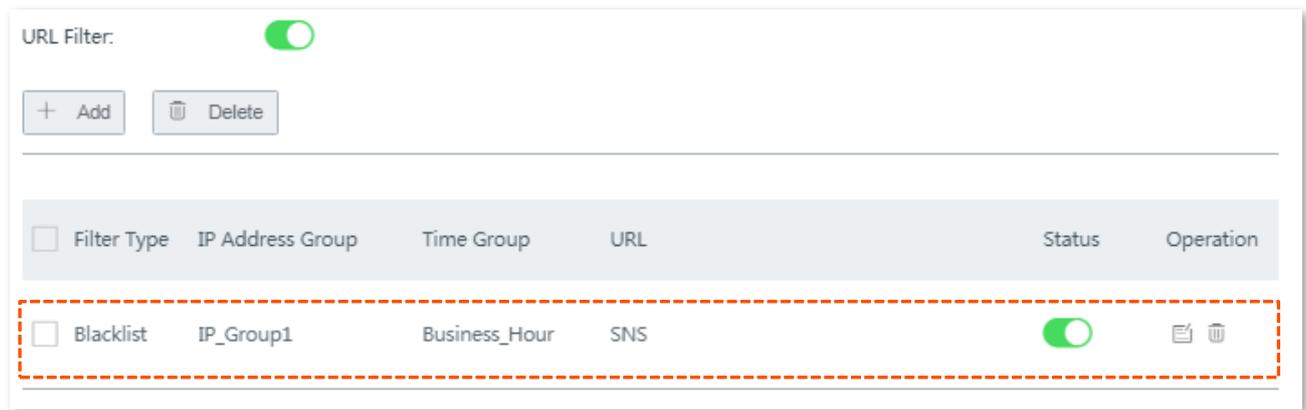
1. Back to the URL filter configuration page, click **+Add**. The **Add** window appears.

2. Set the required parameters, and click **Save**.



---- End

Added successfully. See the following figure:



## Verification

During 08:00 to 18:00 on weekdays, clients with the IP address ranging from 192.168.0.2 to 192.168.0.100 cannot access Facebook, YouTube, and Tumblr.

# 12 More settings

This chapter describes how to modify LAN settings and WAN parameters, how to configure static router, port mirroring, DDNS, port forwarding, UPnP, DMZ host, and how to establish VPN connections.

## 12.1 LAN settings

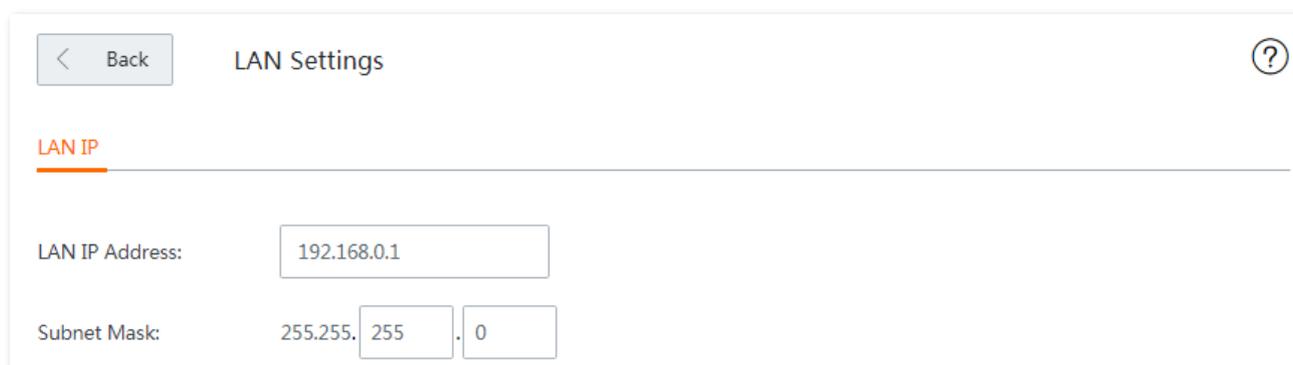
You can view and modify the LAN IP address of the router, and configure DHCP server here.

To enter the configuration page, choose **More > LAN Settings**.

### 12.1.1 Modify LAN IP address of the router

The LAN IP address is also the login IP address of the router. The default LAN IP address is **192.168.0.1**.

Generally, you do not need to modify the LAN IP address of the router, unless an IP conflict happens on the router. An IP conflict happens when the WAN IP address and LAN IP address of the router are in the same network segment, or IP address of another device in the LAN is **192.168.0.1** too.

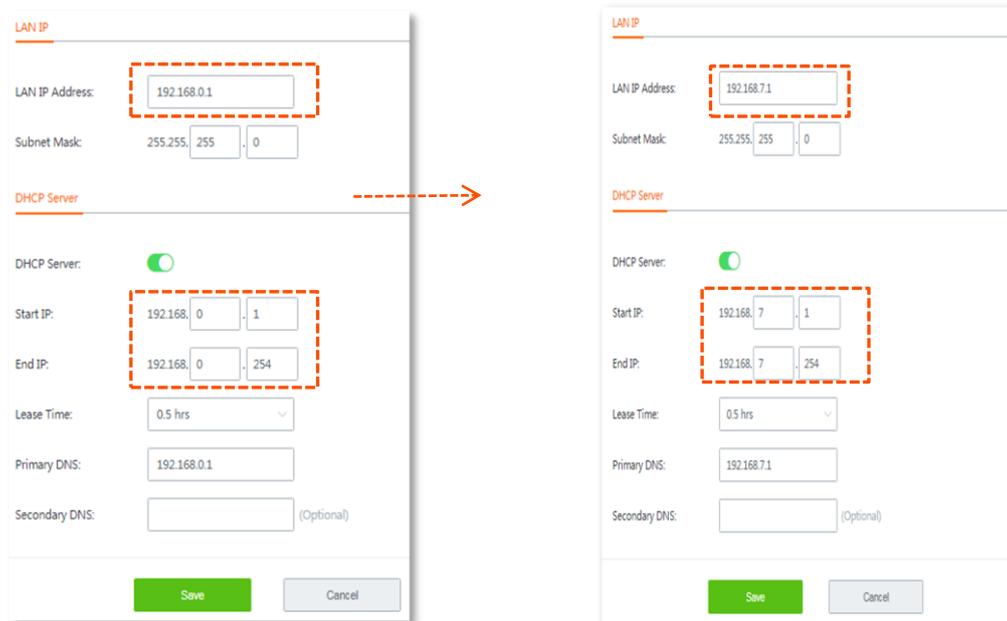


The screenshot shows the 'LAN Settings' configuration page. At the top left, there is a 'Back' button. The page title is 'LAN Settings' with a help icon on the right. Below the title, the 'LAN IP' section is highlighted. The 'LAN IP Address' field is set to '192.168.0.1'. The 'Subnet Mask' field is set to '255.255.255.0'.

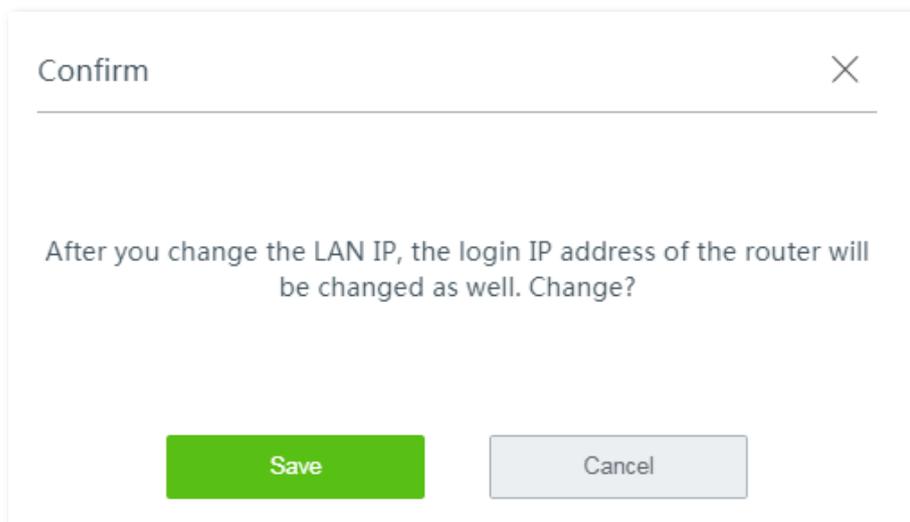
#### Configuration procedure:

**Step 1** Modify the LAN IP address, which is **192.168.7.1** in this example.

Since the network segment of the new LAN IP address is different from the original one, the router modifies the network segment of the DHCP server automatically. See the following figure:



**Step 2** Click **Save**, the following message appears.



**Step 3** Click **Save**.

---- **End**

Wait until the progress bar completes. You will be redirected to the login page.

Use the new LAN IP address to log in to the web UI of router later.

## 12.1.2 Modify DHCP server

DHCP server can automatically assign IP addresses, subnet mask, gateway and other internet parameters to devices connected to the router. If this function is disabled, you have to manually set IP address settings for your connected devices for internet access. Therefore, you are recommended to keep the DHCP server enabled.

To modify DHCP server information, modify the parameters as required and click **Save** to apply your settings.



With this function enabled, IP address-based functions, such as port forwarding and IP address filter may be affected.

**DHCP Server**

DHCP Server:

Start IP: 192.168.  .

End IP: 192.168.  .

Lease Time:

Primary DNS:

Secondary DNS:  (Optional)

## 12.2 WAN parameters

### 12.2.1 Overview

If you have set internet connection parameters but your LAN devices cannot access the internet, try modifying WAN port parameters here.

To access the configuration page, choose **More > WAN Parameters**.

The screenshot shows a web interface for configuring WAN parameters. On the left is a navigation menu with items: System Status, Internet Settings, Wireless, Address Reservation, Bandwidth Control, Authentication, Filter Management, More (highlighted in orange), and Maintenance. The main content area is titled 'WAN Parameters' and has a 'Back' button. It is divided into three sections: WAN1, WAN2, and Fast NAT. Each WAN section has three dropdown menus: WAN Speed (set to 'Auto Negotiation'), MTU (set to '1500'), and MAC Address (set to 'Default MAC'). The MAC address for WAN1 is 50:2B:73:F1:2F:61 and for WAN2 is 50:2B:73:F1:30:62. The Fast NAT section has two radio buttons: 'Enable' (selected) and 'Disable'. At the bottom are 'Save' and 'Cancel' buttons. Copyright information for Shenzhen Tenda Technology Co., Ltd. is visible in the footer.

System Status

Internet Settings

Wireless

Address Reservation

Bandwidth Control

Authentication

Filter Management

**More**

Maintenance

Copyright ©2018  
Shenzhen Tenda Technology Co., Ltd.

Back WAN Parameters

**WAN1**

WAN Speed: Auto Negotiation

MTU: 1500

MAC Address: Default MAC 50:2B:73:F1:2F:61

**WAN2**

WAN Speed: Auto Negotiation

MTU: 1500

MAC Address: Default MAC 50:2B:73:F1:30:62

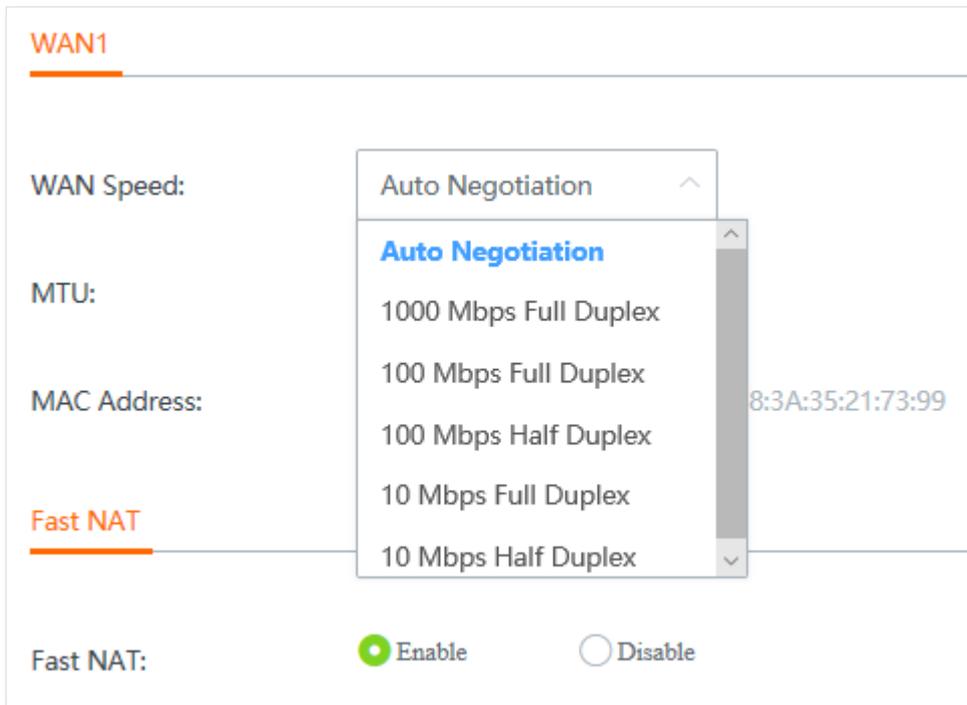
**Fast NAT**

Fast NAT:  Enable  Disable

Save Cancel

## 12.2.2 WAN speed

The speed of an Ethernet physical port is determined through negotiation with its peer device. The negotiated speed can be any speed within the interface capability. You can try to modify the speed and duplex mode when network connection issues occur.



### Duplex modes supported by the router and their scenarios:

Speed and Duplex	Applicable scenario
Auto Negotiation	<p>The duplex mode of the port is determined through auto negotiation between the router and its peer device.</p> <p>You are recommended to keep the default settings since auto negotiation is the default option for most of Ethernet network devices.</p> <p>If the router uses auto negotiation, while its peer uses non-auto negotiation, the negotiated duplex mode is half duplex.</p>
10/100/1000 Mbps Full Duplex	<p>The interface can receive and send packets simultaneously, leading to low latency and high efficiency. <b>10/100/1000 Mbps</b> indicates the maximum link speed that both ends can negotiate. Only W18E and W20E support <b>1000 Mbps Full Duplex</b>.</p> <p> <b>NOTE</b></p> <p>You are recommended to use the same speed link and duplex modes for both ends. Otherwise, network connection issues may occur.</p>
10/100 Mbps Half Duplex	<p>The interface can either receive or send packets at a time. <b>10/100Mbps</b> indicates the maximum link speed that both ends can negotiate.</p> <p> <b>NOTE</b></p> <p>You are recommended to use the same speed link and duplex modes for both ends. Otherwise, network connection issues may occur.</p>

### 12.2.3 MTU

MTU is abbreviated for Maximum Transmission Unit. It specifies the maximum size of a packet that can be transmitted by a network device. Either larger or smaller MTU value affects the network performance. Do not modify the default settings unless the following situations happen:

- Some websites are inaccessible, or secure websites cannot be displayed properly, such as online banking websites, or PayPal.
- Email service suspends, or servers, such as FTP/POP servers, are inaccessible.

**Commonly-used MTU value in different scenarios:**

MTU (Bytes)	Scenario
1500	It is the most common value for non-PPPoE connections and non-VPN connections.
1492	It is used for PPPoE connections.
1480	It is the maximum value for the pinging function. (If a greater value is used, packets are split.)
1450	It is used for DHCP, which assigns dynamic IP addresses to connected devices.
1400	It is used for VPNs or PPTP.

### 12.2.4 Clone MAC address

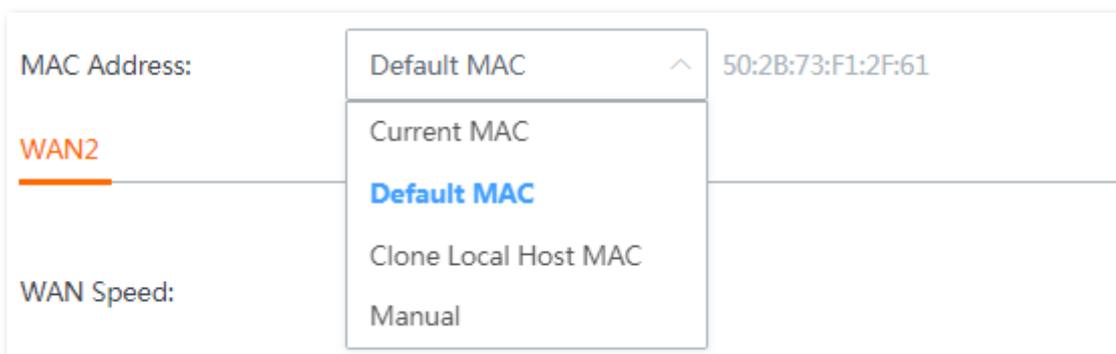
#### Overview

Some ISPs allow only a single or a certain number of computers to use the broadband service you subscribed, and register the MAC address of your computer when you first use their cable modem for internet access. Therefore, you may find yourself in the following situations after setting up the router:

- Only one computer can access the internet normally.
- No internet connection at all.

The reason why such a problem happens is that your ISP does not accept MAC addresses other than the registered one. To resolve this, you need to clone the MAC address of the registered computer to the router to pretend that the router has the same MAC address as the registered one.

The cloning MAC address function is designed for this purpose. Click **More > WAN Parameters** to enter the configuration page.



## Parameter description

Parameter	Description
Current MAC	It specifies the MAC address the router currently used.
Default MAC	<p>It specifies the MAC address of the router itself.</p> <p> <b>TIP</b></p> <ul style="list-style-type: none"><li>- You can view the MAC address of the router on <a href="#">LAN port status</a> page, or the Label on the bottom of your router.</li><li>- If you clone the local host MAC, the MAC address of the router is changed to the MAC address you cloned.</li></ul>
Clone Local Host MAC	<p>It specifies the MAC address of the computer that can access the internet normally.</p> <p> <b>TIP</b></p> <p>To use this option, you need to keep the computer with internet connectivity connected to the router and disconnect all the other computers. Otherwise, find the correct MAC address, and enter it manually. You can consult your ISP as well.</p>
Manual	It allows you to manually specify a MAC address.

## Clone MAC address

**Step 1** Click **More > WAN Parameters**, and locate the corresponding WAN port.

**Step 2** Select one option, or manually specify the MAC address according to your actual situation.

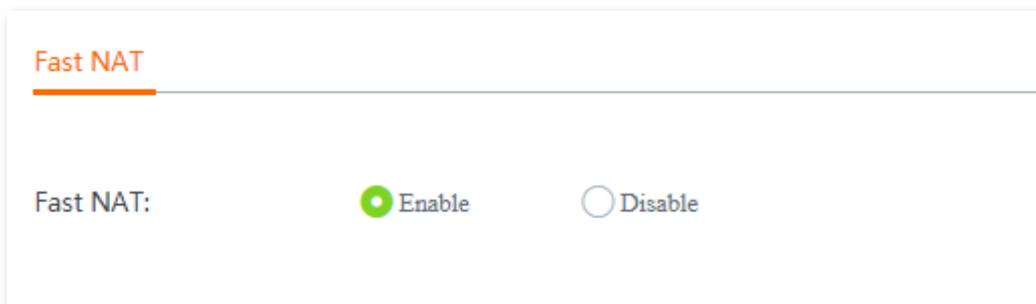
**Step 3** Click **Save** to apply your settings.

---- End

## 12.2.5 Fast NAT

NAT (Network Address Translation) translates private addresses in intranet to global (public) addresses to achieve communication between the intranet and the internet. While fast NAT enables the router forward the traffic from the specific LAN to the chosen WAN directly. This function reduces the CPU loading and speed up the performance of the NAT sessions.

You are recommended to keep fast NAT enabled.



## 12.3 Configure static route

### 12.3.1 Overview

Routing is an operation to select the optimal route for delivering data from a source to a destination. A static route is a special route configured manually, which is simple, efficient, and reliable. Proper static routes help reduce route selection issues and prevent overload caused by route selection data flows, accelerating packet forwarding.

To define a static route, specify the network segment and subnet mask used to identify a destination network or host, the gateway IP address, and the router WAN port for forwarding packets. After a static route is defined, all the packets intended for the destination of the static route are directly forwarded through the WAN port of the router to the gateway IP address.



**TIP** If only static routes are used in a large-scale complex network, destinations may be unreachable in case of a network fault or topology change, which results in network interruption. If the problem occurs, manually modify the static routes.

To enter the configuration page, choose **More > Static Routing**.

Destination Network	Subnet Mask	Default Gateway	Interface	Operation
No data				

Destination Network	Subnet Mask	Default Gateway	Interface
0.0.0.0	0.0.0.0	192.168.0.1	WAN2
192.168.0.0	255.255.255.0	0.0.0.0	WAN2

#### Parameter description

Parameter	Description
Destination Network	Destination network of packets.
Subnet Mask	Subnet mask of the destination network.
Default Gateway	IP address of the next hop to the final destination of packets.

Parameter	Description
Interface	Port through which packets are forwarded.

## 12.3.2 Configure a static routing rule

**Step 1** Choose **More > Static Routing** and click **+Add**. The **Add** configuration window appears.

The 'Add' configuration window is shown with the following fields:

- Destination Network:
- Subnet Mask:
- Default Gateway:
- Interface:

Buttons: **Save** (green), **Cancel** (grey)

**Step 2** Set the parameters and click **Save**.

**Step 3** Choose **More > Static Routing** and view the added static route.

The available static routes are displayed on the static routing page. See the following figure.

The 'Static Routing' page displays the following tables:

**Static Routing Table:**

Destination Network	Subnet Mask	Default Gateway	Interface	Operation
172.16.0.0	255.255.0.0	192.168.97.1	WAN2	

**Routing Table:**

Destination Network	Subnet Mask	Default Gateway	Interface
0.0.0.0	0.0.0.0	192.168.97.1	WAN2
192.168.1.0	255.255.255.0	0.0.0.0	LAN
192.168.97.0	255.255.255.0	0.0.0.0	WAN2
172.16.0.0	255.255.0.0	192.168.97.1	WAN2

---- End

In the route table, the record where **Destination Network** and **Subnet Mask** are **0.0.0.0** indicates the default route of the router. If no route exactly matching the destination address of a packet is found in the route table, the router uses the default route to forward the packet. The route containing the gateway IP address **0.0.0.0** is a direct route, which means that the destination network is directly connected to the router using the port specified in the route.



If a static route conflicts with a user-defined multi-WAN policy, the static route prioritizes.

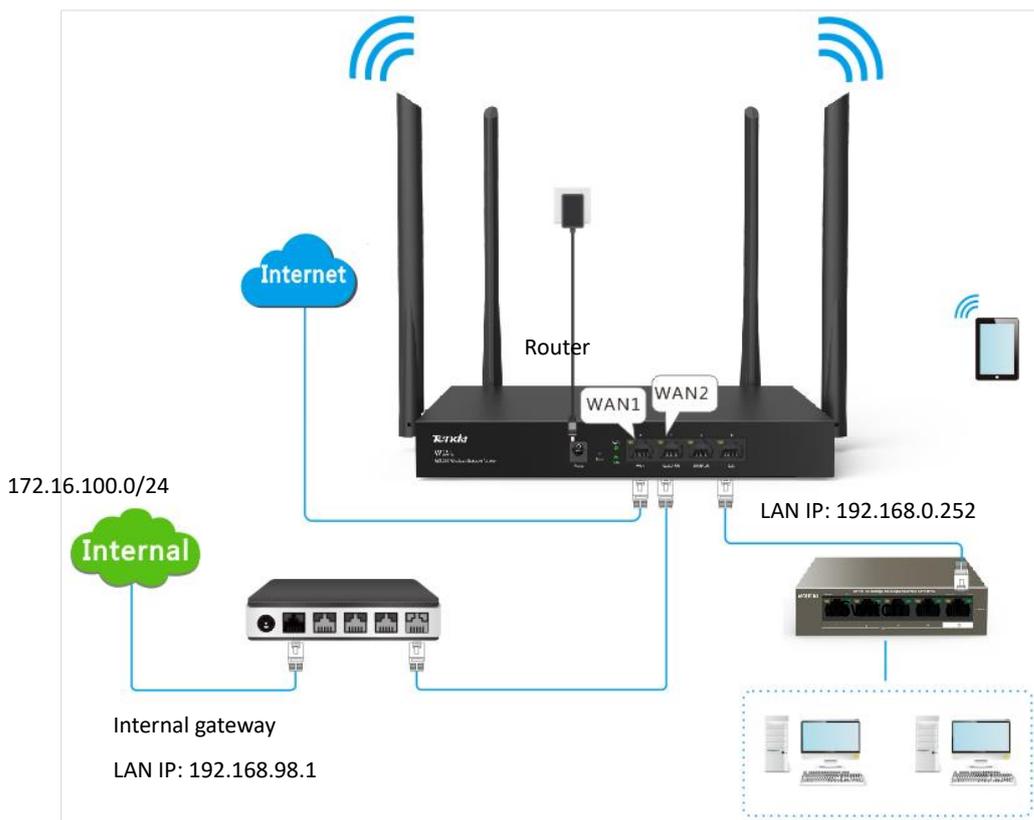
### 12.3.3 Example of configuring static route

#### Network requirement

An enterprise uses the router for network construction. The internet is inaccessible to the enterprise LAN. The WAN1 port of the router accesses the internet using a PPPoE connection and the WAN2 port of the router accesses the enterprise LAN using a dynamic IP address. Users on the router LAN are allowed to access both the internet and enterprise LAN. Assume that the PPPoE user name and password are **tenda/tenda**.

#### Solutions

The static routing function can address this requirement.



#### Configuration procedure

##### Step 1 Configuring multiple WAN ports.

Refer to [Configure multiple WAN ports](#) to configure the **WAN1** port to **PPPoE** and **WAN2** port to **Dynamic IP**. See the following figure:

**Internet Settings**

**WAN Ports**

WAN Ports:

Port Type:

4	3	2	1
WAN	WAN/LAN	WAN/LAN	LAN
WAN1	WAN2	LAN3	LAN4

**WAN1**

Connection Type:

PPPoE Username:

PPPoE Password:

Server Name:  (Optional)

Service Name:  (Optional)

Status: Connected

**WAN2**

Connection Type:

Status: Connected

**Step 2** Configuring static routing rules.

1. Navigate to **System Status** to view the default gateway of WAN2 port, which is **192.168.98.1** in this example.
2. Click **More > Static Routing**, and click **+Add**. The **Add** configuration window appears.
3. Set the parameters and click **Save**.

**Add** ✕

---

Destination Network:

Subnet Mask:

Default Gateway:

Interface:

**---- End**

Added successfully. See the following figure:

Destination Network	Subnet Mask	Default Gateway	Interface	Operation
172.16.100.0	255.255.255.0	192.168.98.1	WAN1	

## Verification

Computers in the LAN can access the internet and the intranet simultaneously.



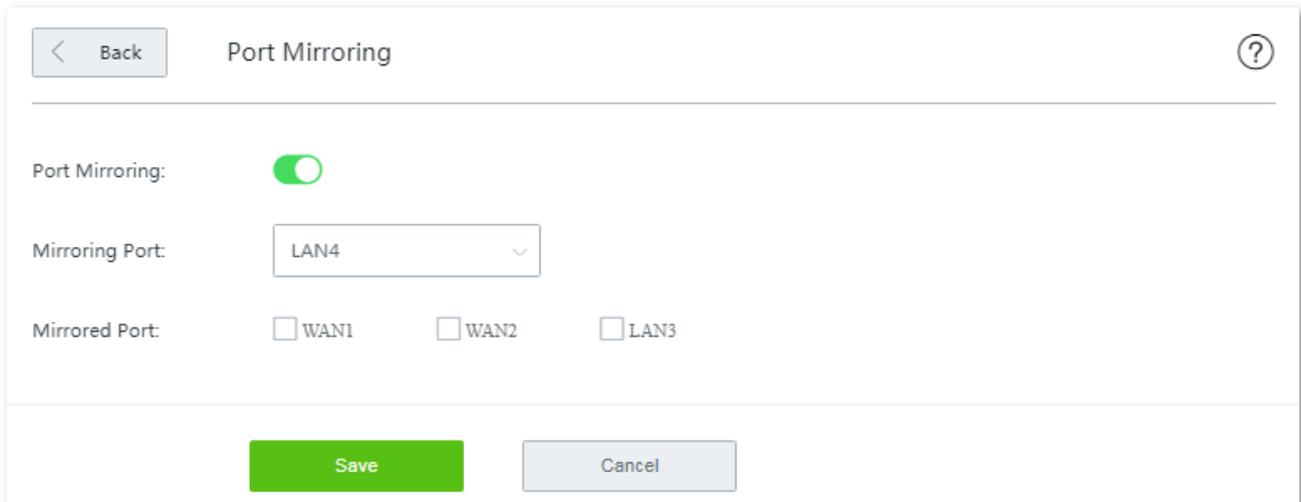
- If the enterprise LAN is connected to the internet, the router may point its default route to the other router, resulting in incorrect routing. In this case, navigate to **Bandwidth Control** and set **Upload/Download Rate** of the **WAN2** port to a value far smaller than the value of the **WAN1** port.
- If the preceding case occurs, it is recommended that you disable the smart load balancing function of the router and use a user-defined multi-WAN policy to ensure that all LAN users access the internet through the WAN1 port of the router.

## 12.4 Port mirroring

### 12.4.1 Overview

Port mirroring function forwards a copy of data of one or more mirrored ports to the specified mirroring port. The network administrator uses data monitoring devices to monitor traffic, analyze performance and perform network diagnose.

By default, this function is disabled. Choose **More > Port Mirroring**, and enable this function, the following configuration page appears:



The screenshot shows the 'Port Mirroring' configuration interface. At the top left is a 'Back' button, and at the top right is a help icon. The main configuration area includes a 'Port Mirroring' toggle switch which is turned on (green). Below it is a 'Mirroring Port' dropdown menu currently showing 'LAN4'. Underneath is a 'Mirrored Port' section with three checkboxes: 'WAN1', 'WAN2', and 'LAN3', all of which are unchecked. At the bottom of the form are two buttons: a green 'Save' button and a grey 'Cancel' button.

#### Parameter description

Parameter	Description
Port Mirroring	It is used to enable or disable the port mirroring function. The default option is <b>Disable</b> .
Mirroring Port	It indicates the monitoring port. A piece of monitoring software must be installed on the computer with this port to perform monitoring. The default mirroring port is <b>LAN4</b> .
Mirrored Port	It specifies the monitored ports. After the port mirroring function is enabled, packets of the mirrored ports are replicated to the mirroring port for monitoring.

### 12.4.2 Configure port mirroring

**Step 1** Choose **More > Port Mirroring** to access the configuration page.

**Step 2** Set **Port Mirroring** to **Enable**.

**Step 3** Choose **Mirroring Port** and **Mirrored Port** as required.

**Step 4** Click **Save** to apply your settings.

---- End

## 12.4.3 Example of configuring port mirroring

### Networking requirement

An enterprise has used the router to set up a LAN. Recently, internet access failures occur frequently and the network administrator needs to capture data packets from the WAN and LAN ports of the router for analysis.

### Solutions

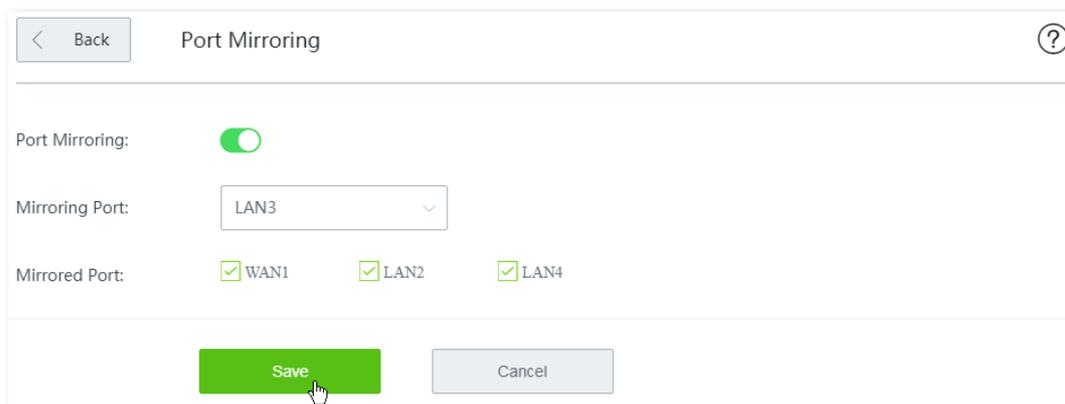
The port mirroring function of the router can meet this requirement.



### Configuration procedure

- Step 1** Choose **More > Port Mirroring** to access the configuration page.
- Step 2** Set **Port Mirroring** to **Enable**.
- Step 3** Choose **Mirroring Port** and **Mirrored Port** as required.

**Step 4** Click **Save** to apply your settings.



Back Port Mirroring ?

Port Mirroring:

Mirroring Port: LAN3

Mirrored Port:  WAN1  LAN2  LAN4

Save Cancel

---- End

## Verification

Run monitoring software such as Wireshark on the monitoring computer to verify the software can capture data packets from the mirrored ports.

## 12.5 Manage your router remotely using web UI

### 12.5.1 Overview

Generally, the web UI of the router can only be accessed on devices that are connected to the router in wired or wireless manner. This costs in case of seeking technician to fix network problems. The remote web management function is designed to address such requirement. When you encounter network faulty, you can ask technician far away to diagnose and fix your problems, improving efficiency and reducing costs and efforts.

Choose **More > Remote WEB Management**, and enable this function, the configuration page appears. See the following figure:

Remote WEB Management

Remote WEB MGMT:

WAN:  WAN1  WAN2

Remote IP:

Remote Access Address:

#### Parameter description

Parameter	Description
Remote IP	<p>IP address of the computer that can access the router remotely.</p> <ul style="list-style-type: none"><li>- <b>Any IP:</b> Any computers can access the router over the internet. Choose this option only when necessary since it lowers network security.</li><li>- <b>Specified IP:</b> Only a computer with the specified IP address can access the router over the internet. If the computer is on a LAN, enter the WAN port IP address of the gateway of the computer.</li></ul>
Remote Access Address	With this function enabled, the router automatically generates one unique domain name that can be used to manage the router remotely.

### 12.5.2 Configure remote web management

**Step 1** Click **More > Remote WEB Management**, and enable this function.

**Step 2** Select the **WAN** port for remote access.

**Step 3** Set the **Remote IP** to either of **Any IP** or **Specified IP**.



- **Any IP:** It indicates that all internet users can access the web UI of the router with the **Remote Access Address** here. For security of your network, select this option only when necessary.
- **Specified IP:** It indicates that only the host with the specified public IP address is allowed to access the web UI of router remotely.
- If the computer for remote access is in an intranet, enter the public IP address of the computer's gateway here.

**Step 4** Click **Save** to apply your settings.

Remote WEB Management

Remote WEB MGMT:

WAN:  WAN1  WAN2

Remote IP: Any IP

Remote Access Address: `http://e9leofi8.cloud.tendacn.net:8080` Copy

Save Cancel

---- End

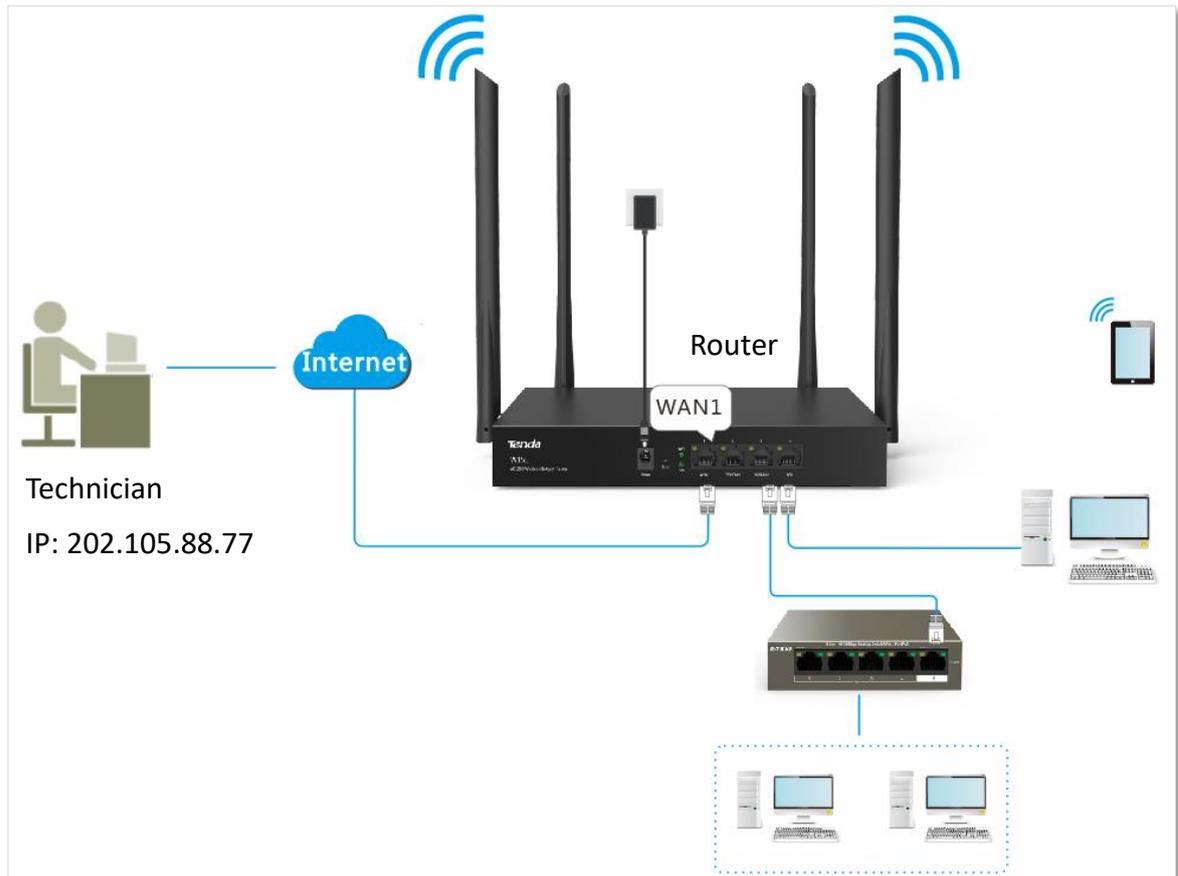
## 12.5.3 Example of configuring remote web management

### Networking requirement

An enterprise uses the router to deploy its network. And its network administrator needs to seek a Tenda technician to solve a problem remotely.

### Solutions

Remote web management function can meet this requirement.



### Configuration procedure

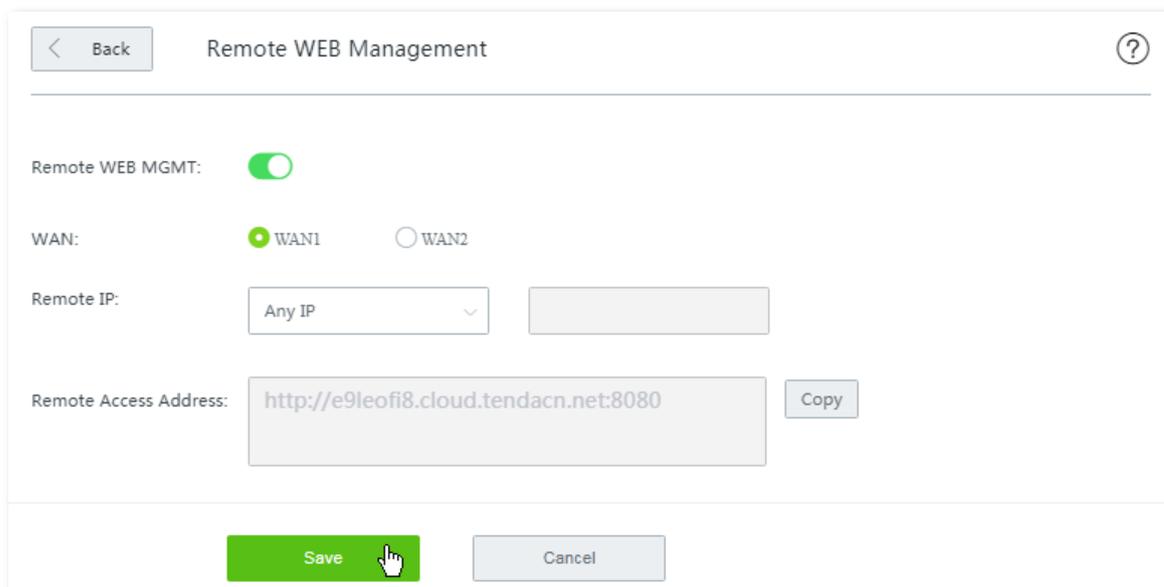
- Step 1** Click **More > Remote WEB Management**, and enable this function.
- Step 2** Select the **WAN** port for remote access, which is **WAN2** in this example.
- Step 3** Enter the IP address of the technician's computer, which is **202.105.88.77** in this example.



If the technician's computer is in a remote LAN network, set the WAN IP address of his router as the **Specified IP**.

- Step 4** Click **Save** to apply your settings.

**Step 5** Click **Copy** and send the **Remote Access Address** to the Tenda technician.



Remote WEB Management

Remote WEB MGMT:

WAN:  WAN1  WAN2

Remote IP: Any IP

Remote Access Address: <http://e9leofi8.cloud.tendacn.net:8080> Copy

Save Cancel

---- End

## Verification

Tenda technician with a computer IP address 202.105.88.77 can use <http://e9leofi8.cloud.tendacn.net:8080> to access the web UI of the router remotely.

## 12.6 DDNS

### 12.6.1 Overview

DDNS is short for Dynamic Domain Name Server. It detects when your IP address changes and maps your dynamic IP address to a static domain name. When the service is running, the DDNS client on the router sends its current WAN port IP address to the DDNS server. Then the server updates the mapping between the domain name and the IP address in the database to implement dynamic domain name resolution. If you enable this function, the router sends its WAN IP address to the specified DDNS server when the WAN IP address is changed and the DDNS server maps the changed WAN IP address to a specified static domain name. This enables internet users to access services on your LAN through the static domain name instead of the changeable WAN IP address.

This function always interworks with other functions, such as Port Forwarding, DMZ Host and Remote Web Management.

Choose **More > DDNS**, and enable this function, the configuration page appears. See the following figure:

The screenshot shows the DDNS configuration interface. At the top, there is a 'Back' button and a help icon. The page is divided into two sections: WAN1 and WAN2. The WAN1 section has a 'DDNS' toggle set to 'Enable', a 'DDNS Provider' dropdown menu set to 'noip' with a 'Register' button next to it, and three input fields for 'User Name', 'Password', and 'Domain Name'. The 'Status' is shown as 'Disconnected'. The WAN2 section has a 'DDNS' toggle set to 'Disable'. At the bottom, there are 'Save' and 'Cancel' buttons.

#### Parameter description

Parameter	Description
DDNS	Used to enable or disable the function.
DDNS Provider	The router supports four DDNS providers: <b>noip</b> , <b>dyndns</b> , <b>oray</b> , and <b>gnway</b> .
User Name	It specifies the user name used to log in to a DDNS provider. It is registered on the website of the provider.

Parameter	Description
Password	It specifies the password used to log in to a DDNS provider.
Domain Name	It specifies the domain name obtained from a DDNS provider.
Status	It specifies the DDNS service status.

## 12.6.2 Configure DDNS



- A dynamic IP address will disable the port forwarding rule. To use this function and make the rule always effective, set a static IP address for the specified local host.
- Some programs, such as firewall, antivirus software, and security guard, may hinder internet users to access the local service. Disable them when necessary.

**Step 1** Choose **More > DDNS**, locate the WAN port and enable the function.

**Step 2** Set required parameters.

**Step 3** Click **Save** to apply your settings.

The screenshot shows a web-based configuration page for DDNS. At the top left is a 'Back' button. The page title is 'DDNS'. Below the title is a 'WAN1' section header. Underneath, there are two radio buttons: 'Enable' (which is selected) and 'Disable'. Below the radio buttons is a 'DDNS Provider' dropdown menu currently set to 'noip', with a 'Register' link to its right. Below that are three text input fields labeled 'User Name', 'Password', and 'Domain Name'. At the bottom left of the form area, the 'Status' is displayed as 'Disconnected'. At the very bottom of the page are two buttons: a green 'Save' button and a grey 'Cancel' button.

---- End

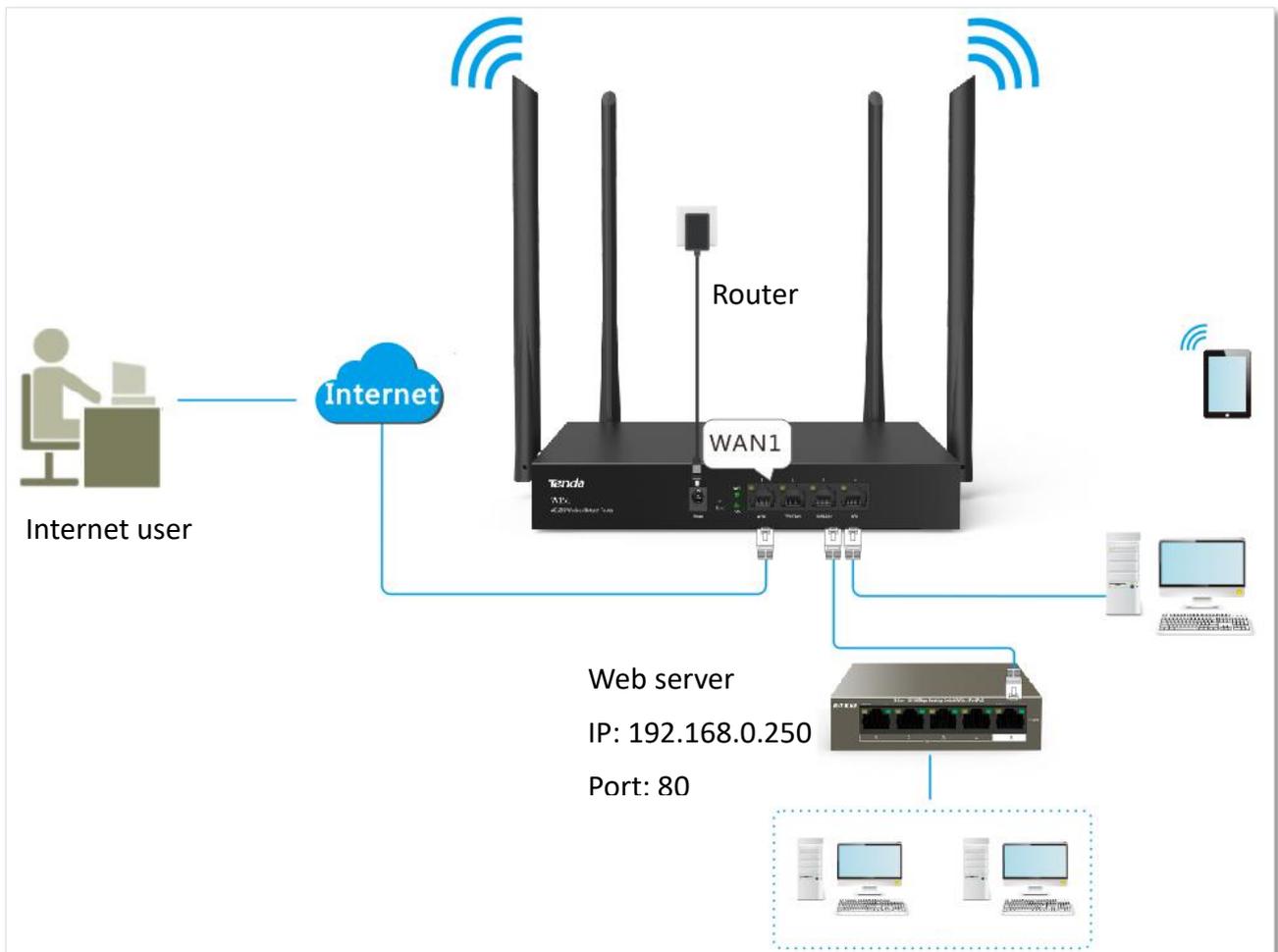
## 12.6.3 Example of configuring DDNS

### Networking requirement

An enterprise uses the router to deploy its WLAN network. The router is connected to the internet. Now the enterprise establishes a web server and wants to be accessed by internet users. Thus when employees are not in the enterprise, they can also access the web server. Assume that the external port is 80.

### Solutions

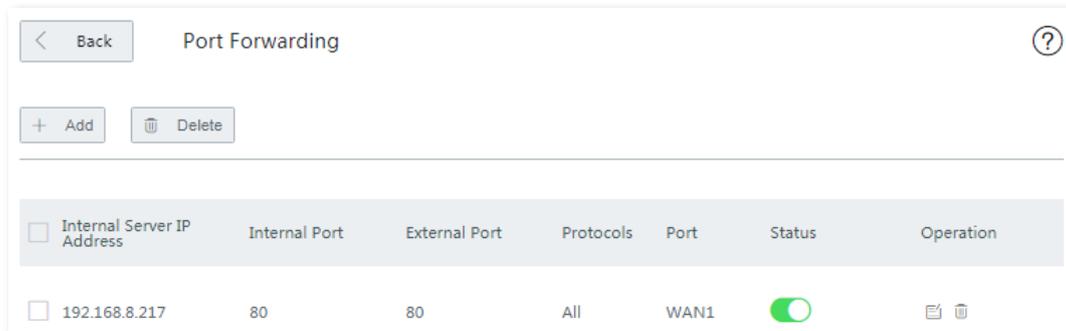
You can use Port Forwarding and DDNS function to meet this requirement.



### Configuration procedure

#### Step 1 Configuring port forwarding.

Navigate to **More > Port Forwarding**, and add a rule. See Port forwarding for detailed configuration procedure.



<input type="checkbox"/>	Internal Server IP Address	Internal Port	External Port	Protocols	Port	Status	Operation
<input type="checkbox"/>	192.168.8.217	80	80	All	WAN1	<input checked="" type="checkbox"/>	 

## Step 2 Configuring DDNS.

### 1. Register a domain name.

Select the DDNS provider from the drop-down list menu, which is **noip** in this example, and click **Register** next to the menu to register a domain name.

### 2. Set DDNS parameters.

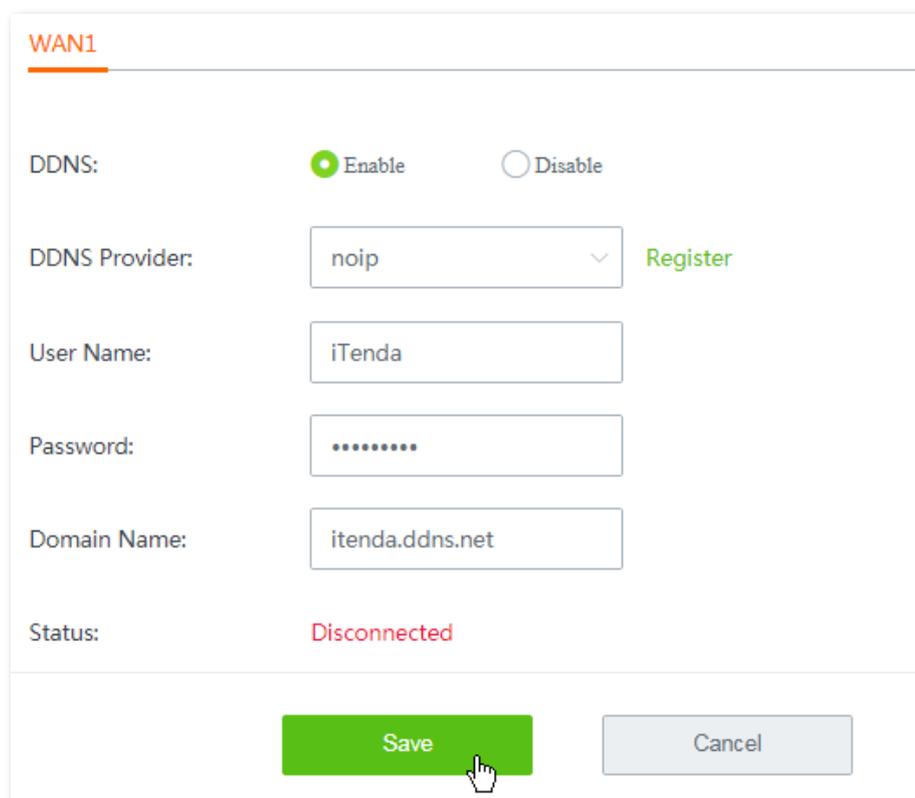
(1) Log in to the web UI of the router, navigate to **More > DDNS**, and enable **WAN1** port's DDNS function.

(2) Enter the DDNS-related parameters you registered on your DDNS provider's website.

Assume that you DDNS-related information are:

- User Name for DDNS: **iTenda**
- Password for DDNS: **itenda123**
- Domain Name for DDNS: **itenda.ddns.net**.

(3) Click **Save** to apply your settings.



**WAN1**

DDNS:  Enable  Disable

DDNS Provider:  Register

User Name:

Password:

Domain Name:

Status: Disconnected

---- End

Wait a moment, and refresh the page. When the **Status** shows **Connected**, the configuration completes successfully.

The screenshot shows a web interface for configuring DDNS. At the top, there is a 'Back' button and the title 'DDNS'. Below this, the section is labeled 'WAN1'. The configuration options are as follows:

- DDNS:** Radio buttons for 'Enable' (selected) and 'Disable'.
- DDNS Provider:** A dropdown menu showing 'noip' and a 'Register' link.
- User Name:** A text input field containing 'iTenda'.
- Password:** A text input field with masked characters (dots).
- Domain Name:** A text input field containing 'itenda.ddns.net'.
- Status:** A label showing 'Connected' in green text, enclosed in a red dashed rectangular box.

## Verification

Internet users can use <http://itenda.ddns.net:80> to access the web server. Among which:

- **http** indicates intranet service protocol name.
- **itenda.ddny.net** is the domain name you registered on your DDNS provider's website.
- **80** is the external port number.



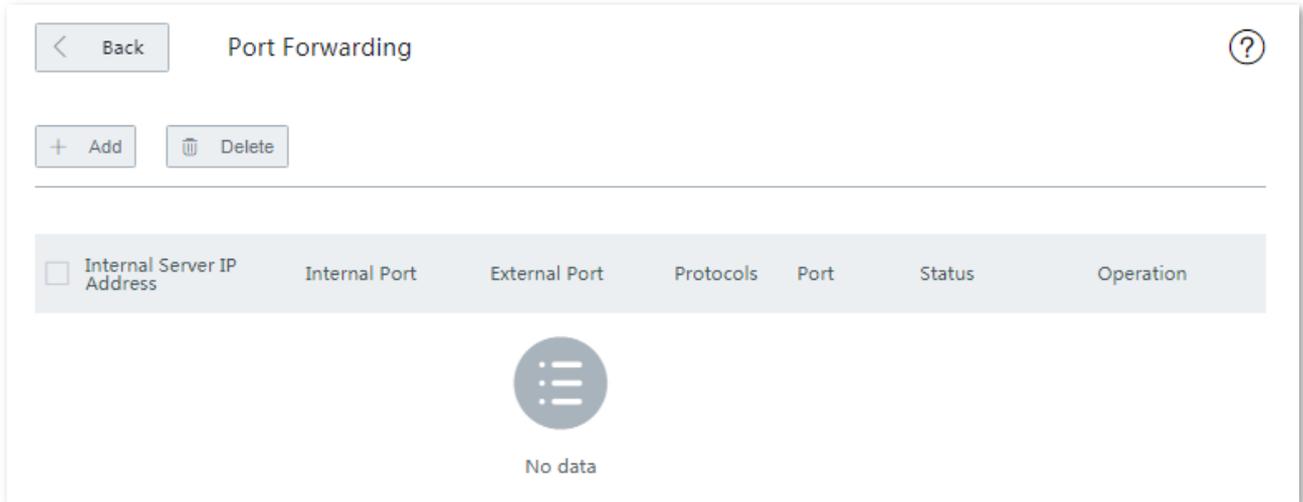
- TIP**
- If you cannot access the web server, try the following methods to resolve the problem:
  - Make sure that the WAN IP address of the router is a public IP address.
  - Make sure that the intranet port number is the service port number on the local host.
-

# 12.7 Port forwarding

## 12.7.1 Overview

By default, internet users cannot access any service on any of your local hosts. If you want to enable internet users to access a particular service on a local host, enable this function and specify the IP address and service port of the local host. This can also prevent local network from being attacked.

To access the configuration page, choose **More > Port forwarding**. See the following figure:



### Parameter description

Parameter	Description
Internal Server IP Address	It specifies the IP address of a local computer that runs a specified service.
Internal Port	It specifies the service port of a server on a local computer.
External Port	It specifies the port for internet users to access a specified service.
Protocols	It specifies the protocol that a specified service uses. <b>All</b> indicates that both TCP and UDP are supported. If you are not familiar with the protocols, select <b>All</b> .
Port	It specifies the physical WAN port that internet users use to access the specified service.
Status	It specifies whether the rule is enabled or not.

## 12.7.2 Configure a port forwarding rule



- A dynamic IP address will disable the port forwarding rule. To use this function and make the rule always effective, set a static IP address for the specified local host.
- Some programs, such as firewall, antivirus software, and security guard, may hinder internet users to access the local service. Disable them when necessary.

**Step 1** Choose **More > Port Forwarding** to enter the configuration page.

**Step 2** Click **+Add**. The **Add** configuration window appears.

**Step 3** Set required parameters.

**Step 4** Click **Save** to apply your settings.

A screenshot of a web-based configuration window titled "Add" with a close button (X) in the top right corner. The window contains several input fields and radio button options. The fields are: "Internal Server IP:" with an empty text box; "Internal Port:" with an empty text box; "External Port:" with an empty text box. Below these fields is a note: "Either use semicolons (;) to add multiple incontinuous ports, or use hyphens (-) to add multiple consecutive ports each time." The "Protocols:" section has three radio buttons: "All" (selected), "TCP", and "UDP". The "Port:" section has two radio buttons: "WAN1" (selected) and "WAN2". At the bottom of the window are two buttons: a green "Save" button and a grey "Cancel" button.

----- End

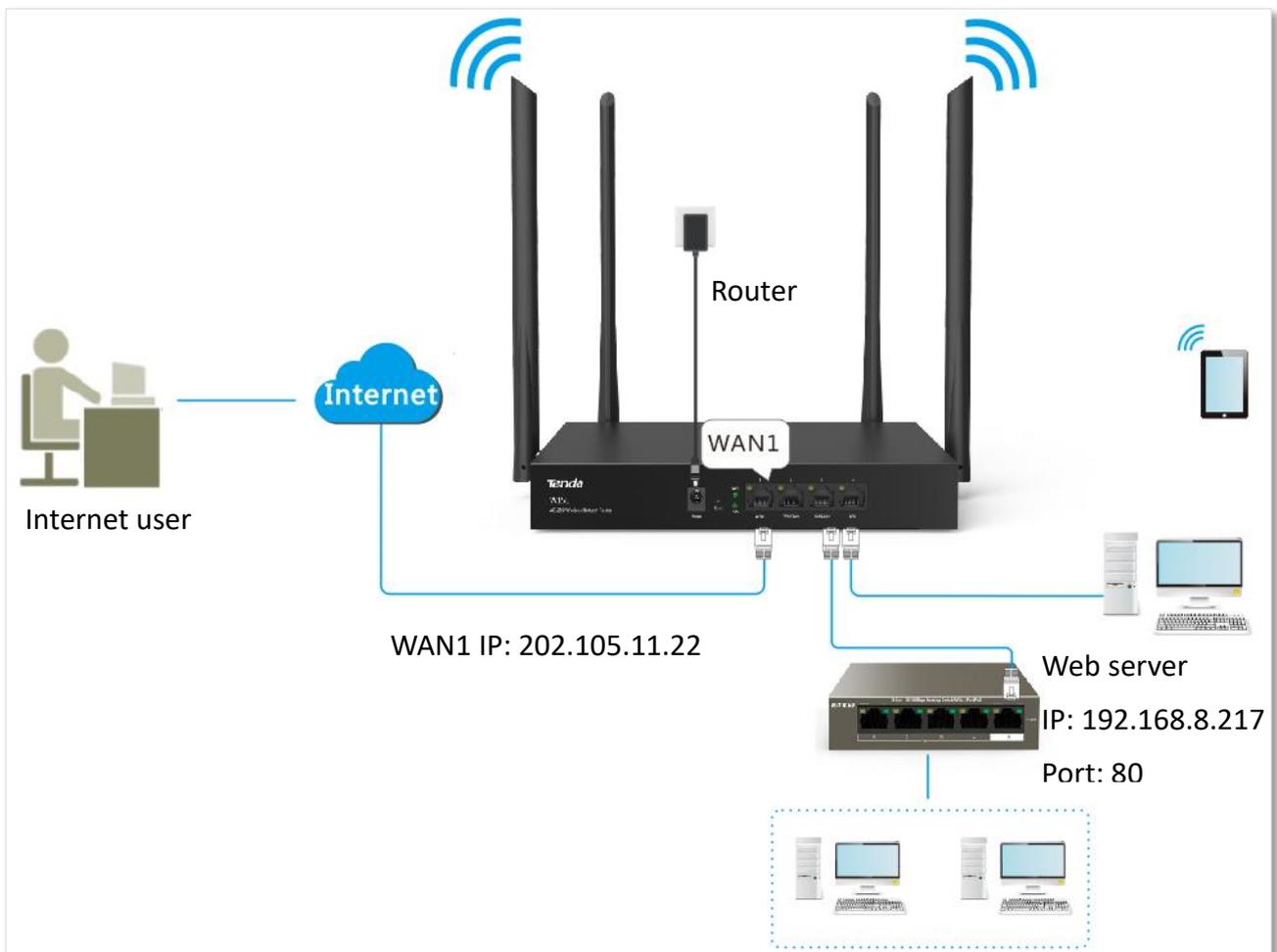
## 12.7.3 Example of configuring a port forwarding rule

### Networking requirement

An enterprise uses the router to deploy its WLAN network. The router is connected to the internet. Now the enterprise establishes a web server and wants to enable its employees to access the web server through the internet.

### Solutions

You can use the port forwarding function to meet this requirement.



### Configuration procedure

- Step 1** Choose **More > Port Forwarding** to enter the configuration page.
- Step 2** Click **+Add**. The **Add** configuration window appears.
- Step 3** Set required parameters. In this example, the parameters are as follows:
  - Internal Server IP: **192.168.8.217**
  - Internal Port: **80**
  - External Port: **80**
  - Protocols: **All**
  - Port: **WAN1**

**Step 4** Click **Save** to apply your settings.

The 'Add' dialog box contains the following fields and options:

- Internal Server IP: 192.168.8.217
- Internal Port: 80
- External Port: 80
- Protocols:  All,  TCP,  UDP
- Port:  WAN1,  WAN2

Buttons: Save (highlighted in green), Cancel

Text: Either use semicolons (;) to add multiple incontinuous ports, or use hyphens (-) to add multiple consecutive ports each time.

----- End

Added successfully. See the following figure:

Port Forwarding configuration page showing a table with one entry. The entry is highlighted with a red dashed border.

<input type="checkbox"/>	Internal Server IP Address	Internal Port	External Port	Protocols	Port	Status	Operation
<input type="checkbox"/>	192.168.8.217	80	80	All	WAN1	<input checked="" type="checkbox"/>	

## Verification

Internet users can use `http://202.105.11.22:80` to access the web server. Among which:

- **http** indicates intranet service protocol name.
- **202.105.11.22** is the WAN1 IP address.
- **80** is the external port number.

In addition, if the corresponding WAN port is configured with DDNS, you can use **intranet service protocol name://domain name:external port** to access the web server.



If you cannot access the web server, try the following methods to resolve the problem:

- Make sure that the WAN IP address of the router is a public IP address.
  - Make sure that the intranet port number is the service port number on the local host.
-

## 12.8 DMZ host

### 12.8.1 Overview

By default, internet users cannot access any service on any local host. If you want internet users to access all services on a local host, enable this function. It is especially used for video conferences and online games. You can set a local computer running these programs to be a DMZ host for better video conferencing and online gaming experience.



If you set a local computer as a DMZ host, the computer is not protected by the firewall of the router and may be easily attacked by internet users. Therefore, enable the DMZ host function only when necessary.

Choose **More > DMZ Host**, and enable this function, the following configuration page appears.

A screenshot of a web-based configuration page titled "DMZ Host". At the top left is a "Back" button with a left arrow. At the top right is a help icon (a question mark in a circle). Below the title, "WAN1" is underlined in red. The main content area contains three settings: "DMZ Host:" with radio buttons for "Enable" (selected) and "Disable"; "IP address of DMZ Host:" with an empty text input field; and "Filter VPN Port:" with radio buttons for "Enable" and "Disable" (selected). At the bottom, there are two buttons: a green "Save" button and a grey "Cancel" button.

#### Parameter description

Parameter	Description
DMZ Host	Used to enable or disable the function.
IP Address of DMZ Host	It specifies the IP address of the would-be DMZ host.
Filter VPN Port	It used to specify whether to filter the VPN port if DMZ is enabled for a host. By default, it is disabled. <ul style="list-style-type: none"><li>- <b>Enable:</b> The router filters the VPN port and responds to VPN requests from internet.</li><li>- <b>Disable:</b> The router does not filter the VPN port and the VPN function of the router is disabled. VPN requests from internet users are responded by the DMZ host.</li></ul>

## 12.8.2 Configure DMZ host



- A dynamic IP address will disable the port forwarding rule. To use this function and make the rule always effective, set a static IP address for the specified local host.
- Some programs, such as firewall, antivirus software, and security guard, may hinder internet users to access the local service. Disable them when necessary.

**Step 1** Choose **More > DMZ Host**, and enable this function of the corresponding WAN port.

**Step 2** Enter the **IP address of the DMZ Host**.

**Step 3** Enable **Filter VPN Port** as required.

**Step 4** Click **Save** to apply your settings.

The screenshot shows the configuration interface for DMZ Host settings. It is divided into two sections: WAN1 and WAN2. The WAN1 section is highlighted with a dashed orange border. In the WAN1 section, the 'DMZ Host' radio button is selected (checked), and the 'Filter VPN Port' radio button is also selected (checked). The 'IP address of DMZ Host' field is empty. In the WAN2 section, the 'DMZ Host' radio button is not selected, and the 'Filter VPN Port' radio button is selected. At the bottom of the interface, there are two buttons: 'Save' (green) and 'Cancel' (grey).

---- End

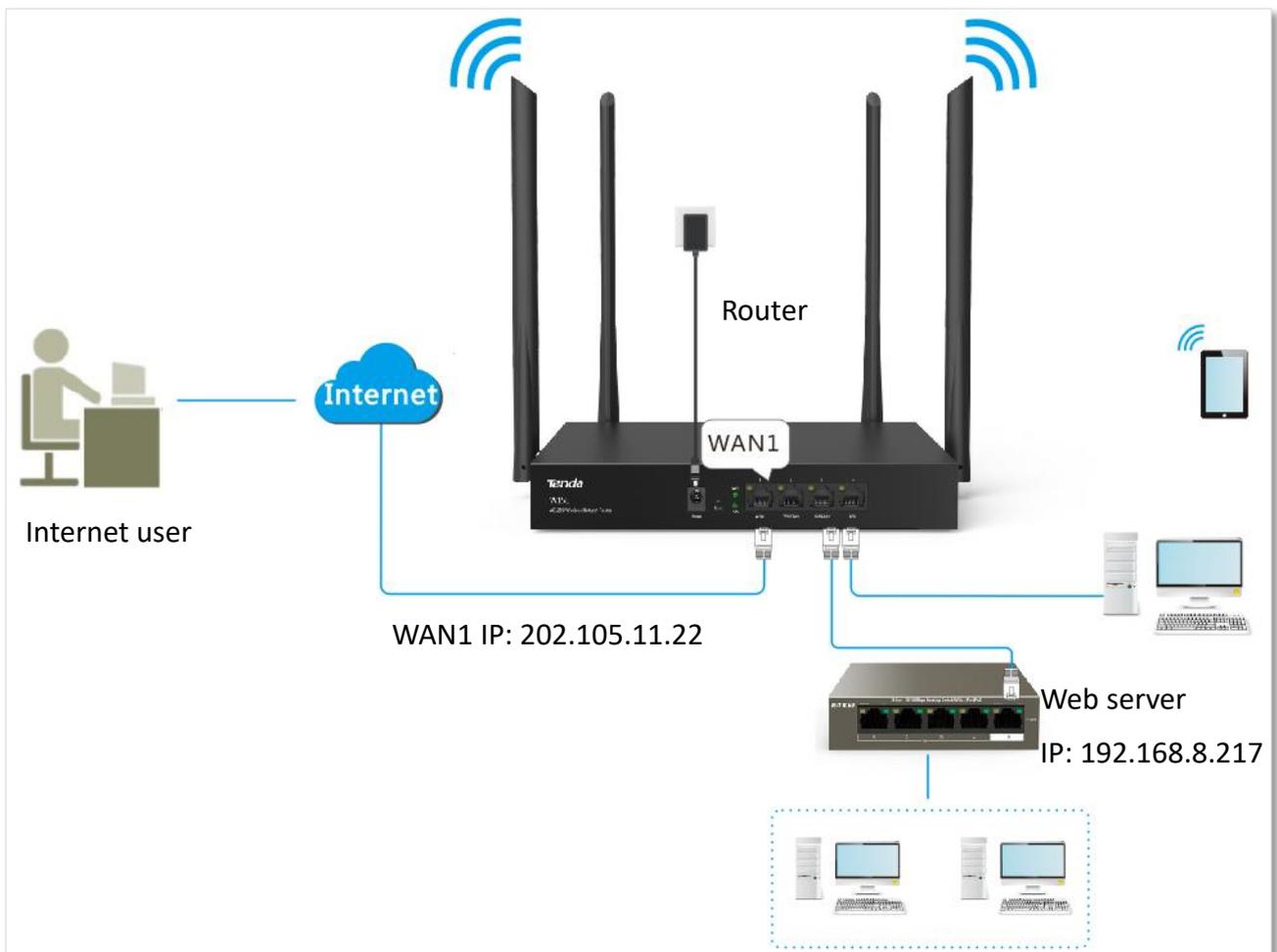
## 12.8.3 Example of configuring DMZ host

### Networking requirement

An enterprise uses the router to deploy its WLAN network. The router is connected to the internet. Now the enterprise establishes a web server and wants to enable its employees to access the web server through the internet.

### Solutions

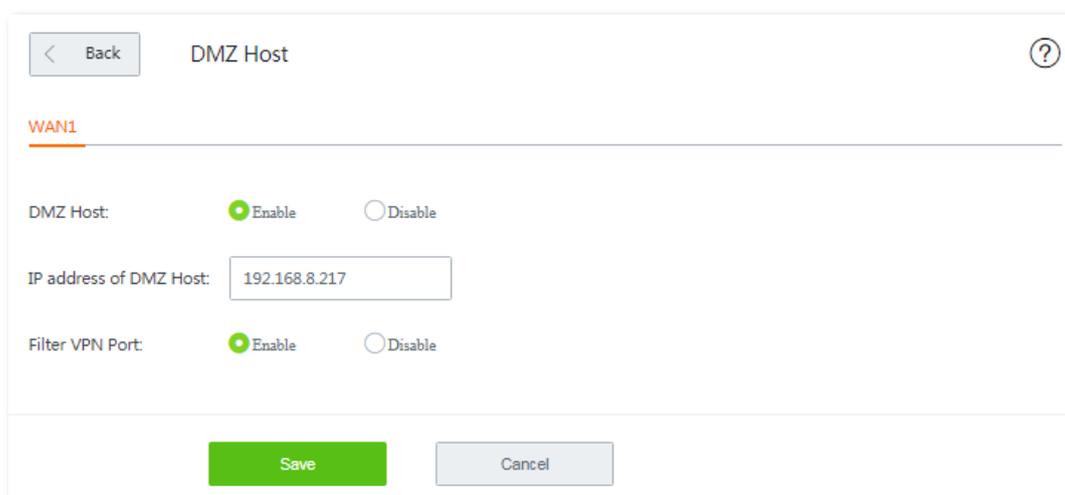
You can use the DMZ function to meet this requirement.



### Configuration procedure

- Step 1** Choose **More > DMZ Host**, and enable this function of the corresponding WAN port.
- Step 2** Enter the **IP address of the DMZ Host**.
- Step 3** Enable **Filter VPN Port** as required.

**Step 4** Click **Save** to apply your settings.



The screenshot shows a configuration window titled "DMZ Host" with a "Back" button and a help icon. Under the "WAN1" section, there are three settings: "DMZ Host" (radio buttons for "Enable" and "Disable", with "Enable" selected), "IP address of DMZ Host" (text input field containing "192.168.8.217"), and "Filter VPN Port" (radio buttons for "Enable" and "Disable", with "Enable" selected). At the bottom, there are "Save" and "Cancel" buttons.

---- End

## Verification

Internet users can use `http://202.105.11.22:80` to access the web server. Among which:

- **http** indicates intranet service protocol name.
- **202.105.11.22** is the WAN1 IP address.
- **80** is the external port number.

In addition, If the corresponding WAN port is configured with [DDNS](#), you can use [intranet service protocol name://domain name:external port](#) to access the web server.

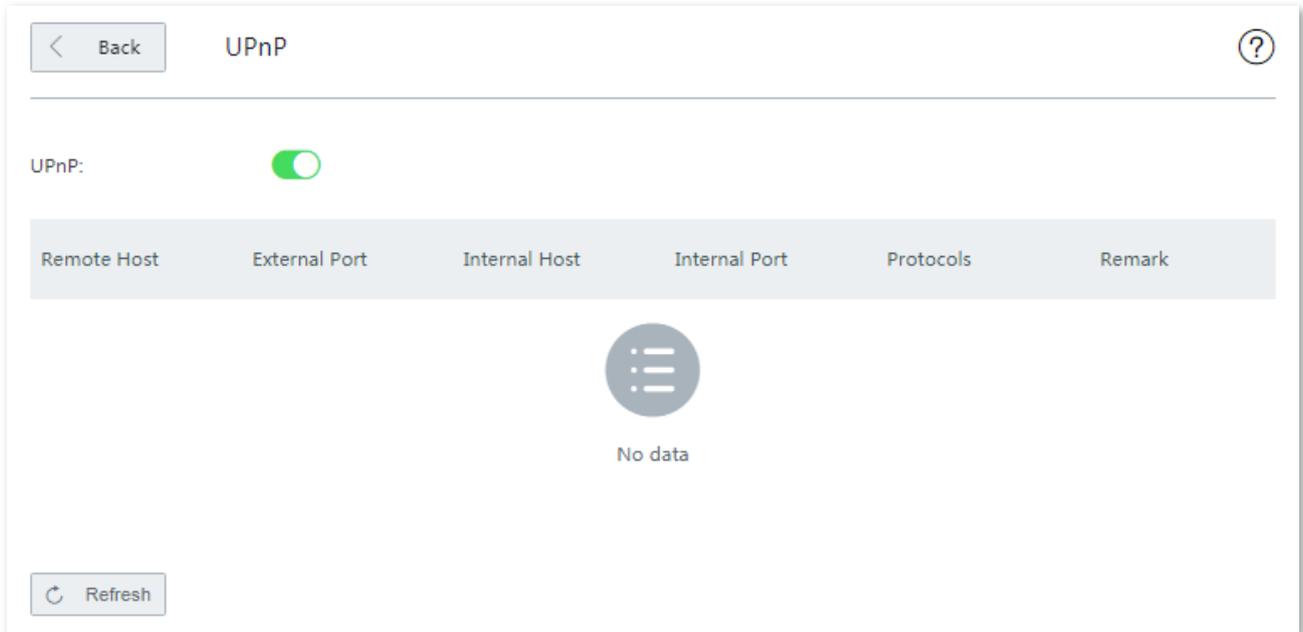


- If you cannot access the web server, try the following methods to resolve the problem:
- Make sure that the WAN IP address of the router is a public IP address.
- Make sure that the intranet port number is the service port number on the local host.

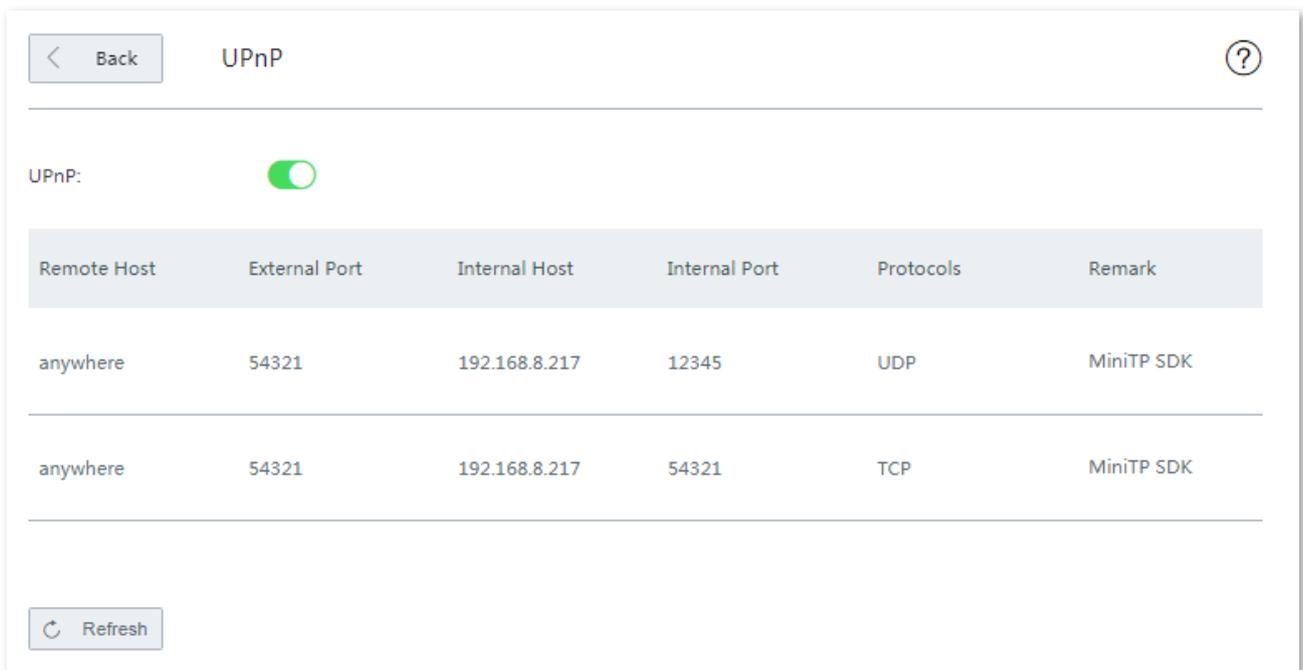
## 12.9 UPnP

UPnP is short for Universal Plug and Play. After you enable this function, the router can detect UPnP-based application programs on local computers and map onto the ports of the programs automatically. In this way, internet users can access these programs. It is generally used for P2P programs, such as BitComet and AnyChat, and helps to increase the download speed.

By default, this function is disabled. Choose **More > UPnP**, and enable this function, the following figure appears.



If you enable the UPnP function, when UPnP-based programs, such as BitComet and AnyChat, are running on the local network, the external and internal mapping relationships are displayed on the page.



## 12.10 Any IP

This function is typically used in public spaces, such as at a hotel. With this function enabled, devices with any IP address can access the internet through the router.



This function cannot be enabled if **Captive Portal** is configured.

[Back](#)    Any IP

---

Any IP:

Enable: Devices with any IP address can access the internet.

Disable: Only devices with IP addresses in the same network segment as that of the LAN IP address of the router are allowed to access the internet.

## 12.11 Security settings

The router supports [ARP defense](#), [DDoS defense](#), [IP attack defense](#), and [Block WAN ping](#).

### ■ ARP defense

#### Security Settings

---

ARP Defense

ARP Broadcast Interval:  sec

#### Parameter description

Parameter	Description
ARP Defense	It is used to efficiently prevent the ARP attack from the local network.
ARP Broadcast Interval	It specifies the interval for sending ARP inquiry messages. Default: 1 second.

### ■ DDoS defense

#### DDoS Defense

---

ICMP Flood Threshold:  PPS

UDP Flood Threshold:  PPS

SYN Flood Threshold:  PPS

#### Parameter description

Parameter	Description
ICMP Flood Threshold	If ICMP request packets exceed the threshold within 1 second, the router suffers ICMP flood attack.
UDP Flood Threshold	If UDP request packets exceed the threshold within 1 second, the router suffers UDP flood attack.
SYN Flood Threshold	If SYN request packets exceed the threshold within 1 second, the router suffers SYN flood attack.

## ■ IP attack defense

**IP Attack Defense**

IP Timestamp Option

IP Security Option

IP Stream Option

IP Record Route Option

IP Loose Source Route Option

Rouge IP Option

### Parameter description

Parameter	Description
IP Timestamp Option	It is used to block IP packets that contain the Internet Timestamp option.
IP Security Option	It is used to block IP packets that contain the Security option.
IP Stream Option	It is used to block IP packets that contain the Stream ID option.
IP Record Route Option	It is used to block IP packets that contain the Record Route option.
IP Loose Source Route Option	It is used to block IP packets that contain the Loose Source Route option.
Rouge IP Option	It is used to block IP packets that fail to pass integrity and correctness check.



Packets meeting the above features may not be used for malicious attack. Therefore, enable attack defense as required.

## ■ Block WAN ping

**Block WAN Ping**

Block WAN Ping

With this function enabled, users cannot ping the WAN IP address of the router over the internet.

## 12.12 VPN server

### 12.12.1 Overview

The router supports PPTP server and L2TP server. To enter the configuration page, choose **More > VPN Server**. See the following figure.

The screenshot displays the 'VPN Server' configuration interface. At the top, there is a 'Back' button and a help icon. The main configuration area includes: 'VPN Server' (checked), 'Server Type' (PPTP selected, L2TP unselected), 'WAN' (WAN1 selected), 'Encryption' (set to 'Disable'), 'IP Address Pool' (10.1.0.100-163), and 'Max. Users' (32). Below this is a section titled 'PPTP/L2TP User' with '+ Add' and 'Delete' buttons. A table header is shown with columns: User Name, Network Users, Network Segment, Subnet Mask, Remark, Status, and Operation. The table content is empty, with a 'No data' message and a refresh icon.

#### Parameter description

Parameter	Description
VPN Server	It is used to enable or disable the PPTP/L2TP VPN server function.
Server Type	It specifies the VPN server type that the router supports, including: <ul style="list-style-type: none"><li>- <b>PPTP</b>: The Point to Point Tunneling Protocol. If PPTP is selected, the peer VPN client should be set to PPTP client.</li><li>- <b>L2TP</b>: Layer 2 Tunneling Protocol. If L2TP is selected, the peer VPN client should be set to L2TP client.</li></ul>
WAN	It specifies the WAN port of the router for setting up a VPN connection.
Encryption	It specifies whether to enable 128-bit data encryption. This parameter only appears when PPTP is selected. The value of this parameter must be consistent with that of the client. Otherwise, the client is unable to communicate with the server.
IP Address Pool	It specifies IP address range that the PPTP/L2TP clients can obtain from the VPN server to be connected.

Parameter	Description
Max. Users	It specifies the maximum number of VPN clients allowed to be connected to the PPTP/L2TP server. The value is fixed to <b>32</b> .
User Name Password	It specifies the user name and password used to dial in a PPTP/L2TP VPN connection.
Network Users	It specifies the password for the user name used to dial in PPTP/L2TP VPN connection.
Network Segment	It specifies whether a VPN client is a network. <ul style="list-style-type: none"> <li>- <b>Yes:</b> The network segment and subnet mask of the VPN client are required.</li> <li>- <b>No:</b> The VPN client is a computer.</li> </ul>
Subnet Mask	It specifies subnet mask of the LAN of a VPN client in case that the client is a network.
Remark	It specifies a short description about the corresponding account. You are recommended to add a remark to your VPN account for later management.
Status	It specifies whether or the corresponding rule is enabled.

## 12.12.2 Configure the router as a PPTP/L2TP VPN server



To establish a VPN connection, the VPN server and VPN client should be configured consistently on **Client Type**, **WAN** and **Encryption**.

**Step 1** Enable the PPTP/L2TP server function.

1. Choose **More > VPN Server**, enable **VPN Server**, and click **Save**.
2. Set the VPN server to **PPTP** or **L2TP** as required.



The peer VPN client should use the same type.

3. Select the egress WAN port of the tunnel between a PPTP/L2TP server and PPTP/L2TP clients.



- If the egress WAN port you selected is set to a DMZ host, enable the port's **Filter VPN Port** first by navigating to **More > DMZ Host**.
- The IP address of the egress WAN port must be a public IP address. The following lists private IP address range of IPv4. IP addresses that are not in the range are public IP addresses.

Category A: 10.0.0.0-10.255.255.255

Category B: 172.16.0.0—172.31.255.255

Category C: 192.168.0.0-192.168.255.255

4. Click **Save** to apply your settings.

The screenshot shows the 'VPN Server' configuration interface. At the top left is a 'Back' button and a question mark icon. The settings are as follows:

- VPN Server:  (toggled on)
- Client Type:  PPTP,  L2TP
- WAN:  WAN1,  WAN2
- Encryption:  (dropdown menu)
- IP Address Pool: 10.1.0.100-163
- Max. Users: 32

At the bottom, there are two buttons: a green 'Save' button and a grey 'Cancel' button.

**Step 2** Add a PPTP/L2TP user.

1. Choose **More > VPN Server**, and go to the **PPTP/L2TP User** module.
2. Click **+Add**. The **Add** page appears.

3. Set required parameters, and click **Save**.

The 'Add' dialog box contains the following fields and controls:

- User Name:
- Password:
- Network Users:  Yes  No
- Network Segment:
- Subnet Mask:
- Remark:
- Buttons:

---- End

Added successfully. See the following figure:

PPTP/L2TP User

<input type="checkbox"/>	User Name	Network Users	Network Segment	Subnet Mask	Remark	Status	Operation
<input type="checkbox"/>	Branch	Yes	192.168.0.0	255.255.255.0	Branch	<input checked="" type="checkbox"/>	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

## 12.13 VPN client

### 12.13.1 Overview

To enter the configuration page, choose **More > VPN Client**. By default, this function is disabled. After you enable the function, the following page appears.

The screenshot shows the 'VPN Client' configuration interface. At the top left is a 'Back' button, and at the top right is a help icon. The main configuration area includes:

- VPN Client:** A green toggle switch is turned on.
- Client Type:** Two radio buttons are present: 'PPTP' (selected) and 'L2TP'.
- WAN:** A radio button labeled 'WAN1' is selected.
- Server IP/Domain Name:** An empty text input field.
- User Name:** An empty text input field.
- Password:** An empty text input field.
- Encryption:** Two radio buttons: 'Enable' and 'Disable' (selected).
- VPN Proxy:** Two radio buttons: 'Enable' and 'Disable' (selected).
- Remote LAN:** An empty text input field.
- Remote Subnet Mask:** An empty text input field.
- Status:** The text 'Disconnected' is displayed in red.

At the bottom of the page, there are two buttons: a green 'Save' button and a grey 'Cancel' button.

#### Parameter description

Parameter	Description
VPN Client	It is used to enable or disable the PPTP/L2TP VPN client function.
Client Type	It specifies the VPN client type that the router supports, including: <ul style="list-style-type: none"><li>- <b>PPTP:</b> The Point to Point Tunneling Protocol. If PPTP is selected, the peer VPN server should be set to PPTP client.</li><li>- <b>L2TP:</b> Layer 2 Tunneling Protocol. If L2TP is selected, the peer VPN server should be set to L2TP client.</li></ul>
WAN	It specifies the WAN port of the router for setting up a VPN connection.
Server IP/Domain Name	It specifies the IP address or domain name of the peer VPN server.

Parameter	Description
User Name	It specifies the user name and password used to dial in a PPTP/L2TP VPN connection.
Password	
Encryption	It specifies whether to enable 128-bit data encryption. This parameter only appears when PPTP is selected. The value of this parameter must be consistent with that of the client. Otherwise, the client is unable to communicate with the server.
VPN Proxy	With this function enabled, clients access the internet through the peer router that has established a VPN server.
Remote LAN	It specifies the network segment of the LAN of the PPTP/L2TP server.
Remote Subnet Mask	It specifies the subnet mask of the LAN of the PPTP/L2TP server.
Status	It specifies whether or the corresponding rule is enabled.

## 12.13.2 Configure the router as a PPTP/L2TP VPN client

**Step 1** Choose **More > VPN Client**, and enable the function. The following configuration page appears:

**Step 2** Set required parameters.



- **Client Type**, **WAN**, and **Encryption** should be identical with its peer VPN server.
- Click on the upper-right corner on the page to get the detailed explanation to the parameters here.

**Step 3** Click **Save** to apply your settings.

---- End

## 12.14 IPSec

### 12.14.1 Overview

IPSec, abbreviated for Internet Protocol Security, is a protocol suite for transmitting data over the internet in a secure and encrypted manner. The following terms will be used in this document to describe IPSec configurations.

#### Encapsulation Mode

The router uses either Tunnel mode or Transport mode to encapsulate IP packets.

- Tunnel Mode: It is most commonly used between security gateways.
- Transport Mode: It is mainly used for end-to-end communications.

#### 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 tampering and peeping.

#### IPSec peer

The two IPSec terminals 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), cryptographic 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.
- Each IPsec SA is unidirectional with a life cycle.
- An SA can be created manually or generated automatically using internet Key Exchange (IKE).

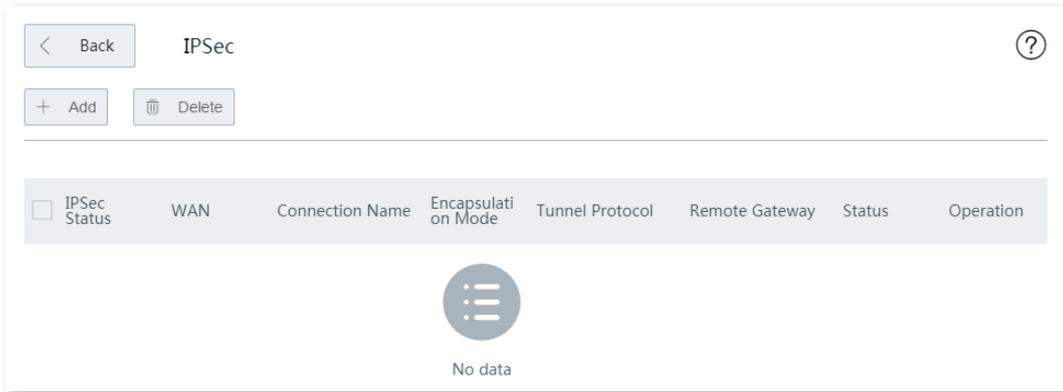
### 12.14.2 Create IPSec connection

This section walks you through:

- [Configuring Tunnel mode.](#)
- [Configuring transport mode.](#)

## Configuring Tunnel mode

**Step 1** Choose **More > IPSec**. The following page appears.



**Step 2** Click **+ Add**. The configuration page appears.

The screenshot shows the 'IPSec / Add' configuration page. The 'IPSec' option is selected as 'Enable'. The 'WAN' is set to 'WAN1', 'Encapsulation Mode' is 'Tunnel', 'Exchange Mode' is 'Initiator Mode', and 'Tunnel Protocol' is 'ESP'. The 'Remote Gateway' field is empty. The 'Local LAN/Prefix Length' and 'Remote LAN/Prefix Length' fields are empty, with a note 'For example: 192.168.100.0/24'. The 'Key Negotiation' is set to 'Auto Negotiation', 'Authentication Type' is 'Shared key', and the 'Pre-shared Key' field is empty. The 'DPD Detection' is set to 'Enable' and the 'DPD Detection Cycle' is set to '10' (with a note '(1 to 30 sec)'). At the bottom, there are 'Save' and 'Cancel' buttons.

**Step 3** Tick **Enable** beside the **IPSec** option.

**Step 4** Select the WAN port.

**Step 5** Select **Tunnel** from the **Encapsulation Mode** drop-down list menu.

**Step 6** Set required parameters, and click **Save** to apply your settings.

---- End

## Parameter description

Parameter	Description
IPSec	It is used to enable or disable the IPSec function.
WAN	It specifies the WAN port of the IPSec connection on this end. The remote gateway of the IPSec peer should be the IP address of the WAN port you specified here.
Encapsulation Mode	<p>The router uses either of the following to encapsulate IP packets.</p> <ul style="list-style-type: none"> <li>- <b>Tunnel Mode:</b> It is most commonly used between security gateways.</li> <li>- <b>Transport Mode:</b> It is mainly used for end-to-end communications.</li> </ul>
Connection Name	It specifies the name of the IPSec tunnel.
Exchange Mode	<p>It specifies whether the device is an initiator that starts the VPN request, or a responder that answers the request.</p> <ul style="list-style-type: none"> <li>- <b>Initiator mode:</b> It indicates the device that starts the VPN attempt.</li> <li>- <b>Responder mode:</b> It indicates the device that answers the Initiator's request.</li> </ul> <p> <b>NOTE</b></p> <p>IPSec peers cannot be set to <b>Responder</b> mode at the time. Otherwise, IPSec connection fails.</p>
Tunnel Protocol	<p>The router supports ESP and AH protocols, as well as the mix of the two.</p> <ul style="list-style-type: none"> <li>- <b>ESP:</b> It indicates the Encapsulating Security Payload protocol 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.</li> <li>- <b>AH:</b> It indicates the Authentication Header protocol used for verifying data integrity. If a packet is tampered during transmission, the receiver discards it during data integrity verification.</li> <li>- <b>AH+ESP:</b> It indicates that the router uses both AH and ESP protocols.</li> </ul>
Remote Gateway	IP address or domain name of the specified WAN port of the IPSec peer.
Local LAN/Prefix Length	<p>It specifies the network segment and subnet mask of LAN network of this device.</p> <p>For example: Assume that the LAN IP address and subnet mask of this device are 192.168.0.252 and 255.255.255.0 respectively, you can enter 192.168.0.0/24.</p>
Remote LAN/Prefix Length	It specifies the LAN network segment and subnet mask of the IPSec peer. If the remote gateway is a single host, enter its IP address and subnet mask, such as 192.168.100.1/32.
Key Negotiation	<p>The key negotiation method to establish an IPSec tunnel.</p> <ul style="list-style-type: none"> <li>- <b>Auto</b> (default): 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.</li> <li>- <b>Manual:</b> 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.</li> </ul>

■ **Key negotiation: Auto Negotiation**

To protect information confidentiality when using auto negotiation, IKE is in place to negotiate keys for secure communication between IPSec peers. The IKE protocol is a hybrid of three other protocols:

- **ISAKMP:** Internet Security Association and Key Management Protocol. It defines the procedures for authenticating a communicating peer, creation and management of Security Associations, key generation techniques, and threat mitigation.
- **Oakley:** Oakley Key Determination Protocol. It defines the specific key negotiation mechanism.
- **SKEME:** A secure and versatile key exchange protocol for key management over internet is presented.

IKE negotiation can be broke down into two periods.

**Period 1:** Period 1 is used to negotiate the parameters and key required to establish IKE Security Association (SA) between two IPSec peers.

**Period 2:** Period 2 then uses the Security Associations (SAs) negotiated in Period 1 to protect future IKE communication.

When **Auto Negotiation** is selected, the following page appears.

The screenshot shows a configuration interface with the following fields:

- Key Negotiation:** A dropdown menu with "Auto Negotiation" selected.
- Authentication Type:** A text field containing "Shared key".
- Pre-shared Key:** An empty text input field.
- DPD Detection:** A dropdown menu with "Enable" selected.
- DPD Detection Cycle:** A text input field containing "10", with a range "(1 to 30 sec)" indicated to the right.

**Parameter description**

Parameter	Description
Authentication Type	The router supports IPSec authentication with <b>Shared Key</b> . Only authorized users can access the private network.
Pre-shared Key	It is used to encrypt Phase1 authentication information. A pre-shared key contains a maximum of 128 characters. This must be the same at both ends.
DPD Detection	Dead Peer Detection. It is used to detect the liveliness of its IKE peer.
DPD Detection Cycle	It is used to configure the router to detect the liveliness of its IKE peer at regular intervals.

Clicking **Advanced** loads the following configuration area:

Period 1

Mode:

Encryption Algorithm:

Integrity Verification:

Diffie-Hellman Group:

Key Expiration:

Period 2

PFS :  Enable  Disable

Encryption Algorithm:

Integrity Verification:

Diffie-Hellman Group:

Key Expiration:

### Parameter description

Parameter	Description
Period 1/2	<p>It specifies the two periods that the IKE SA (IKE Security Association that is broken down.</p> <p> <b>NOTE</b></p> <p>The router does not support IKEV2.0.</p>
Mode	<p>It specifies the mode that IPSec ends use to exchange information in Period 1.</p> <ul style="list-style-type: none"> <li>- <b>Main</b>: This mode requires double messages to be exchanged in Period 1, which provides higher security but lower efficiency.</li> <li>- <b>Aggressive</b>: This mode requires half of messages to be exchanged in Period 1, which provide lower security but higher efficiency.</li> </ul>
Encryption Algorithm	<p>The router supports the following algorithms:</p> <ul style="list-style-type: none"> <li>- <b>DES</b> (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.</li> <li>- <b>3DES</b>: Three 56-bit keys are used for encryption.</li> <li>- <b>AES</b> (Advanced Encryption Standard): AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.</li> </ul>
Integrity Verification	<p>The router supports the following algorithms to check key integrity:</p> <ul style="list-style-type: none"> <li>- <b>MD5</b> (Message Digest Algorithm): A 128-bit message digest is generated to prevent message tampering.</li> <li>- <b>SHA1</b> (Secure Hash Algorithm): A 160-bit message digest is generated to prevent</li> </ul>

Parameter	Description
	message tampering, leading to higher security than MD5.
Diffie-Hellman Group	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.
Key Expiration	It specifies the life cycle of IKE SA. The default time is 3600 seconds. The minimum time is 600 seconds. When 540 seconds are left, IKE SA will be negotiated again.
PFS	It indicates Perfect Forward Secrecy that improves security by forcing a new Diffie-Hellman exchange whenever key expires.

### ■ Key negotiation: Manual

The following configuration area appears in case that the **Tunnel Protocol** is set to **AH+ESP**.

Key Negotiation:

ESP Encryption

Algorithm:

ESP Encryption Key:

ESP Authentication

Algorithm:

ESP Authentication Key:

ESP Outgoing SPI:

ESP Incoming SPI:

AH Authentication

Algorithm:

AH Authentication Key:

AH Outgoing SPI:

AH Incoming SPI:

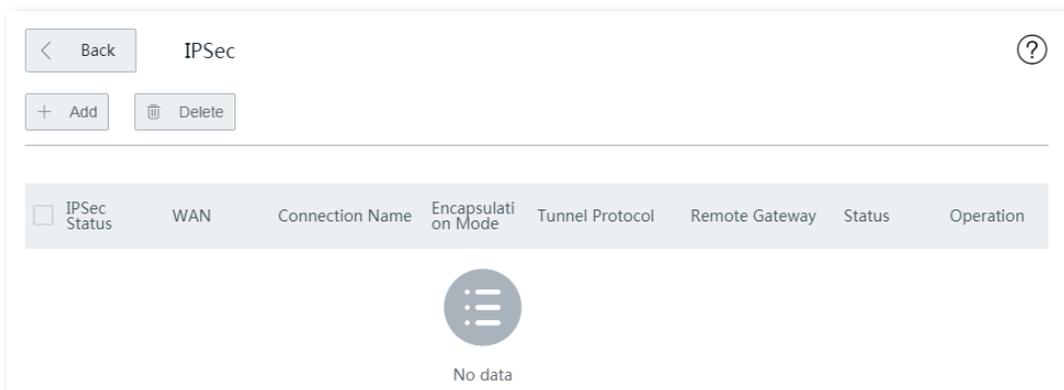
### Parameter description

Parameter	Description
ESP Encryption Algorithm	<p>The router supports the following ESP encryption algorithms:</p> <ul style="list-style-type: none"> <li>- <b>3DES</b> (default): Three 56-bit keys are used for encryption. A key of 24 ASCII characters or 48 hexadecimal characters is required.</li> <li>- <b>DES</b>: 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. A key of 8 ASCII characters or 16 hexadecimal characters is required.</li> <li>- <b>AES-128</b>: A 128-bit key is used for encryption. A key of 16 ASCII characters or 32</li> </ul>

Parameter	Description
	hexadecimal characters is required. <ul style="list-style-type: none"> <li>- <b>AES-192</b>: A 192-bit key is used for encryption. A key of 24 ASCII characters or 48 hexadecimal characters is required.</li> <li>- <b>AES-256</b>: A 256-bit key is used for encryption. A key of 32 ASCII characters or 64 hexadecimal characters is required.</li> </ul>
ESP Encryption Key	This parameter should be the same for IPSec peers.
ESP Authentication Algorithm	Optional service to ensure the integrity of data packets. <ul style="list-style-type: none"> <li>- <b>MD5</b>: A 128-bit message digest is generated to prevent message tampering. The authentication key must be 16 ASCII characters or 32 hexadecimal characters.</li> <li>- <b>SHA1</b>: A 160-bit message digest is generated to prevent message tampering. The authentication key must be 20 ASCII characters or 40 hexadecimal characters.</li> </ul>
ESP Authentication Key	This parameter should be the same for IPSec peers.
ESP Outgoing SPI	SPI is used to identify an IPSec SA with the IP address and security protocol of the remote gateway. This parameter should be the same for IPSec peers.
ESP Incoming SPI	This parameter should be the same for IPSec peers.
AH Authentication Algorithm	Optional service to ensure the integrity of data packets. <ul style="list-style-type: none"> <li>- <b>MD5</b>: A 128-bit message digest is generated to prevent message tampering. The authentication key must be 16 ASCII characters or 32 hexadecimal characters.</li> <li>- <b>SHA1</b>: A 160-bit message digest is generated to prevent message tampering. The authentication key must be 20 ASCII characters or 40 hexadecimal characters.</li> </ul>
AH Authentication Key	This parameter should be the same for IPSec peers.
AH Outgoing SPI	This parameter should be the same for IPSec peers.
AH Incoming SPI	This parameter should be the same for IPSec peers.

## Configuring transport mode

**Step 1** Choose **More > IPSec**. The following page appears.



**Step 2** Click **+ Add**. The configuration page appears.

< IPsec / Add ?

IPsec:  Enable  Disable

WAN: WAN1

Encapsulation Mode: Tunnel

Connection Name:

Exchange Mode: Initiator Mode

Tunnel Protocol: ESP

Remote Gateway:

Local LAN/Prefix Length:  For example: 192.168.100.0/24

Remote LAN/Prefix Length:  For example: 192.168.100.0/24

Length:

Key Negotiation: Auto Negotiation

Authentication Type: Shared key

Pre-shared Key:

DPD Detection: Enable

DPD Detection Cycle: 10 (1 to 30 sec)

[Advanced >](#)

**Step 3** Tick **Enable** beside the IPsec option.

**Step 4** Select the **WAN** port.

**Step 5** Select **Transport** from the **Encapsulation Mode** drop-down list menu. The following page appears.

< IPsec / Add ?

IPsec:  Enable  Disable

WAN: WAN1

Encapsulation Mode: Transport

Connection Name:

Exchange Mode: Initiator Mode

Encryption Algorithm: 3DES

Integrity Verification: SHA1

Pre-shared Key:

**Step 6** Set required parameters, and click **Save** to apply your settings.

---- End

### Parameter description

Parameter	Description
IPSec	It is used to enable or disable the IPSec function.
WAN	It 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	The router supports two modes: <ul style="list-style-type: none"><li>- <b>Tunnel Mode</b>: It is most commonly used between gateways.</li><li>- <b>Transport Mode</b>: It is mainly used for end-to-end communications.</li></ul>
Connection Name	It specifies the name of the IPSec tunnel.
Exchange Mode	It specifies whether the device is an imitator that starts the VPN request, or a responder that answers the request. <ul style="list-style-type: none"><li>- <b>Initiator mode</b>: It specifies the device that starts the VPN attempt.</li><li>- <b>Responder mode</b>: It specifies the device that answers the Initiator's request.</li></ul>
Encryption Algorithm	It specifies the IKE session encryption algorithm. <ul style="list-style-type: none"><li>- <b>DES</b> (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.</li><li>- <b>3DES</b>: Three 56-bit keys are used for encryption.</li><li>- <b>AES</b> (Advanced Encryption Standard): AES 128/192/256 indicates that 128/192/256-bit keys are used for encryption respectively.</li></ul>
Integrity Verification	The router supports the following algorithms to check key integrity: <ul style="list-style-type: none"><li>- <b>MD5</b> (Message Digest Algorithm): A 128-bit message digest is generated to prevent message tampering.</li><li>- <b>SHA1</b> (Secure Hash Algorithm): A 160-bit message digest is generated to prevent message tampering, leading to higher security than MD5.</li></ul>
Pre-shared Key	This must be the same at both ends.

## 12.15 Example of configuring VPN connections

### 12.15.1 Example of configuring a PPTP/L2TP VPN

#### Networking requirement

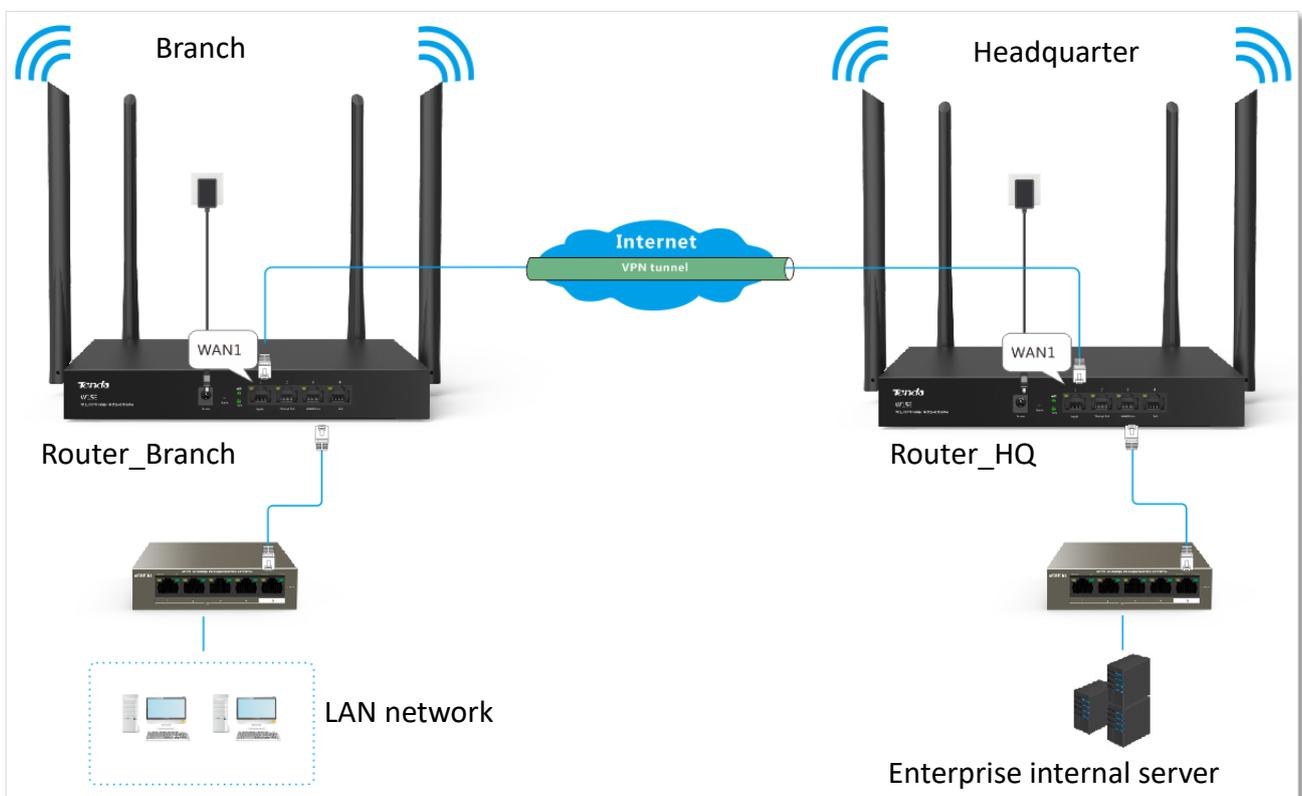
An enterprise has used the router to set up a LAN and access the internet. Branch employees need to access the HQ's internal resources through the internet, such as internal data, OA, ERP, CRM, project management systems.

#### Solutions

PPTP/L2TP VPNs of the router can address this requirement.

The following uses PPTP to illustrate the setup procedure. Set up the L2TP VPN in the same way.

#### Network topology



#### Configuration description

Step	Task	Description
1	Configure Router_HQ as a VPN server	Enable VPN server on the router, configure <b>Client Type</b> , specify the egress <b>WAN</b> port, and enable the <b>Encryption</b> .
2	Configure a PPTP/L2TP user on Router_HQ	Set a user name and password for connecting to VPN. Clarify whether or not the client is a network user. If yes, enter a proper network segment and subnet mask.
3	Configuring Router_Branch as a VPN client	Enable VPN client on the router, set related parameters by following the on-screen instructions.

Step	Task	Description
4	Verify the connectivity between the VPN server and VPN client	Check if VPN connection is established and access HQ LAN resources using VPN.

## Configuration procedure

**Step 1** Configure Router\_HQ as a VPN server.

1. On Router\_HQ, choose **More > VPN Server**, enable this function, and click **Save**.
2. Set **Client Type** to **PPTP**.
3. Set the egress port of the VPN server for setting up a tunnel with the VPN client, which is **WAN1** in this example.
4. Set **Encryption** to **Enable**.



The peer VPN client should use the same configuration.

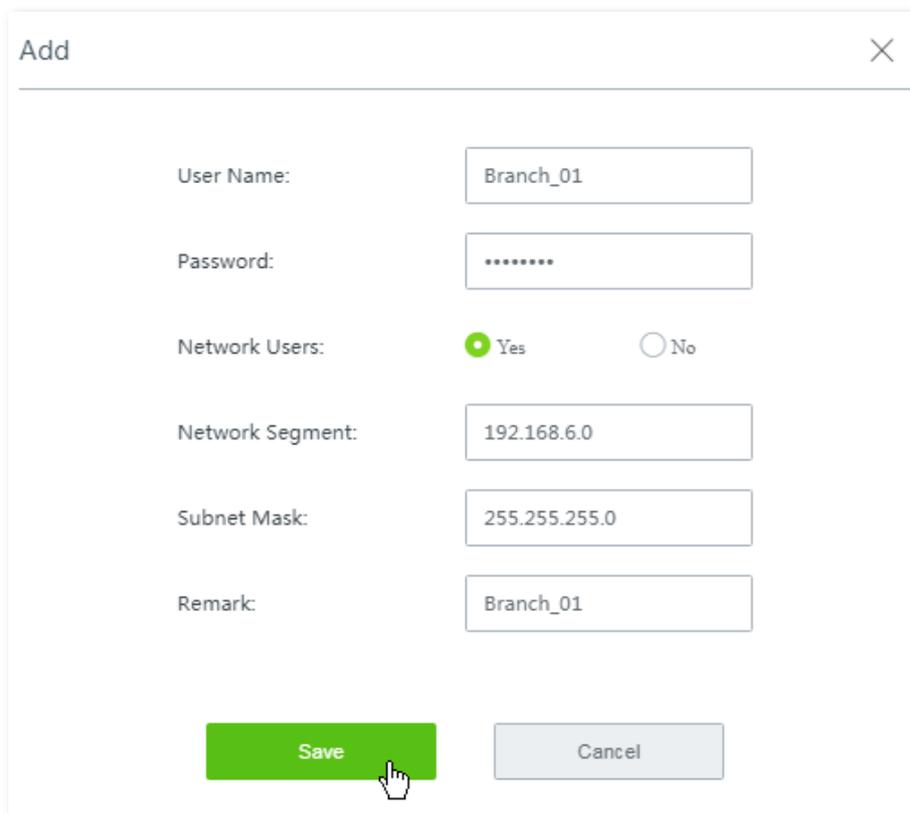
5. Click **Save**.

The screenshot shows the 'VPN Server' configuration page. The 'VPN Server' toggle is turned on. Under 'Client Type', 'PPTP' is selected. Under 'WAN', 'WAN1' is selected. The 'Encryption' dropdown is set to 'Enable'. Below these, the 'IP Address Pool' is '10.1.0.100-163' and 'Max. Users' is '32'. There is a section for 'PPTP/L2TP User' with '+ Add' and '- Delete' buttons. At the bottom, there are 'Save' and 'Cancel' buttons.

**Step 2** Configure a PPTP/L2TP user on Router\_HQ.

1. On Router\_HQ, choose **More > VPN Server**, and move to the **PPTP/L2TP User** module.
2. Click **+Add**. The **Add** configuration window appears.

3. Set the required parameters. The following shows the examples:



The 'Add' dialog box contains the following fields and controls:

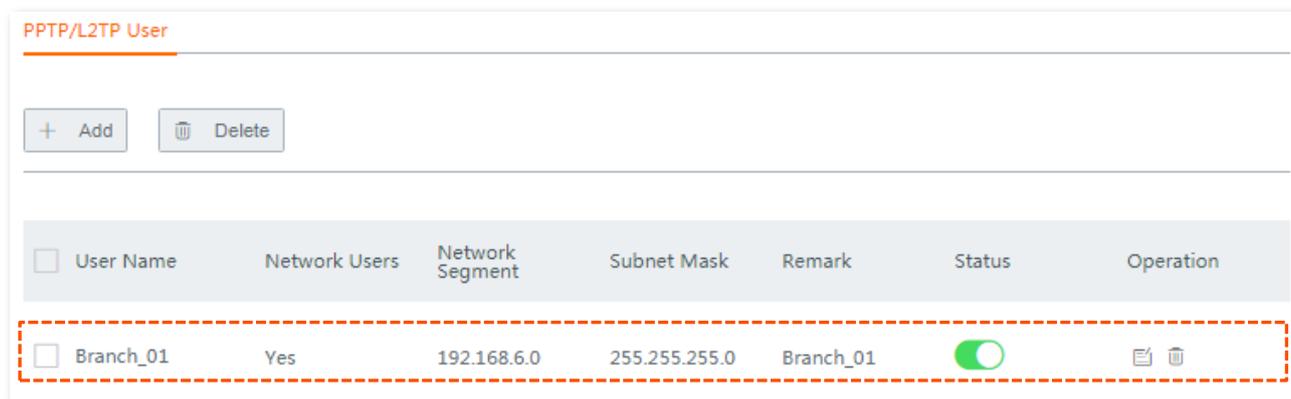
- User Name: Branch\_01
- Password: [Masked]
- Network Users:  Yes  No
- Network Segment: 192.168.6.0
- Subnet Mask: 255.255.255.0
- Remark: Branch\_01
- Buttons: Save (green), Cancel (grey)



**Remark** is optional. However, you are recommended to add a brief description of the rule for convenient management later, which is **Branch\_01** in this example.

4. Click **Save**.

Added successfully. See the following figure:



<input type="checkbox"/>	User Name	Network Users	Network Segment	Subnet Mask	Remark	Status	Operation
<input type="checkbox"/>	Branch_01	Yes	192.168.6.0	255.255.255.0	Branch_01	<input checked="" type="checkbox"/>	 

**Step 3** Configure Router\_Branch as a VPN client.

1. On Router\_Branch, choose **More > VPN Client**, and enable this function.
2. Set required parameters. The parameters should keep consistent with the VPN server.
  - Client Type: **PPTP Client**
  - WAN: **WAN1**
  - Server IP Address/Domain Name: **202.105.11.22**

- User name/Password: **Branch\_HQ/12345678**
  - Remote LAN: **192.168.6.0**
  - Remote Subnet Mask: **255.255.255.0**
3. Disable **VPN Proxy**.
  4. Click **Save** to apply your settings.

----- End

## Verification

**Step 1** Check if the VPN connection is established.

There are two methods for checking whether or not the VPN connection is established.

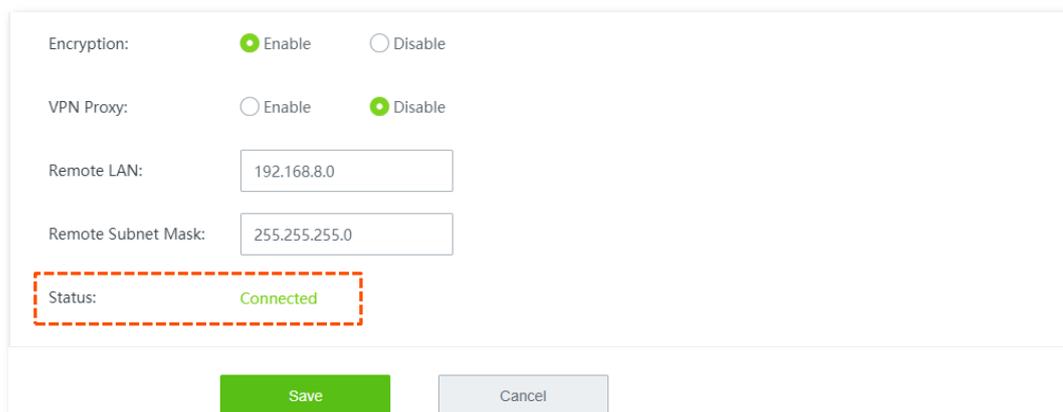
### ■ Method 1:

Log in to the web UI of Router\_HQ, choose **More > VPN Sever**, and move to the **PPTP/L2TP User** module, there is a squared tip **Online** next to the user name, indicating the VPN connection is established.

User Name	Network Users	Network Segment	Subnet Mask	Remark	Status	Operation
Branch_01 <b>Online</b>	Yes	192.168.6.0	255.255.255.0	Branch_01	<input checked="" type="checkbox"/>	

■ **Method 2:**

Log in to the web UI of Router\_Branch, choose **More > VPN Client**, the **Status** changes into **Connected**, indicating the VPN connection is established.



**Step 2** Access HQ LAN resources remotely.

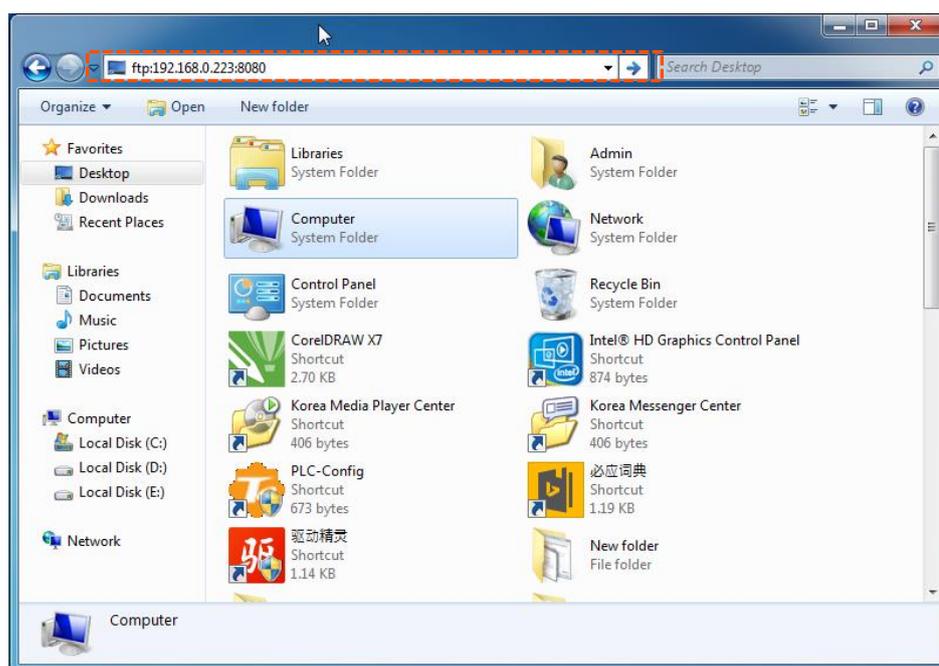
---- End

After the preceding configuration, employees at the branch and HQ can remotely access resources on the branch and HQ LANs through the internet in a secure manner. The following is an example of how the employees at branch access the FTP server at the headquarters. The HQ project data is placed on the FTP server. Assume that the server information is as follows:

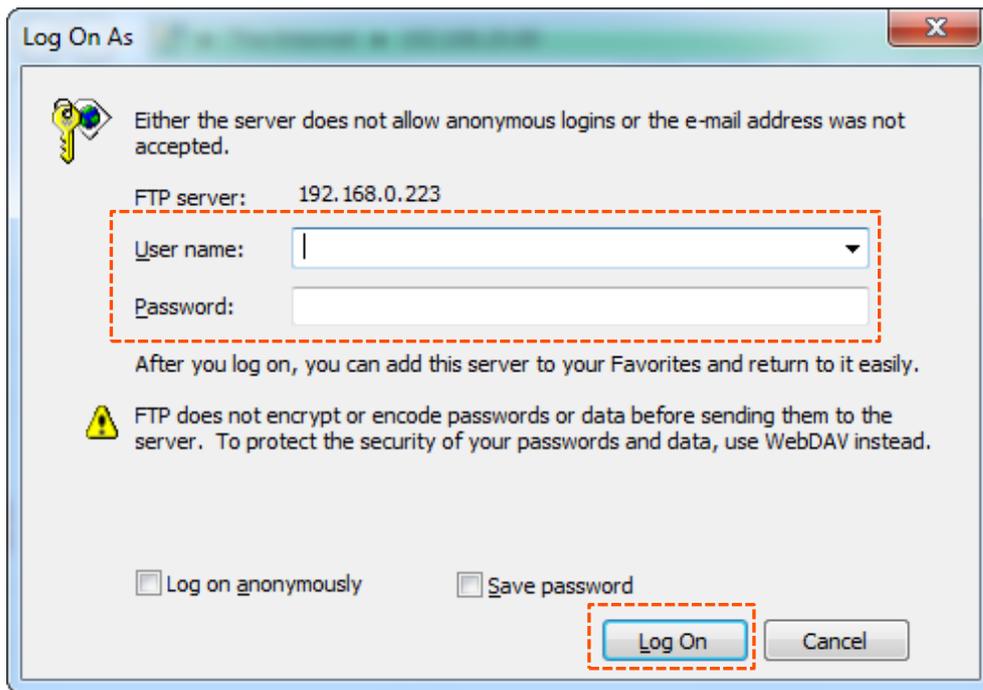
- IP address of the FTP server: **192.168.0.223**
- Server port: **8080**
- Login username and password: **admin/admin**

The procedures for employees at the branch access the HQ project data are as follow:

**Step 1** Access the link <ftp://server IP address:server port> on a computer, which is <ftp://192.168.0.223:8080> in this example.

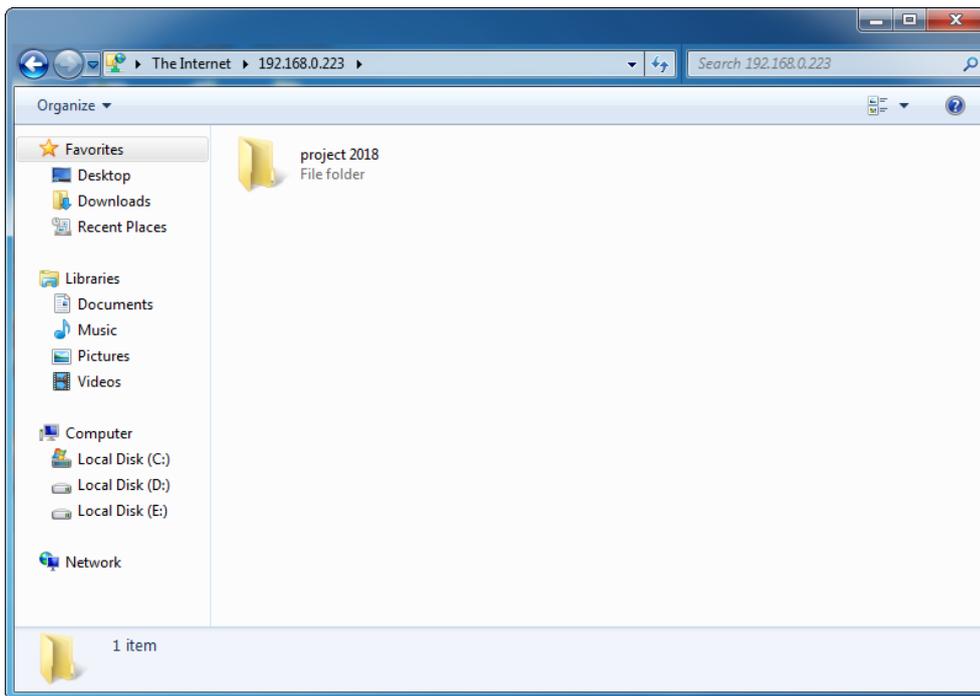


**Step 2** In the popup window, enter login **User name** and **Password**, which are both **admin** in this example, and click **Log On**.



----- End

Access the HQ LAN resources successfully.



## 12.15.2 Example of configuring an IPSec VPN

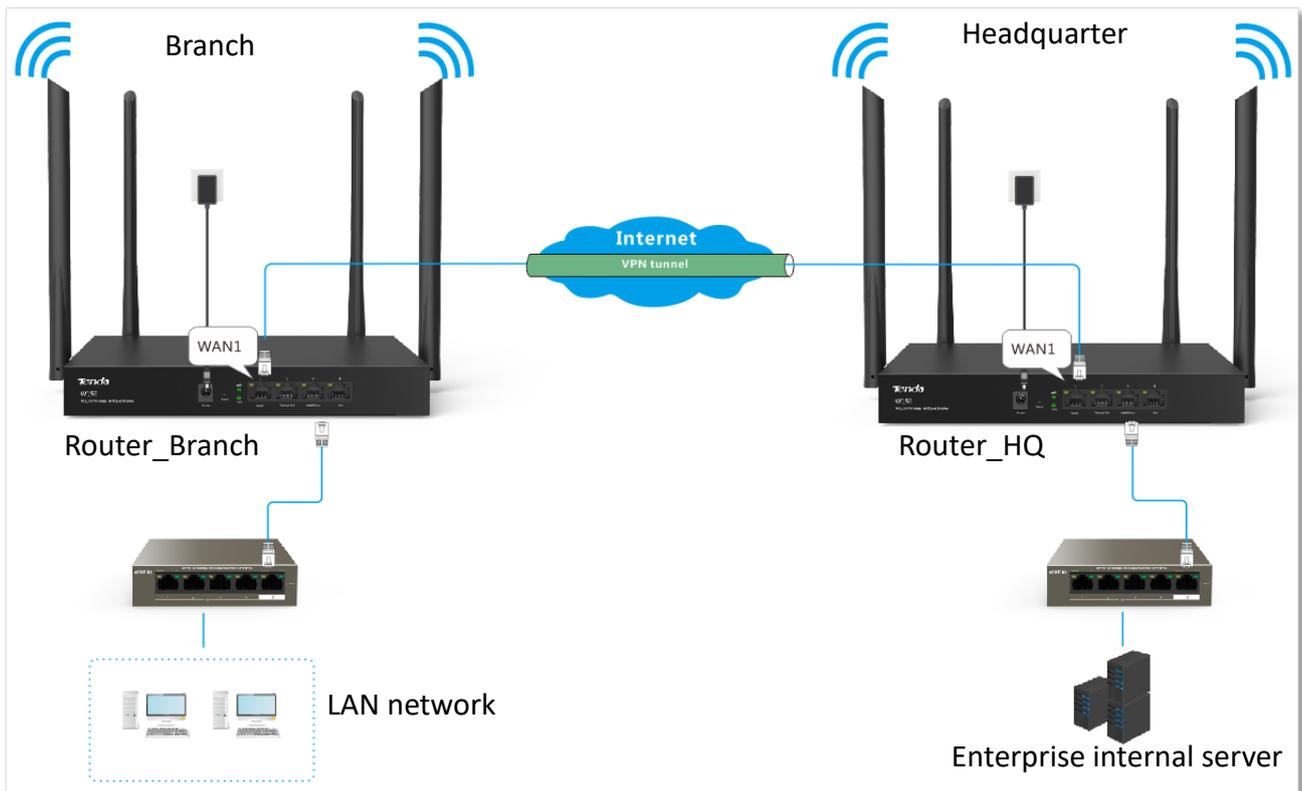
### Networking requirement

An enterprise has used the router to set up a LAN and access the internet. Branch employees need to access the HQ's internal resources through the internet, such as internal data, OA, ERP, CRM, project management systems.

### Solutions

You can set up an IPSec VPN using the router to meet this requirement.

### Network topology



Assume that:

WAN port enabled with IPSec: WAN1

WAN1 IP: 202.105.88.77

LAN network segment/subnet mask:

192.168.1.0/24

Assume that:

WAN port enabled with IPSec: WAN1

WAN1 IP: 202.105.11.22

LAN network segment/subnet mask:

192.168.0.0/24

### Configuration procedure



Security software, such as firewall, may fail the configuration. Therefore, you are recommended disable them.

Assume that the two routers share the following basic IPSec tunnel information:

- Encapsulation Mode: **Tunnel**

- Key negotiation method: **Auto Negotiation**
- Pre-shared key: **12345678**

**Step 1** Configure Router\_HQ the IPsec connection.

1. Choose **More > IPsec**, and click **+Add**, the configuration page appears.
2. Set required parameters.
  - (1) Select the WAN port enabled with IPsec, which is **WAN1** in this example.
  - (2) Select **Tunnel** from the **Encapsulation Mode** drop-down list menu.
  - (3) Customize a **Connection Name**, which is **IPSec\_1** in this example.
  - (4) **Remote Gateway**: Enter the WAN IP address of its peer Router\_Branch, which is **202.105.88.77** in this example.
  - (5) **Local LAN/Prefix Length**: Enter the LAN network segment/subnet mask of Router\_HQ in the defined format, which is **192.168.1.0/24** in this example.
  - (6) **Remote LAN/Prefix Length**: Enter the LAN network segment/subnet mask of its peer Router\_Branch in the defined format, which is **192.168.0.0/24** in this example.
  - (7) Select **Auto negotiation** from the **Key Negotiation** drop-down list menu, and customize the **Pre-shared Key**, which is **12345678** in this example.
3. Click **Save**.

The screenshot shows a configuration form for an IPsec connection. The fields and their values are as follows:

- WAN: WAN1
- Encapsulation Mode: Tunnel
- Connection Name: IPSec\_1
- Exchange Mode: Initiator Mode
- Tunnel Protocol: ESP
- Remote Gateway: 202.105.88.77
- Local LAN/Prefix Length: 192.168.1.0/24 (For example: 192.168.100.0/24)
- Remote LAN/Prefix Length: 192.168.0.0/24 (For example: 192.168.100.0/24)
- Key Negotiation: Auto Negotiation
- Authentication Type: Shared key
- Pre-shared Key: 12345678
- DPD Detection: Enable
- DPD Detection Cycle: 10 (1 to 30 sec)

At the bottom of the form, there is a link for "Advanced >" and two buttons: "Save" (green) and "Cancel".



To configure advanced settings, click **Advanced**. And use the same configurations to set the peer device.

## Step 2 Configure Router\_Branch.

1. Log in to the web UI of the router Router\_Branch.
2. Choose **More > IPsec**, and click **+Add**. The **Add** configuration page appears.
3. Set required parameters.
  - (1) Select the WAN port enabled with IPsec, which is **WAN1** in this example.
  - (2) Keep **Encapsulation Mode, Connection Name, Tunnel Protocol, Key Negotiation**, and **Pre-shared Key** identical with its peer Router\_HQ.
  - (3) **Remote Gateway**: Enter the WAN IP address of its peer Router\_HQ, which is **202.105.11.22** in this example.
  - (4) **Local LAN/Prefix Length**: Enter the LAN network segment/subnet mask of Router\_Branch in the defined format, which is **192.168.0.0/24** in this example.
  - (5) **Remote LAN/Prefix Length**: Enter the LAN network segment/subnet mask of Router\_HQ in the defined format, which is **192.168.1.0/24** in this example.
4. Click **Save**.

WAN: WAN1

Encapsulation Mode: Tunnel

Connection Name: IPsec\_1

Exchange Mode: Initiator Mode

Tunnel Protocol: ESP

Remote Gateway: 202.105.11.22

Local LAN/Prefix Length: 192.168.0.0/24 For example: 192.168.100.0/24

Remote LAN/Prefix Length: 192.168.1.0/24 For example: 192.168.100.0/24

Length:

Key Negotiation: Auto Negotiation

Authentication Type: Shared key

Pre-shared Key: 12345678

DPD Detection: Enable

DPD Detection Cycle: 10 (1 to 30 sec)

[Advanced >](#)

**Save** Cancel

---- End

Added successfully. See the following figure.

The screenshot shows the IPsec configuration page. At the top, there is a 'Back' button and the title 'IPsec'. Below the title are 'Add' and 'Delete' buttons. A table lists the configuration details for an IPsec tunnel. The table has columns for IPsec Status, WAN, Connection Name, Encapsulation Mode, Tunnel Protocol, Remote Gateway, Status, and Operation. The single entry in the table is highlighted with a red dashed border. The 'IPsec Status' column shows a checkbox that is unchecked, and the status text is 'Disconnected'. The 'Status' column shows a green toggle switch that is turned on.

IPsec Status	WAN	Connection Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation
<input type="checkbox"/> Disconnected	WAN1	IPSec_1	Tunnel	ESP	202.105.11.22	<input checked="" type="checkbox"/>	

## Verification

When the **IPsec Status** of both ends shows **Connected**, the IPsec VPN is established successfully.

The screenshot shows the IPsec configuration page. At the top, there is a 'Back' button and the title 'IPsec'. Below the title are 'Add' and 'Delete' buttons. A table lists the configuration details for an IPsec tunnel. The table has columns for IPsec Status, WAN, Connection Name, Encapsulation Mode, Tunnel Protocol, Remote Gateway, Status, and Operation. The single entry in the table is highlighted with a red dashed border. The 'IPsec Status' column shows a checkbox that is checked, and the status text is 'Connected'. The 'Status' column shows a green toggle switch that is turned on.

IPsec Status	WAN	Connection Name	Encapsulation Mode	Tunnel Protocol	Remote Gateway	Status	Operation
<input checked="" type="checkbox"/> Connected	WAN1	IPSec_1	Tunnel	ESP	202.105.11.22	<input checked="" type="checkbox"/>	

Then, employees at the branch and HQ can remotely access LAN resources on the other side through the internet in a secure manner.

## 12.15.3 Example of configuring a L2TP over IPSec VPN

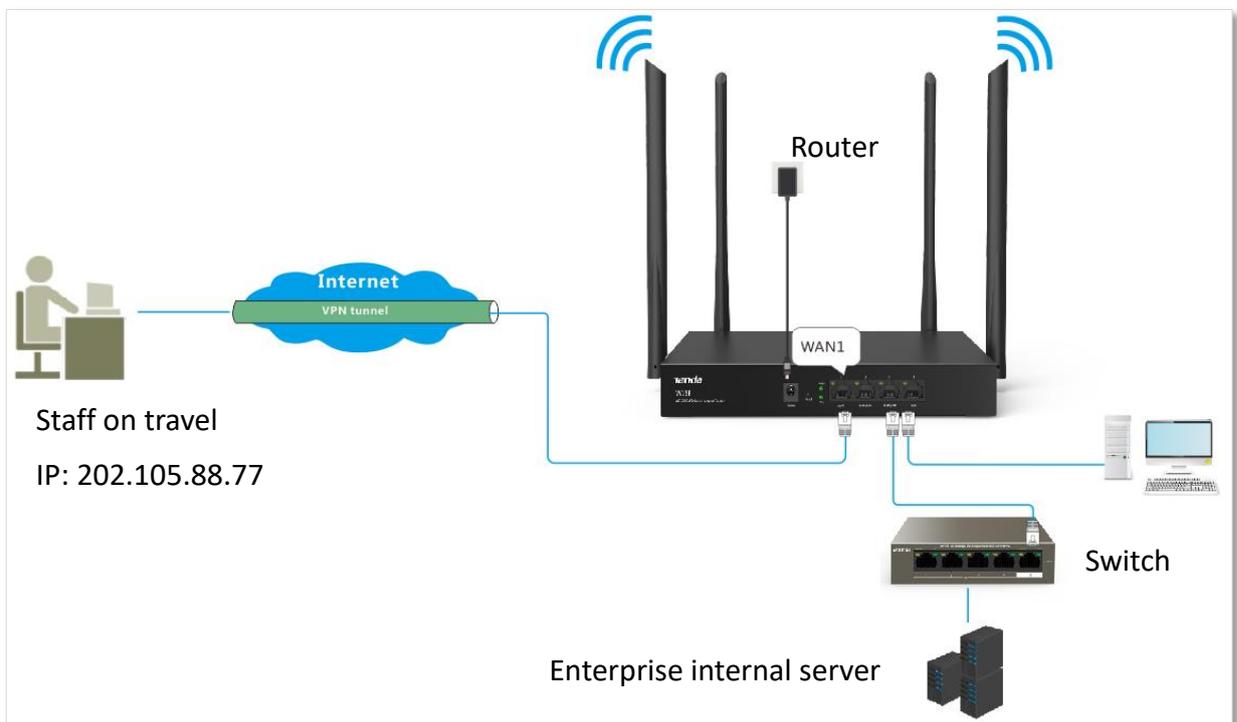
### Networking requirement

An enterprise has used the router to set up a LAN and access the internet. Employees of its branch must be allowed to access, through the internet, the HQ's resources over the HQ LAN in a secure manner, including internal resources as well as the OA, ERP, CRM, and project management systems.

### Solutions

You can set up an L2TP over IPSec VPN using the router to meet this requirement.

### Network topology



### Configuration description

Step	Task	Description
1	Configure IPSec connection.	Configure basic IPSec parameters.
2	Configure L2TP server.	Set the router as a L2TP VPN server.
3	Add L2TP users	Create an account for connecting.

### Configuration procedure

Assume that the two routers share the following basic IPSec information:

- **Encapsulation Mode:** Transport
- **Key negotiation Method:** Auto Negotiation

- **Pre-shared Key:** 87654321

**Step 1** Configure IPsec connection.

1. Choose **More > IPsec**, and click **+Add**. The **Add** configuration page appears.
2. Set required parameters.

Configurations on the following figure are only used for examples.

IPSec:  Enable  Disable

WAN:

Encapsulation Mode:

Connection Name:

Exchange Mode:

Encryption Algorithm:

Integrity Verification:

Pre-shared Key:

- (1) Set **IPSec** to **Enable**.
- (2) Set **Encapsulation Mode** to **Transport**.
- (3) Set **WAN** to the WAN port bound to the IPsec tunnel, which is **WAN1** in this example.
- (4) Set **Connection Name** to the name of the IPsec tunnel, which is **HQ** in this example.
- (5) Set **Pre-shared Key** to **87654321**.
- (6) Click **OK**.

**Step 2** Configure L2TP server.

1. Choose **VPN > VPN Server**.
2. Set required parameters.
  - (1) Set **VPN Server** to **Enable**.
  - (2) Set **Client Type** to **L2TP**.
  - (3) Set **WAN** to the WAN port bound to the IPsec tunnel, which is **WAN1** in this example.
  - (4) Set **IPsec Encryption** to **HQ**.
3. Click **Save**.

**Step 3** Add L2TP users.

1. Choose **VPN > PPTP/L2TP Server**, locate **PPTP/L2TP User** module.

2. Click **+Add**. The **Add** configuration window appears.
3. Set required parameters. Configurations on the following figure are only used for examples.

4. Click **Save**.

---- End

Added successfully. See the following figure.

<input type="checkbox"/>	User Name	Network Users	Network Segment	Subnet Mask	Remark	Status	Operation
<input type="checkbox"/>	Tom	No	--	--	Tom Smith	<input checked="" type="checkbox"/>	

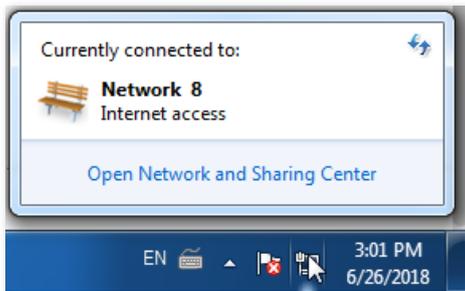
## Verification

To access the HQ LAN resources, you have to configure your client. The document introduces how to create VPN dialing on Windows 7 and iOS. Choose the scenario according to your actual situations.

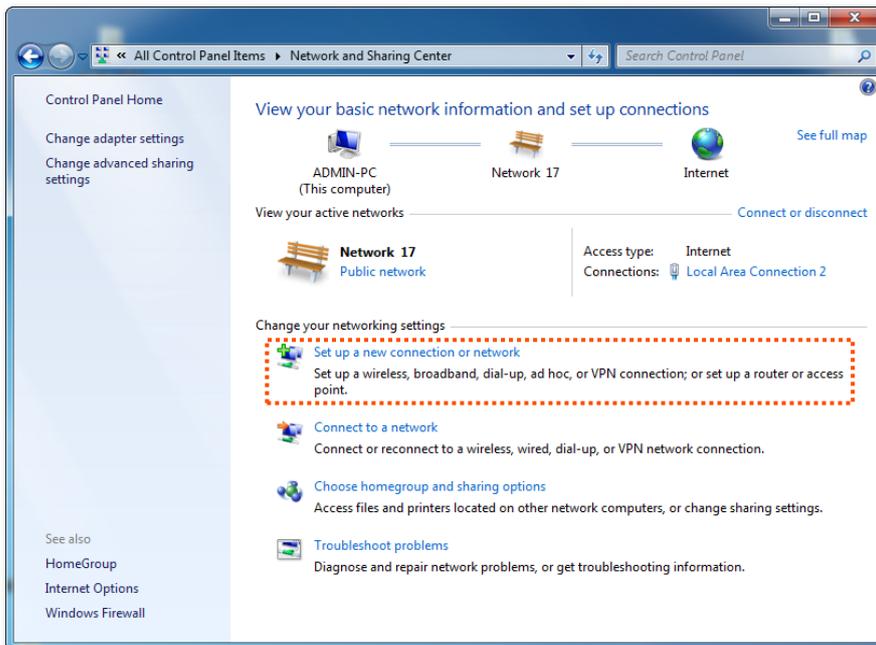
- **Create VPN connection on Windows 7.**

**Step 1** Create VPN connections.

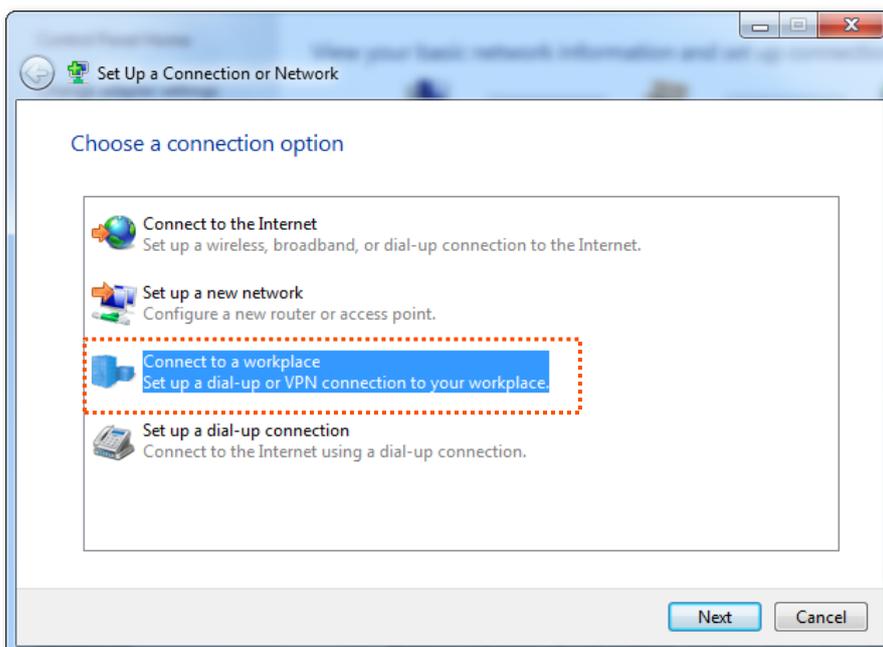
1. Click  in the lower right corner of the desktop, click **Open Network and Sharing Center**.



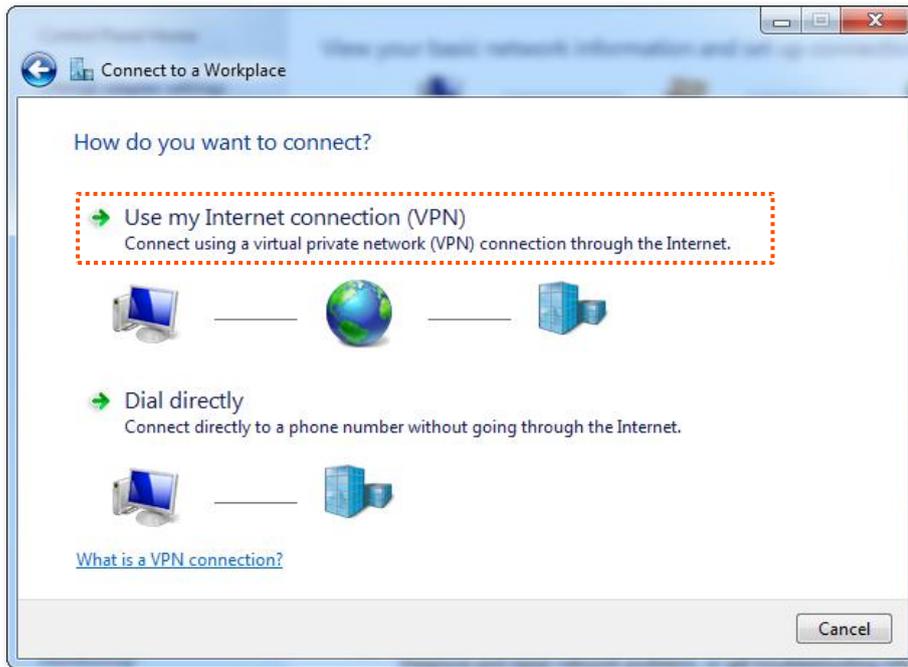
2. Click **Set up a new connection or network**.



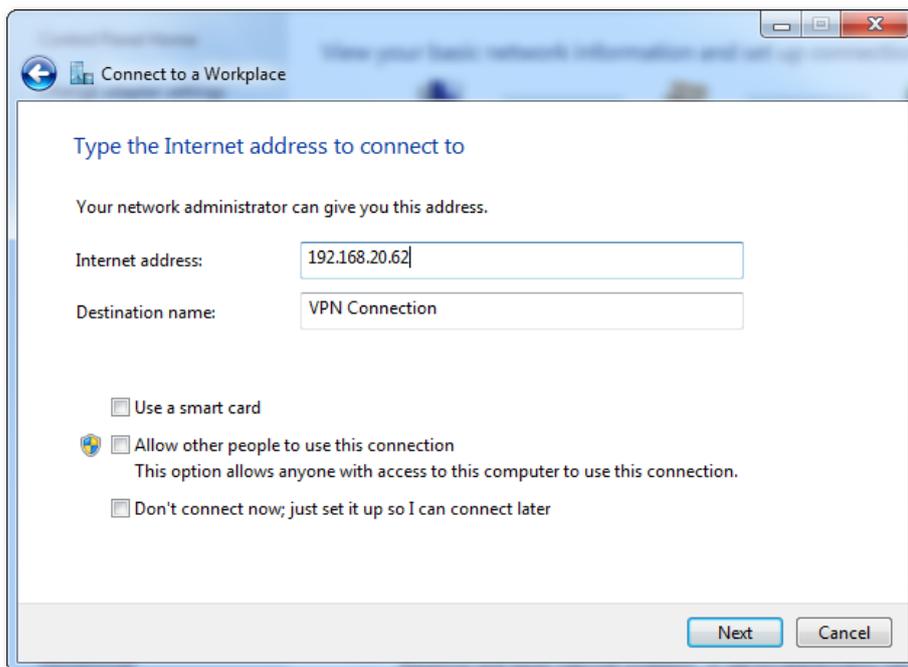
3. Click **Connect to a workplace**, then click **Next**.



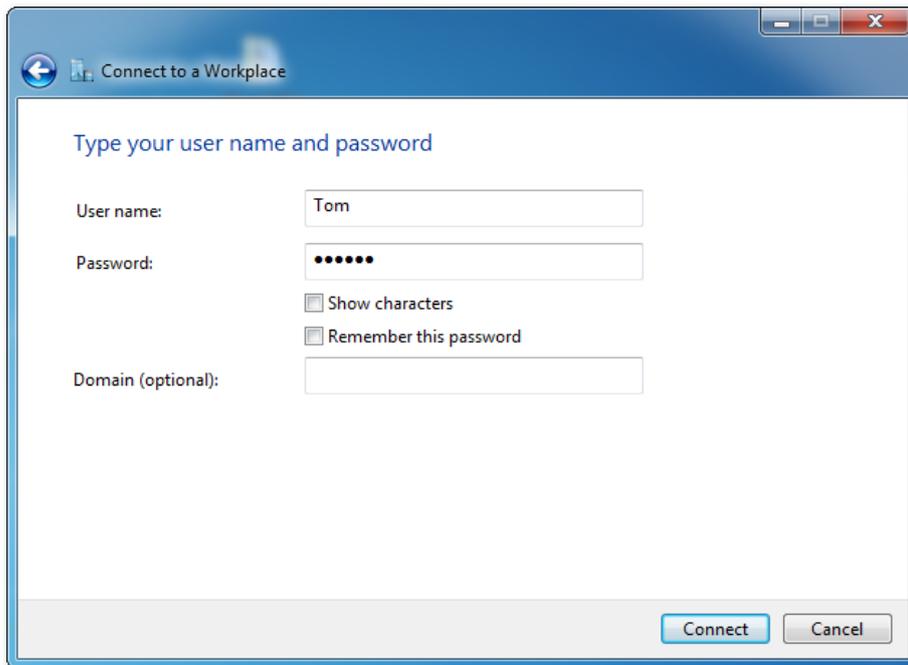
4. Click **Use my internet connection (VPN)**. If any other window pop up, follow the on-screen instructions.



5. Set the IP address of the L2TP server, which is **192.168.20.62** in this example. Then click **Next**.



6. Set the **User name** to **Tom**, and **password** to **Tom123**. Then click **Connect**.

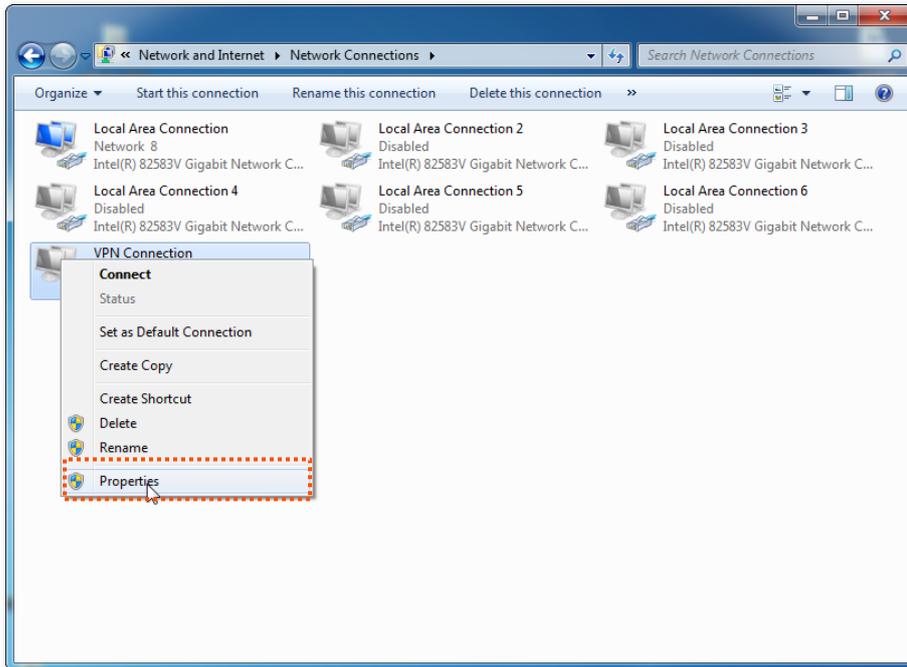


7. Wait for a moment to establish a connection.

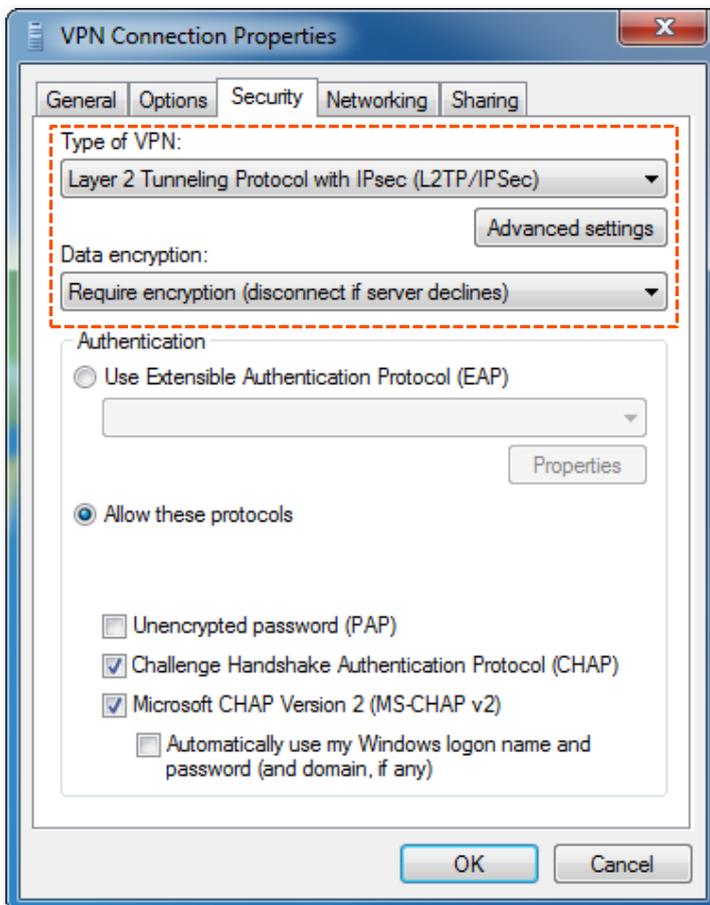


**Step 2** Set VPN connection parameters.

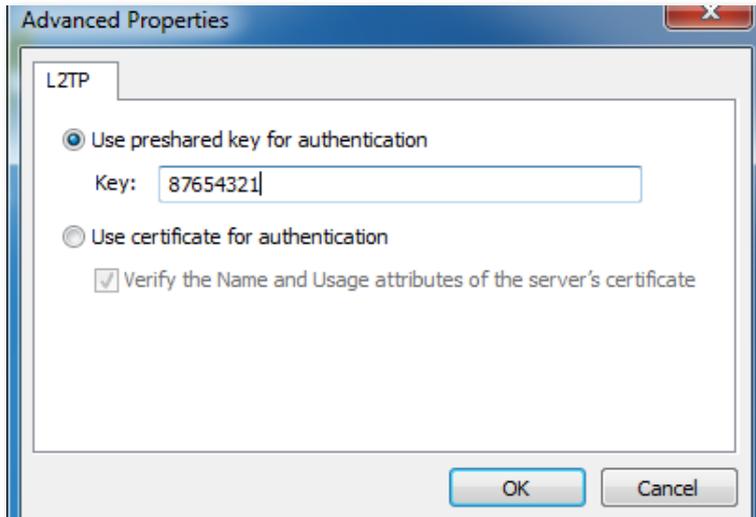
1. Click  in the lower right corner of the desktop, choose **Open Network and Sharing Center**, click **Change adapter settings**, right click on **VPN connection**, and choose **Properties**.



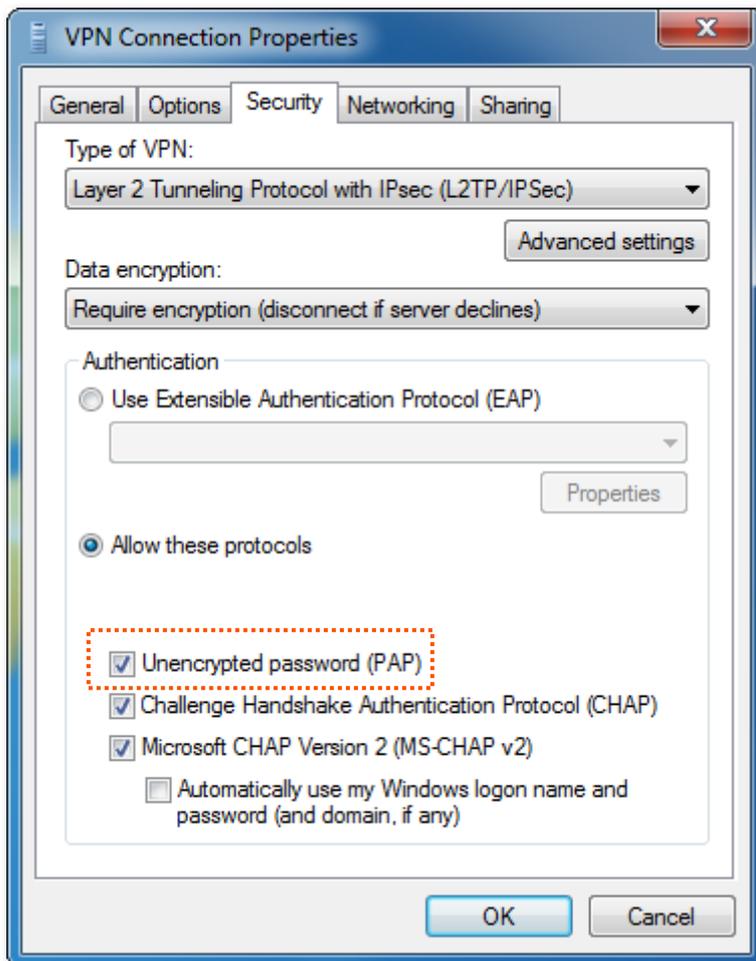
2. Click **Security tab**, in the **Type of VPN** section, choose **Layer 2 Tunneling Protocol with IPsec (L2TP/IPSec)** and click **Advanced settings**.



3. Click **Use preshared key for authentication**, and set the **Key** to **87654321**.
4. Click **OK**.

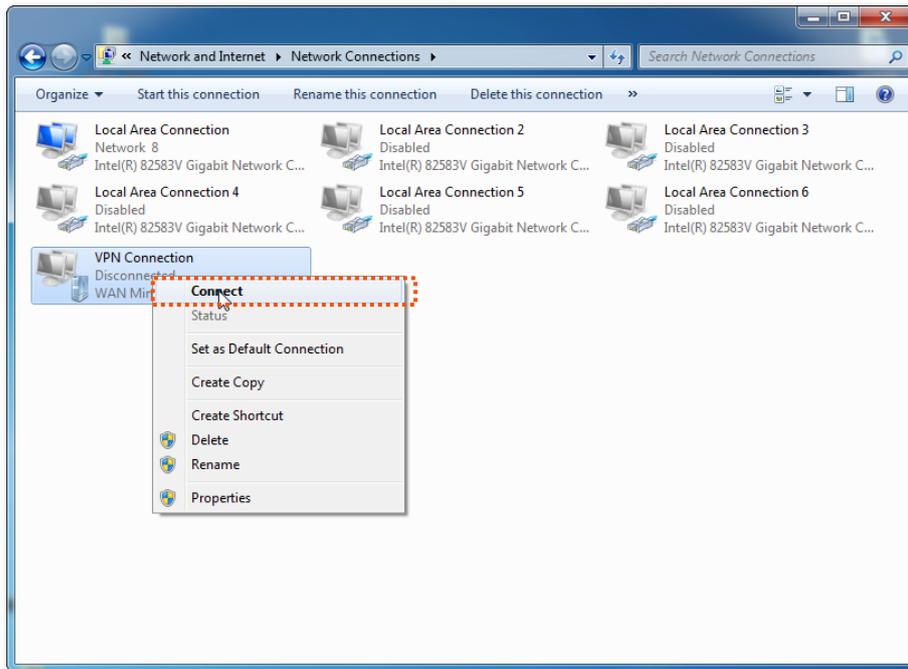


5. It redirects to the properties page of VPN Connection, tick **Unencrypted password (PAP)**. Then click **OK**.

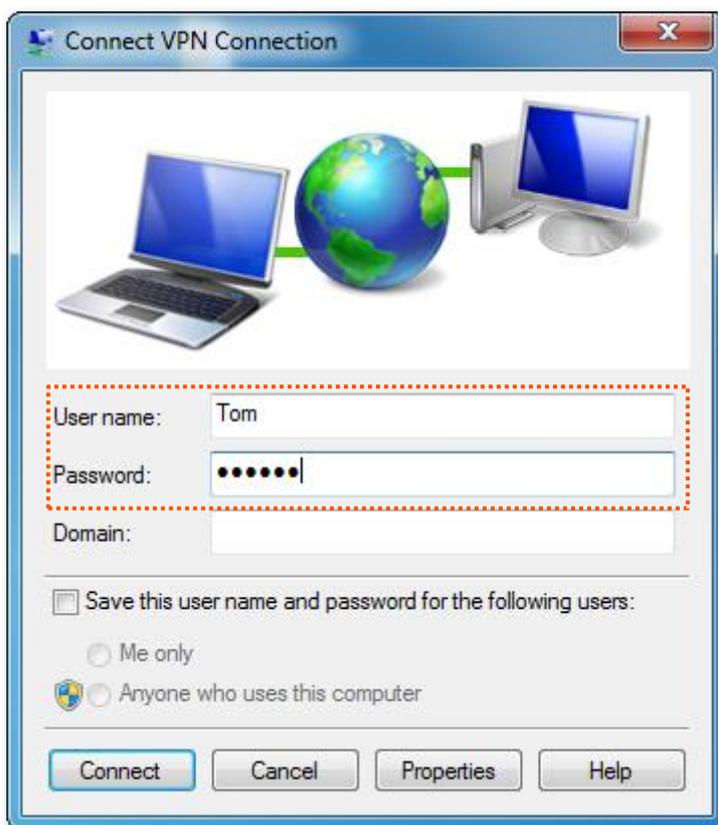


**Step 3** Create VPN dialing.

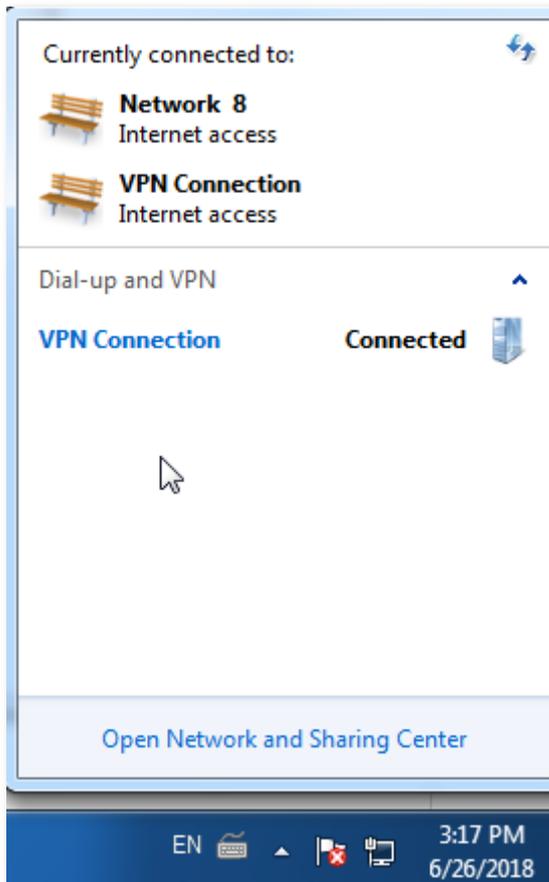
1. Go to Network and Sharing Center page, right click **VPN Connection**, and click **Connect**.



2. Enter **User name** to **Tom**, **Password** to **Tom123**, and click Connect.



Wait for a moment to establish a connection.

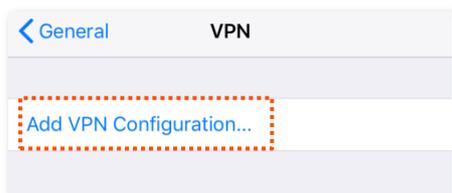


**Step 4** Create VPN connection on a mobile device (Example: iOS).

1. Tap  on the **Settings** page.
2. Tap **VPN**.

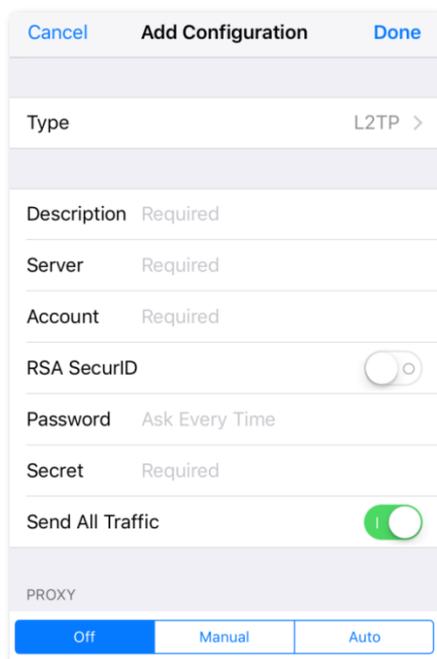


3. Tap **Add VPN Configuration**.



4. Set required parameters.

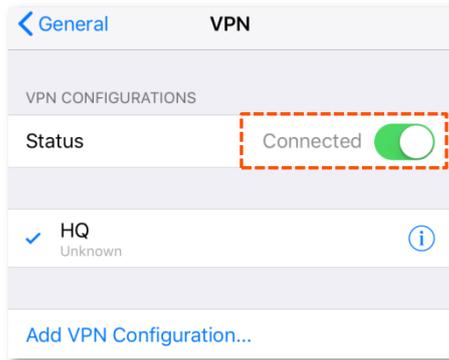
- (1) Set **Type** to **L2TP**.
- (2) Set **Description** to the name of the VPN connection, which is **HQ** in this example.
- (3) Set **Server** to the IP address of L2TP server, which is **192.168.20.62** in this example.
- (4) Set **Account** to the user name used to connect the VPN client to the VPN server, which is **Tom** in this example.
- (5) Set **Password** to the password for the user name, which is **Tom123** in this example.
- (6) Set **Secret** to the **Pre-shared Key** set in IPsec connection, which is **87654321** in this example.
- (7) Tap **Done**.



5. Tap .



Wait for a moment. When the **Status** turns to **Connected** , the IPSec connection is created successfully.

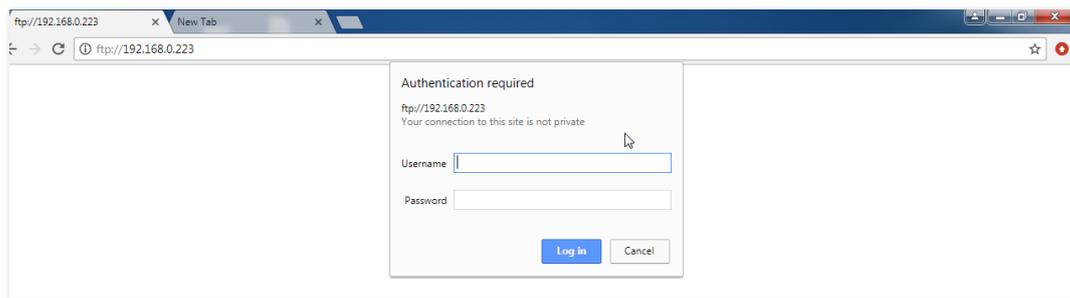


**Step 5** Accessing HQ data for employees on business trip.

Here takes accessing web server of HQ as an example. The project data of the HQ is stored on the FTP server. Assume that the server information is as follows:

- FTP server IP address: **192.168.0.223**
- Server port: **8080**

1. Open a web browser, access the website <ftp://192.168.0.223:8080>.



2. Enter the **Username** and **Password** you set, which is Tom/Tom123 in this example.

Accessed successfully. See the following figure:



To access the FTP server on a mobile device (smartphone, tablet, etc.), the mobile device needs to install an FTP client.

## 12.16 Multi-WAN policy

### 12.16.1 Overview

The router has 1 WAN port by default but allows a maximum of 3 WAN ports. When multiple WAN ports are operating at the same time, an appropriate multi-WAN policy can greatly improve the bandwidth usage of the router. The router supports the following types of multi-WAN policy:

- **Smart load balancing** (default): If such a policy is applied, the router automatically distributes traffic based on the bandwidth on the **Bandwidth Control** page through the WAN ports to achieve load balancing.
- **Custom**: Such a policy is configured by an administrator to distribute data of specified IP address groups to specified WAN ports.

### 12.16.2 Set multi-WAN policies

To access the configuration page, choose **More > Multi-WAN Policy**. By default, the **WAN Detection** is disabled. The following page appears when the **WAN Detection** is enabled.

The screenshot shows the 'Multi-WAN Policy' configuration page. At the top, there is a 'Back' button and a help icon. The 'Multi-WAN Policy' section has two radio buttons: 'Smart Load Balancing' (selected) and 'Custom'. Below this is the 'WAN Detection' section, which is underlined in red. It contains 'WAN Link Detection' with 'Enable' selected and 'Disable' as an option. There are two input fields: 'Detection Address' with the value 'www.apple.com' and 'Detection Interval' with the value '5' and a note 'min (Range: 1 to 200)'. At the bottom, there are 'Save' and 'Cancel' buttons.

#### Parameter description

Parameter	Description
Mutil-WAN Policy	<p>It specifies the policy through the WAN ports.</p> <ul style="list-style-type: none"><li>- <b>Smart Load Balancing</b>: The system automatically distributes traffic through the WAN ports with the smallest amount of traffic.</li><li>- <b>Custom</b>: It enables you to assign WAN ports to source IP addresses as required.</li></ul>
WAN Detection	The router regularly detects the connection status between the WAN ports and

Parameter	Description
	detection address.
	- <b>Detection Address:</b> The IP address or domain name to detect.
	- <b>Detection Interval:</b> The interval of detection, it is 5 minutes by default.

### 12.16.3 Customize a multi-WAN policy

#### Before you start

Configure the following parameters first:

- **IP group(s):** Choose **Filter Management > Time group/IP group** for settings.
- **Bandwidth upload/download rate:** Choose **Bandwidth Control**, and locate the corresponding WAN port for settings.

#### Configuration procedure

**Step 1** Choose **More > Multi-WAN Policy**, and click **+Add**.

**Step 2** Select the **IP Group** you set on **Filter Management > Time group/IP group** page.

**Step 3** Select the WAN port to which the policy applies.

**Step 4** Click **Save**.

The screenshot shows a modal dialog titled "Add" with a close button (X) in the top right corner. Inside the dialog, there are three configuration fields:
 

- Status:** A toggle switch that is currently turned on (green).
- IP Group:** A dropdown menu with "IP\_Group\_1" selected.
- WAN Port:** Two radio buttons, "WAN1" (which is selected) and "WAN2".

 At the bottom of the dialog, there are two buttons: a green "Save" button and a grey "Cancel" button.

---- End

The policy is added successfully. See the following figure:

The screenshot shows the "Multi-WAN Policy" configuration interface. At the top, there are two radio buttons: "Smart Load Balancing" (unselected) and "Custom" (selected). Below this are "+ Add" and "Delete" buttons. A table below lists the configured policies. The first row, representing the added policy, is highlighted with a dashed orange border.

IP Group	WAN Port	Status	Operation
<input type="checkbox"/> IP_Group_1	WAN1	<input checked="" type="checkbox"/>	

## 12.16.4 Example of customizing a multi-WAN policy

### Networking requirement

An enterprise has used the router to set up a LAN. To meet its internet access requirement, the enterprise has set up two broadband connections with two different ISPs and can now access the internet properly. To achieve load balancing, the enterprise raises the following LAN requirements:

- The computers with IP addresses ranging from 192.168.0.2 to 192.168.0.100 access the Internet through the fixed-line broadband connection with ISP A.
- The computers with IP addresses ranging from 192.168.0.101 to 192.168.0.250 access the Internet through the mobile broadband connection with ISP B.

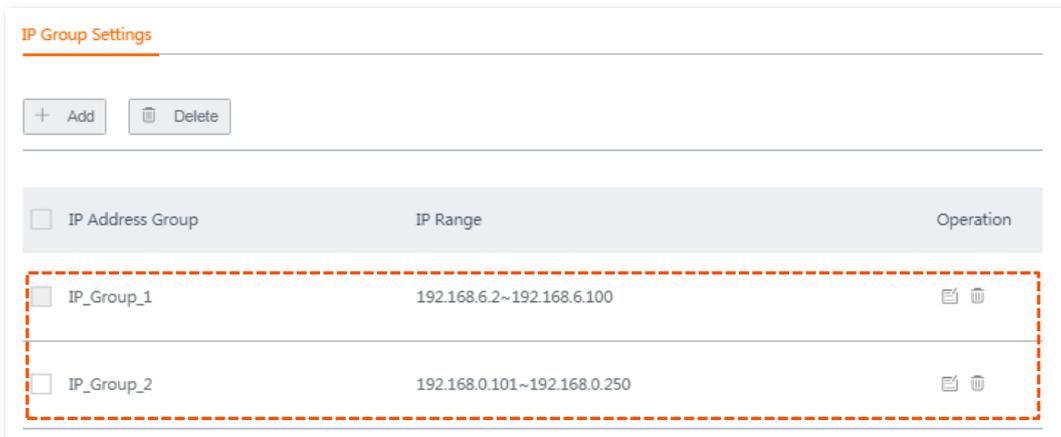
### Solutions

You can use the multi-WAN policy function of the router to meet this requirement.

### Configuration procedure

**Step 1** Set IP address groups.

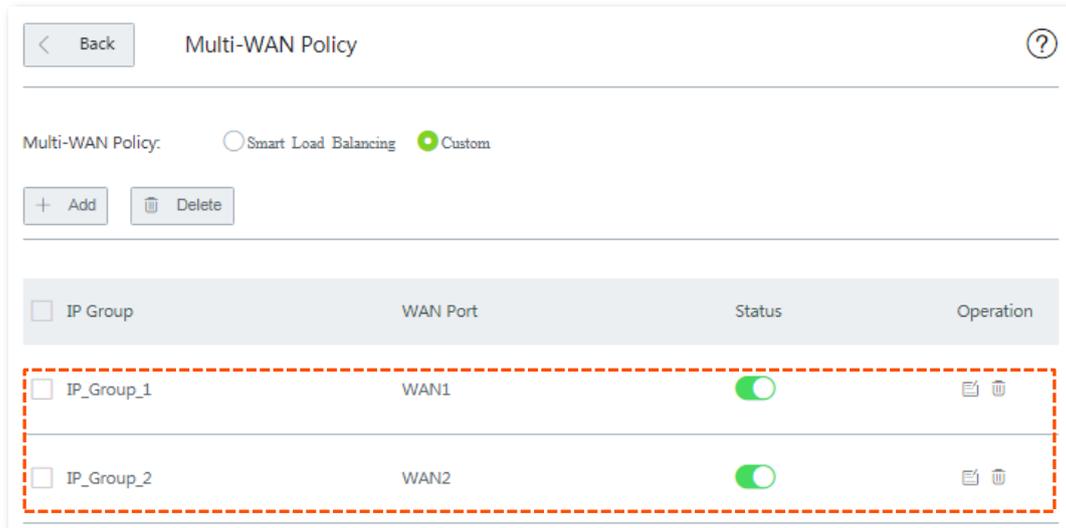
1. Choose **Filter Management > IP Group/Time Group**, and move to the **IP Group** configuration area.
2. Set the IP address group shown in the following figure.



**Step 2** Customize multi-WAN policies.

1. Choose **More > Multi-WAN Policy**.
2. Select **Custom**, and click **Save**.

3. Click **+Add**, and set the rules shown in the following figure.



---- End

## Verification

The computers with IP addresses ranging from 192.168.0.2 to 192.168.0.100 can access the Internal through the fixed-line broadband connection with ISP A.

The computers with IP addresses ranging from 192.168.0.101 to 192.168.0.250 can access the Internal through the mobile broadband connection with ISP B.

# 13 Maintenance

This chapter describes how to reboot, reset, and upgrade the router, how to modify the login password, how to back up your current configuration and restore the router to previous configuration, how to view the system logs and functions that are enabled or disabled, how to set up system time, and how to use the Ping and Traceroute commands.

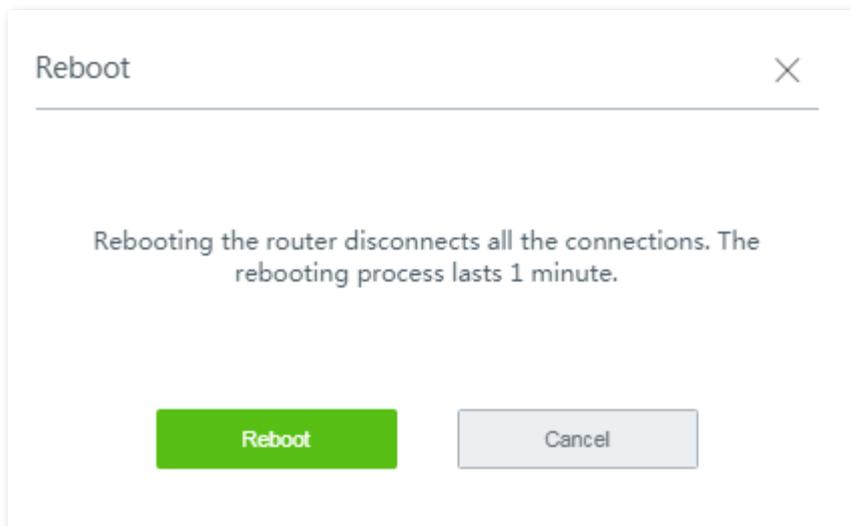
## 13.1 Reboot the router

### 13.1.1 Overview

If a parameter does not take effect or the router does not work properly, you can try rebooting the router to resolve the problem.

### 13.1.2 Reboot the router manually

Choose **Maintenance > Reboot**, and follow the on-screen instruction to reboot the device.



### 13.1.3 Reboot the router on schedule



To enable reboot schedule function to work properly, ensure that the **Model** of your router is correct.

**Step 1** Choose **Maintenance > Reboot Schedule** to enter the configuration page, and enable this function.

**Step 2** Set the time and date when the router performs rebooting.

**Step 3** Click **Save** to apply your settings.

Reboot Schedule

Reboot Schedule:

Reboot Time: 0 hrs 0 min

Reboot on:  Every Day  Specified Date and Time

Repeat:  Mon.  Tues.  Wed.  Thur.  Fri.  Sat.  Sun.

Save Cancel

**---- End**

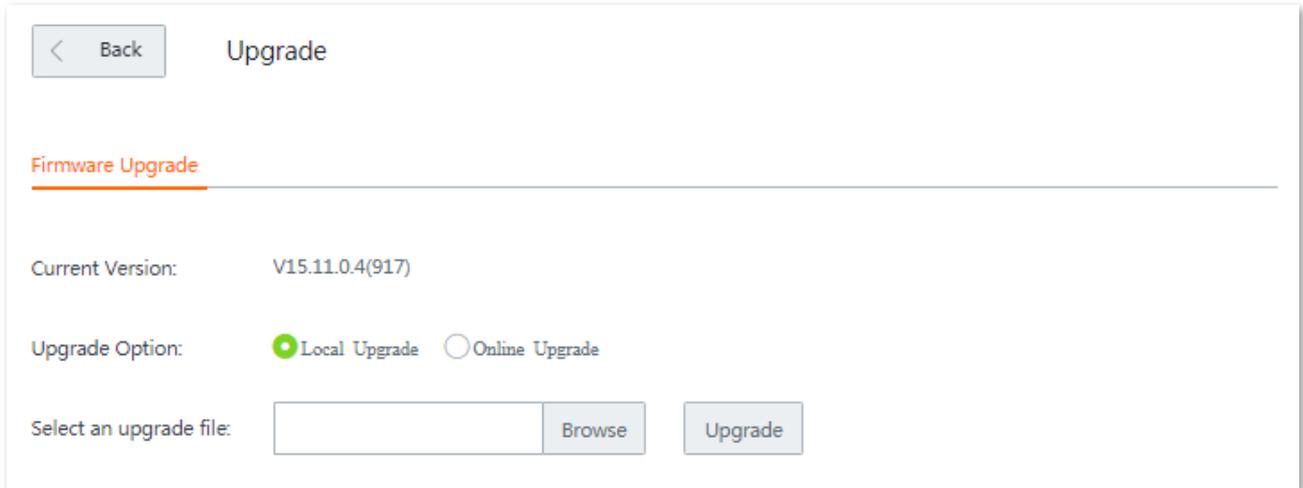
The router performs rebooting regularly on the time and date you set here.

## 13.2 Upgrade

### 13.2.1 Overview

The router supports **local** and **online** upgrades.

Choose **Maintenance > Upgrade** to enter the configuration page. See the following figure:



Back Upgrade

**Firmware Upgrade**

Current Version: V15.11.0.4(917)

Upgrade Option:  Local Upgrade  Online Upgrade

Select an upgrade file:  Browse Upgrade

### 13.2.2 Upgrad the rotuer manually



- To enable your router to work properly after an upgrade, ensure that the firmware used to upgrade complies with your [Model](#).
- When upgrading, do not power off the router.

**Step 1** Download the upgrade file to your local computer.

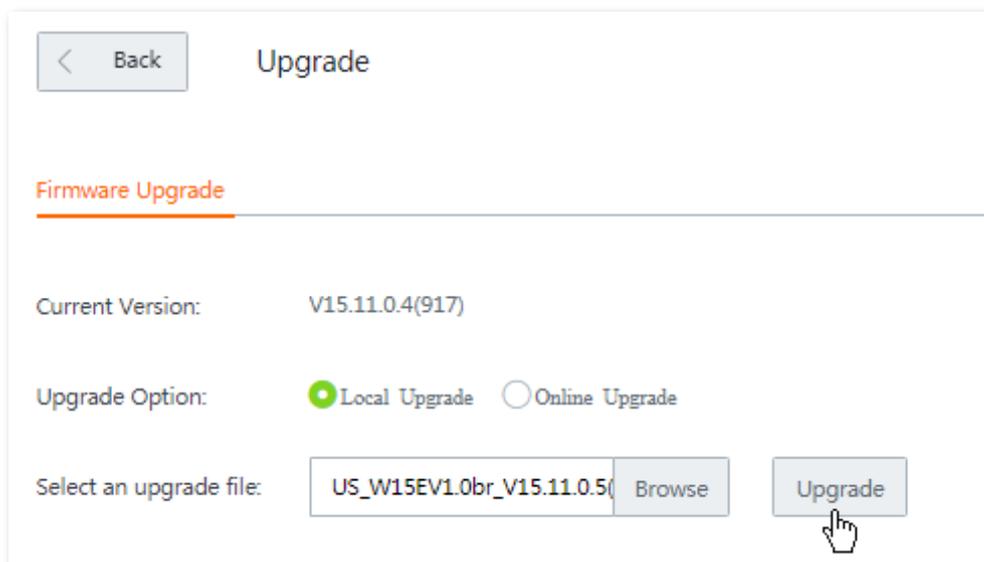
1. Visit [www.tendacn.com](http://www.tendacn.com), searching the **Model** in the searching bar to enter the product details page.
2. Locate the latest firmware, download it to your computer, and unzip it.

**Step 2** Log in to the web UI of your router, click **Maintenance > Upgrade** to enter the configuration page.

**Step 3** Set **Upgrade Option** to **Local Upgrade**.

**Step 4** Click **Browse**, select and upload the firmware that has been downloaded to your computer.

**Step 5** Click **Upgrade**. Wait until the progress bar completes.



The screenshot shows a web interface titled "Upgrade". At the top left is a "Back" button. Below the title is a section header "Firmware Upgrade" with a red underline. The interface displays the following information:

- Current Version: V15.11.0.4(917)
- Upgrade Option:  Local Upgrade  Online Upgrade
- Select an upgrade file: A text input field containing "US\_W15EV1.0br\_V15.11.0.5" and a "Browse" button.
- An "Upgrade" button is located to the right of the file selection area, with a mouse cursor pointing at it.



If upgrade does not apply, [reset](#) the router. [Back up](#) your configurations properly before reset.

### 13.2.3 Upgrad the rotuer automatically

When the router is connected to the internet, it checks whether there is a later firmware version, and displays the detected information on the page. You can choose whether to upgrade the firmware with the latest version. If you want to upgrade the firmware, click **Upgrade**. Then the system will download the firmware and the router upgrades the firmware automatically.

## 13.3 Reset

### 13.3.1 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:

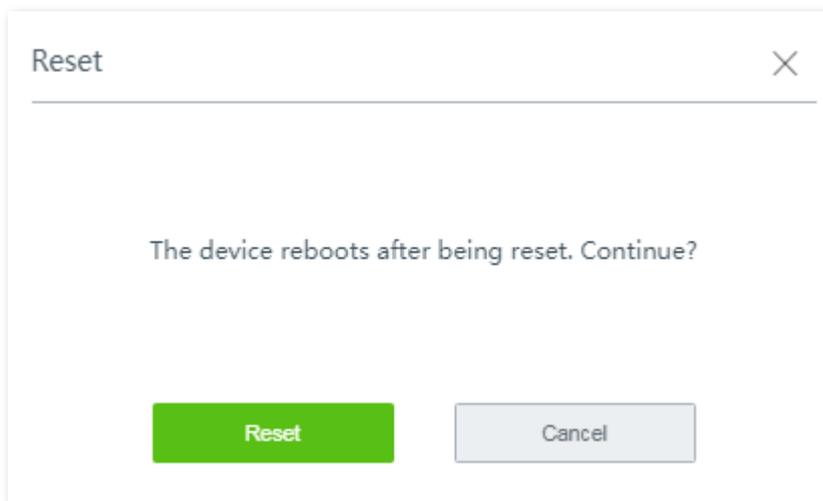
- [Reset the router using web UI.](#)
- [Reset the router using the reset button.](#)

### 13.3.2 Reset the router using web UI



- Resetting the router deletes all your current configurations and you need to reconfigure the router to access the internet.
- If it is necessary to reset the router, [Back up your current configuration](#) first.
- When resetting, do not power off the router.

Choose **Maintenance > Reset**, and follow the on-screen instruction to reset the device.



### 13.3.3 Reset the router using the reset button

With the SYS LED indicator blinking, hold down the **Reset** button using a paper clip for about 8 seconds, and then release it. When all LED indicators light up, the router is reset to the factory settings successfully.

## 13.4 Password manager

### 13.4.1 Overview

The router supports two account types: **Administrator** and **Authentication**. The difference between them is their access permission.

The **Administrator** account enjoys all access permission. Password for **Administrator** account is the login password you set during initial setup. You can view and modify it here.

The **Authentication** account only has permission for accessing **System Status** and **Authentication** modules. The default password for this account is **rzadmin**. You can view and modify it here.

To enter the configuration page, choose **Maintenance > Password Manager**.

Account Type	Password	Permission
Administrator	admin	All permissions
Authentication	rzadmin	View system status and configure authentication accounts.

### 13.4.2 Modify login password

**Step 1** Click **Maintenance > Password Manager** to enter the configuration page.

**Step 2** Locate the account type and modify the password.

**Step 3** Click **Save** on the bottom of the page to apply your settings.

---- End

Then you will be redirected to the login page. Enter the password corresponding to the administrator account you set just now, and click **Login** to log in to the router.

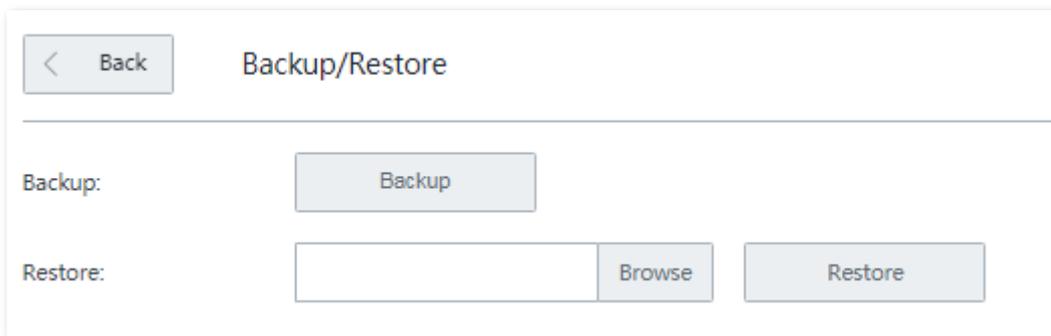
## 13.5 Backup/Restore

### 13.5.1 Overview

The **backup** function is used to export the current configuration of the router to your computer. The **restore** function is used to import a configuration file to the router.

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 a configuration that has been backed up.

To access the configuration page, choose **Maintenance > Backup/Restore**.



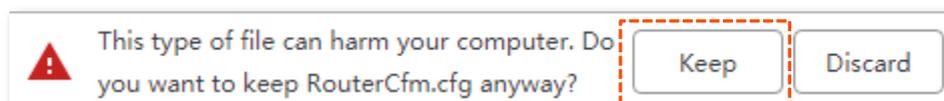
### 13.5.2 Back up your current configuration

**Step 1** Click **Maintenance > Backup/Restore** to enter the configuration page.

**Step 2** Click **Backup**. The system exports the configuration file to your local computer.



If the following warning message appears, click **Keep**.



---- End

### 13.5.3 Restore your previous configuraiton

**Step 1** Click **Maintenance > Backup/Restore** to enter the configuration page.

**Step 2** Click **Browse**, and upload the configuration file ending with **.cfg**.

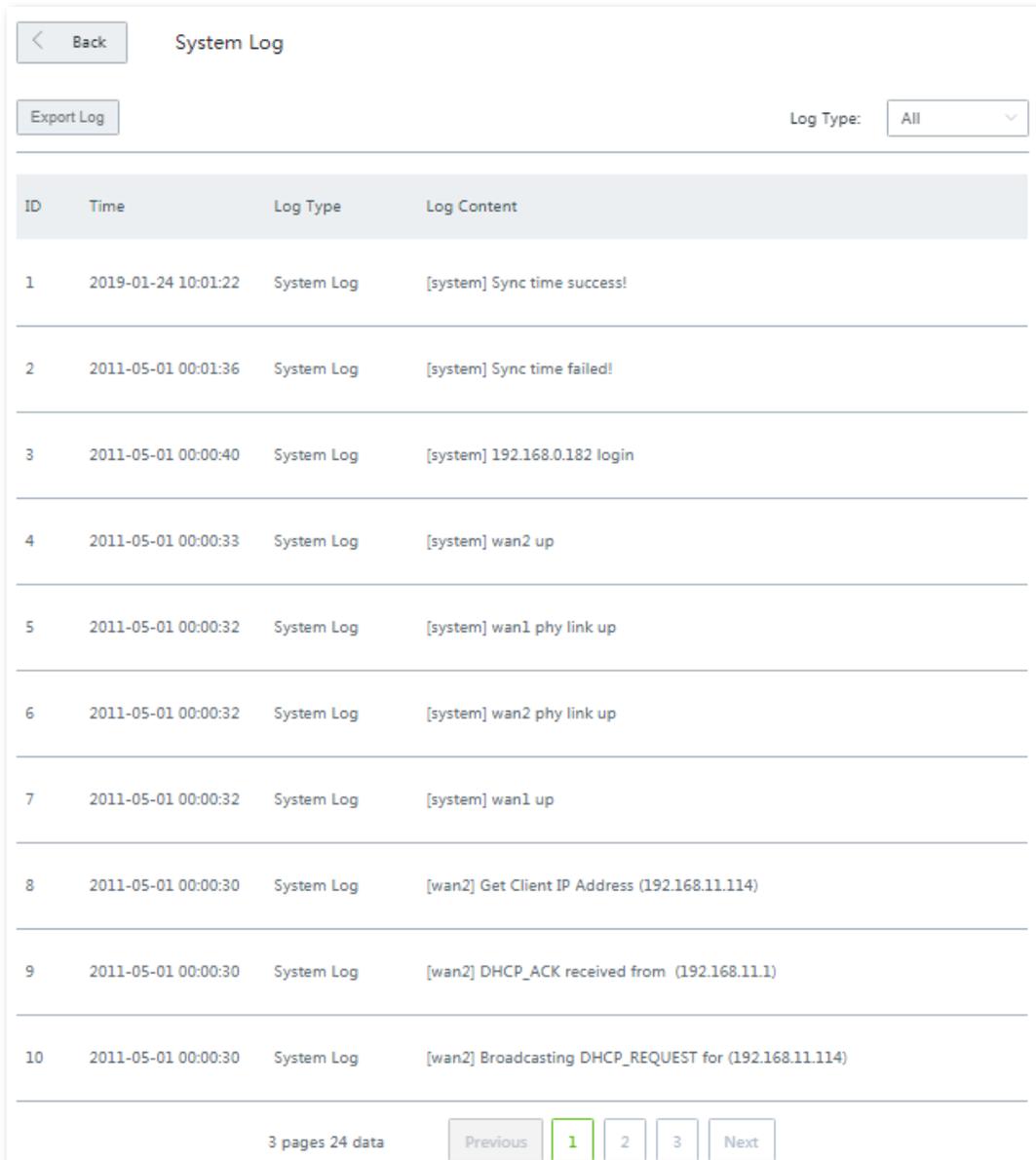
**Step 3** Click **Restore** and follow the on-screen instruction to restore the configuration.

---- End

## 13.6 System log

System logs record information about system running status and the operation you performed on it. When system malfunctions occur, you can use system log for troubleshooting.

To enter the configuration page, click **Maintenance > System Log**.



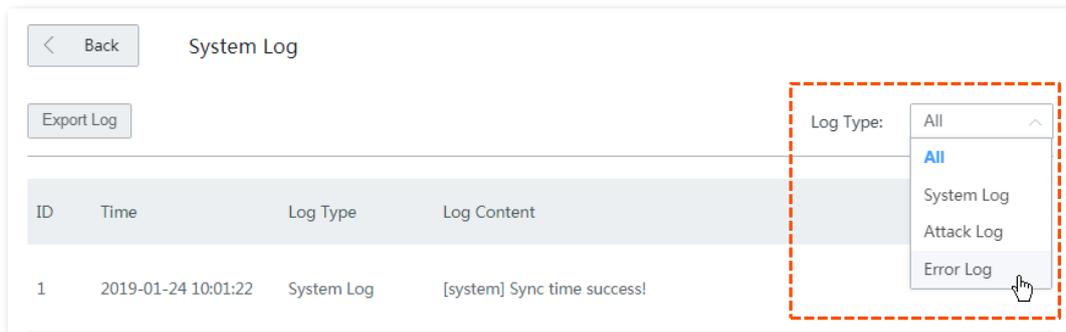
ID	Time	Log Type	Log Content
1	2019-01-24 10:01:22	System Log	[system] Sync time success!
2	2011-05-01 00:01:36	System Log	[system] Sync time failed!
3	2011-05-01 00:00:40	System Log	[system] 192.168.0.182 login
4	2011-05-01 00:00:33	System Log	[system] wan2 up
5	2011-05-01 00:00:32	System Log	[system] wan1 phy link up
6	2011-05-01 00:00:32	System Log	[system] wan2 phy link up
7	2011-05-01 00:00:32	System Log	[system] wan1 up
8	2011-05-01 00:00:30	System Log	[wan2] Get Client IP Address (192.168.11.114)
9	2011-05-01 00:00:30	System Log	[wan2] DHCP_ACK received from (192.168.11.1)
10	2011-05-01 00:00:30	System Log	[wan2] Broadcasting DHCP_REQUEST for (192.168.11.114)

### 13.6.1 View system log



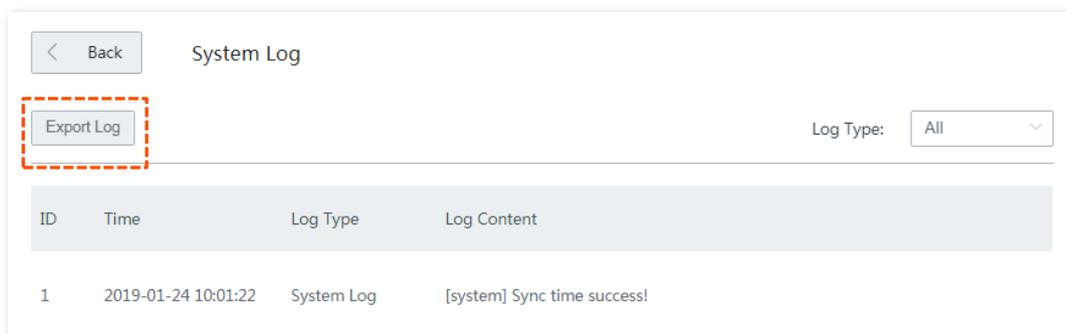
- System logs will be cleared each time the router reboots or resets.
- A maximum of **300** logs will be recorded.
- The system only keeps 300 logs that are generated the most recently.

The router records three log types: **System Log**, **Attack Log**, and **Error Log**. You can view all logs or filter the logs to view as needed.



## 13.6.2 Export system log

Click **Export Log**, the log file will be downloaded to your local computer.



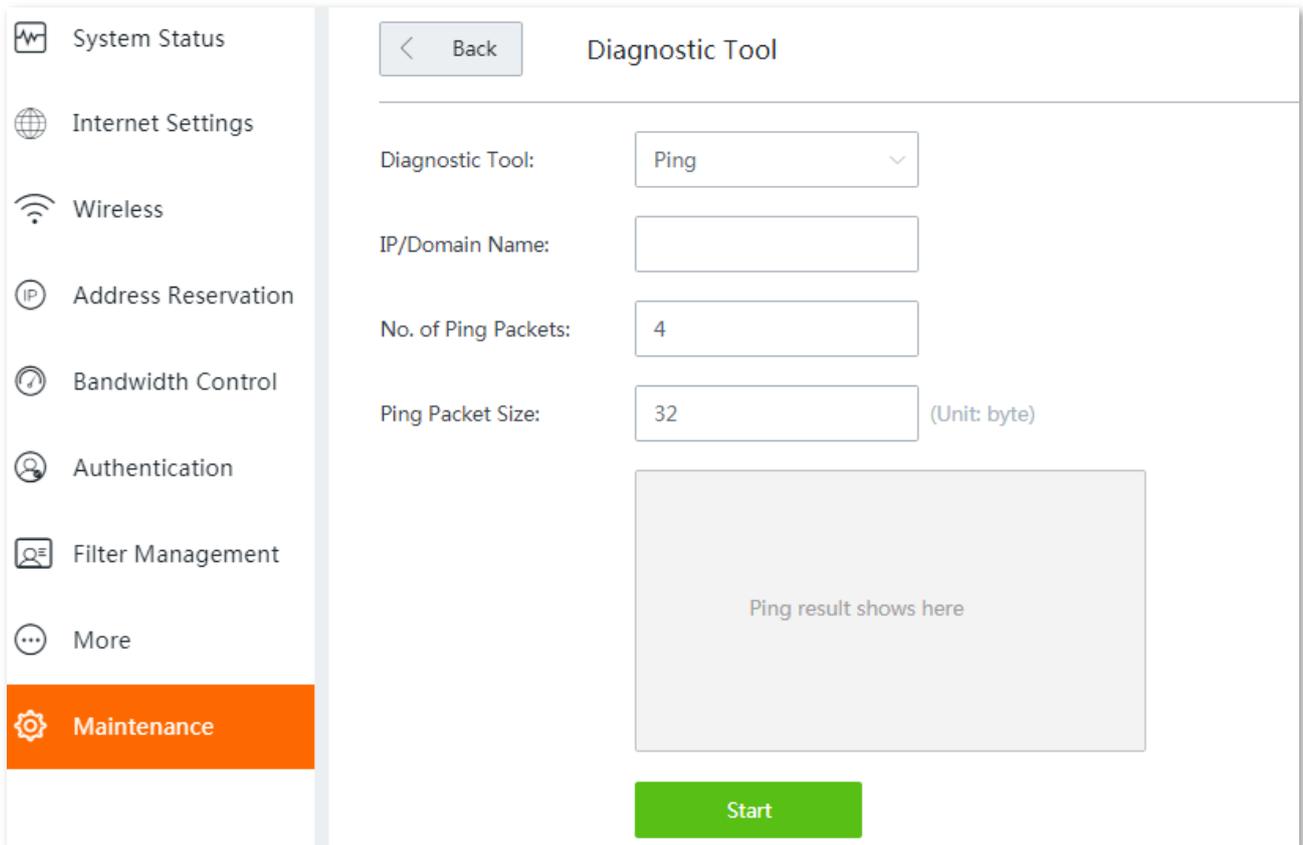
## 13.7 Diagnostic tool

### 13.7.1 Overview

You can execute Ping/Traceroute command on this page.

- **Ping:** Used to check whether the connection is correct and the connection quality.
- **Traceroute:** Used to detect the route from the bridge to the destination IP address or domain name.

To access the configuration page, click **Maintenance > Diagnosis Tool**.



The screenshot shows a web interface for the Diagnostic Tool. On the left is a navigation menu with items: System Status, Internet Settings, Wireless, Address Reservation, Bandwidth Control, Authentication, Filter Management, and More. The 'Maintenance' item is highlighted in orange. The main content area is titled 'Diagnostic Tool' and has a 'Back' button. It contains four input fields: 'Diagnostic Tool' (a dropdown menu set to 'Ping'), 'IP/Domain Name' (an empty text box), 'No. of Ping Packets' (a text box containing '4'), and 'Ping Packet Size' (a text box containing '32' with '(Unit: byte)' to its right). Below these fields is a large grey rectangular area with the text 'Ping result shows here'. At the bottom center is a green 'Start' button.

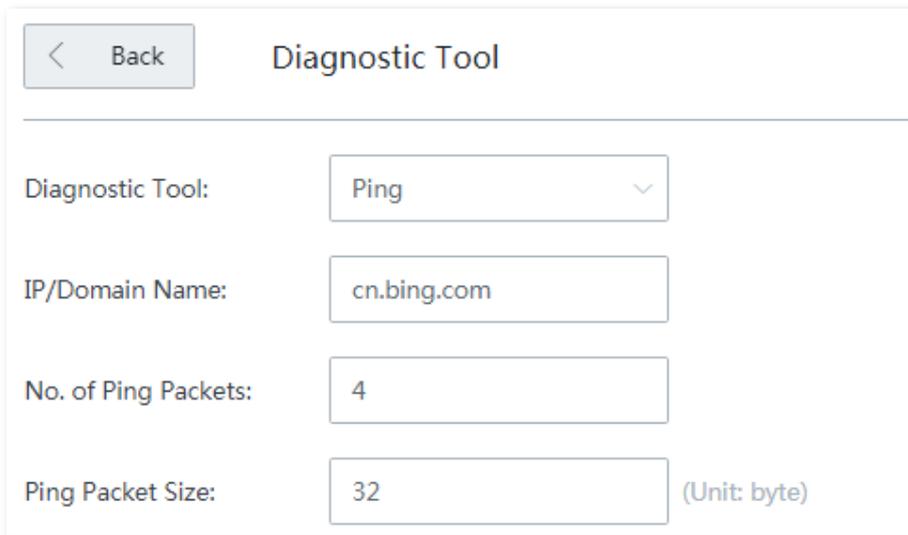
### 13.7.2 Execute Ping command to detect connection quality

Assume that:

You need to detect the connectivity between the router and the **Bing** website.

- Step 1** Click **Maintenance > Diagnosis Tool** to enter the configuration page.
- Step 2** Select **Ping** from the drop-down list menu of the **Tools**.
- Step 3** Enter the IP address or domain name of the ping target, which is **cn.bing.com** in this example.
- Step 4** Set **Number of Ping Packets** as required.
- Step 5** Set **Ping Packet Size** as required.

**Step 6** Click **Start**.



Diagnostic Tool

Diagnostic Tool: Ping

IP/Domain Name: cn.bing.com

No. of Ping Packets: 4

Ping Packet Size: 32 (Unit: byte)

---- End

Wait a moment. The ping result will be displayed in the result box. See the following figure:

```
32bytes fromcn.bing.com: ttl=113time=13.795
32bytes fromcn.bing.com: ttl=113time=12.519
32bytes fromcn.bing.com: ttl=113time=12.275
32bytes fromcn.bing.com: ttl=113time=11.424
---cn.bing.comping statistics ---
4packets transmitted,4packets received,0% packet
loss
round-trip min/avg/max =11.424/12.503/13.795ms
```

### 13.7.3 Execute Traceroute command to detect the route selection

Assume that:

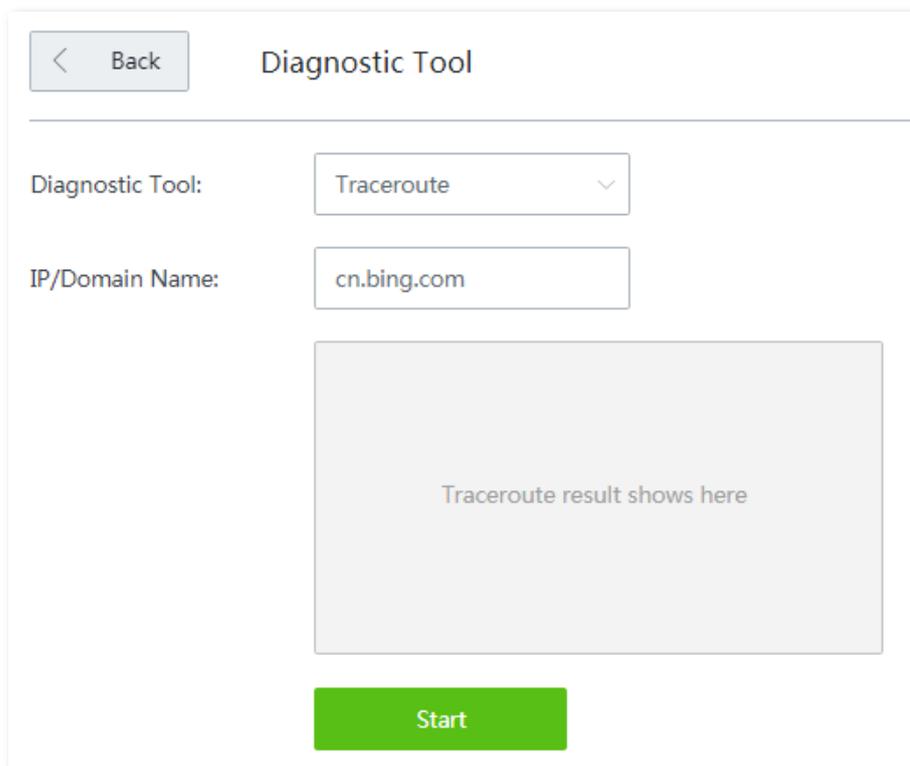
You need to detect the path from the router to **Bing** website.

**Step 1** Click **Maintenance > Diagnosis Tool** to enter the configuration page.

**Step 2** Select **Traceroute** from the drop-down list menu of the **Tools** menu.

**Step 3** Enter the IP address or domain name of the traceroute target, which is **cn.bing.com** in this example.

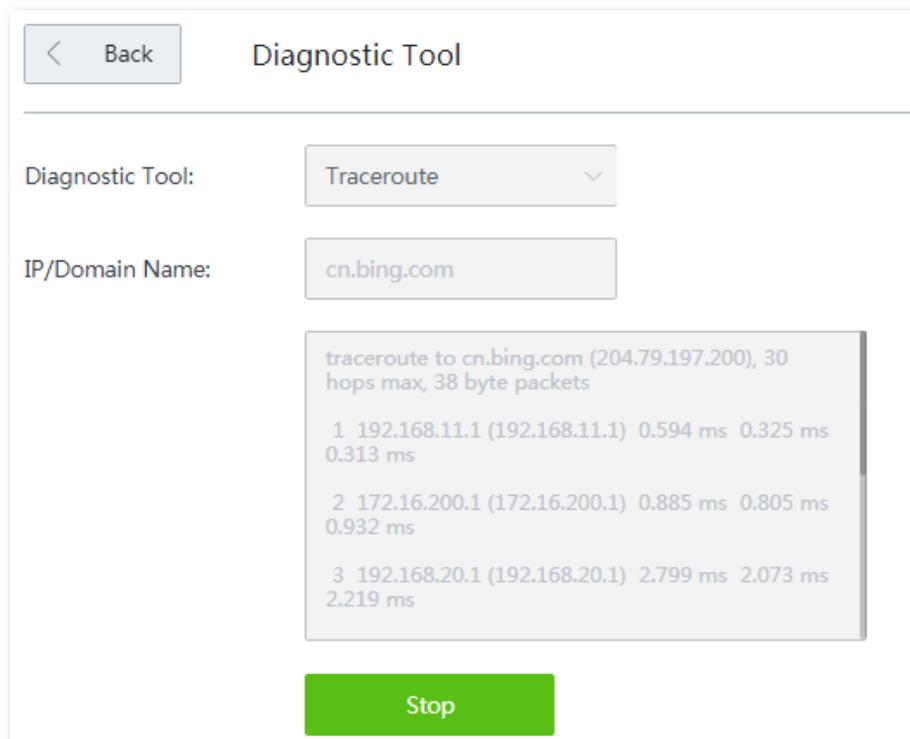
**Step 4** Click **Start**.



The screenshot shows a web interface titled "Diagnostic Tool". At the top left is a "Back" button with a left-pointing arrow. Below the title, there are two input fields: "Diagnostic Tool:" with a dropdown menu set to "Traceroute", and "IP/Domain Name:" with a text box containing "cn.bing.com". Below these fields is a large, empty gray rectangular box with the text "Traceroute result shows here" centered inside. At the bottom center is a green "Start" button.

---- End

Wait a moment. The traceroute result will be displayed in the result box. See the following figure:



The screenshot shows the same "Diagnostic Tool" interface as before, but now the large gray box contains the following text:

```
traceroute to cn.bing.com (204.79.197.200), 30 hops max, 38 byte packets
 1 192.168.11.1 (192.168.11.1) 0.594 ms 0.325 ms 0.313 ms
 2 172.16.200.1 (172.16.200.1) 0.885 ms 0.805 ms 0.932 ms
 3 192.168.20.1 (192.168.20.1) 2.799 ms 2.073 ms 2.219 ms
```

At the bottom center, the green button now says "Stop".

Click **Stop** to end the process as needed.

## 13.8 System time

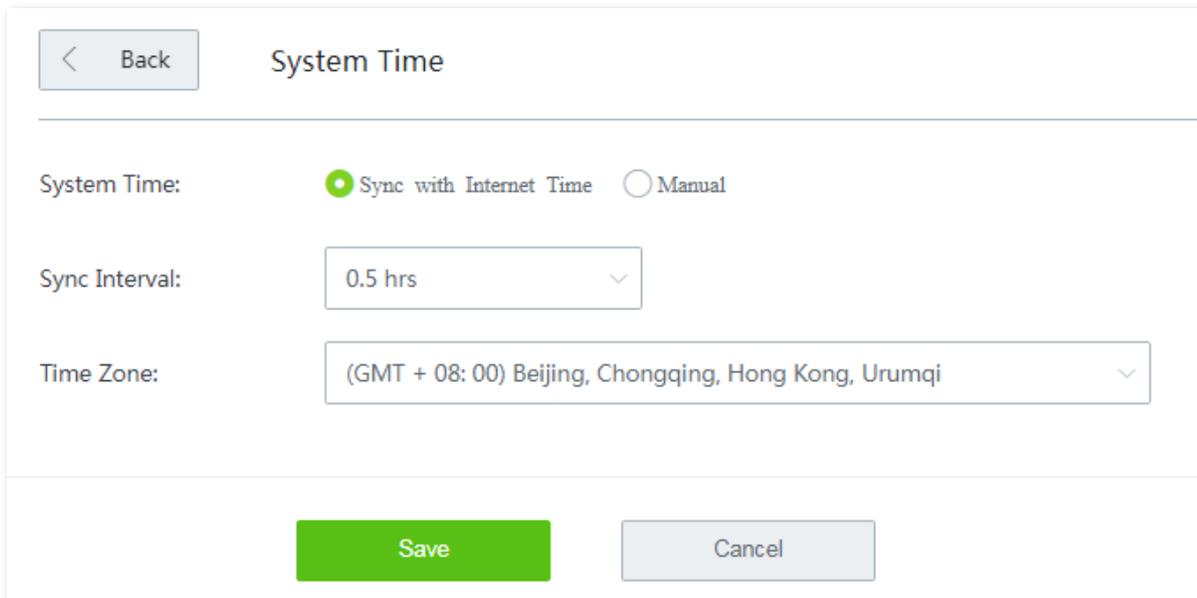
### 13.8.1 Overview

This function is used to set the system time of your router. To make the time-related functions effective, ensure that the system time of the router is set correctly.

The router supports:

- [Synchronize with internet time](#) (default)
- [Set system time manually](#)

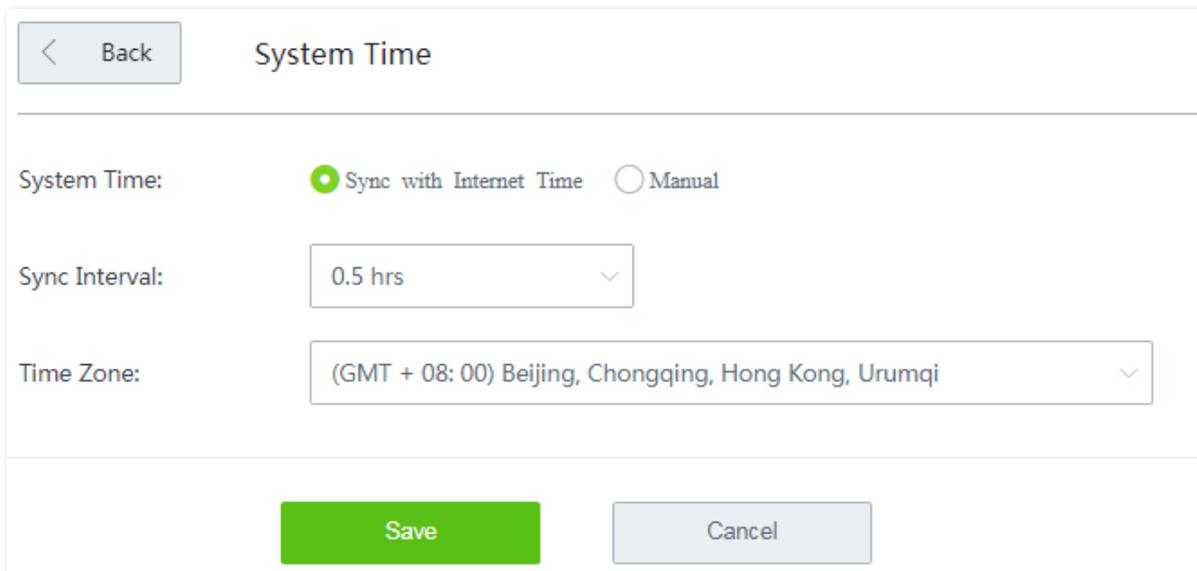
To access the configuration page, click **Maintenance** > **System Time**. See the following figure:



The screenshot shows the 'System Time' configuration page. At the top left is a 'Back' button. The title 'System Time' is centered. Below the title, there are three settings: 'System Time:' with radio buttons for 'Sync with Internet Time' (selected) and 'Manual'; 'Sync Interval:' with a dropdown menu set to '0.5 hrs'; and 'Time Zone:' with a dropdown menu set to '(GMT + 08: 00) Beijing, Chongqing, Hong Kong, Urumqi'. At the bottom, there are two buttons: a green 'Save' button and a grey 'Cancel' button.

### 13.8.2 Synchronize with internet time

With this method, the router automatically synchronizes its system time with the network time server (NTS). As long as the router is connecting to the internet, the system time is correct.



This screenshot is identical to the one above, showing the 'System Time' configuration page with 'Sync with Internet Time' selected. It includes the 'Back' button, the title 'System Time', the radio button selection, the 'Sync Interval' dropdown set to '0.5 hrs', the 'Time Zone' dropdown set to '(GMT + 08: 00) Beijing, Chongqing, Hong Kong, Urumqi', and the 'Save' and 'Cancel' buttons at the bottom.

## Parameter description

Parameter	Description
Sync Interval	It specifies an interval at which the router synchronizes its system time with the time server on the internet. By default, the router performs synchronization every <b>0.5</b> hours.
Time Zone	It specifies the time zone where the router is deployed.

After configuration, navigate to the [System status](#) page to check whether it is synchronized.

### 13.8.3 Set system time manually

With this method, you can manually specify a system time for the router. When **Manual** option is selected, the related parameters are shown as follows.



With this method, you need to manually reconfigure the system time each time the router reboots.

## Parameter description

Parameter	Description
Date	Manually enter the date and time as needed.
Time	
Sync with Local PC Time	It allows you to synchronize the system time of the router with the system time of the management computer. Click this button, the router auto-fills the system time of your management computer.

After configuration, navigate to the [System status](#) page to check whether it is synchronized.

## 13.9 Function center

The function center groups all functions of the router into **Enabled Function** and **Disabled Function**, giving you a clearly insight into the functions that are enabled or disabled.

In addition, move the mouse pointer to a specific function and click it, you will be taken to the corresponding configuration page.

Enabled Function			
Wireless Settings 2.4GHz	Wireless Settings 5GHz	Bandwidth Control	DHCP Server
Fast NAT			
Disabled Function			
MAC Filters	Captive Portal	WiFi via WeChat	MAC Address Filter
URL Filter	Port Filter	Port Mirroring	Remote WEB Management
DDNS	DMZ Host	UPnP	Any IP
VPN Client	Reboot Schedule	VPN Server	

# Appendix

## Default parameters

Parameter		Default	
Login information	IP address of the management page	192.168.0.1	
	Administrator	/	
	Authentication management	User name	rzadmin
		Password	rzadmin
LAN setting	IP address	192.168.0.1	
	Subnet mask	255.255.255.0	
DHCP server	DHCP server	On	
	Start IP address	192.168.0.100	
	End IP address	192.168.0.200	
	Lease time	30 minutes	
	Primary DNS	192.168.0.1	
Wireless settings	SSID	2.4/5GHz Support three SSIDs, which can be named as Tenda_XXXXXX. XXXXXX indicates the last six characters of the MAC address which can be found on the device.	
	WiFi password	No password	
	Guest network	Off	
Any IP	Off		
System time	Sync with Internet time		