Configuration Guide

Wireless Controller

AC50/AC500

1910012001 REV 1.0.0

Content

About This Guide

This Configuration Guide provides information for managing AC500/AC50 Series Wireless Controller. Please read this guide carefully before operation.

Intended Readers

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

Conventions

When using this guide, please notice that features of the device may vary slightly depending on the model and software version you have. All screenshots, images, parameters and descriptions documented in this guide are used for demonstration only.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute the warranty of any kind, express or implied. Users must take full responsibility for their application of any products.

In this Guide, the following conventions are used:

Notes contains suggestions or references that helps you make better use of your device.

For GUI, Menu Name > Submenu Name > Tab page indicates the menu structure. Network > DHCP Server > DHCP Client List means the DHCP Client List page under the DHCP Server menu option that is located under the Network menu.

Bold font indicates a button, a toolbar icon, menu or menu item.

More Information

- The latest software and documentations can be found at Download Center at http://www.tp-link.com/support.
- The Installation Guide (IG) can be found where you find this guide or inside the package of the wireless controller.
- Specifications can be found on the product page at http://www.tp-link.com.
- A Technical Support Forum is provided for you to discuss our products at http://forum.tp-link.com.
- Our Technical Support contact information can be found at the Contact Technical Support page at http://www.tp-link.com/support.

1 Quick Start

The wireless controller (AC) is a device used for centralized management of access points (APs). At present, the supported APs are TP-Link's CAPs. The AC can configure CAPs in batches using a web browser and conduct a real-time monitoring of each CAP in the network. This AC supports AP automatic discovery, AP status monitoring, AP centralized control, MAC filtering, radio management, load balance, dual-link backup and various authentication types.

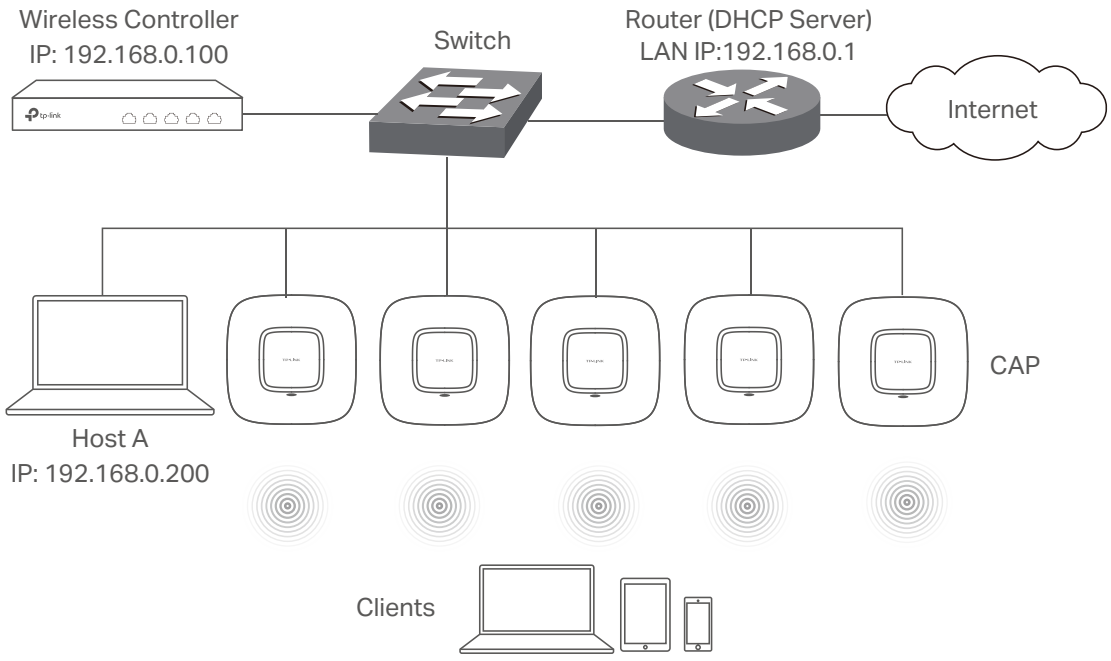
This wireless controller makes it easier to configure and manage dozens or hundreds of CAPs in a large public environment, such as markets, hotels, companies and campuses,etc. AC500 wireless controller supports to manage 500 CAPs at the same time and AC50 wireless controller supports 50 CAPs.

1.1 Determine the Network Topology

You can use the AC to centrally manage the CAPs in the same or different network segment.

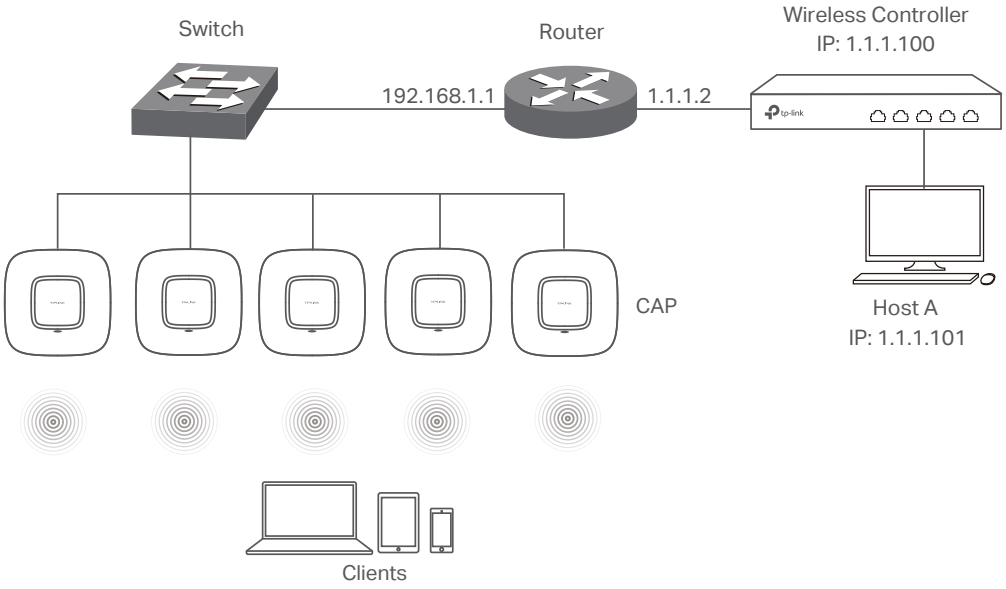
1.1.1 Manage CAPs in the LAN

If you want to manage the CAPs in the LAN, refer to the following network topology.



1.1.2 Manage CAPs in Different Network Segment

If the AC needs to manage CAPs in a different network segment, refer to the following topology.



Note:

In this situation, the router acting as the CAPs' DHCP server should support option 60 and option138 in DHCP settings.

1.2 Log in to the AC

1.2.1 Preparations

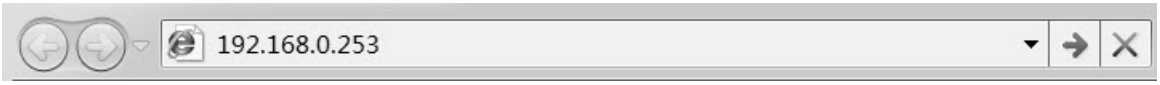
Before login, you should verify the following:

- The AC is powered on and correctly connected. The management host is accessible to the AC.
- Specify the management host with a static IP address on the 192.168.0.x subnet (for example, IP address 192.168.0.100 and subnet mask 255.255.255.0).
- Operating System: Microsoft Windows XP/Vista/7/8/10.
- Web Browser: Mozilla Firefox 32 (or above), Google Chrome 37 (or above), Opera 24 (or above), or Microsoft Internet Explorer 8-11.

1.2.2 Log in

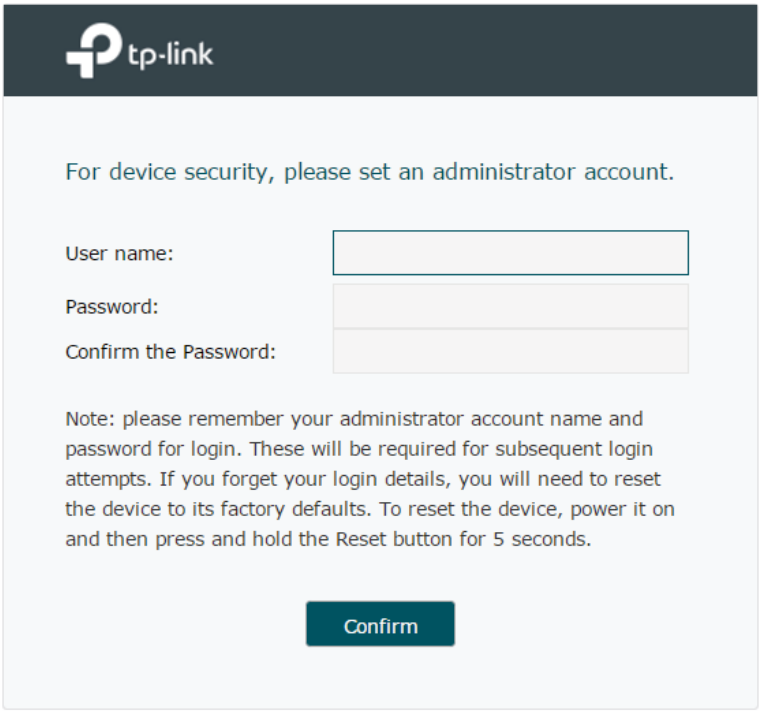
1 Open a web browser and enter 192.168.0.253 in the address field, then press **Enter** key.

Figure 1-1 Enter the IP Address



2 Create a username and a password for subsequent login attempts.

Figure 1-2 Create an account

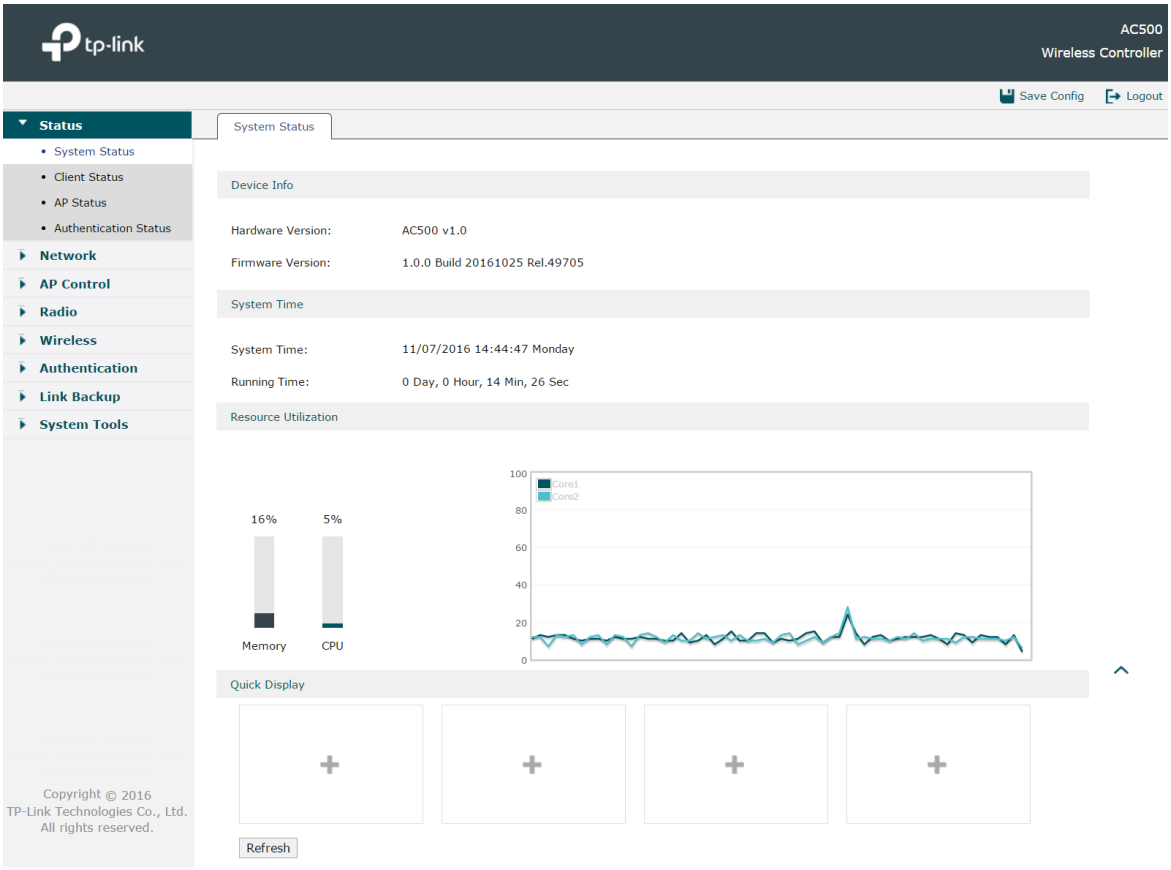


3 Use the username and password set above to log in to the webpage.

Figure 1-3 Log in to the webpage

4 After a successful login, the main page will appear as in the figure below, and you can configure the function by clicking the setup menu on the left side of the screen.

Figure 1-4 Main Page



The wireless controller's configuration files fall into two types: the running configuration file and the start-up configuration file. After you perform configurations on the sub-interfaces and click **Save**, the modifications will be saved in the running configuration file. However, the configurations will be lost when the device reboots.

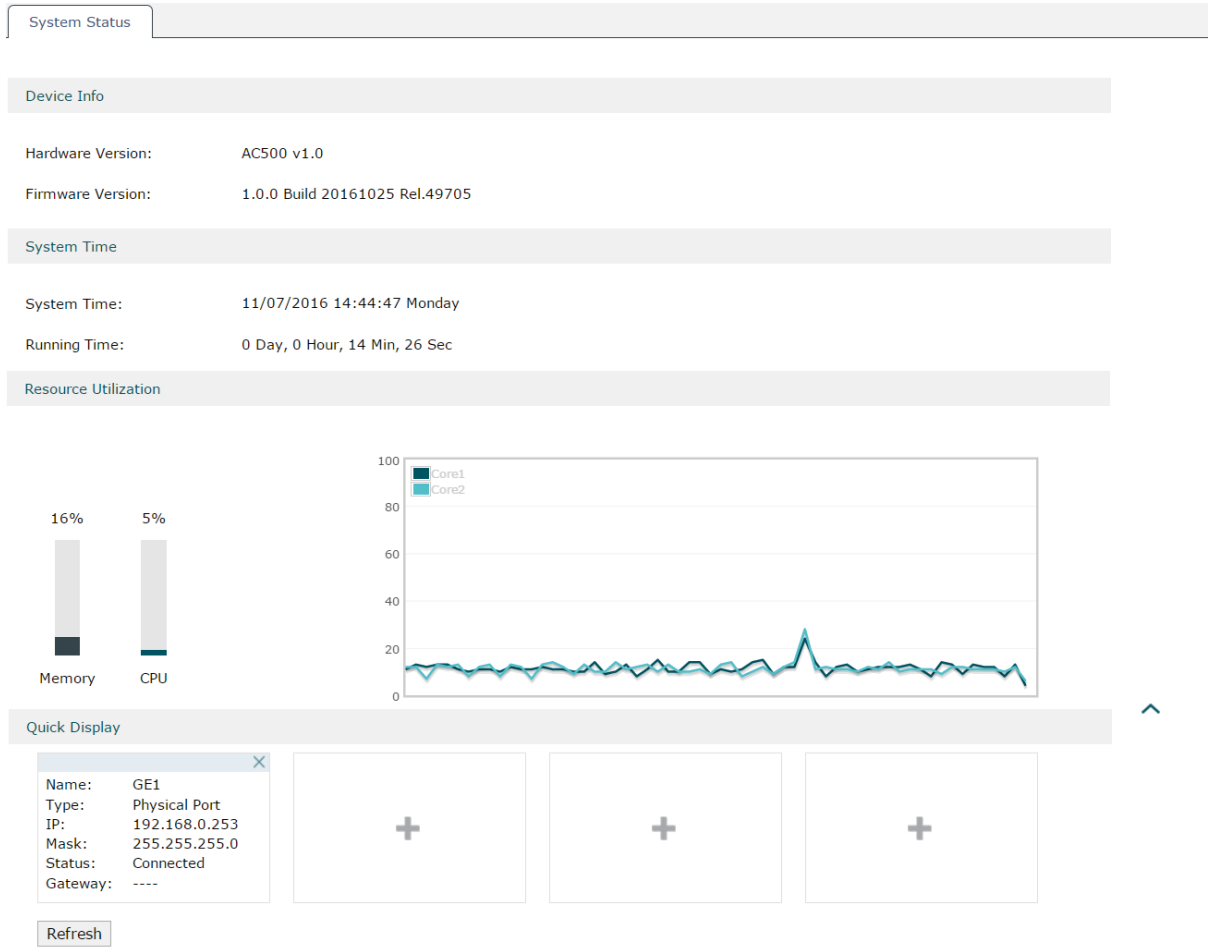
If you need to keep the configurations even if the device reboots, please use the function to save the configurations in the start-up configuration file. Click **Save Config** on the top-right of the interface, especially before you power off or reboot the device.

2 Status

2.1 System Status

Choose the menu **Status > System Status > System Status** to load the following page.

Figure 2-1 System Status



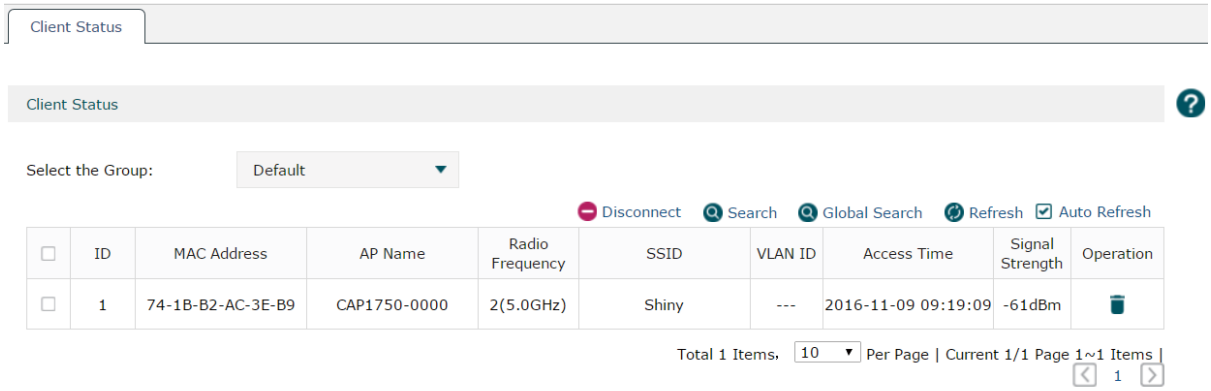
In the **Resource Utilization** section, you can monitor the utilization of the memory and CPU. It is recommended that the CPU utilization should be at about 50%. The CPU utilization above 85% indicates that the AC is under a high load and above 95% means AC is completely loaded. When the CPU utilization keeps at high loads, some function of the AC may be abnormal. Please check to find the real reason.

In the **Quick Display** section, click the button ➕ to select the desired interface and its basic information such as interface name, type and IP address will be shown in this section.

2.2 Client Status

Choose the menu **Status > Client Status > Client Status** to load the following page.

Figure 2-2 Client Status



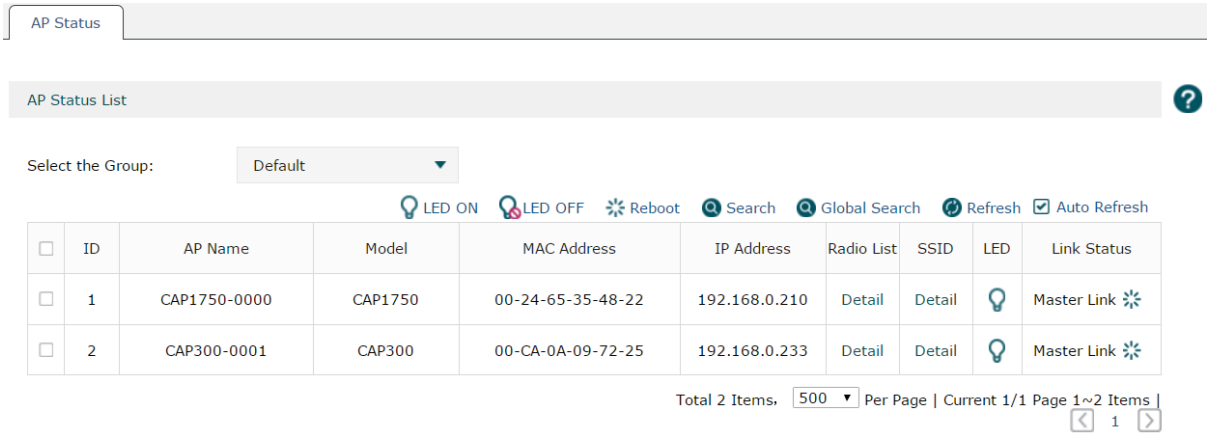
You can check the information of the connected clients on this page. Select the desired clients by checking the boxes in front of the entries. Click the buttons above the list for additional operations.

Select the Group	Select the group from the drop-down list to see the clients' information in the corresponding group.
Disconnect	Disconnect one or more clients from the AP(s).
Search	Search the specified clients in the list.
Global Search	Search the specified clients globally.
Refresh	Refresh the list manually.
Auto Refresh	Check the box to enable the Auto Refresh function. With it enabled, the list will refresh every few seconds automatically.
	Disconnect the client from the AP in this corresponding entry.

2.3 AP Status

Choose the menu **Status > AP Status > AP Status** to load the following page.

Figure 2-3 AP Status



The information of the connected CAPs will be displayed in this section. Select the desired CAPs by checking the boxes in front of the entries. Click the buttons above the list for additional operations.

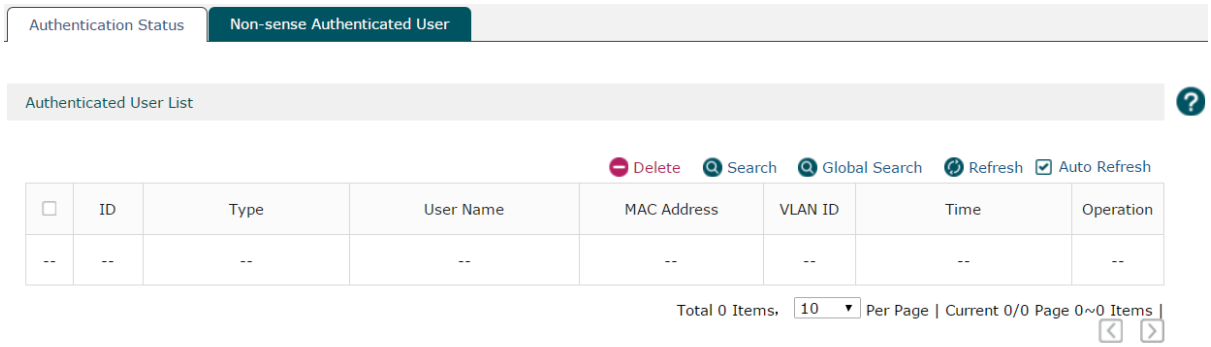
Select the Group	Select the group from the drop-down list to see the CAPs' information in the corresponding group.
LED ON	Select the corresponding CAPs and click this button to turn on their LEDs.
LED OFF	Select the corresponding CAPs and click this button to turn off their LEDs. For example, if the CAP's LED disturbs you at night, you can turn off it.
Reboot	Select the corresponding CAPs and click this button to reboot them.
Search	Search the specified clients in the list.
Global Search	Search the specified clients globally.
Refresh	Refresh the list manually.
Auto Refresh	Check the box to enable the Auto Refresh function. With it enabled, the list will refresh every few seconds automatically.
	It indicates the LED is on. you can click the icon to turn off it.
	It indicates the LED is off. you can click the icon to turn on it.
	Click this icon to reboot the CAP.
Detail	Click **Detail** to check the information of the radio list and SSID and click Back to return.

2.4 Authentication Status

2.4.1 Authentication Status

Choose the menu **Status > Authentication Status > Authentication Status** to load the following page.

Figure 2-4 Authentication Status



You can check the information of the authentication status on this page. Select the desired users by checking the boxes in front of the entries. Click the buttons above the list for additional operations.

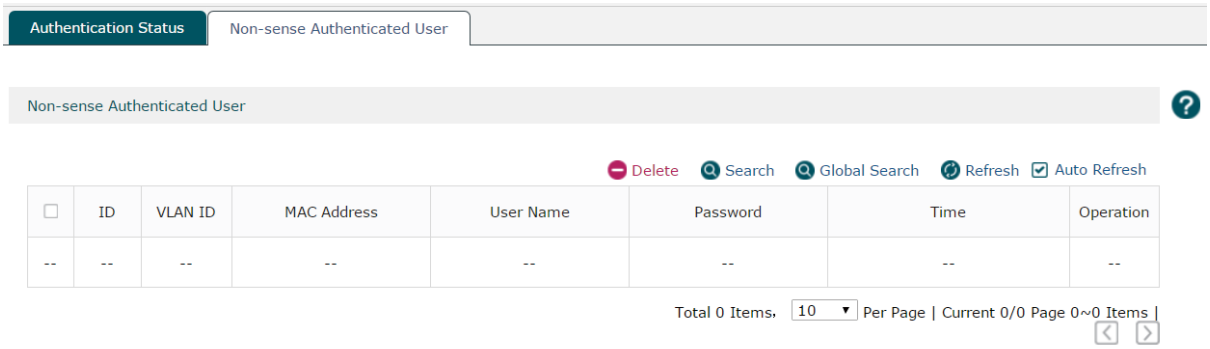
Delete	Delete the users from the authentication list.
Search	Search the specified users in the list.
Global Search	Search the specified users globally.
Refresh	Refresh the list manually.
Auto Refresh	Check the box to enable the Auto Refresh function. With it enabled, the list will refresh every few seconds automatically.
	Disconnect the client from the AP in this corresponding entry.

2.4.2 Non-sense Authenticated User

Non-sense authenticated users are users who have passed the authentication, leave the wireless network and then join the wireless network again. If the time they left is within the time threshold set by the AC, they don't have to re-authenticate.

Choose the menu **Status > Authentication Status > Non-sense Authenticated User** to load the following page.

Figure 2-5 Non-sense Authenticated User



You can check the information of the non-sense authenticated users on this page. Select the desired users by checking the box in the front of the entries. Click the buttons above the list for additional operations.

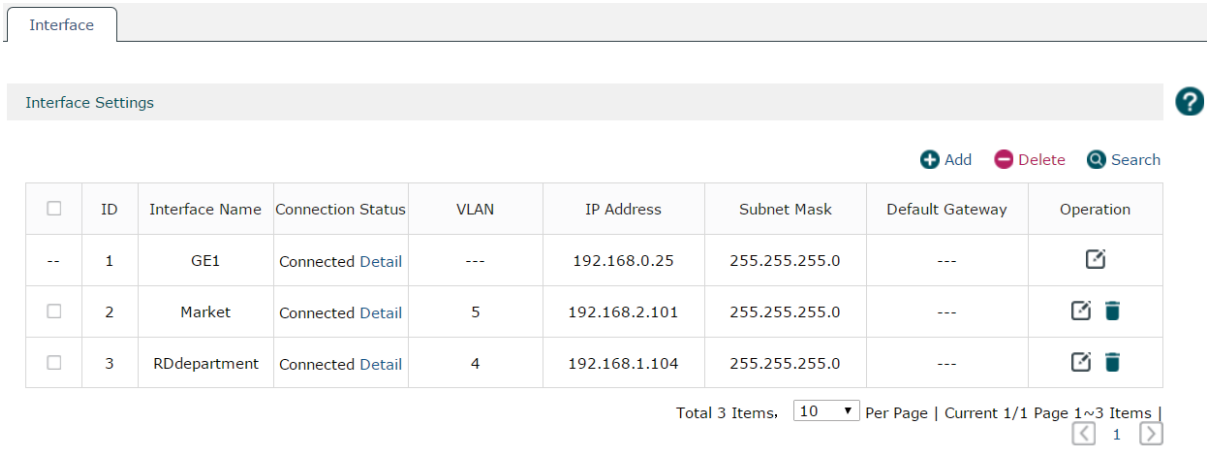
Delete	Delete the users from the authentication list.
Search	Search the specified users in the list.
Global Search	Search the specified users globally.
Refresh	Refresh the list manually.
Auto Refresh	Check the box to enable the Auto Refresh function. With it enabled, the list will refresh every few seconds automatically.
	Disconnect the client from the AP in this corresponding entry.

3 Network

3.1 Interface

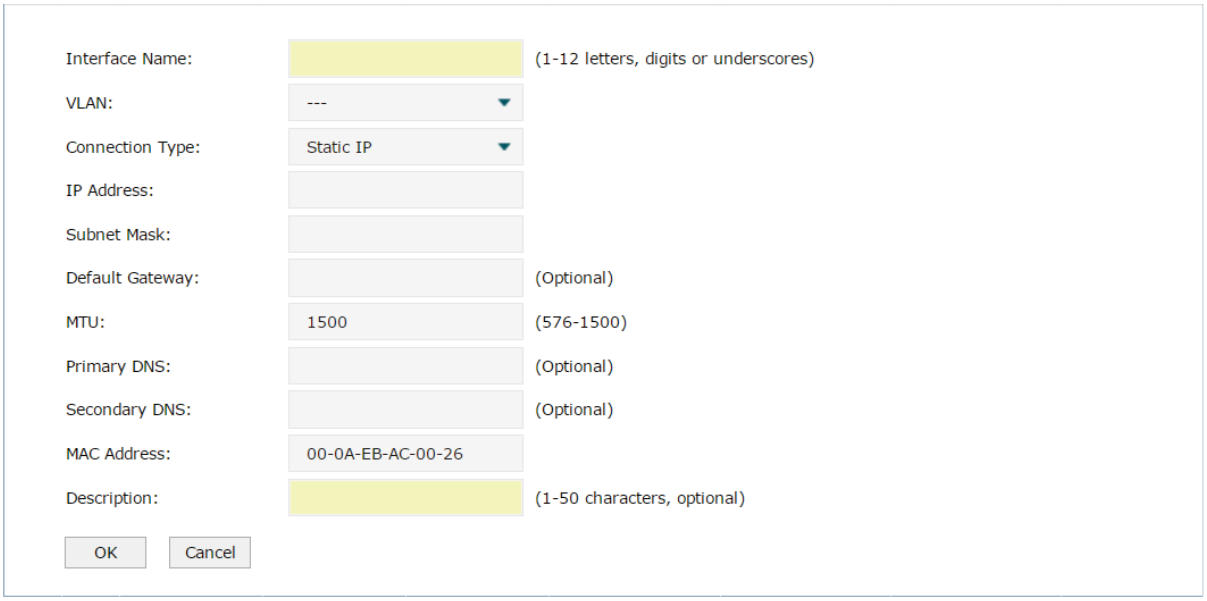
Choose the menu **Network > Interface > Interface** to load the following page. On this page you can create a logical interface and specify it to a specified VLAN. Please refer to *3.3.1 VLAN* to set VLANs first.

Figure 3-1 Interface



Click Add to create a new interface. The page will be shown as below.

Figure 3-2 Add an Interface



Interface Name	Specify a name for the interface to make it easier to search for and manage.
VLAN	Specify a VLAN for the interface.

Connection Type	Select the connection type for the interface. Only static IP is supported at present.
IP Address	Specify an IP address for the interface.
Subnet Mask	Specify a subnet mask for the interface.
Default Gateway	(Optional) Specify a default gateway for the interface.
MTU	Specify the MTU (Maximum Transmission Unit) for the interface. Its value is between 576 to 1500 and 1500 by default.
Primary DNS	(Optional) Specify the primary DNS server for the interface.
Secondary DNS	(Optional) Specify the secondary DNS server for the interface.
MAC Address	The MAC address is filled automatically. You can modify it manually.
Description	Specify a description for the entry to make it easier to search for and manage.

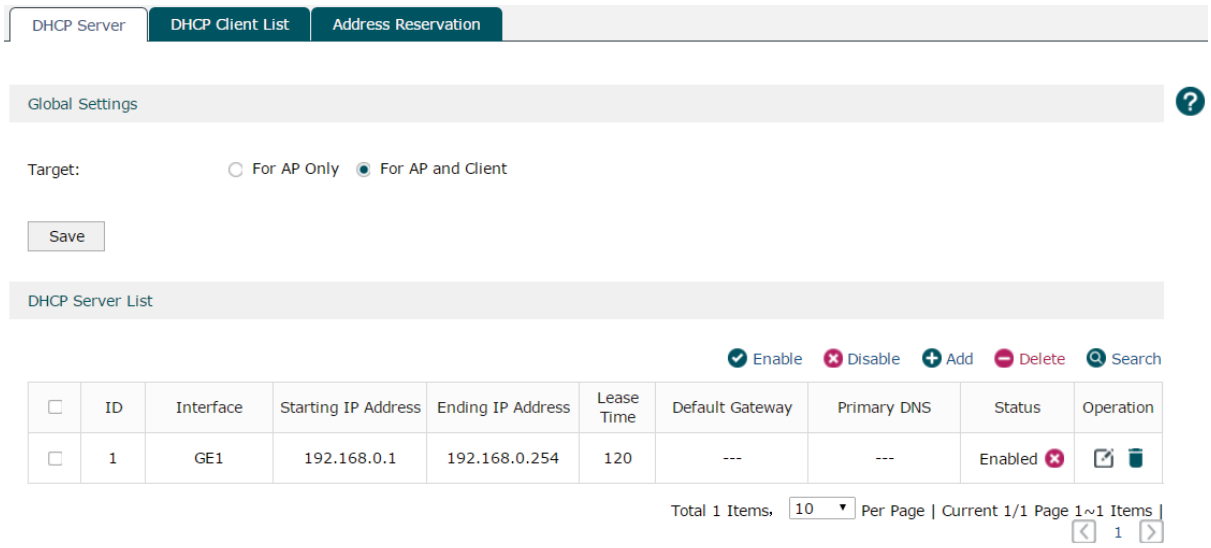
Click **OK** to finish the settings.

3.2 DHCP Server

3.2.1 DHCP Server

Choose the menu **Network > DHCP Server > DHCP Server** to load the following page.

Figure 3-3 DHCP Server

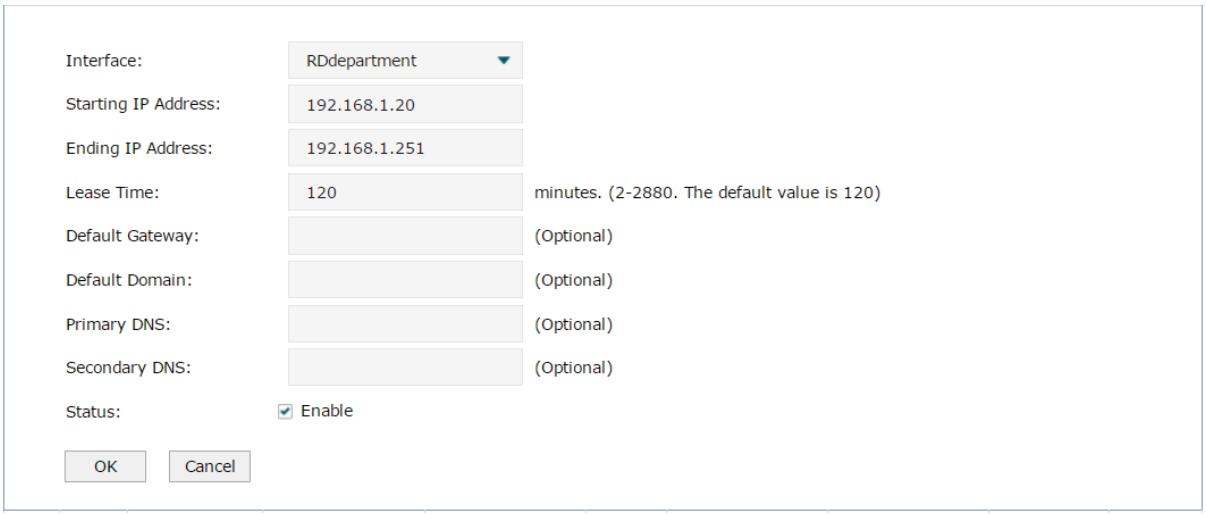


DHCP (Dynamic Host Configuration Protocol) allows the wireless controller to assign IP addresses, subnet masks, default gateways and other IP parameters to CAPs and clients

that request this information. In the global settings you can select that the DHCP server assigns IP parameters to AP only or both AP and client.

Click Add to create a DHCP server. The page will be shown as below.

Figure 3-4 Add a DHCP Server



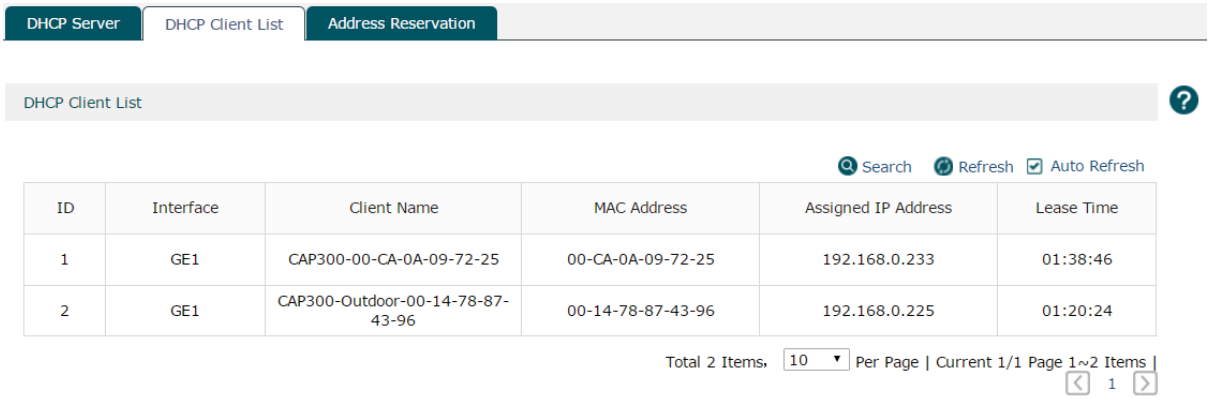
Interface	Select the interface which you want to create the DHCP server for. Refer to *3.1 Interface* to set the interface first.
Starting/Ending IP Address	Specify the starting IP address and ending IP address of the DHCP server IP pool. The IP pool should be in the same segment with the interface IP address.
Lease Time	Enter the time duration of the IP address assigned by the DHCP server between 2 and 2880 minutes. The default is 120 minutes. Before the time is up, DHCP server would not assign this IP address to other APs or clients.
Default Gateway	Optional: Specify the IP address of gateway for the server.
Default Domain	Optional: Specify the domain of for the server.
Primary DNS	Optional: Specify the primary DNS server for the server.
Secondary DNS	Optional: Specify the secondary DNS server for the server.
Status	Check the box to enable the DHCP service.

Click **OK** to finish the settings.

3.2.2 DHCP Client List

Choose the menu **Network > DHCP Server > DHCP Client List** to load the following page. The list displays the information such as the IP address, MAC address and lease time of the connected clients.

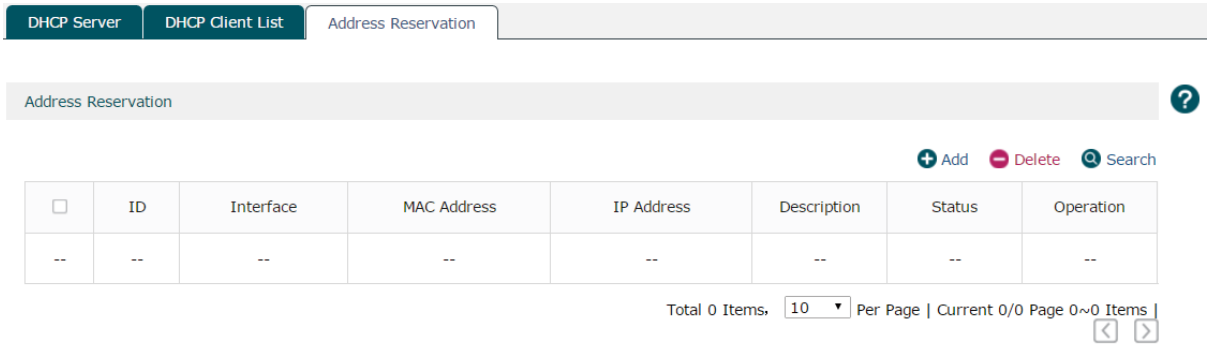
Figure 3-5 DHCP Client List



3.2.3 Address Reservation

Choose the menu **Network > DHCP Server > Address Reservation** to load the following page.

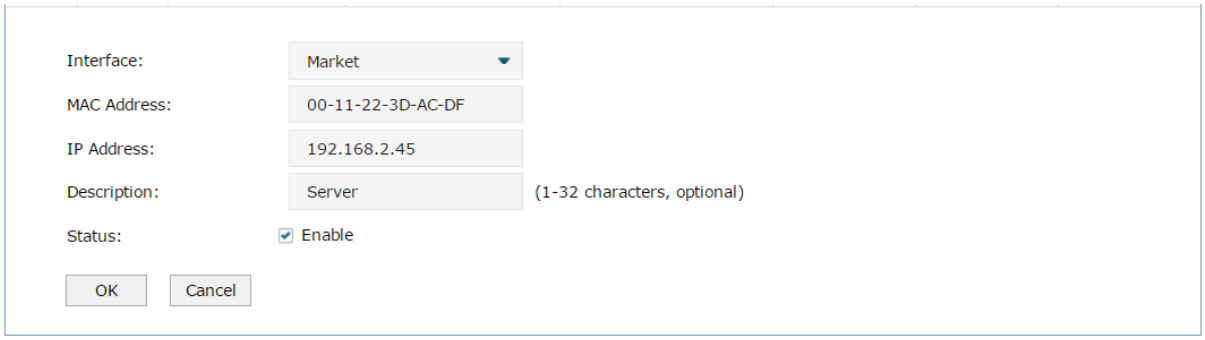
Figure 3-6 Address Reservation



If the CAP or client requires a static IP address, you can manually reserve an IP address for it. Once reserved, the IP address will only be assigned to the same client by the DHCP server.

Click Add to create an IP address reservation.

Figure 3-7 Create an IP Address Reservation



Interface	Select the interface which the CAP or client requiring the static IP address belongs to. Refer to *3.1 Interface* to set the interface first.
MAC Address	Enter the MAC address of the specified AP or client to which you want to assign the static IP address.
IP Address	Specify a static IP address to the specified AP or client. The IP address should be in the same segment as the interface.
Description	Specify a description for the entry to make it easier to search for and manage.
Status	Check the box to enable the address reservation.

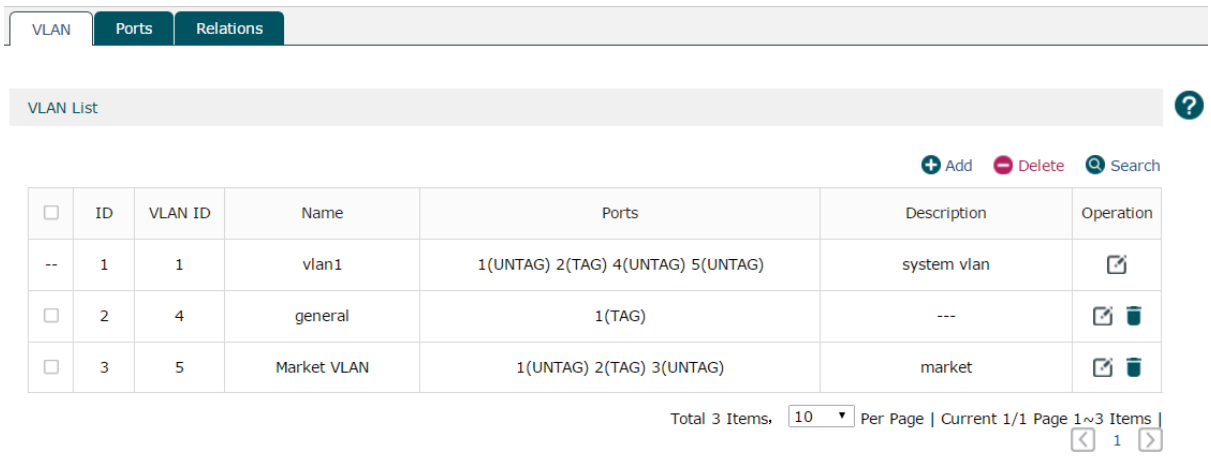
Click **OK** to finish the settings.

3.3 VLAN

3.3.1 VLAN

Choose the menu **Network > VLAN > VLAN** to load the following page.

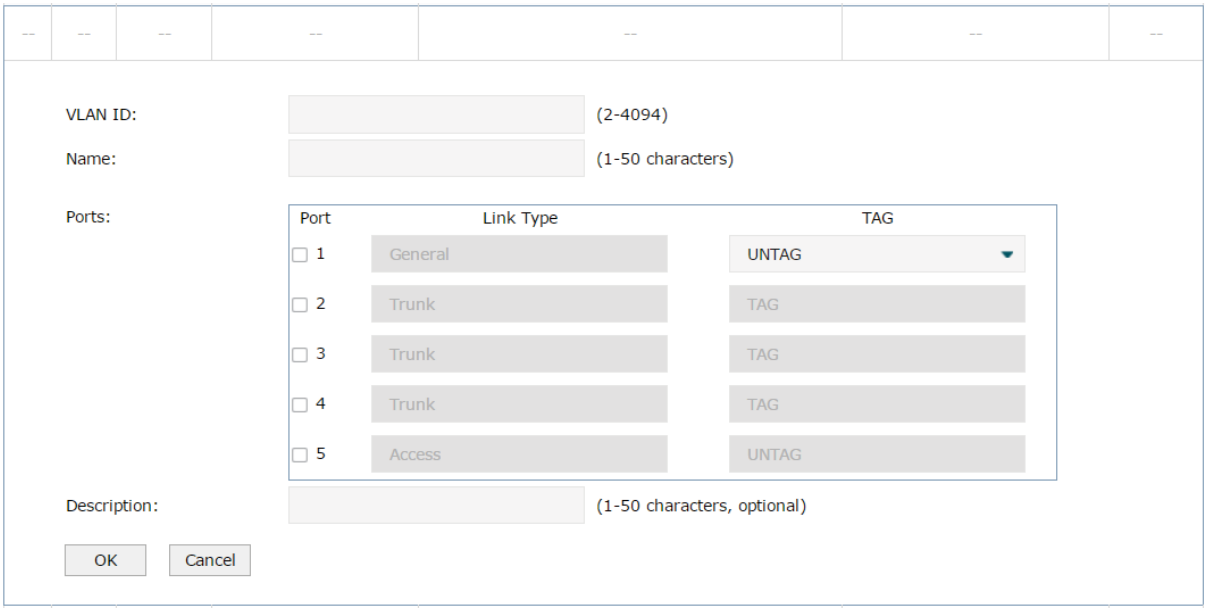
Figure 3-8 VLAN



VLAN (Virtual Local Area Network) is a network technique that solves broadcasting issues in local area networks. A local area network is partitioned into several VLANs, and all VLAN traffic remains within its VLAN. Therefore, you can group and isolate APs and clients to enhance network security. VLANs group devices logically instead of physically, so devices in the same VLAN can be located in different places.

Click Add to create a VLAN.

Figure 3-9 Create a VLAN



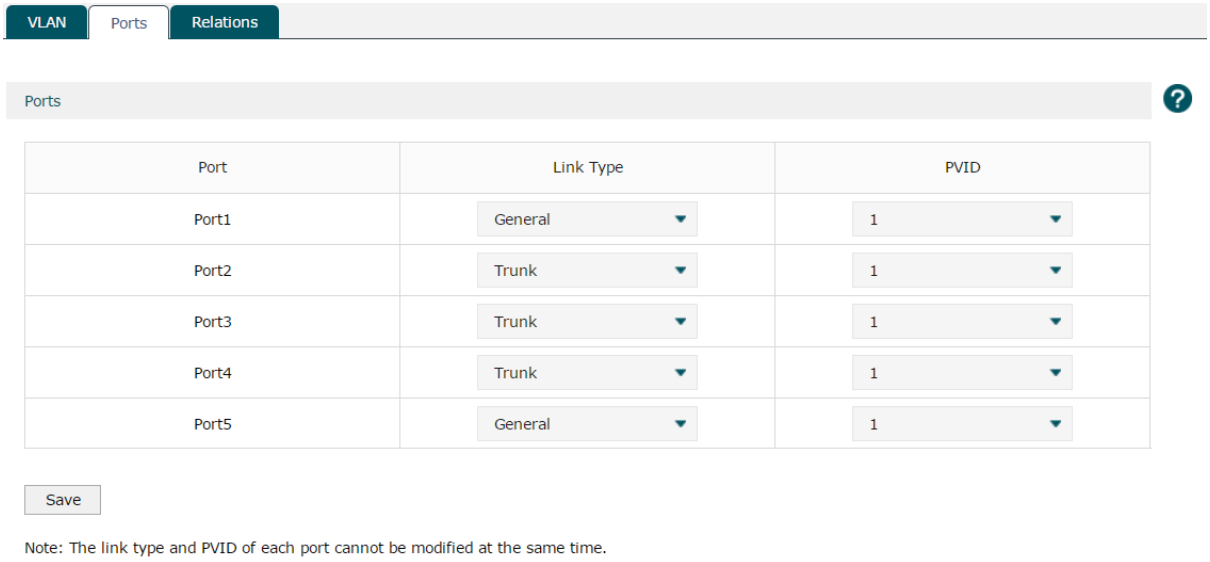
VLAN ID	Specify a VLAN ID between 2 to 4094.
Name	Specify an easy-to-remember name for the VLAN.
Ports	Select the ports that belong to the VLAN.
Description	Specify a description for the entry to make it easier to search for and manage.

Click **OK** to finish the settings.

3.3.2 Ports

Choose the menu **Network > VLAN > Ports** to load the following page. Specify the link type and PVLD for each port. The link type and PVID can not be modified at the same time.

Figure 3-10 Ports



Link Type	The ports can be divided into three link types: **Access**: The access port can be added in a single VLAN, and the egress rule of the port is UNTAG. The PVID is same as the current VLAN ID. If the current VLAN is deleted, the PVID will be set to 1 by default. **Trunk**: The trunk port can be added in multiple VLANs. The egress rule of the port is UNTAG if the arriving packet's VLAN tag is the same as the port's PVID, otherwise the egress rule is TAG. The PVID can be set as the VID number of any valid VLAN. **General**: The general port can be added in multiple VLANs and set various egress rules according to the different VLANs. The default egress rule is UNTAG. The PVID can be set as the VID number of any valid VLAN.
PVID	Enter the VLAN ID of the port.

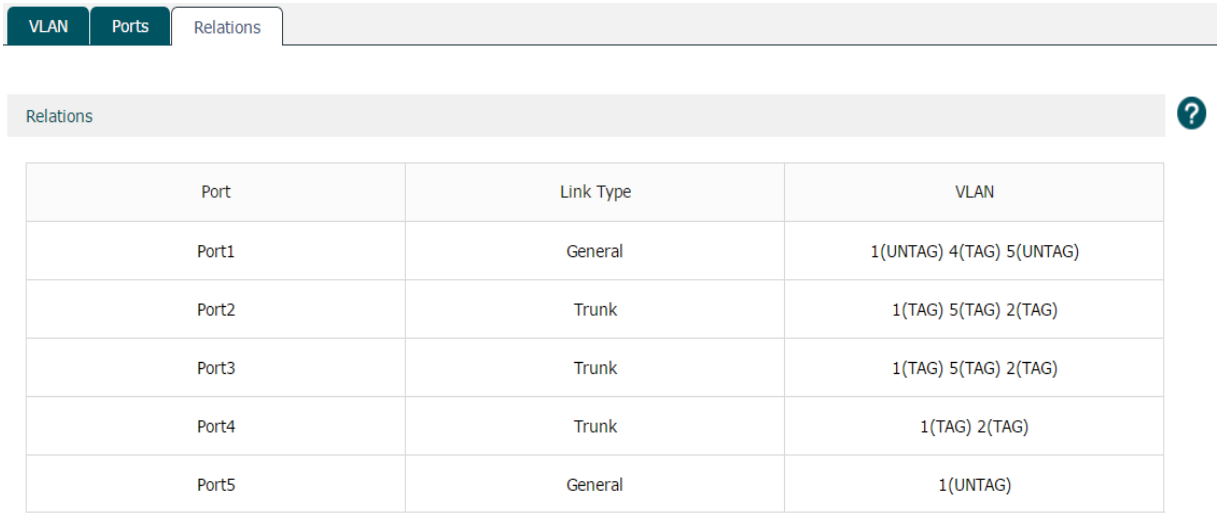
Note:

AC50 doesn't include a General port link type.

3.3.3 Relations

Choose the menu **Network > VLAN > Relations** to load the following page. This list displays the relations among ports, link types and VLANs.

Figure 3-11 Relations



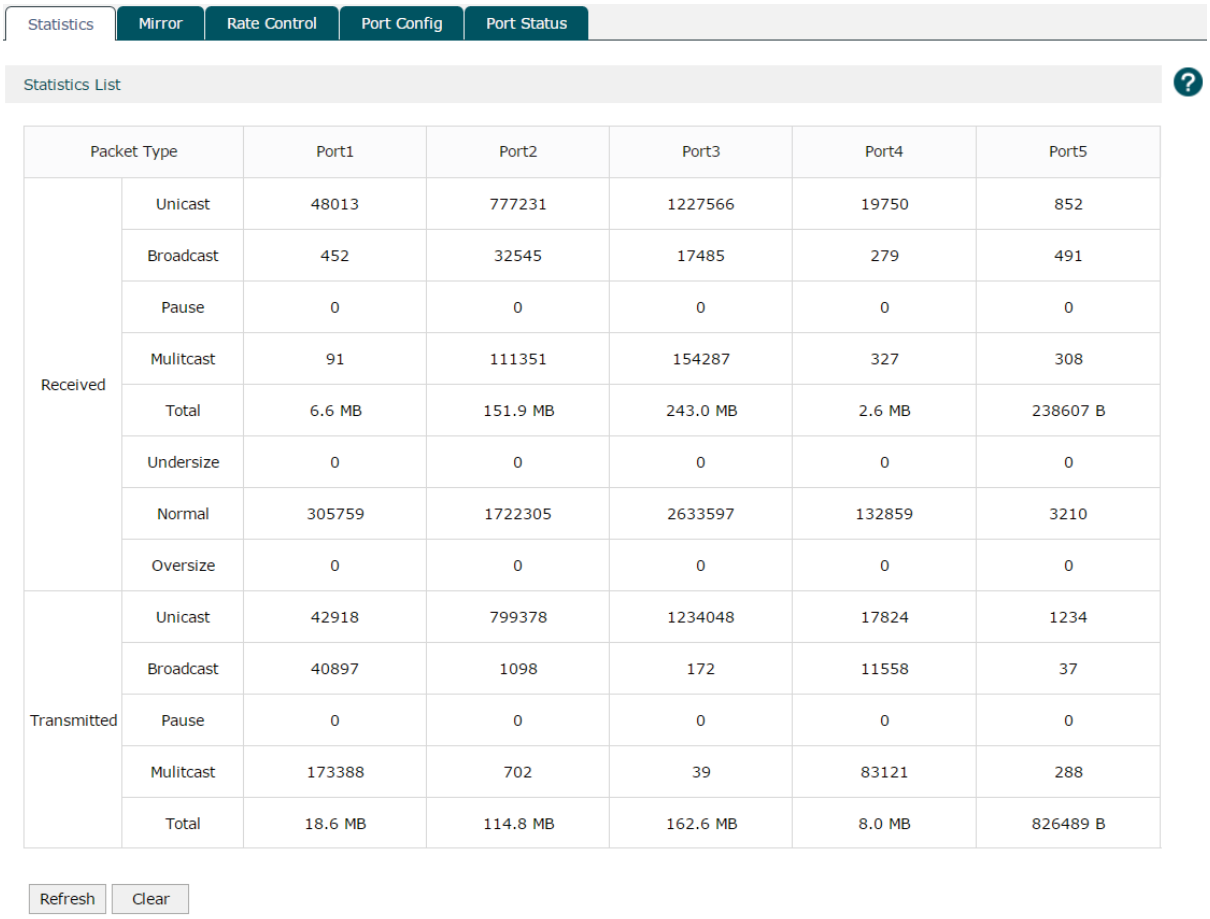
Port	Link Type	VLAN
Port1	General	1(UNTAG) 4(TAG) 5(UNTAG)
Port2	Trunk	1(TAG) 5(TAG) 2(TAG)
Port3	Trunk	1(TAG) 5(TAG) 2(TAG)
Port4	Trunk	1(TAG) 2(TAG)
Port5	General	1(UNTAG)

3.4 Switch

3.4.1 Statistics

Choose the menu **Network > Switch > Statistics** to load the following page. The statistics list displays the information of data packets received or transmitted by each port.

Figure 3-12 Statistics



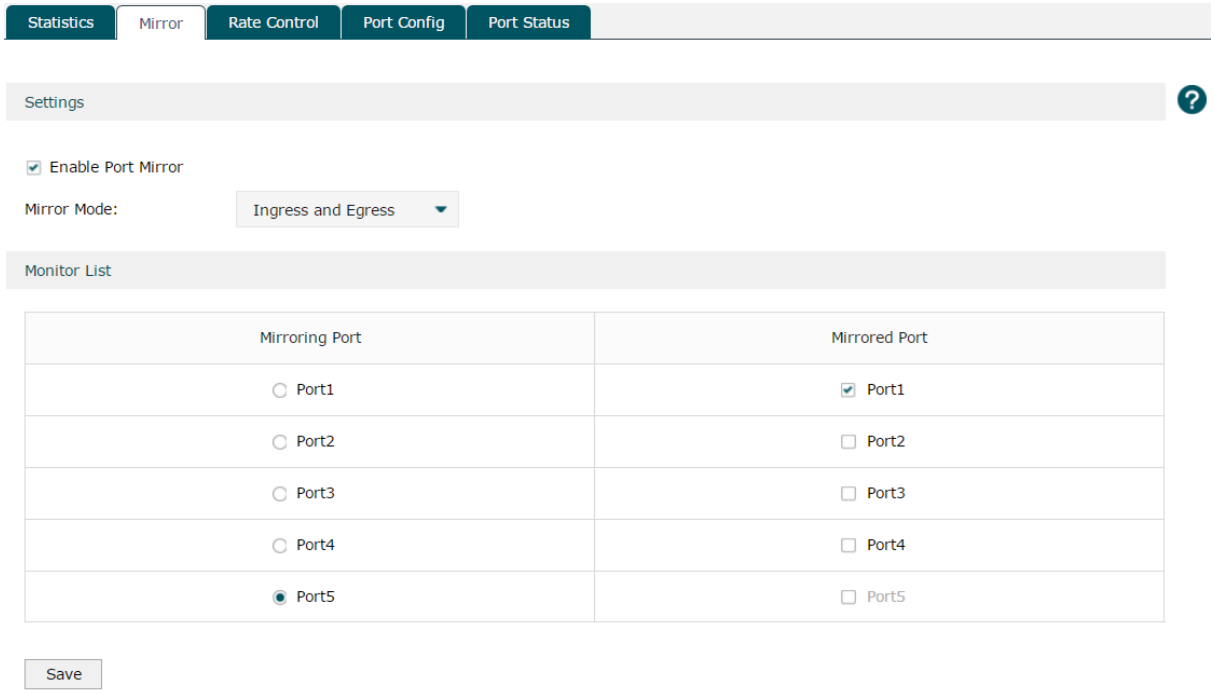
Packet Type		Port1	Port2	Port3	Port4	Port5
Received	Unicast	48013	777231	1227566	19750	852
	Broadcast	452	32545	17485	279	491
	Pause	0	0	0	0	0
	Mulitcast	91	111351	154287	327	308
	Total	6.6 MB	151.9 MB	243.0 MB	2.6 MB	238607 B
	Undersize	0	0	0	0	0
	Normal	305759	1722305	2633597	132859	3210
	Oversize	0	0	0	0	0
Transmitted	Unicast	42918	799378	1234048	17824	1234
	Broadcast	40897	1098	172	11558	37
	Pause	0	0	0	0	0
	Mulitcast	173388	702	39	83121	288
	Total	18.6 MB	114.8 MB	162.6 MB	8.0 MB	826489 B

Refresh Clear

3.4.2 Mirror

Choose the menu **Network > Switch > Mirror** to load the following page.

Figure 3-13 Mirror



Check the box to enable the Port Mirror function. There are three port mirror modes as follows.

Ingress and egress: When this mode is selected, both the incoming and outgoing packets through the mirrored port will be copied to the mirroring port.

Ingress: When this mode is selected, the incoming packets received by the mirrored port will be copied to the mirroring port.

Egress: When this mode is selected, the outgoing packets sent by the mirrored port will be copied to the mirroring port.

A port cannot be set as the mirrored port and the mirroring port simultaneously. Only one mirroring port can be set.

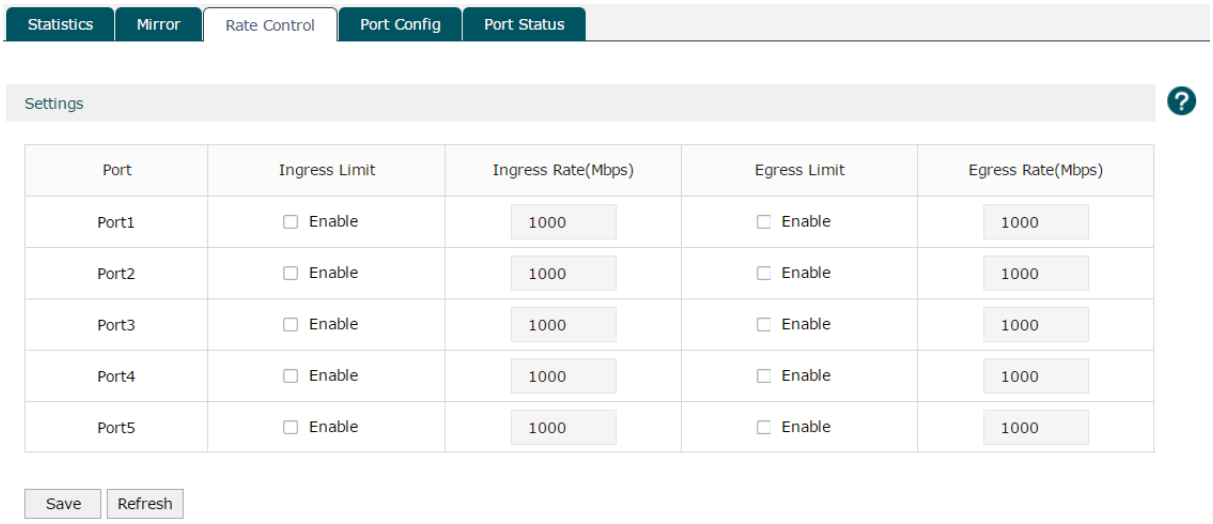
3.4.3 Rate Control

Choose the menu **Network > Switch > Rate Control** to load the following page. Here you can control the data transfer rate for each port. Check boxes to manually enter the corresponding rates.

Note:

The data transfer rate ranges from 1 to 100Mpbs for AC50, and from 1 to 1000Mpbs for AC500.

Figure 3-14 Rate Control

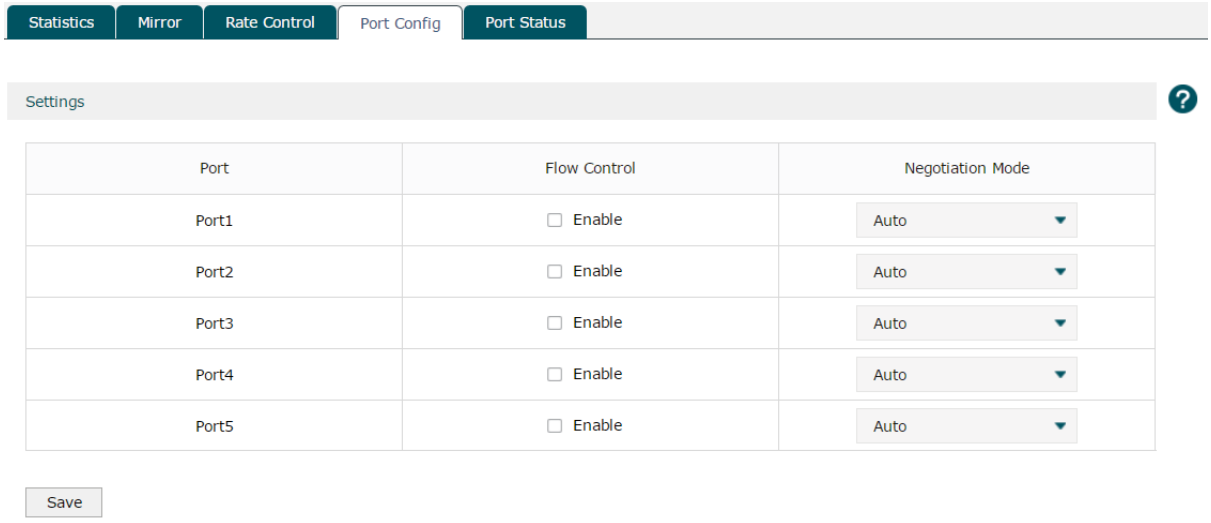


Click **Save** to finish the settings.

3.4.4 Port Config

Choose the menu **Network > Switch > Port Config** to load the following page.

Figure 3-15 Port Cofig



Flow Control	With this option enabled, the device synchronizes the data transmission speed with the peer device, thus avoiding the packet loss caused by congestion. By default, it is disabled.
Negotiation Mode	Select the Negotiation Mode for the port including auto and duplex mode. Duplex mode includes 10M Half-duplex, 10M Full-duplex, 100M Half-duplex, 100M Full-duplex and 1000M Full-duplex.

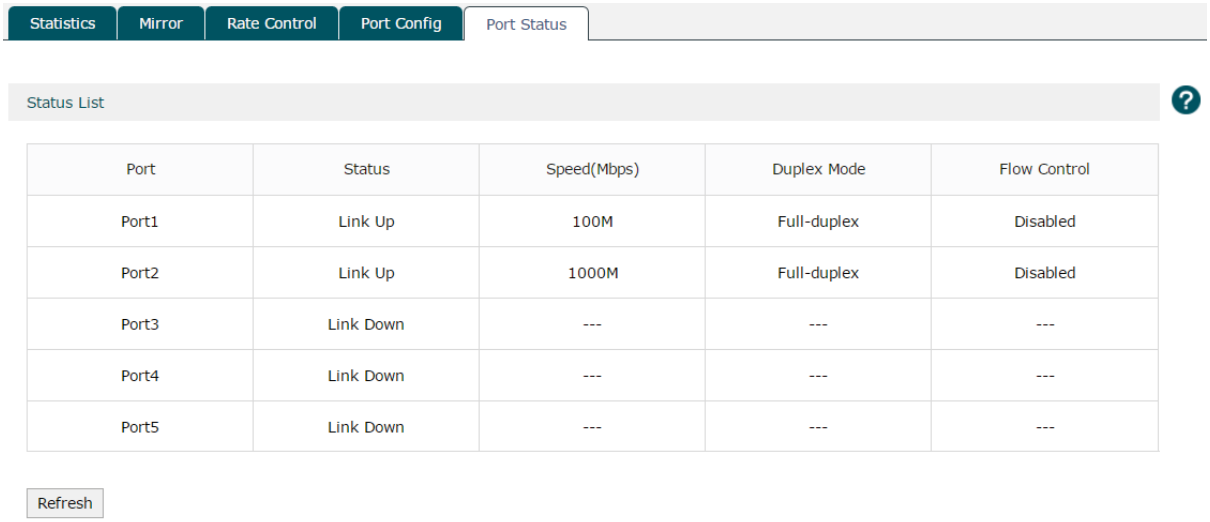
Note:

The AC50 doesn't support 1000M Full-duplex.

3.4.5 Port Status

Choose the menu **Network > Switch > Port Status** to load the following page.

Figure 3-16 Port Status



This page displays the connection status, speed, duplex mode and flow control status of each port.

Disabled: The port is disabled.

Link down: The port is enabled but with physical connection.

Link up: The Port is enabled and connected normally.

Note:

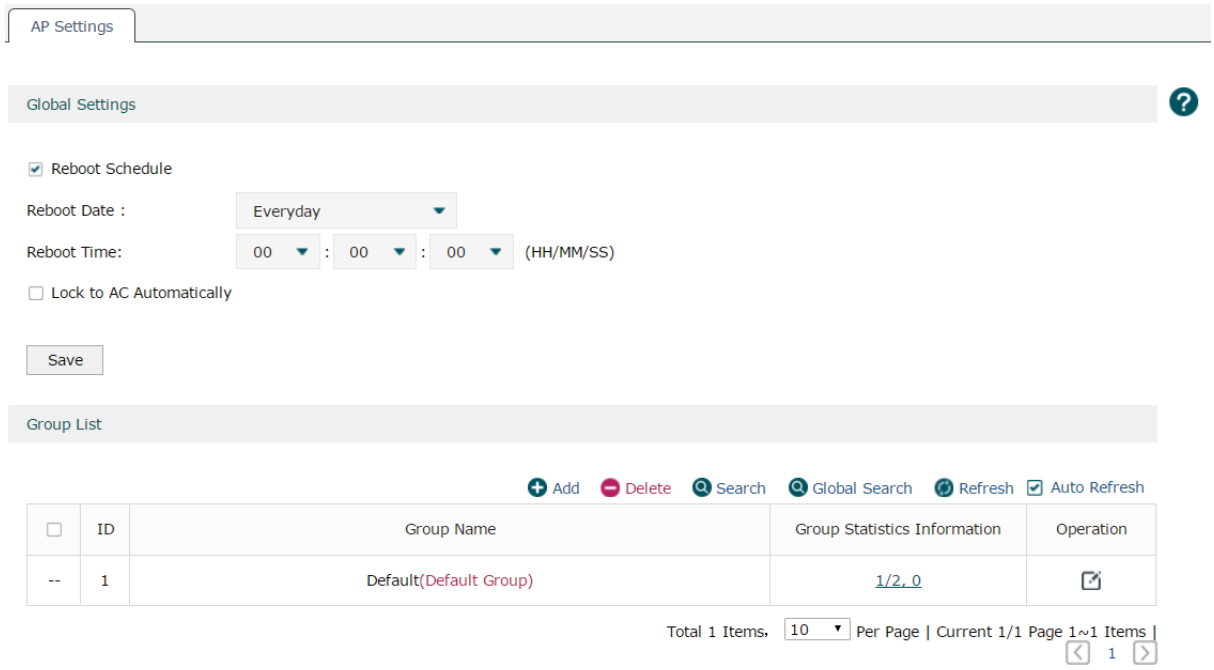
The data transfer rate ranges from 1 to 100Mpbs for AC50, and from 1 to 1000Mpbs for AC500. AC50 doesn't support 1000M Full-duplex.

4 AP Control

4.1 AP Settings

Choose the menu **AP Control > AP Settings > AP Settings** to load the following page.

Figure 4-1 AP Settings

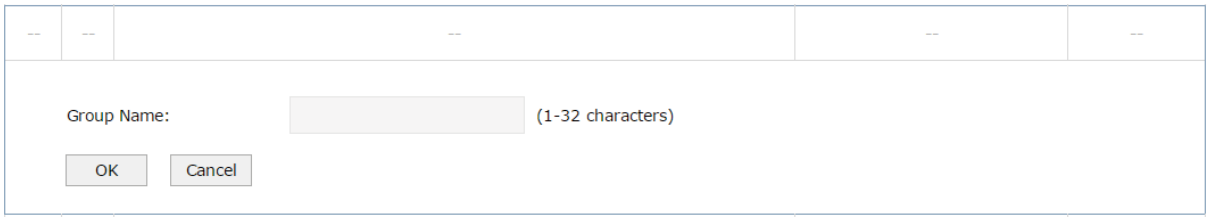


In the global settings, check the Reboot Schedule box and then the Lock to AC Automatically box to enable the corresponding function. Click **Save** to complete.

Reboot Schedule	With the reboot schedule enabled, all connected APs will reboot at the specified time.
Reboot Date	Select the date to reboot the APs. If you want to reboot the APs everyday, please select everyday in the list.
Reboot Time	Specify the reboot time to reboot the APs in the format of HH/MM/SS.
Lock to AC Automatically	With the lock to AC automatically enabled, all the APs entries will be locked to AC automatically once APs connect to the AC. The unlocked AP entries will disappear when the AC reboots.

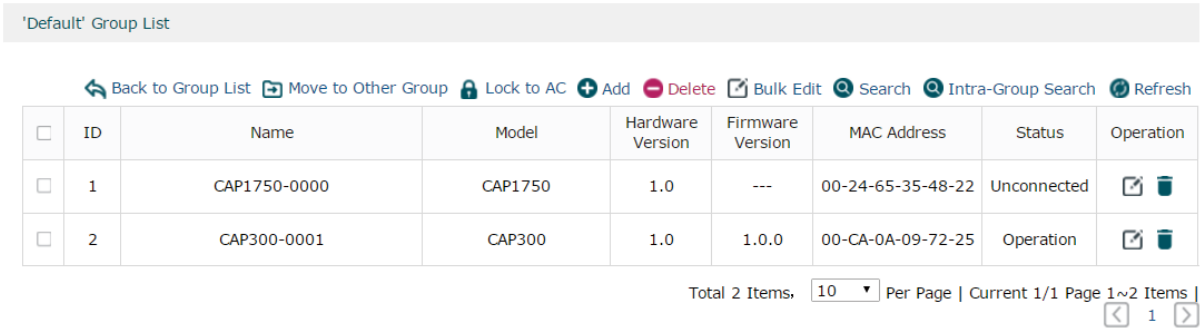
Click Add to create a new group. The following figure will be shown. Specify a group name in the field and click **OK**.

Figure 4-2 Add a group



In the group list, click the numbers at the Group Statistics Information row. The group information will be shown as below. Click the buttons above the list for additional operations.

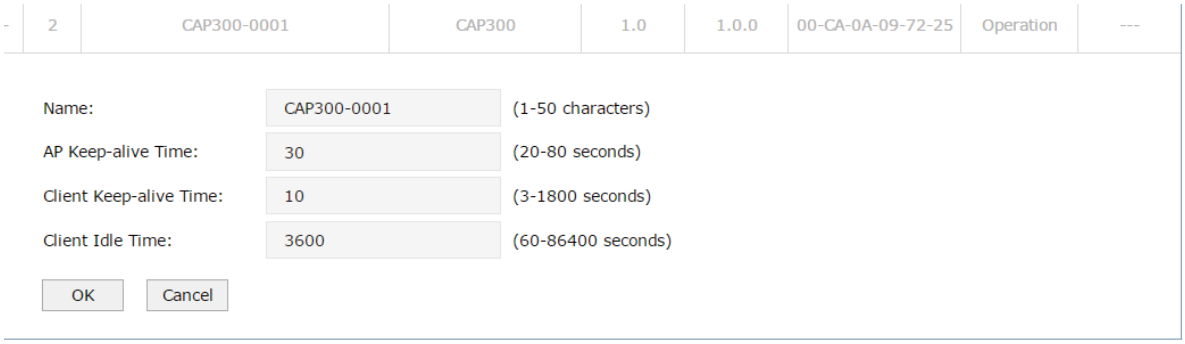
Figure 4-3 Group statistics information



Back to Group List	Click this button to return to the group list.
Move to Other Group	Select the corresponding entries and click this button to move them to your desired group.
Lock to AC	Select the corresponding entries and click this button to lock the APs to the AC.
Bulk Edit	Select the corresponding entries and click this button to bulk edit the APs' AP keep-alive time, client keep-alive time and client idle time. Refer to the following introduction below the table for details.
Search	Click this button to search the specified AP(s) on the current page.
Intra Group Search	Click this button to search the specified AP(s) in all the AP entries without the limitation of groups.

Click at the Operation row of the list. The following figure will be shown.

Figure 4-4 AP Settings



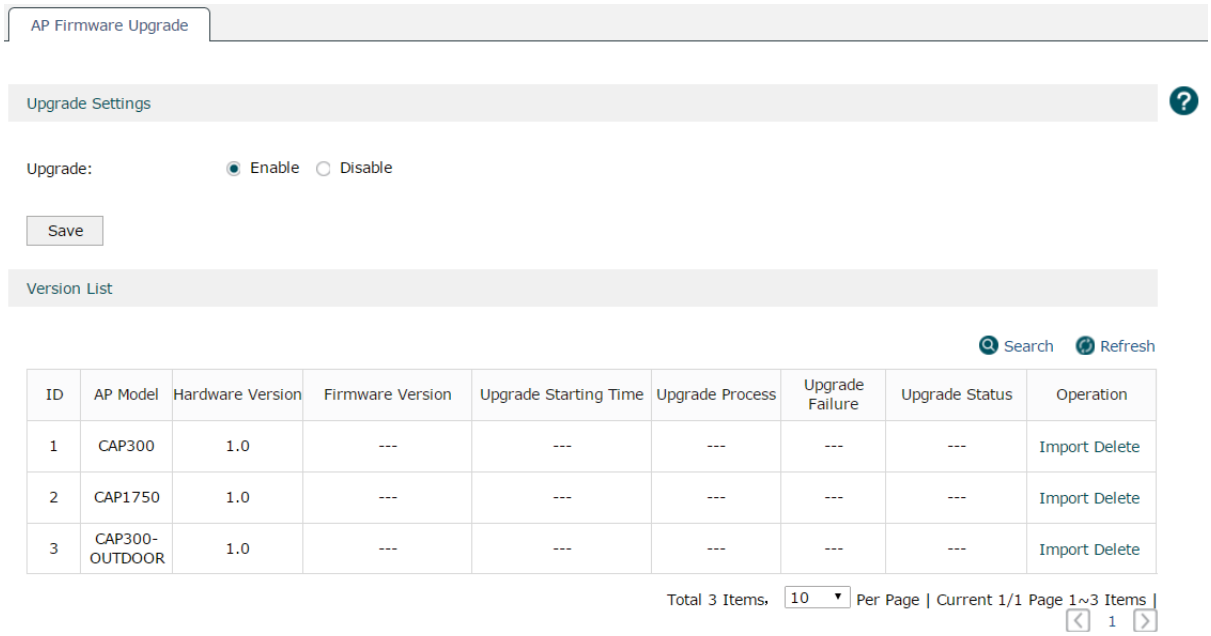
Name	Specify the AP's name.
AP Keep-alive Time	Specify the time interval for the AP sending echo packets to the AC. AC can detect whether the AP is online or not by receiving the echo packets.
Client Keep-alive Time	Specify the time interval for the client sending heartbeat packets to the AP. APs can detect whether the client is online or not by receiving heartbeat packets.
Client Idle Time	Specify a time interval for the client idle time. The clients will be disconnected from the AP if there is no data transmission between AP and clients for the specific time interval.

4.2 AP Firmware Upgrade

Choose the menu **AP Control > AP Firmware Upgrade > AP Firmware Upgrade** to load the following page.

With it enabled, import the correct firmwares and set the starting upgrade time. The connected APs will start to upgrade at the specified time. If it is disabled, the APs that haven't started upgrading will not be upgraded.

Figure 4-5 AP Firmware Upgrade



AP Model	Displays the AP model.
Hardware Version	Displays the current hardware version.
Firmware Version	Displays the imported firmware version.
Upgrade Starting Time	After the upgrade file has been imported successfully, specify the upgrade starting time. With upgrade enabled, the APs of this model will automatically upgrade using the upgrade file.
Upgrade Process	Displays the upgrade process. The format is X/Y/Z, which means there are Z APs of this model in the system, with Y APs waiting to upgrade and X APs have upgraded successfully. Click the numbers to check each AP's upgrade status.
Upgrade Failure	Displays the number of APs which failed to upgrade. Click the number to check the detailed log information.

Upgrade Status	Displays the upgrade status of current APs of this model. Click to check the detailed upgrade information of each AP of this model. **Latest**: There is no AP of the current model to be upgraded. **Waiting**: APs of the current model are waiting to be upgraded. **Upgrading**: Some APs of the current model are upgrading. **Completed:** All APs of the current model are upgraded. **Terminated**: The upgrade was disabled while the AP was waiting to upgrade. The AP's upgrade process is terminated. When the upgrade is enabled again, the status of the AP will change to "Waiting".
Operation	Click **Import** to import the upgrade firmware into the system. Click **Delete** to delete the firmware.

Note:

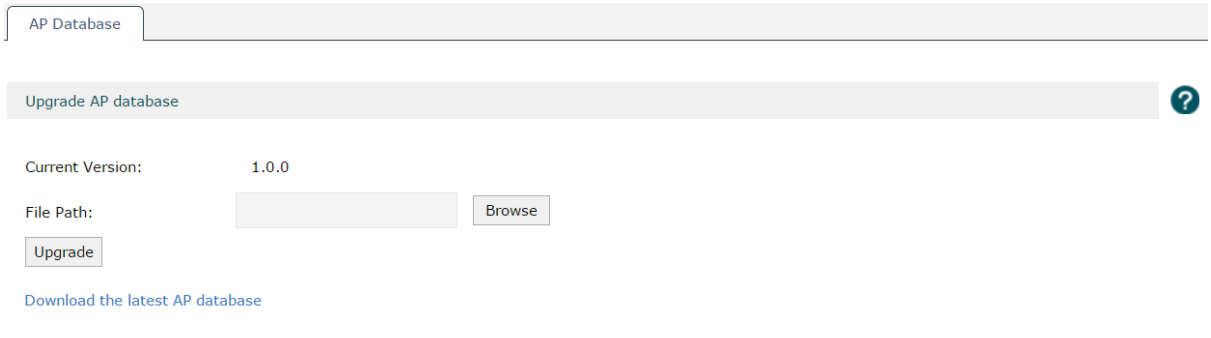
1. Only one model can upgrade at a time.
2. When the AC reboots or the CAPs reboot automatically, the CAPs can only upgrade after ten minutes.
3. The parameter of upgrade process and upgrade failure will be cleared when the AC reboots.
4. The standby link doesn't support upgrade schedule.

4.3 AP Database

Import the AP database file to support the identification and management of new AP models on this page. When there is an undetected AP model connecting to the AC, the AC should import the latest AP database to identify the new AP models.

Choose the menu **AP Control > AP Database > AP Database** to load the following page.

Figure 4-6 AP Settings



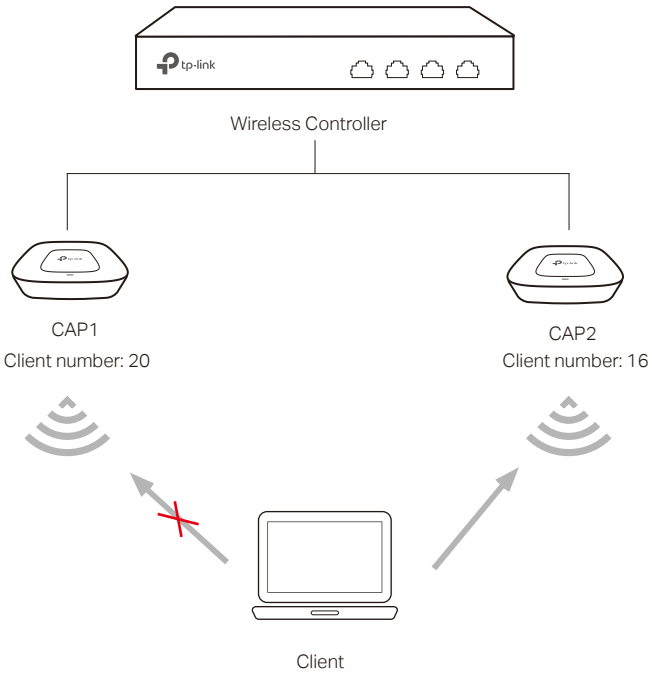
Current Version	Displays the current version of the AP database.
File Path	Click **Browse** to locate and select the new AP database. Click **Upgrade** to import it.
Download the latest AP database	Click **Download the latest AP database**. You will be redirected to the TP-Link download center to download the AP database files. The download center will update the AP database file.

4.4 Load Balancing

Load Balancing is applied in the high density wireless environment. It can balance the APs load and guarantee the reasonable access of the clients to APs. Therefore, the wireless resources and bandwidth of each AP can be used fairly.

The following example is used to illustrate the working process of load balancing.

Figure 4-7 Topology



The client is within the wireless range of CAP1 and CAP2. The client requests to connect to CAP1 and the following two conditions are met:

1 The client number of CAP1 has reached or exceeded the maximum number that the load balancing set (20 as an example).

2 The client is also in the coverage of other CAPs. And the difference of the connected client number between CAP1 and one of the other CAPs is greater than the difference threshold set in load balancing (4 as an example, 20-16≥4).

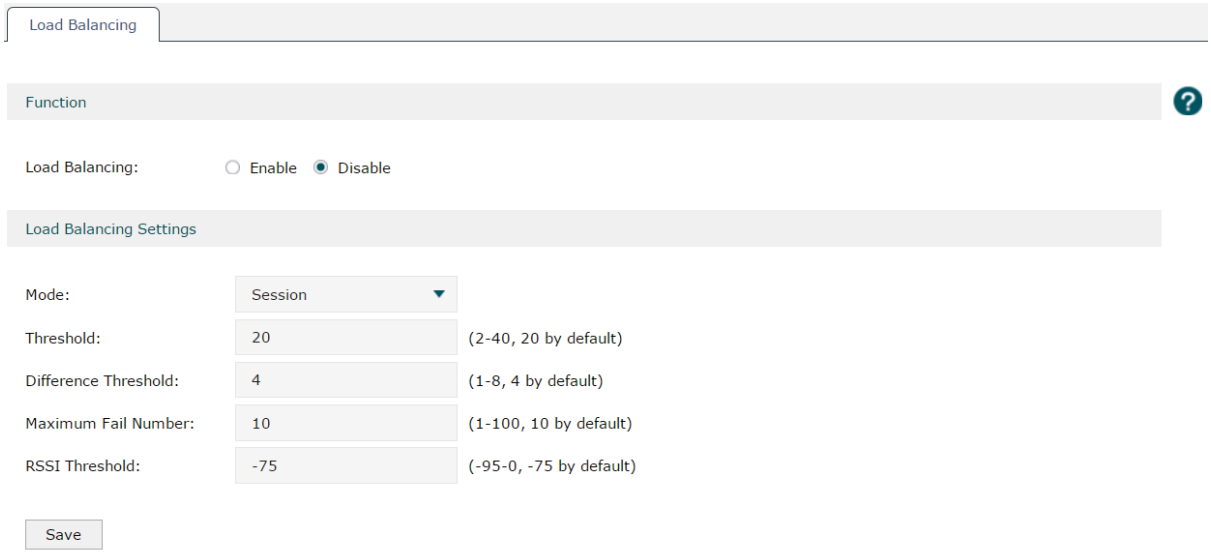
Due to load balancing, AC will reject the client's request to connect to CAP1 and instead connect the client to other CAPs with a smaller load. Thus, the performance of the whole network is improved.

If the client requests to connect to CAP1 continually, and the request fail number exceeds the maximum fail number set in load balancing, CAP1 will accept the connecting request of the client.

If the signal strength of the client is smaller than the RSSI threshold, it will not count to the total number of clients in load balancing.

Choose the menu **AP Control > Load Balancing > Load Balancing** to load the following page.

Figure 4-8 Load Balancing



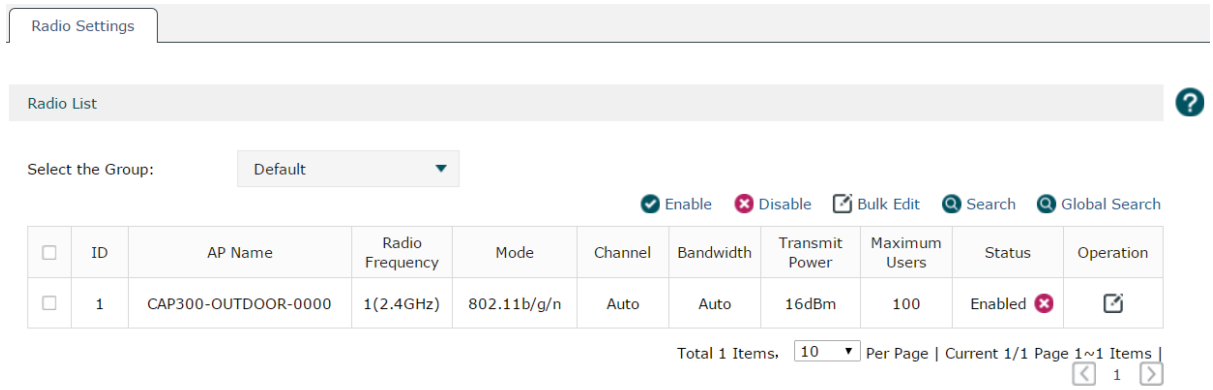
Load Balancing	Specify whether to enable load balancing.
Mode	Load balancing supports session mode only at present. In this mode, each AP will be assigned an average number of clients by the AC.
Threshold	Set the maximum number of clients that are allowed to access the AP. The client's request to connect to the CAP will be rejected when the threshold and difference threshold are exceeded.
Difference Threshod	Set the maximum difference between the number of clients connected to the AP with the number of clients connected to other APs. The client's requests to connect will be rejected when the threshold and difference threshold are exceeded.
Maximum Fail Number	Set the maximum fail number for the client's connection request. When the client's connection requests fail more than the specified number, the AP will allow it to connect.
RSSI Threshold	Specify the RSSI (Received Signal Strength Indicator) threshold. If the signal strength of the client is lower than the RSSI threshold, it will not count to the total number of clients for the purpose of load balancing.

5 Radio

5.1 Radio Settings

Choose the menu **Radio > Radio Settings > Radio Settings** to load the following page.

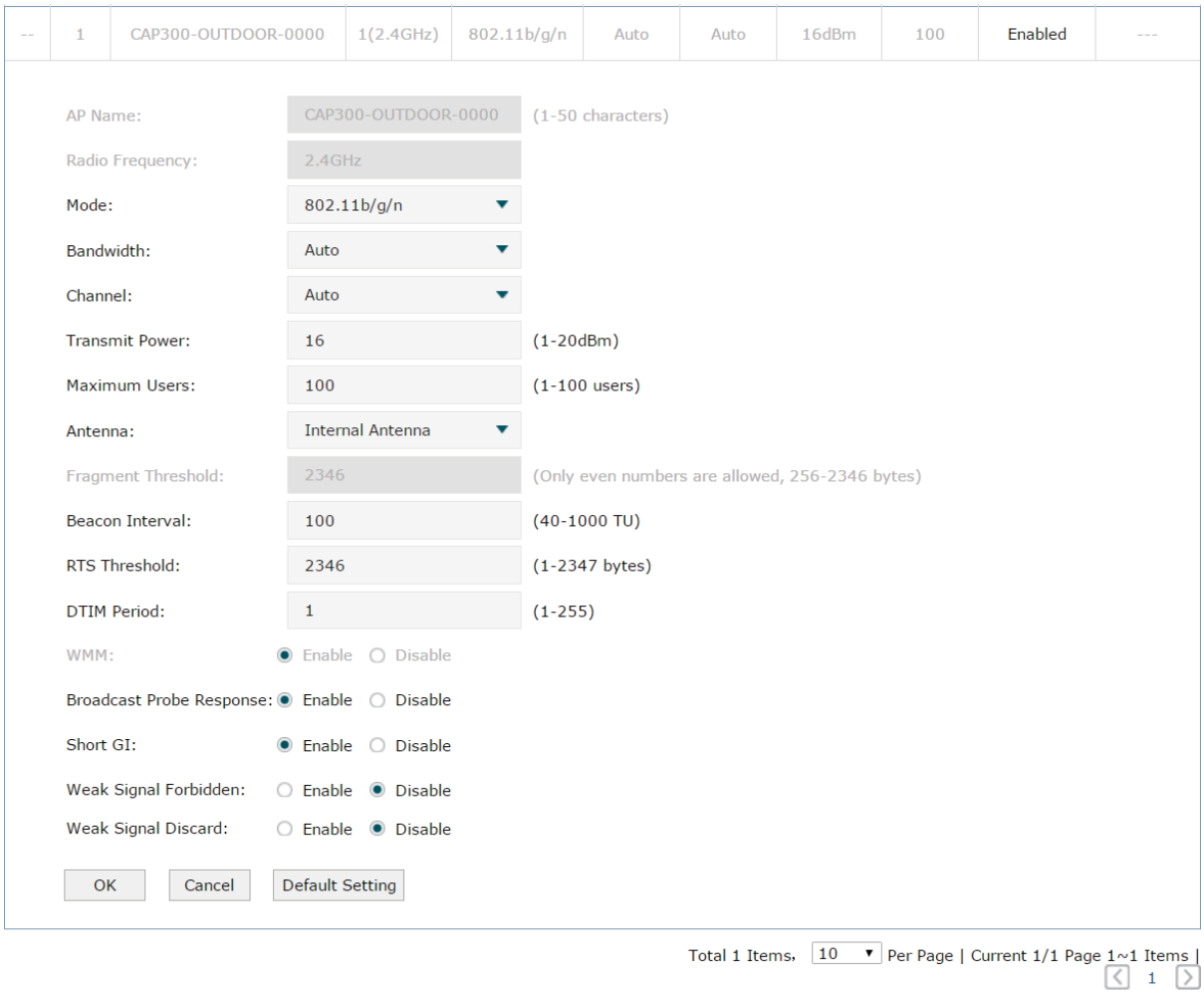
Figure 5-1 Radio Settings



On this page, you can specify the radio parameters of multiple or individual CAPs. Select the entries and click the buttons above the list to change the radio status or bulk edit the parameters.

Click at the operation row in the radio list, the following figure will be shown.

Figure 5-2 Change the Radio Settings



AP Name	Displays the AP's name.
Radio Frequency	Displays the radio frequency of the AP to be modified.
Mode	Specify the working mode of the wireless network. AP with a frequency band of 2.4GHz supports five wireless modes: 802.11b, 802.11g, 802.11n, 802.11b/g and 802.11b/g/n. You are recommended to select the 11b/g/n mode, and all of 802.11b, 802.11g and 802.11n wireless stations can connect to the AP. AP with a frequency band of 5GHz supports 802.11a, 802.11n, 802.11a/n and 802.11a/n/ac modes. You are recommended to select 11a/n/ac mode, allowing 802.11a, 802.11n and 802.11ac wireless stations to access the AP.
Bandwidth	Specify the bandwidth of the wireless network. According to IEEE 802.11n standard, using higher bandwidth can increase wireless throughput. However, users may choose lower bandwidth due to the following reasons: 1. Increase the available number of channels within the limited total bandwidth. 2. To avoid interference from overlapping channels occupied by other devices in the environment. 3. Lower bandwidth can concentrate higher transmit power, increasing stability of wireless links over long distances.
Channel	Specify a channel for the wireless network. If auto is selected, the AP will automatically choose a suitable channel.

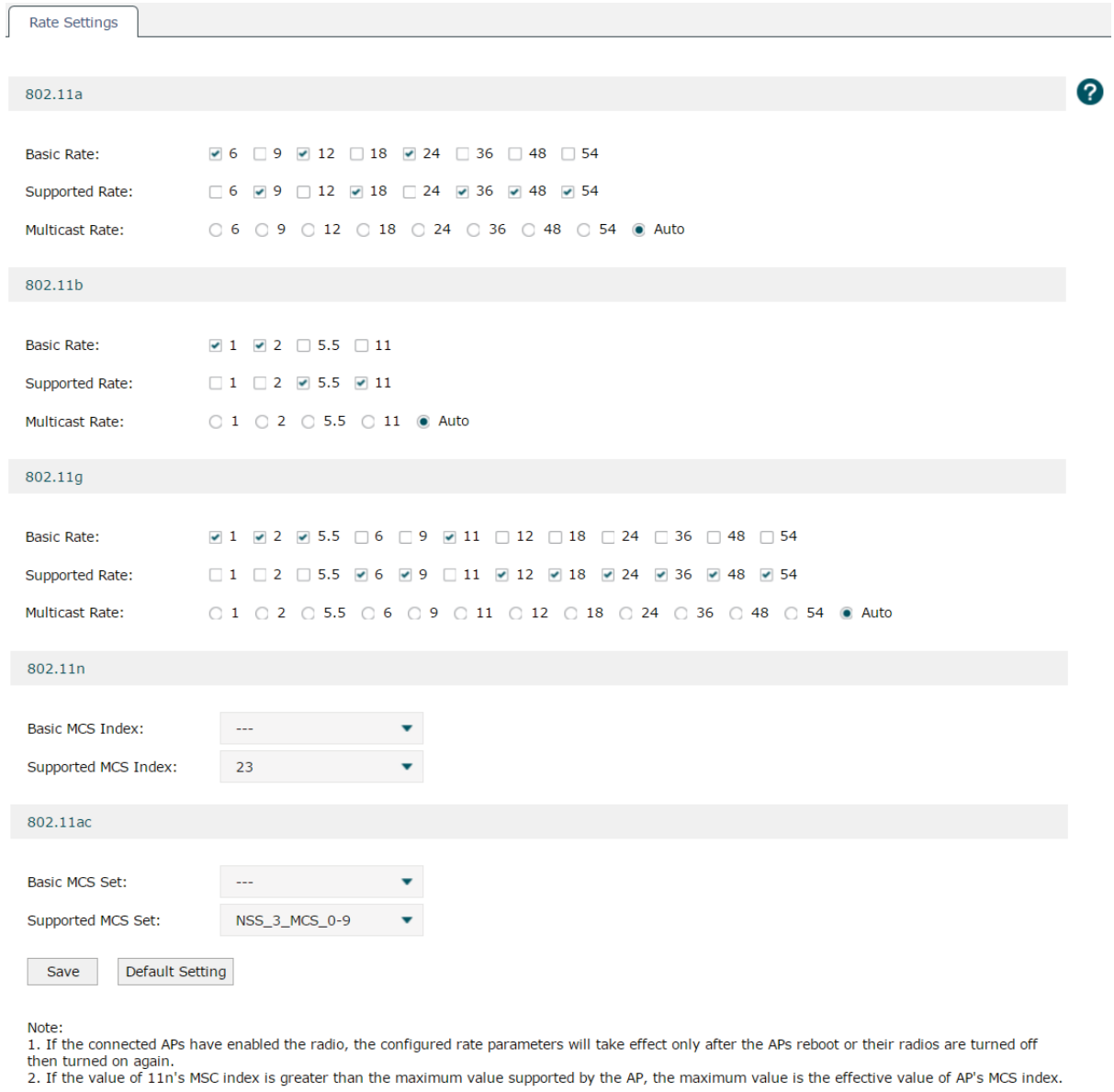
Transmit Power	Specify a transmit power for the wireless network. A larger transmission power than needed may cause interference to other wireless networks.
Maximum Users	Specify the maximum number of clients that can be connected to the AP.
Antenna	Specify the antenna type. Only internal antenna is supported at present.
Fragment Threshold	Specify the fragment threshold for transmitting packets. If the size of the packet is larger than the fragment threshold, the packet will be fragmented into several packets. A value that is too low for the fragment threshold may result in poor wireless performance caused by the excessive packets. The recommended and default value is 2346 bytes.
Beacon Interval	Enter a value between 40 and 1000 in milliseconds to determine the duration between beacon packets that are broadcasted by the AP to synchronize the wireless network. The default is 100 milliseconds.
RTS Threshold	Enter a value between 1 and 2347 to determine the packet size of data transmission through the AP. By default, the RTS (Request to Send) Threshold size is 2346. If the packet size is greater than the preset threshold, the AP sends Request of Send frames to a particular receiving station and negotiates the sending of a data frame, or else the packet will be sent immediately.
DTIM Period	This value indicates the number of beacon intervals between successive Delivery Traffic Indication Messages (DTIM) and this number is included in each Beacon frame. A DTIM is contained in Beacon frames to indicate whether the AP has buffered broadcast and/or multicast data for the client devices. Following a Beacon frame containing a DTIM, the access point will release the buffered broadcast and/or multicast data, if any exists. You can specify a value between 1-255 Beacon Intervals. The default value is 1, indicating the DTIM Interval is the same as the Beacon Interval. An excessive DTIM interval may reduce the performance of multicast applications. It is recommended to keep it as the default.
WMM	Specify whether to enable the WMM. With WMM enabled, this device uses the QoS function to guarantee the transmission of audio and video packets with high priority.
Broadcast Probe Response	Specify whether to enable the broadcast probe response function. The clients send broadcast probes to detect the wireless networks nearby. If the function is enabled, the AP will respond to the broadcast probe to let the clients know of its existence. With the function disabled, the client cannot find the AP by sending broadcast probes.
Short GI	Specify whether to enable the Short GI. Short GI is used to increase the throughput by reducing the guard interval time. It is recommended to enable this function.
Weak Signal Forbidden	Specify whether to enable the weak signal forbidden function. With this function enabled, the AP will forbid the client with a signal strength lower than a certain value from connecting.
Weak Signal Discard	Specify whether to enable the weak signal discard function. With this function enabled, the AP will discard the client with a signal strength lower than a certain value.

Click **OK** to complete the configuration. Click **Default Settings** to restore the parameters to the default.

5.2 Rate Settings

Choose the menu **Radio > Rate Settings > Rate Settings** to load the following page. Specify the data transmission rate on this page.

Figure 5-3 Rate Settings



802.11a

Basic Rate: Specify the basic rate set with which the 802.11a clients are allowed to access the network. At least one rate should be selected from the rate set. 6Mbps, 12Mbps and 24Mbps are selected by default.

Supported Rate: Specify the supported rate for 802.11a clients. The supported rate set should not overlap with the basic rate set. 9Mbps 18Mbps, 36Mbps 48Mbps and 54Mbps are selected by default.

Multicast Rate: Specify the multicast rate for the 802.11a multicast packets. The rate should be selected from the basic rate set. When auto is selected, the system will select a suitable rate from the basic rate set automatically.

802.11b	**Basic Rate**: Specify the basic rate with which 802.11b clients are allowed to access the wireless network. At least one rate should be selected in the rate set. 1Mbps and 2Mbps are selected by default. **Supported Rate**: Specify the supported rate for 802.11b clients. The supported rate should not overlap with the basic rate that has been set. 5.5Mbps and 11Mbps are selected by default. **Multicast Rate**: Specify the multicast rate for the 802.11b multicast packets. The rate should be selected from the basic rate set. When auto is selected, the system will select a suitable rate from the basic rate set automatically.
802.11g	**Basic Rate**: Specify the basic rate with which the 802.11g clients are allowed to access the network. At least one rate should be selected in the rate set. 1Mbps, 2Mbps, 5.5 Mbps and 11Mbps are selected by default. **Supported Rate**: Specify the supported rate for 802.11g clients. The supported rate set should not overlap with the basic rate set. 6Mpbs, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps and 54Mbps are selected by default. **Multicast Rate**: Specify the multicast rate for the 802.11g multicast packets. The rate should be selected from the basic rate set. When auto is selected, the system will select a suitable rate from the basic rate set automatically.
802.11n	**Basic MCS Index**: Specify the basic MCS index for 802.11n clinet. The maximum MCS index value for 802.11n clients should be equal to or greater than the basic MCS index value. Otherwise, the clients cannot be allowed to access the wireless network. The default setting is blank. If a value is selected , only 802.11n clients are allowed to access the network. **Supported MCS Index**: Specify the support MCS index for the device. The support MCS index should be equal to or greater than the basic MCS index.
802.11ac	**Basic MCS Set:** Specify the basic MCS set for the device. The 802.11ac clients should support the number of antennas and MCS index range regulated by the basic MCS set. Otherwise, the clients cannot access the wireless network. **Supported MCS Set**: Specify the support MCS set for the device. The corresponding number of antennas and MCS index range of the support MCS set should be equal to or greater than that of basic MCS set.

Note:

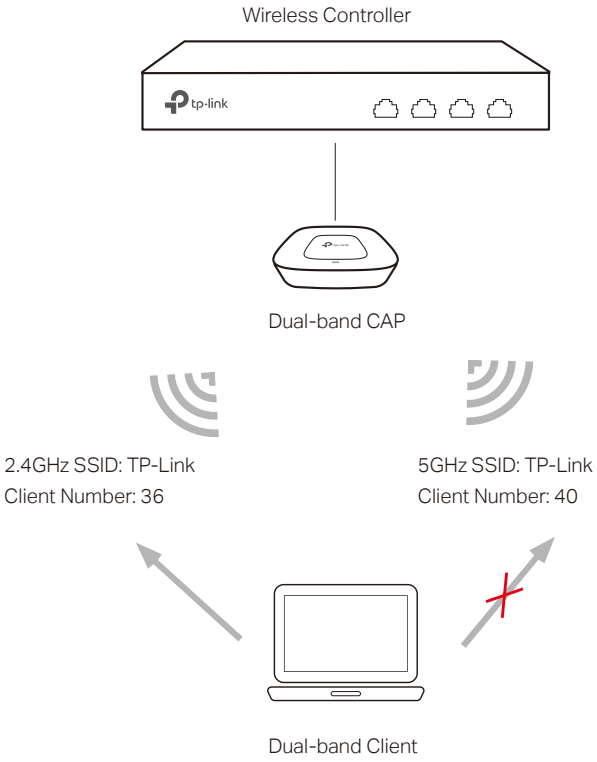
For the connected APs enabled with radio, the rate settings won't take effect until the APs reboot or their radios are disabled and enabled again.

5.3 Band Steering

There are clients that only support the 2.4GHz band and clients that support dual band in a wireless network. If all the clients connect to the 2.4GHz band, the 2.4GHz band will become very congested, reducing the network performance. With band steering enabled, the AP would steer the dual band clients to connect to the 5GHz first, which would balance the band connections and improve the network performance. When enabling band steering, please ensure the SSIDs of both 2.4GHz and 5GHz bands are the same.

The following example is used to illustrate the process of band steering.

Figure 5-4 Band Steering Process



The 2.4GHz SSID and 5GHz SSID of the dual-band CAP are set the same. If a 2.4GHz client or 5GHz client requests to connect to the CAP, the band steering won't take effect and the client will connect to the 2.4GHz or 5GHz directly. If a dual band client requests to connect to the CAP, due to band steering, the CAP will lead the client to connect to the 5GHz band first.

When the wireless network satisfies the following two conditions:

1 The client number of the 5GHz band reaches or exceeds the maximum client numbers that are allowed to connect (40 as an example).

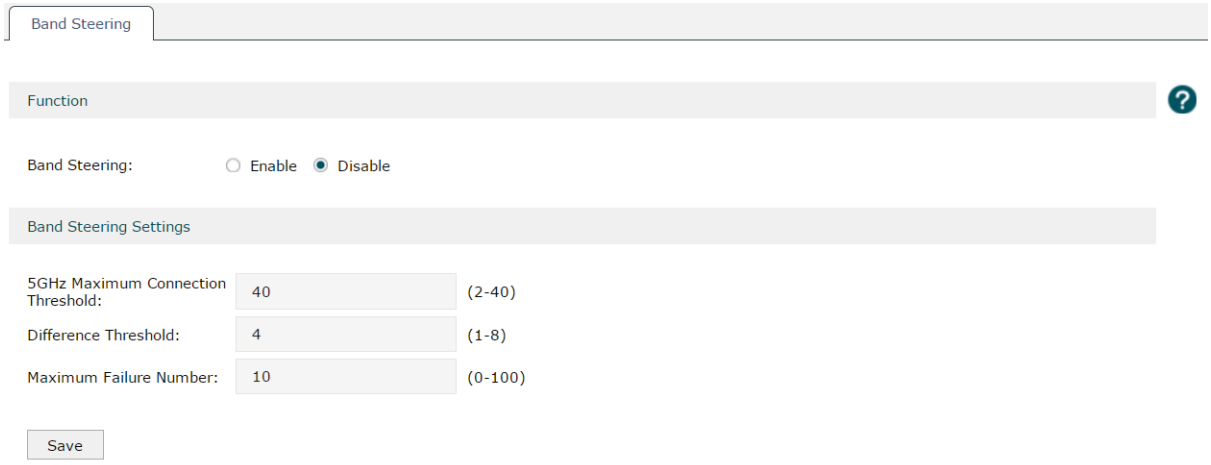
2 The difference value in client number of the 2.4GHz band and the 5GHz band reaches or exceeds the difference threshold set in band steering setting (4 as an example,40-36≥4).

Due to band steering, a new dual band client will be rejected from connecting to the 5GHz band and be allowed to connect to the 2.4GHz band.

But if the client repeatedly requests to connect to the 5GHz, and the rejection exceeds the maximum failure number set in band steering setting, the client will be allowed to connect.

Choose the menu **Radio > Band Steering > Band Steering** to load the following page. Check the Enable radio button to enable the band steering function.

Figure 5-5 Band Steering



5GHz Maximum Connection Threshold	Specify the maximum number of clients that are allowed to connect to the 5GHz band. When the client number meets the 5GHz maximum connection threshold and difference threshold, the AP will prevent more APs from connecting to the 5GHz band.
Difference Threshold	Specify the maximum difference value between the number of clients connected to the 5GHz band and the number connected to the 2.4GHz band. When the client connections meet the 5GHz maximum connection threshold and the difference threshold, the AP will prevent more APs from connecting to the 5GHZ band.
Maximum Failure Number	Specify the maximum number of failed connection attempts of the client. If the clients continuously request to connect to the 5GHz band and the number of failed attempts exceeds the specified number, the CAP will accept the connection request.

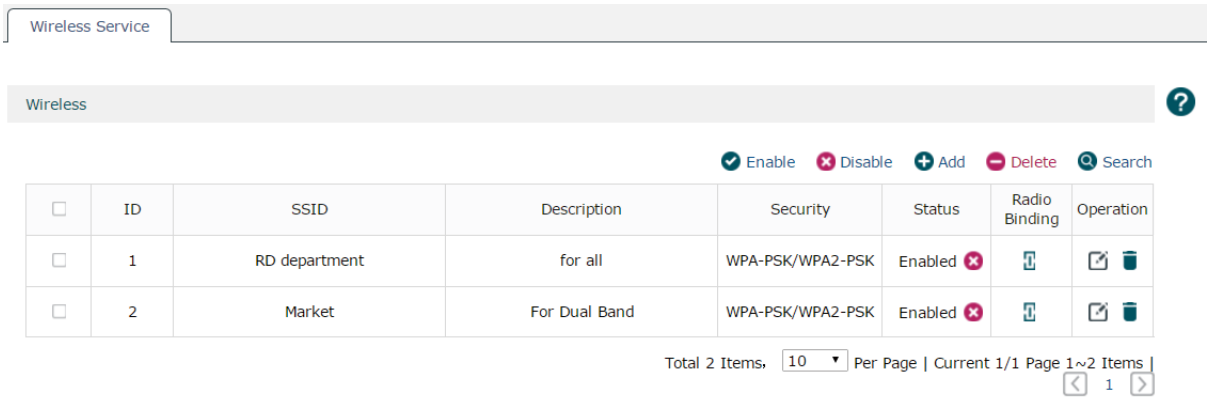
Click **Save** to finish the settings.

6 Wireless

6.1 Wireless Service

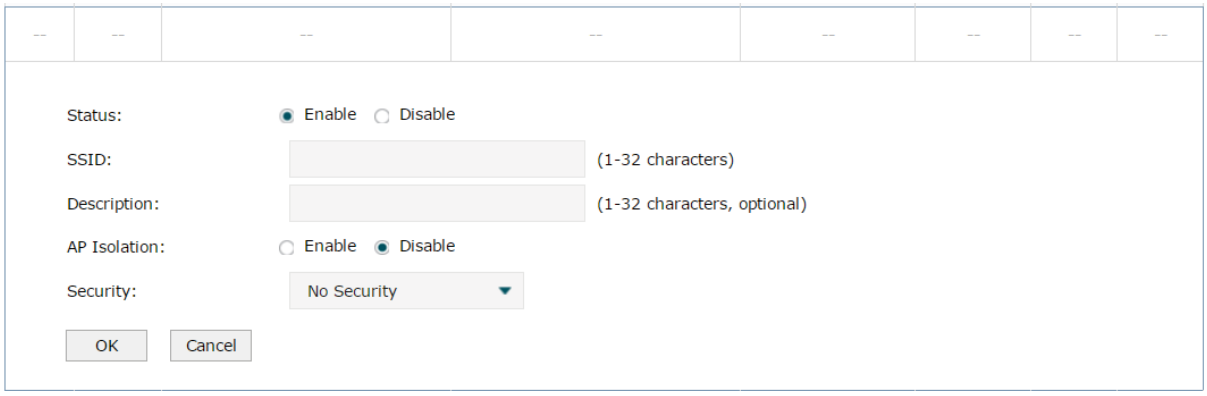
Choose the menu **Radio > Wireless > Wireless Service** to load the following page.

Figure 6-1 Wireless Service



Specify and view the wireless service on this page. Click Add to create a new wireless service. Click button, you can go into the radio binding page.

Figure 6-2 Add a New Wireless Service



Status	Specify whether to enable the wireless network.
SSID	Specify the SSID (Service Set Identifier) for the wireless network. The SSID should be unique.
Description	Specify a description for the entry to make it easier to search for and manage.
AP Isolation	Enable AP isolation to isolate the wireless clients connected to the same AP so that they cannot communicate with each other. This setting cannot take effect in other APs; that is, AP isolation cannot isolate the clients connected to different APs with the same SSIDs.

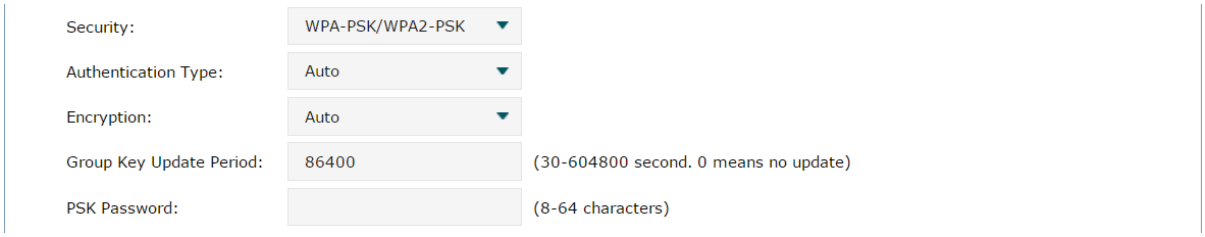
Security	Specify the security option of the wireless network. If all the clients are allowed to access the wireless network, please select **None**. For the safety of the wireless network, you are suggested to encrypt your wireless network with password. This device provides three security options: WPA/WPA2 (Wi-Fi Protected Access) and WPA-PSK/WPA2-PSK (WPA Pre-Shared Key). WPA-PSK/WPA2-PSK is recommended. Settings vary in different security options as the details is in the following introduction.

Following is the detailed introduction of security mode: **WPA/WPA2** and **WPA-PSK/WPA2-PSK**.

- **WPA-PSK/WPA2-PSK**

Based on pre-shared key. It is characterized by higher safety and simple settings, which suits for common households and small business. WPA-PSK has two versions: WPA-PSK and WPA2-PSK.

Figure 6-3 Security of WPA-PSK/WPA2-PSK

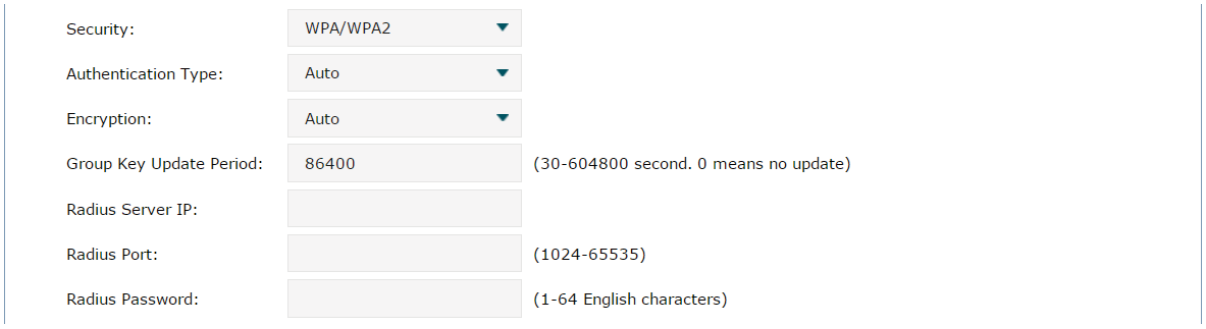


Authentication Type	Select one of the following versions: **Auto**: Select WPA or WPA2 automatically based on the wireless client's capability and request. **WPA-PSK**: Pre-shared key of WPA. **WPA2-PSK**: Pre-shared key of WPA2.
Encryption	Select the encryption type, including Auto, TKIP, and AES. The default setting is Auto, which can select TKIP (Temporal Key Integrity Protocol) or AES (Advanced Encryption Standard) automatically based on the wireless station's capability and request. AES is more secure than TKIP and TKIP is not supported in 802.11n mode. It is recommended to select AES as the encryption type.
Group Key Update Period	Enter the number of seconds (minimum 30) to control the time interval for the encryption key automatic renewal.
PSK Password	Configure the PSK password with ASCII or Hexadecimal characters. For ASCII, the length should be between 8 and 63 characters with a combination of numbers, letters (case-sensitive) and common punctuations. For Hexadecimal, the length should be 64 characters (case-insensitive, 0-9, a-f, A-F).

- **WPA/WPA2**

Based on Radius Server, WPA can assign different passwords for different users and it is much safer than WPA-PSK. However, it has high maintenance costs and is only suitable for enterprise users. At present, WPA has two versions: WPA and WPA2.

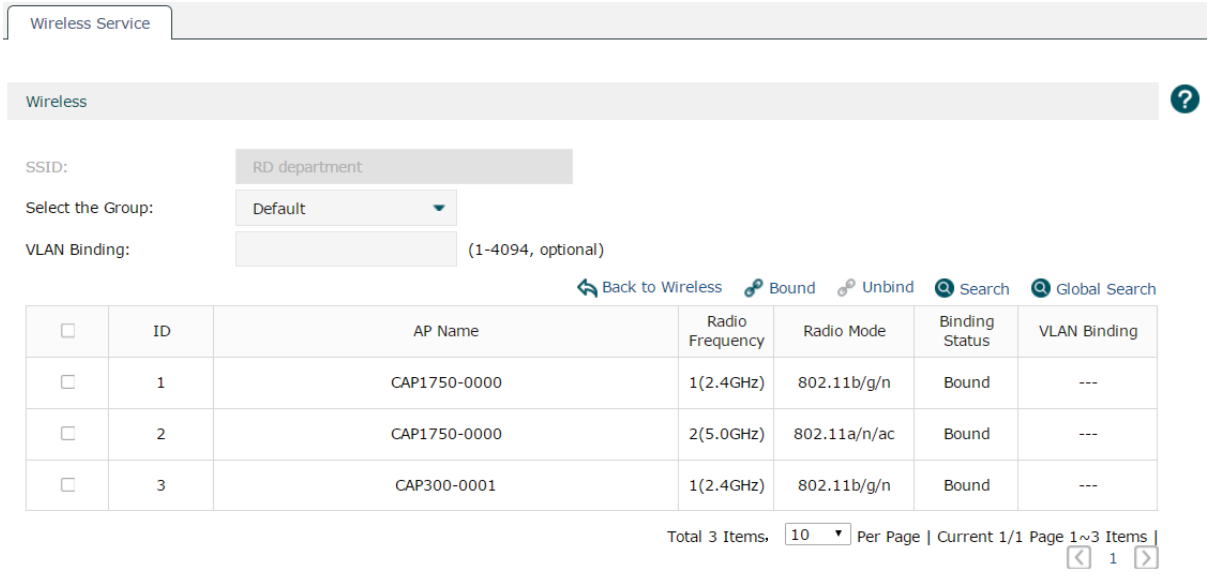
Figure 6-4 Security of WPA/WPA2



Authentication Type	Select one of the following versions: **Auto:** Select WPA-PSK or WPA2-PSK automatically based on the wireless station's capability and request. **WPA**: Wi-Fi Protected Access. **WPA2**: Version 2 of WPA.
Encryption	Select the encryption type, including Auto, TKIP, and AES. The default setting is Auto, which can select TKIP (Temporal Key Integrity Protocol) or AES (Advanced Encryption Standard) automatically based on the wireless station's capability and request. AES is more secure than TKIP and TKIP is not supported in 802.11n mode. It is recommended to select AES as the encryption type.
Group Key Update Period	Enter the number of seconds (minimum 30) to control the time interval for the encryption key automatic renewal.
PSK Password	Configure the PSK password with ASCII or Hexadecimal characters. For ASCII, the length should be between 8 and 63 characters with combination of numbers, letters (case-sensitive) and common punctuations. For Hexadecimal, the length should be 64 characters (case-insensitive, 0-9, a-f, A-F).

Click button, you can go into the radio binding page.

Figure 6-5 Radio Banding



SSID	Displays the current wireless network.

Select the Group	Select the group to be displayed in the list.
VLAN Binding	Enter a VLAN ID into the field and Click Bound above the list. The wireless network will be bound to the corresponding VLAN.
Bound	Select the desired entries and click this button to bind the service to corresponding radios. Unlocked APs cannot be bound. Please refer to *4.1 AP Settings* and check the box **Lock to AC Automatically**.
Unbind	Select the desired entries and click this button to unbind the service in corresponding radios.
Back to Wireless	Click this button to return to the wireless service page.

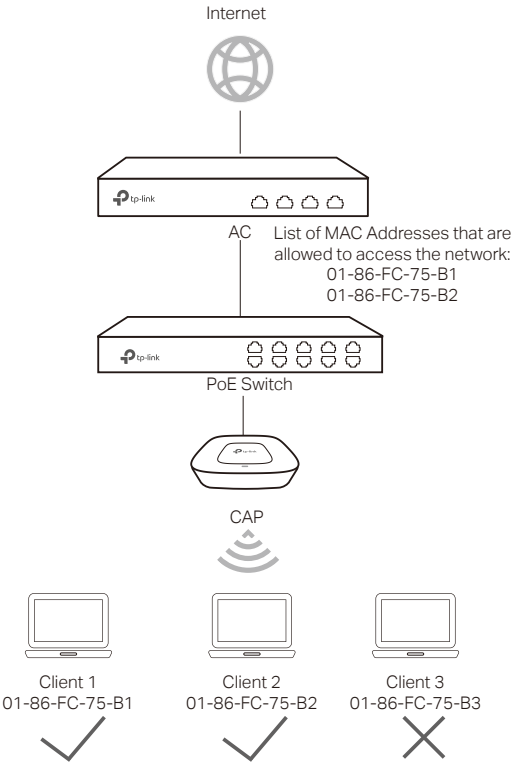
7 Authentication

7.1 MAC Authentication

MAC Authentication is based on port and MAC address. AC can control the clients' network access by their MAC addresses.

In MAC Authentication, the AC should first get the MAC addresses information of the clients that are authorized to access the network. When the AC detects the MAC address of the client for the first time, it initiates the authentication for the client immediately. The clients do not need to install any client software, nor any operation during the authentication process.

Figure 7-1 Topology for MAC Authentication



The administrator presets the MAC addresses of the clients allowed to access the network in the AC. Only those users whose MAC addresses are in the " MAC address list of allowed clients" can access the network, and the others are forbidden.

- **Configure MAC Authentication**

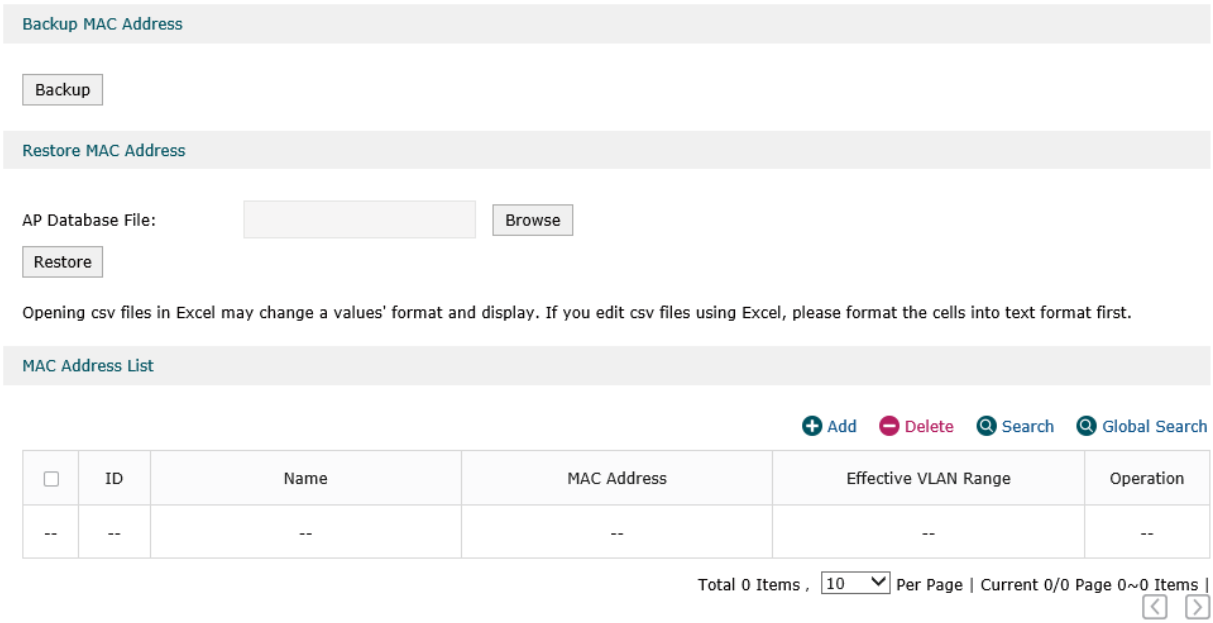
1 Choose the menu **Authentication > MAC Authentication > MAC Address** to configure the MAC addresses of the clients allowed to access the network.

2 Choose the menu **Authentication > MAC Authentication > MAC Authentication** to create MAC Authentication List of the allowed clients or the forbidden clients.

7.1.1 MAC Address

Choose the menu **Authentication > MAC Authentication > MAC Address** to load the following page.

Figure 7-2 MAC Address



Click **Backup** to backup all the MAC authentication entries in the CSV file which are in ANSI coding format. This file can be restored to the AC and all MAC addresses can be added into the MAC address list.

Add multiple MAC address entries at a time:

1 Save the MAC address entries as a CSV file with ANSI coding format in the AC. You can use the **Backup MAC Address** function to obtain a CSV file to view the correct format.

2 Click **Browse** to select the file path, and then click **Restore** to restore the file.

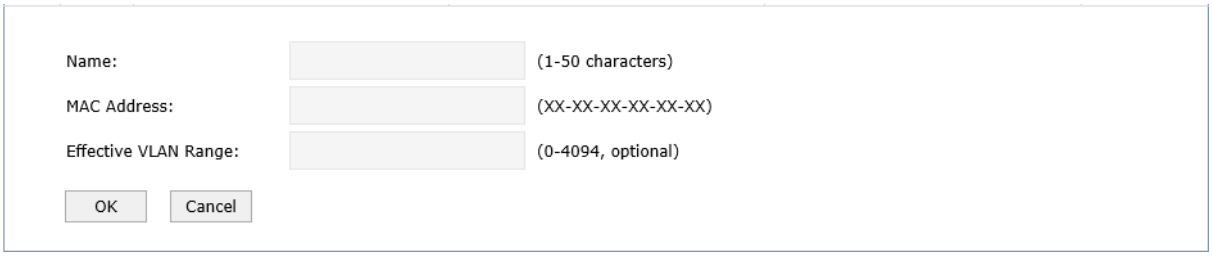
Note:

Using Excel to open the CSV file may cause some numerical format changes, and the number may be displayed incorrectly. If you use Excel to edit the CSV file, please set the cell format as text.

In the MAC address list you can view the MAC address entries.

Click Add to add a new MAC address entry, as shown in the following figure.

Figure 7-3 Add a new MAC address entry

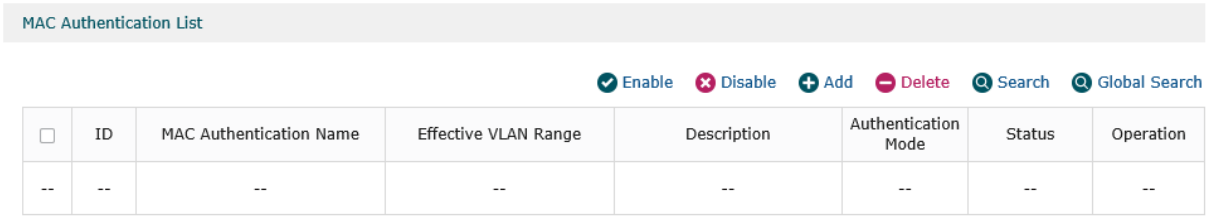


Name	Specify the name for the entry.
MAC Address	Specify the MAC address of the client.
Effective VLAN Name	Specify the effective VLAN entry range. The range is 1 to 4094. Number and range are both supported. The ranges can be seperated by commas. For example: 1 11-20 1,3,5,4090-4094

7.1.2 MAC Authentication

Choose the menu **Authentication > MAC Authentication > MAC Authentication** to load the following page.

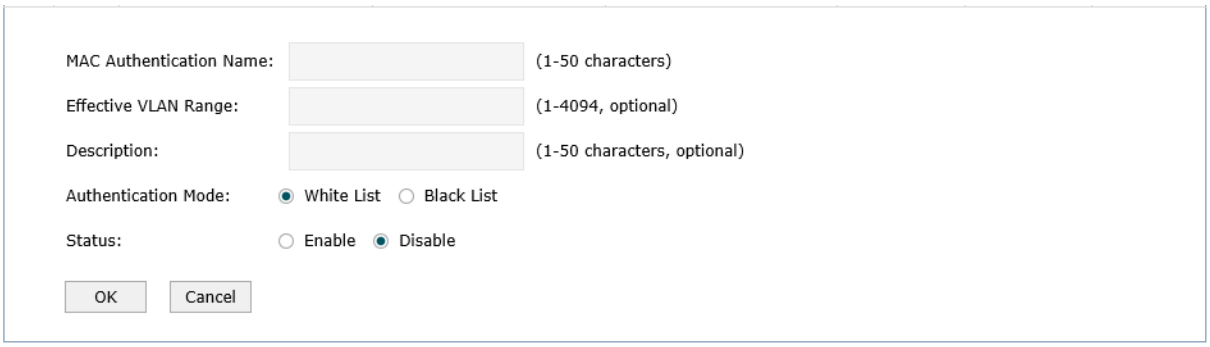
Figure 7-4 MAC Authentication



Here you can view the MAC Authentication List.

Click Add to add a new entry.

Figure 7-5 Add a MAC Authentication List



MAC Authentication Name	Specify or check the name of the MAC authentication entry to make it easier to search for and manage.
Effective VLAN Range	Specify or check the effective VLAN range of the MAC authentication entry. The range is 1 to 4094. Number and range are both supported. The ranges can be seperated by commas. For example: 1 11-20 1,3,5,4090-4094
Description	Specify or check the description of the authentication entry to make it easier to search for and manage.

Authentication Mode	Black List: All the MAC addresses in this authentication mode are forbidden to access the network.
Status	Specify whether to enable this authentication entry.

7.2 Portal Authentication

AC provides portal authentication, including **Web authentication**, **Onekey Online**, **Remote Portal**, as well as **Redirect Page**, **Free Authentication Policy** and **Authentication Config**.

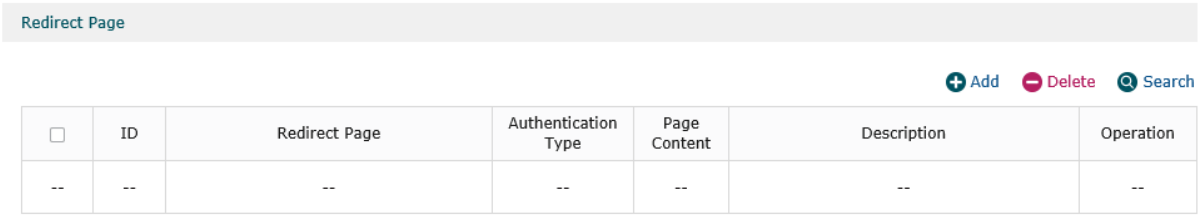
Note:

Before configuring portal authentication, make sure that the IP address of the AC's interface that manages the AP and the IP addresses of the clients are routable.

7.2.1 Redirect Page

Choose the menu **Authentication > Portal Authentication > Redirect Page** to load the following page.

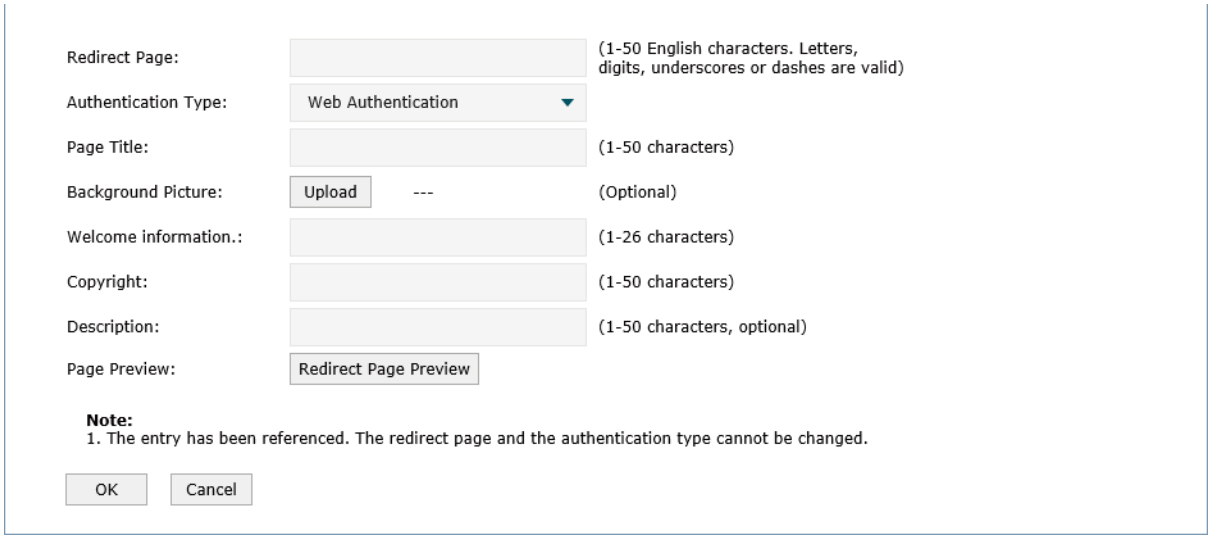
Figure 7-6 Redirect Page



Here you can upload pictures, specify external links or use the default template to set the redirect pages for subsequent authentication to meet the requirements of advertisement promotions.

Click Add to add a new entry. There are two authentication types of the redirect page, including Web authentication and Onekey Online.

Figure 7-7 Add a Redirect Page



Redirect Page	Specify the name of the redirect page template.
Authenticaiton Type	Select the authentication type of the redirect page . Options include **Web Authentication** and **Onekey Online**. **Web Authentication:** Users need to enter a username and password to log in on the login page, and can access the network after successful authentication. **Onekey Online:** Users can access the network without entering any parameters on the login page.
Page Title	Specify the page title for the authentication.
Background Picture	Upload the background picture for the authentication.
Welcome information	Specify the welcome information for the authentication.
Copyright	Specify the copyright information for the authentication.
Description	Specify a description for the entry to make it easier to search for and manage.
Page Preview	Click the button to preview the redirect page.

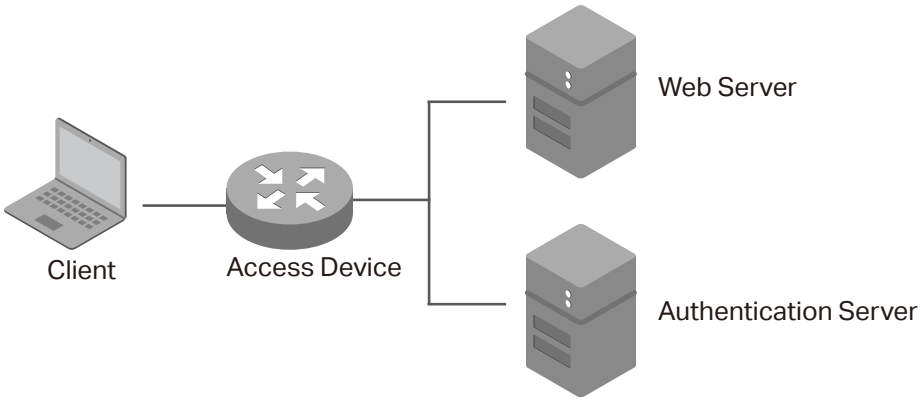
7.2.2 Web Authentication

The AC provides Web Authentication. Users need to log in by entering a username and password, and can then access the network after successful authentication.

- **Web Authentication Model**

The Web Authentication model is shown as below:

Figure 7-8 Web Authentication Topology



Client: The client needs to be authenticated before accessing the network.

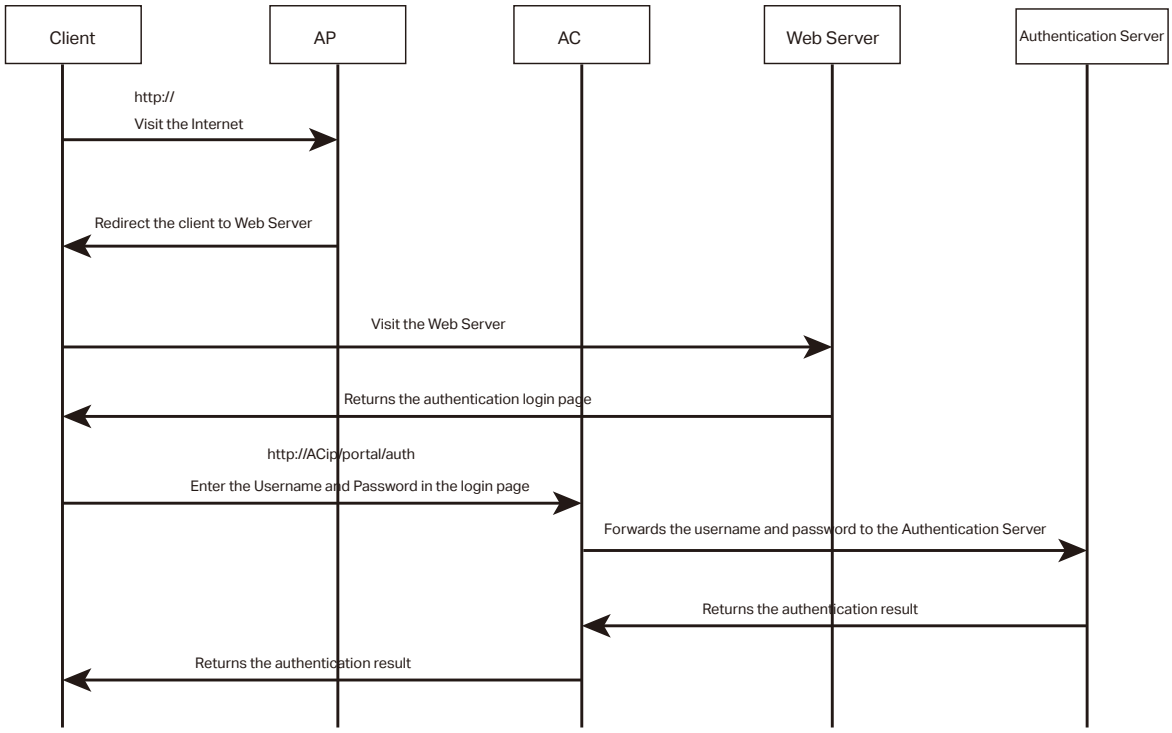
Access Device: Access Devices includes routers, switches and AC. Its helps to: redirect all HTTP requests to the Web Server before authentication; interact with the Web Server to authenticate the client during the authentication process; allow users to access the network resources authorized by the administrator after the successful authentication.

Web Server: Web Server responds to user's authentication requests, and provides an authentication login page.

Authentication Server: Authentication Server interacts with the Access Device to authenticate clients.

■ **Web Authentication Process**

Figure 7-9 Web Authentication Process



1 The client connects to the network but is not authenticated, and starts to visit the Internet through HTTP;

2 The Access Device returns a redirect URL and redirects the client to the Web Server.

3 The client visits the Web Server.

4 The Web Server returns the authentication login page to the client.

5 The client enters the username and password at the login page.

6 The Access Device forwards the username and password to the Authentication Server.

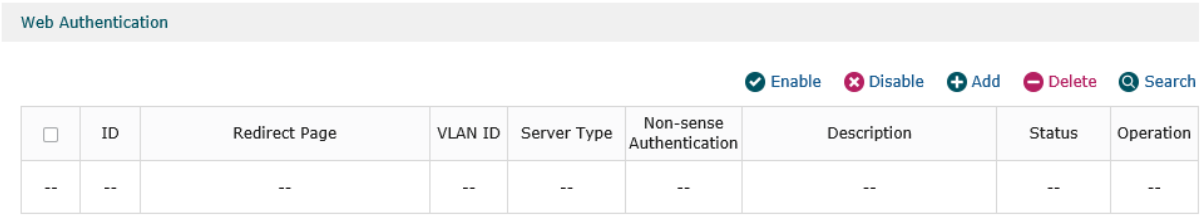
7 The Authentication Server returns the authentication result to the Access Device.

8 The Access Device replies to the client with the authentication result.

7.2.3 Configuring Web Authentication

Choose the menu **Authentication > Portal Authentication > Web Authentication** to load the following page.

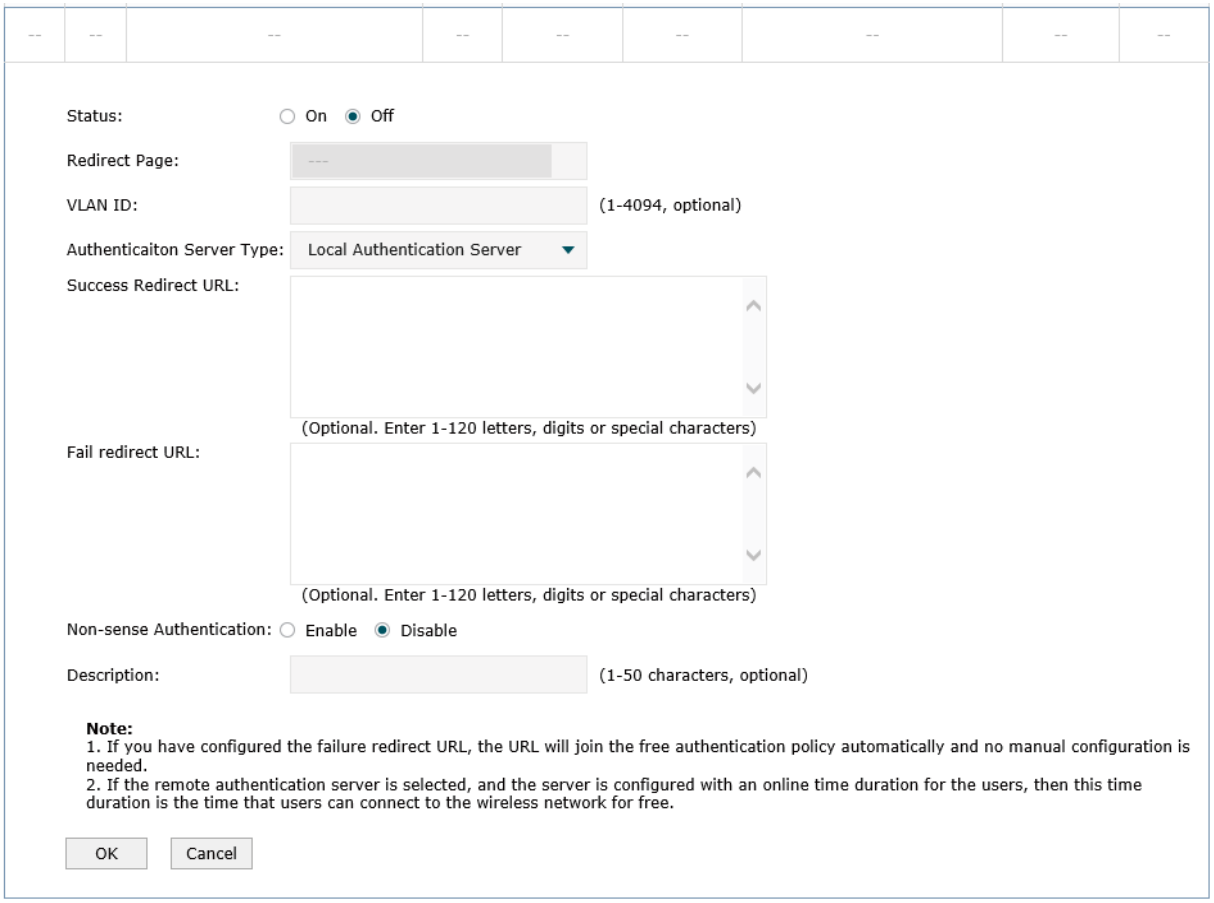
Figure 7-10 Web Authentication



Here you can view the Web Authentication information and edit the entries.

Click Add to add a new entry. There are two authentication server types, including Local Authentication Server and Remote Authentication Server.

Figure 7-11 Local Authentication Server Page

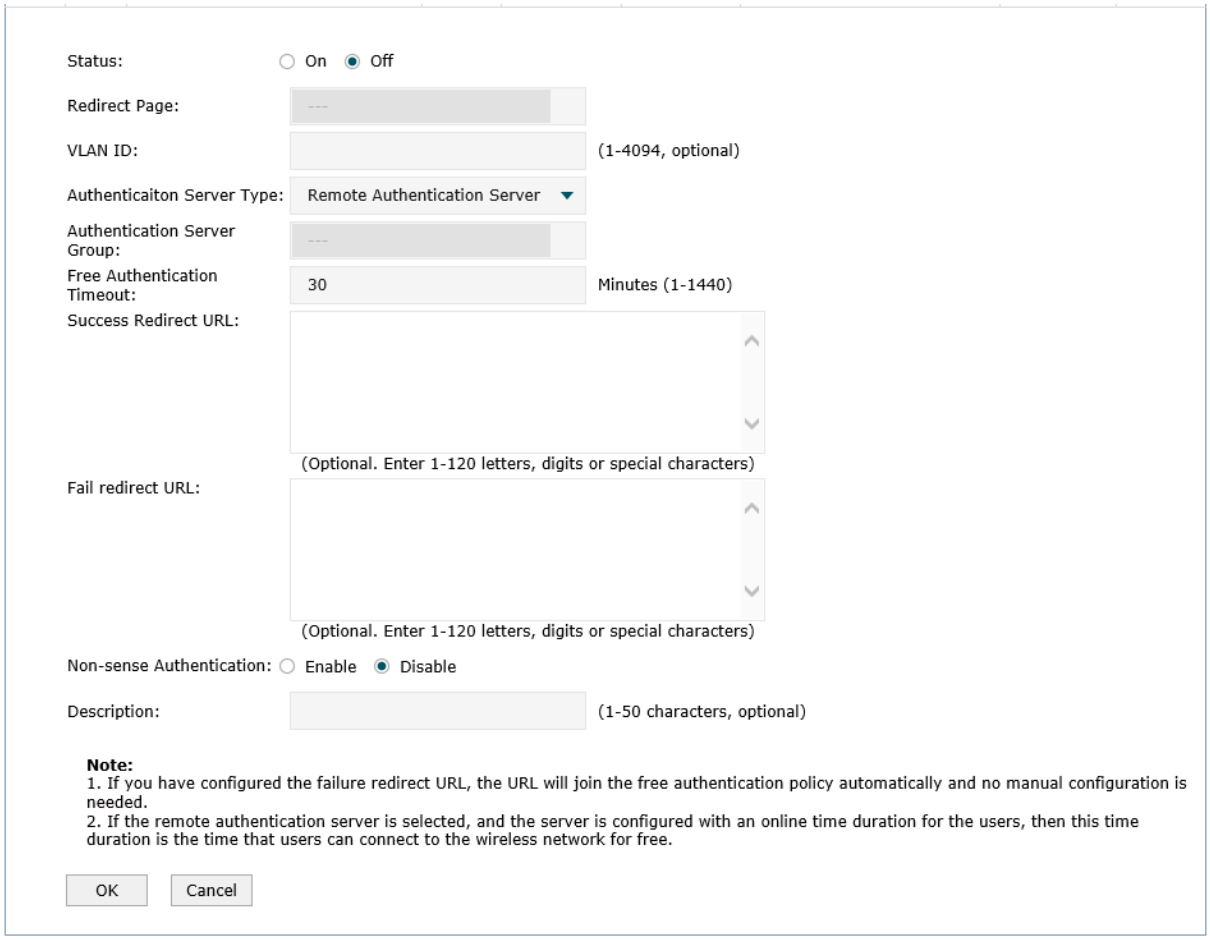


Status	Specify the status of the entry.
Redirect Page	Select the redirect page of the Web authentication.
VLAN ID	Specify the VLAN ID of the Web authentication.
Authenticaiton Server Type	Specify the server type of the Web authentication.
Success Redirect URL	Specify the redirect URL address after successful authentication
Fail redirect URL	Specify the redirect URL address after the authentication failure.
Non-sense Authentication	If non-sense authentication is enabled, the non-sense authenticated users will pass the authentication automatically when connecting to the wireless network.
Description	Specify a description for the Web authentication entry to make it easier to search for and manage.

Note:

When Local Authentication Server is selected, you need to add the login information of the allowed users. For detailed configuration, refer to *7.3 User Management*.

Figure 7-12 Remote Authentication Server Page



Status	Specify the status of the entry.
Redirect Page	Select the redirect page of the Web authentication.
VLAN ID	Specify the VLAN ID of the Web authentication.
Authenticaiton Server Type	Specify the server type of the Web authentication.
Authentication Server Group	Select the server group of the Web authentication.
Free Authentication Timeout	If the remote authentication server is selected, and the server is configured with an online time duration for the users, then this time duration is the length of time that users can connect to the wireless network for free.
Success Redirect URL	Specify the redirect URL address after successful authentication
Fail redirect URL	Specify the redirect URL address after the authentication failed.
Non-sense Authentication	If non-sense authentication is enabled, the non-sense authenticated users will pass the authentication automatically when connecting to the wireless network.

Description	Specify a description for the Web authentication entry to make it easier to search for and manage.

7.2.4 Onekey Online

In Onekey Online Authentication, users can access the network need without entering any parameters on the login page .

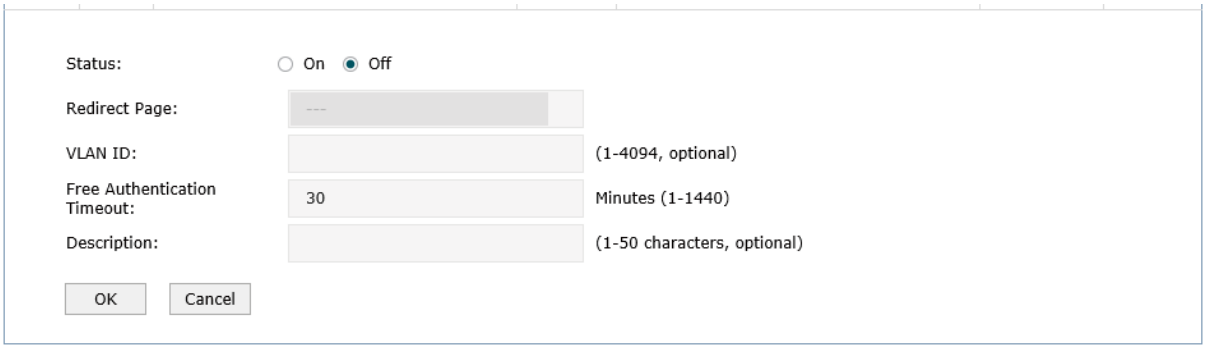
Choose the menu **Authentication > Portal Authentication > Onekey Online** to load the following page.

Figure 7-13 Onekey Online

Here you can view the Onekey Online Authentication information and edit the entries.

Click Add to add a new entry.

Figure 7-14 Add a New Onekey Online Entry

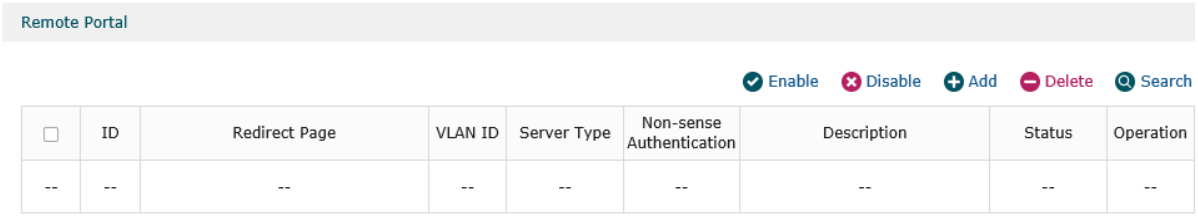


Status	Specify whether to turn on the Onekey Online authentication entry.
Redirect Page	Select the redirect page of Onekey Online authentication.
VLAN ID	Select the VLAN ID used to Onekey Online authentication.
Free Authentication Timeout	Select the free online time for users who have passed onekey online authentication.
Description	Specify a description for the onekey online authentication entry to make it easier to search for and manage.

7.2.5 Remote Portal

Choose the menu **Authentication > Portal Authentication > Remote Portal** to load the following page.

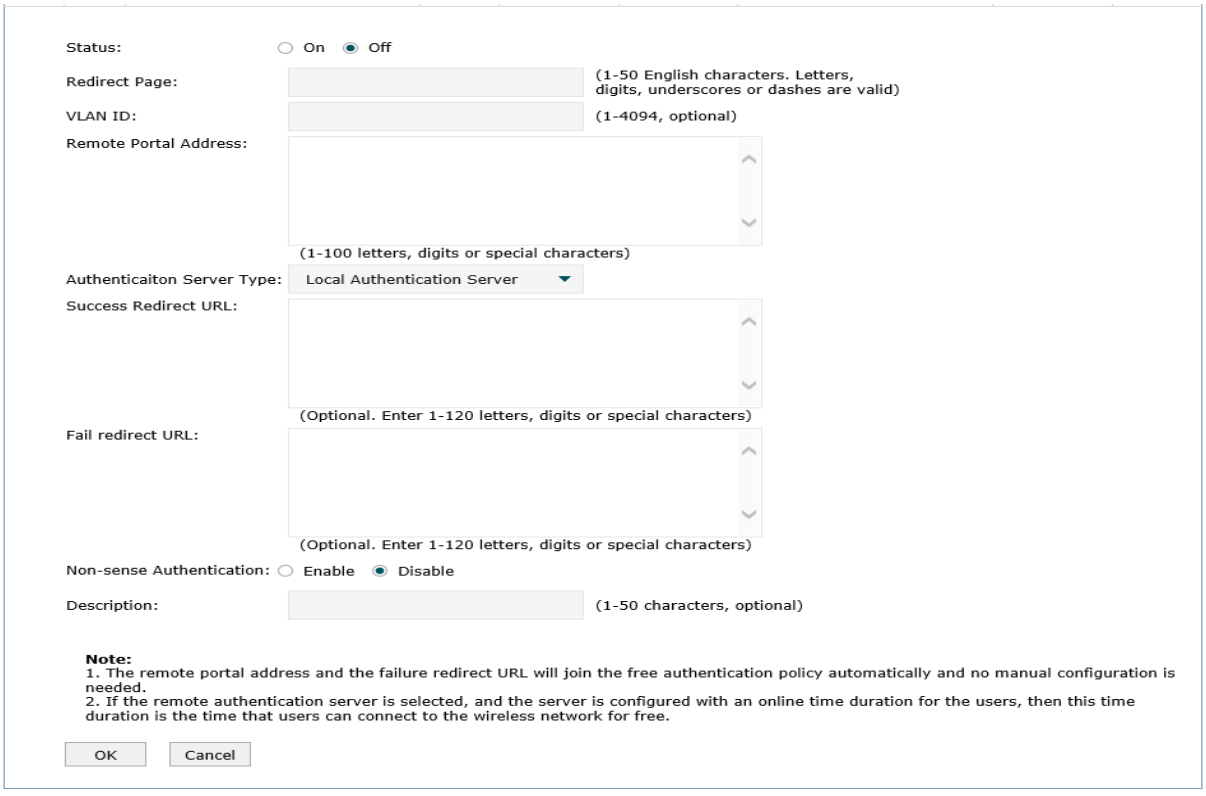
Figure 7-15 Remote Portal



Here you can view the Remote Portal Authentication information and edit the entries.

Click Add to add a new entry. There are two authentication server type: Local Authentication Server and Remote Authentication Server.

Figure 7-16 Local Authentication Server Page



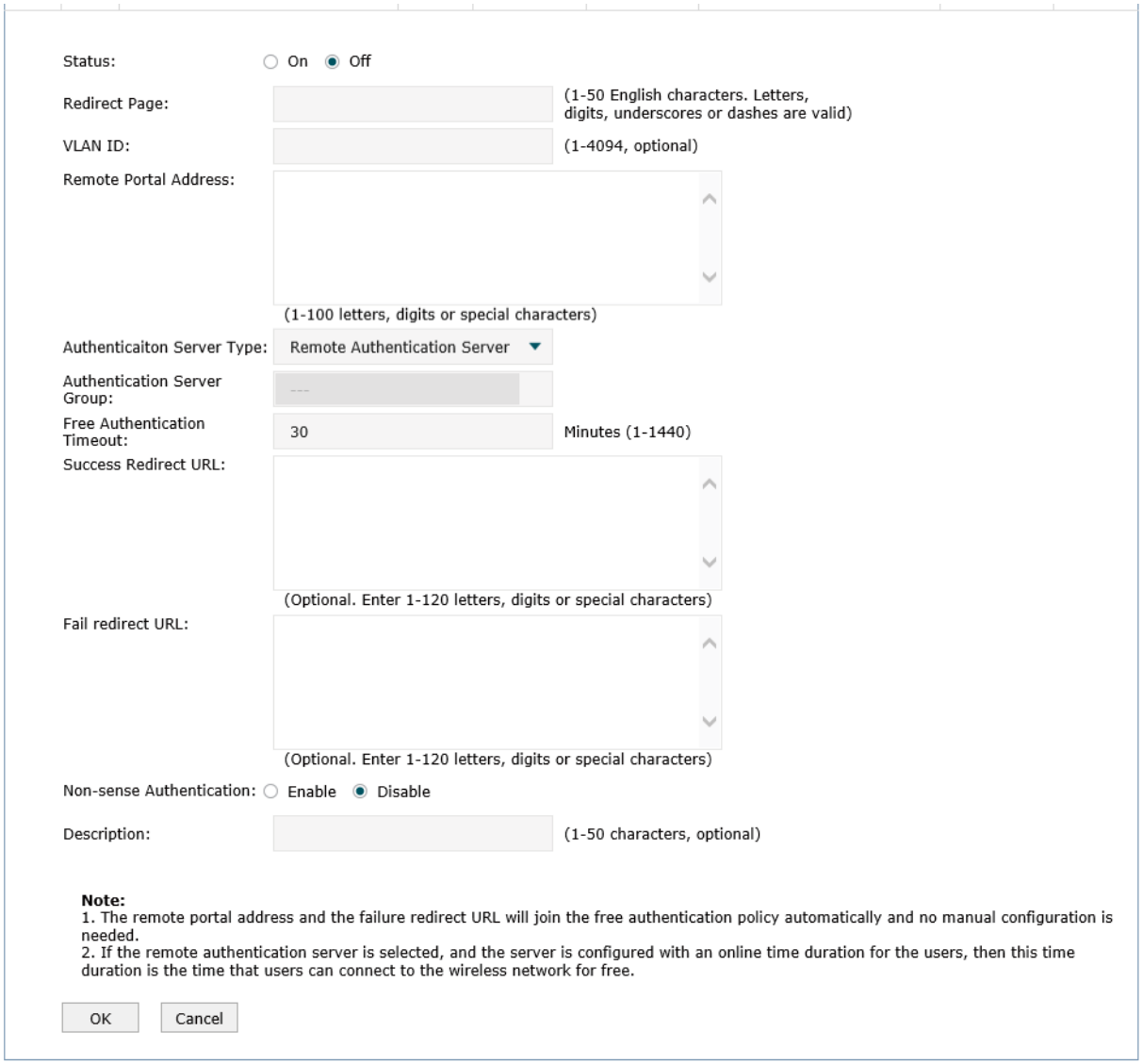
Status	Specify whether to turn on the remote portal authentication entry.
Redirect Page	Enter the redirect page name of the remote portal authentication.
VLAN ID	Select the VLAN ID used for remote portal authentication.
Remote Portal Address	Enter the address of the server used for remote portal authentication.
Authenticaiton Server Type	Select the server type used for remote portal authentication.

Success Redirect URL	Specify the redirect URL address after successful authentication.
Fail redirect URL	Specify the redirect URL address after the authentication failed.
Non-sense Authentication	If non-sense authentication is enabled, the non-sense authenticated users will pass the authentication automatically when connecting to the wireless network.
Description	Specify a description for the remote portal authentication entry to make it easier to search for and manage.

Note:

When Local Authentication Server is selected, you need to add the login information of the allowed users. For detailed configuration, refer to *7.3 User Management*.

Figure 7-17 Remote Authentication Server Page



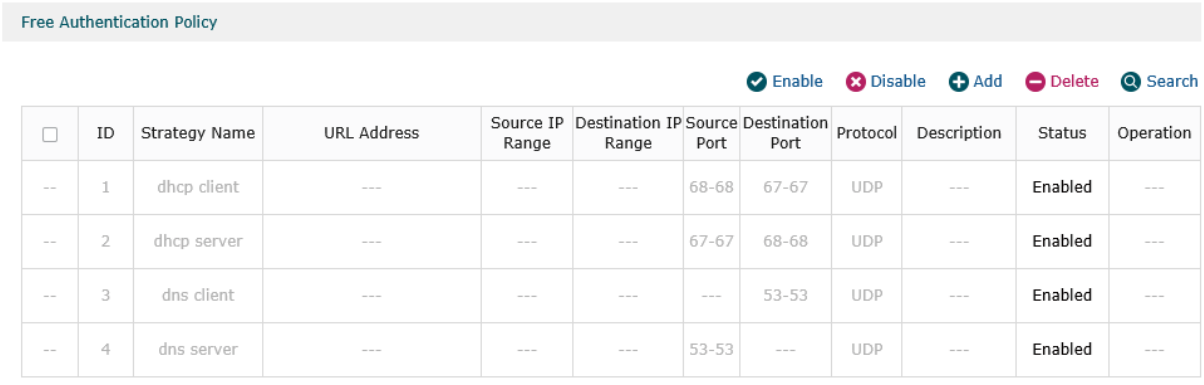
Status	Specify whether to turn on the remote portal authentication entry.
Redirect Page	Enter the redirect page name of the remote portal authentication.

VLAN ID	Select the VLAN ID used to remote portal authentication.
Remote Portal Address	Enter the address of the server used for remote portal authentication.
Authenticaiton Server Type	Select the server type used for remote portal authentication.
Authentication Server Group	Select the server group used for remote portal authentication.
Free Authentication Timeout	If the remote authentication server is selected, and the server is configured with an online time duration for the users, then this time duration is the length of time that users can connect to the wireless network for free.
Success Redirect URL	Specify the redirect URL address after successful authentication.
Fail redirect URL	Specify the redirect URL address after the authentication failed.
Non-sense Authentication	If non-sense authentication is enabled, the non-sense authenticated users will pass the authentication automatically when connecting to the wireless network.
Description	Specify a description for the remote portal authentication entry to make it easier to search for and manage.

7.2.6 Free Authentication Policy

Choose the menu **Authentication > Portal Authentication > Free Authentication Policy** to load the following page.

Figure 7-18 Free Authentication Policy



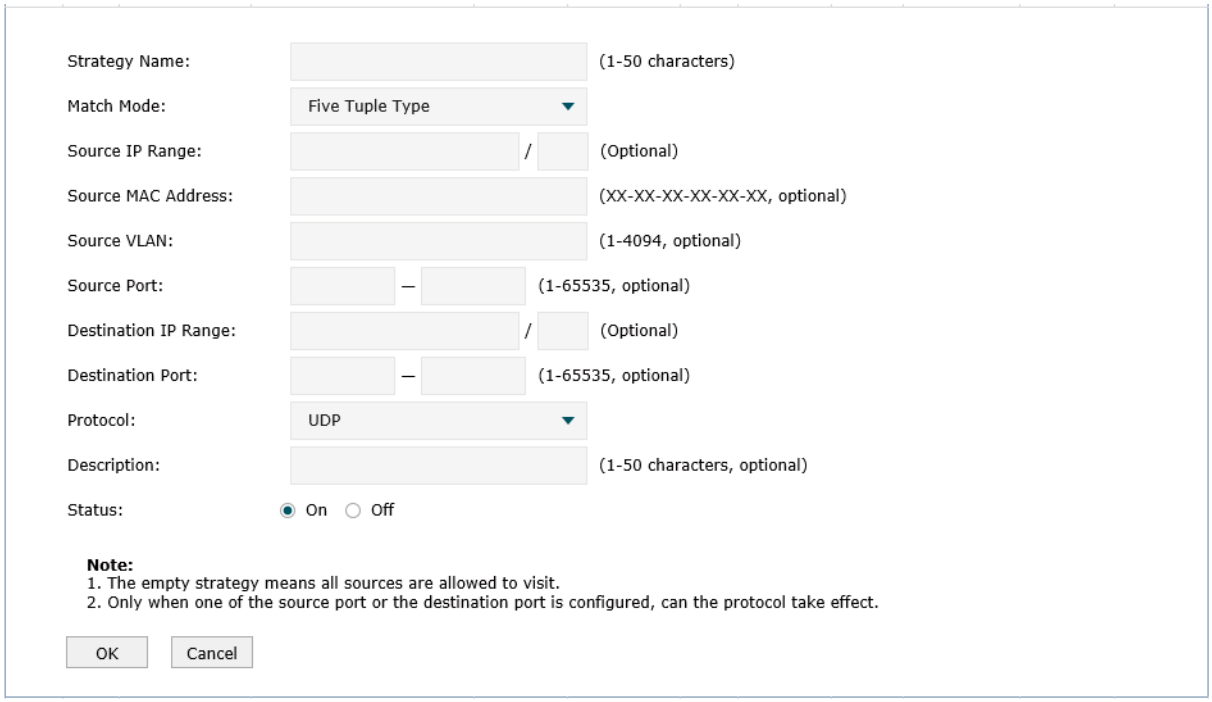
Free authentication policy is used to provide free resources for users before they pass the portal authentication. Here you can view the Free Authentication Policy information and edit the entries. Entry 1 to entry 4 are default free authentication policies and cannot be edited.

Click Add to add a new entry. There are two Match Modes, including Five Tuple Type and URL Type.

- **Five Tuple Type**

Five Tuple Type is configured based on the IP address range, MAC address, VLAN ID, port and protocol. It is recommended to select Five Tuple Type when there are many parameters to be configured in the free authentication policy.

Figure 7-19 Five Tuple Type



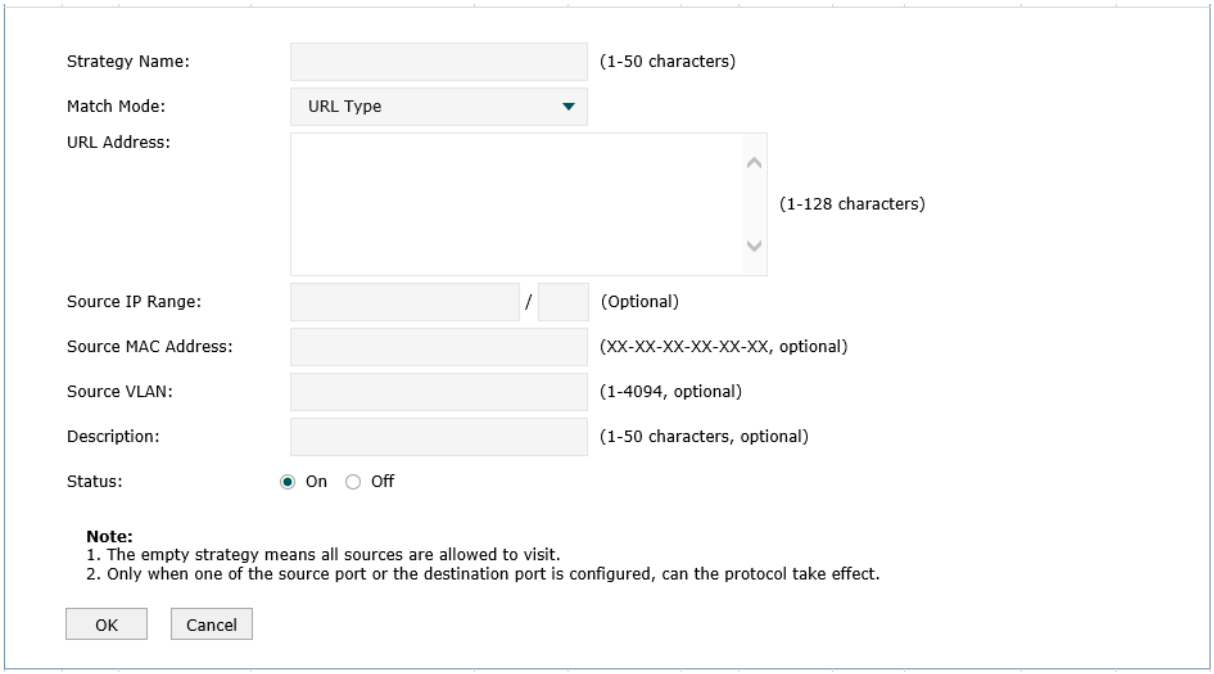
Strategy Name	Specify a name for the free authentication policy entry.
Match Mode	Specify a match mode for the free authentication policy.
Source IP Range	Specify the source IP address and subnet mask of the free authentication policy entry.
Source MAC Address	Specify the source MAC address of the free authentication policy entry.
Source VLAN	Specify the source VLAN ID of the free authentication policy entry.
Source Port	Specify the source port range of the free authentication policy entry.
Destination IP Range	Specify the destination IP address and subnet mask of the free authentication policy entry.
Destination Port	Specify the destination source MAC address of the free authentication policy entry.
Protocol	Specify the service protocol of the free authentication policy entry.

Description	Specify a description for the free authentication policy entry to make it easier to search for and manage.
Status	Specify whether to turn on the free authentication policy.

■ URL Type

URL Type is configured based on the URL address, IP address range, MAC address and VLAN ID. It is recommended to select URL Type when the URL address is already known.

Figure 7-20 URL Type



Strategy Name	Specify a name for the free authentication policy entry.
Match Mode	Specify a match mode for the free authentication policy.
URL Address	Specify the URL address for the URL type of free authentication policy.
Source IP Range	Specify the source IP address and subnet mask of the free authentication policy entry.
Source MAC Address	Specify the source MAC address of the free authentication policy entry.
Source VLAN	Specify the source VLAN ID of the free authentication policy entry.
Protocol	Specify the service protocol of the free authentication policy entry.
Description	Specify a description for the free authentication policy entry to make it easier to search for and manage.

Status	Specify whether to turn on the free authentication policy.

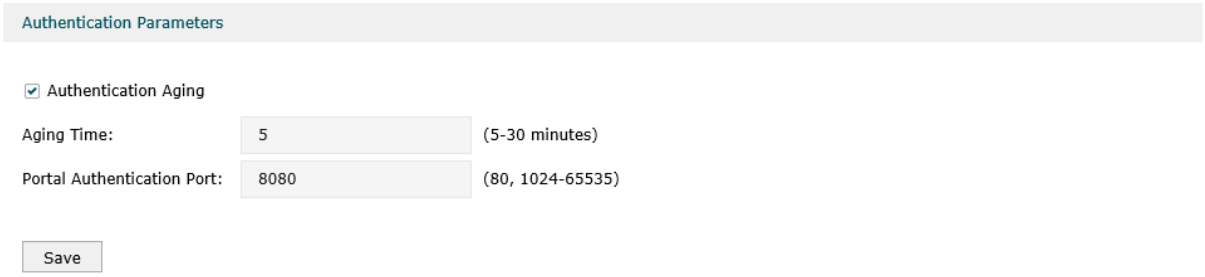
Note:

1. The empty strategy means all sources are allowed to visit.
2. Only when one of the source port or the destination port is configured, can the protocol take effect.

7.2.7 Authentication Config

Choose the menu **Authentication > Portal Authentication > Authentication Config** to load the following page.

Figure 7-21 Authentication Config



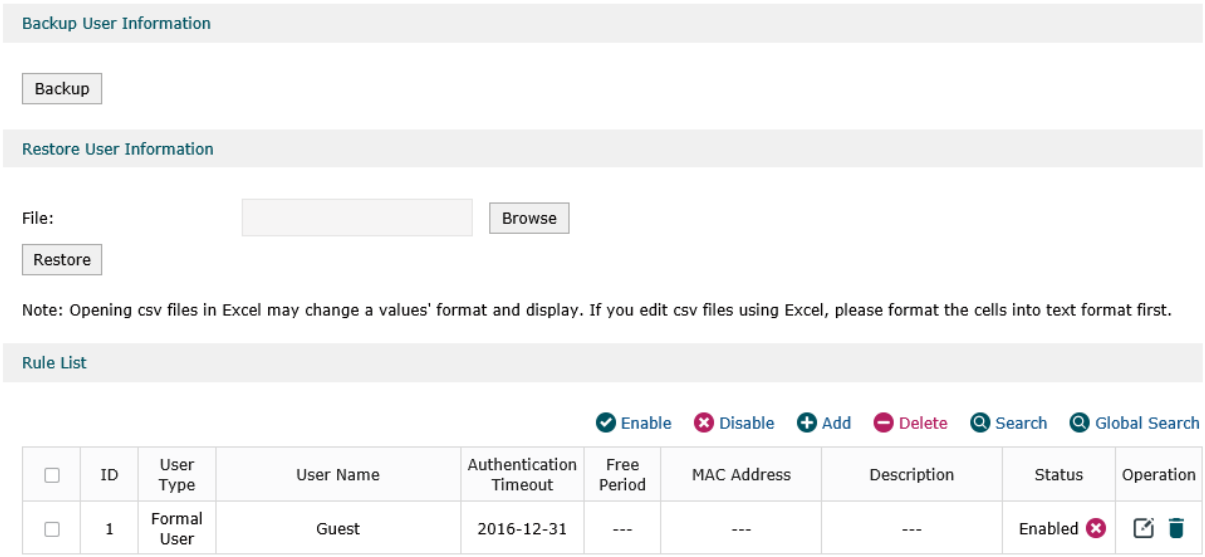
Here you can configure and view the global parameters for the authentication.

Authentication Aging	Specify whether to enbale authentication aging. If the authenticated users leave the wireless network within the aging time, they could reconnect to the AP without re-authentication. If the leave time is longer than the aging time, authentication is required again for users to connect to the AP.
Aging Time	Enter the aging time within which the users could reconnect to the AP without authentication.The default value is 5.
Portal Authentication Port	Specify the service port for portal authenticaiton. The default setting is 8080. It should not be the same as other occupied service ports.

7.3 User Management

Choose the menu **Authentication > User Management > User Management** to load the following page.

Figure 7-22 User Management



- **Backup User Information**

Click **Backup** to backup all the local users' information into a CSV file in ANSI coding format. This file can be restored to the user's list.

- **Restore User Information**

Add multiple local user entries at a time:

1 Save the local user entries as a CSV file with ANSI coding format in the device. You can use the **Backup User Information** function to obtain a CSV file to view the correct format.

2 Click **Browse** to select the file path, and then click **Restore** to restore the file.

Note:

Using Excel to open the CSV file may cause some numerical format changes, and the number may be displayed incorrectly. If you use Excel to edit the CSV file, please set the cell format as text.

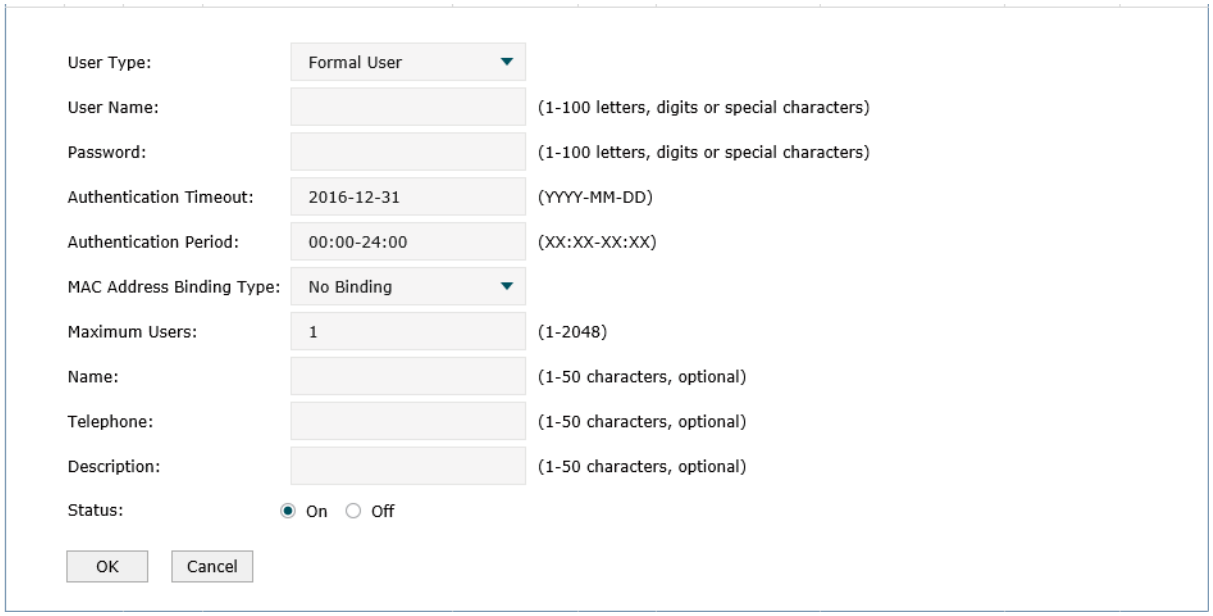
- **Rule List**

Here you can specify and view the local users. Click Add to add a new entry. There are two user types, including **Formal User** and **Free User**.

Formal User

You can provide formal users with continuous internet service. When the user's account expires, the account will be invalid.

Figure 7-23 Add a Formal User

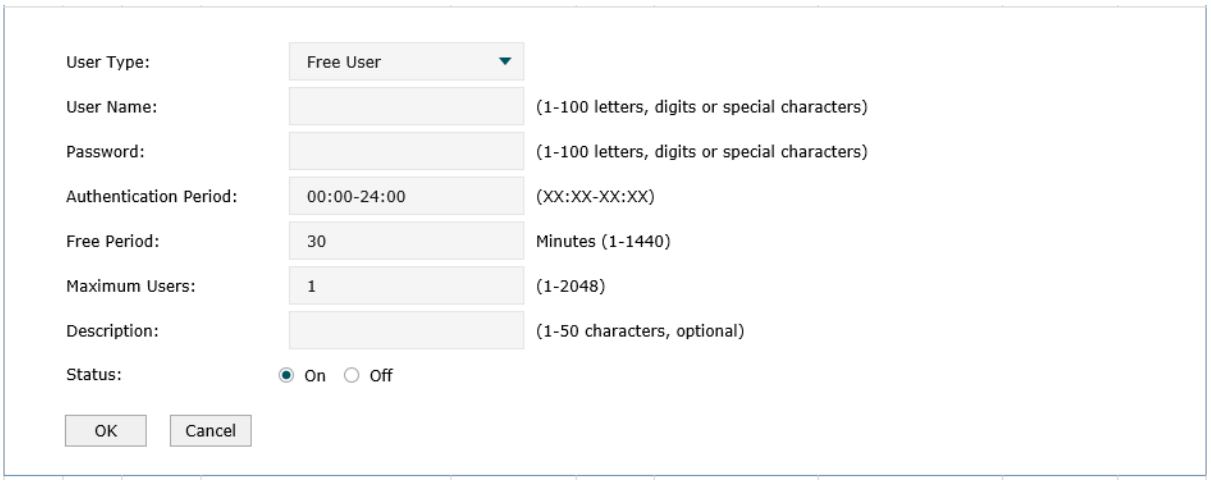


User Type	Specify the user type as formal user.
User Name	Specify the username. The username should not be the same as any existing one.
Password	Specify the password. Users will be required to enter the user name and password when they attempt to access the network.
Authentication Timeout	Specify the authentication timeout for formal users. After the timeout, the users need to log in at the web authentication page again to access the network.
Authentication Period	Specify the authentication period during which the users can log in to the web authentication page.
MAC Address Binding Type	There are three types of MAC binding: No binding, Static binding and dynamic binding. If dynamic binding is selected, the MAC address of the first user that passes the authentication will be bound. If static binding is selected, the MAC address of all users that pass the authentication will be bound.
Maximum Users	Specify the maximum number of users able to use this username and password to authencitate.
Name	Specify the user's name (optional).
Telephone	Specify the user's telephone number (optional).
Description	Enter a description for the user (optional).
Status	Specify whether to turn on authentication.

Free User

You can provide free users with internet service for a short time (in minutes). The account can be reused. When the time expires, the user can log in to the authentication page again and can be re-authenticated.

Figure 7-24 Add a Free User



User Type	Specify the user type as free user.
User Name	Specify the username. The username should not be the same as any existing one.
Password	Specify the password. Users will be required to enter the user name and password when they attempt to access the network.
Authentication Period	Specify the authentication period during which the users can log in to the web authentication page.
Free Period	Specify the free period for the users to be online.
Maximum Users	Specify the maximum number of users able to use this username and password to authencitate.
Description	Optional: Enter a description for the user.
Status	Specify whether to turn on authentication.

7.3.1 Authentication Server

AC supports external Radius server. When clients start the authentication process, the AC will forward user information to the external authentication server, and the server will authenticate the user.

- **Configure the Radius Server**

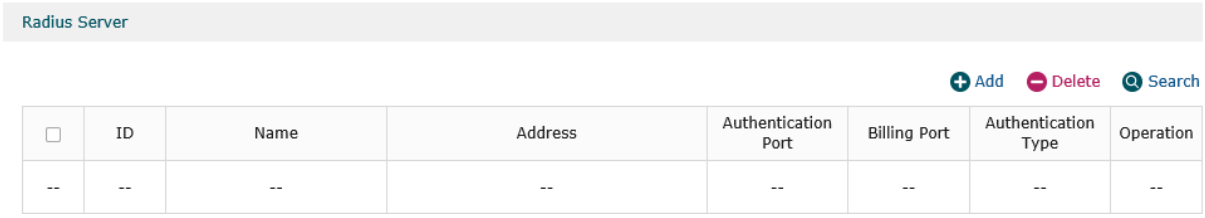
1 Configure the Radius Server. Choose the menu **Authentication > Authentication Server > Radius Server.**

2 Configure the Server group. Choose the menu **Authentication > Authentication Server > Authentication Server.**

Radius Server

Choose the menu **Authentication > Authentication Server > Radius Server** to load the following page.

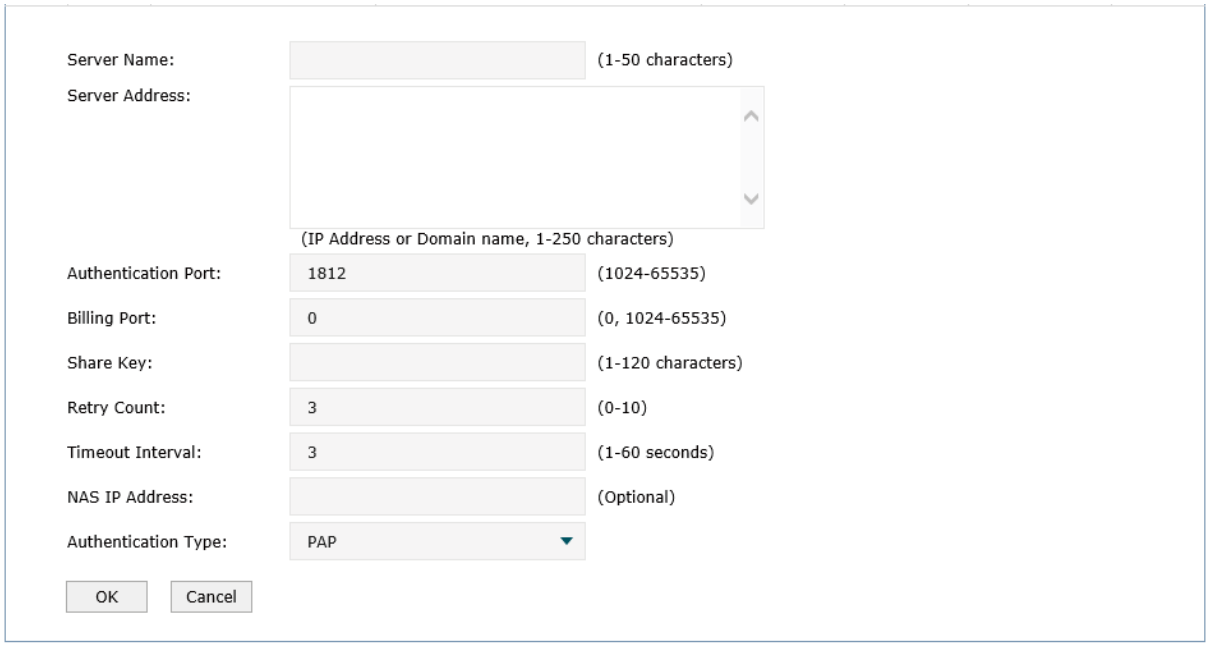
Figure 7-25 Radius Server



Here you can add, edit or delete an external radius server.

Click Add to add a new entry.

Figure 7-26 Add a Radius Serve



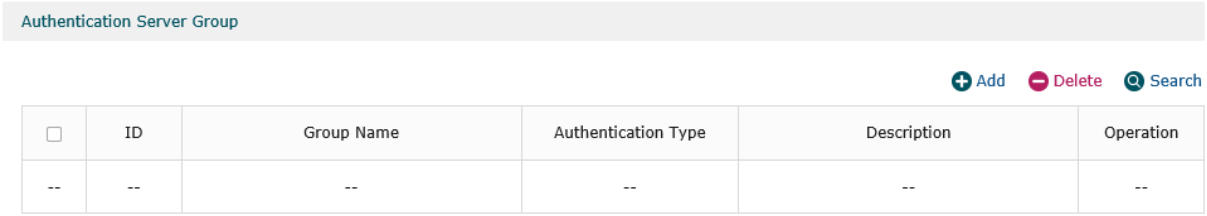
Server Name	Specify a name for the Radius server.
Server Address	Specify the address of the server. It should be an IPv4 address or a DNS domain.
Authentication Port	Specify a port for the server to monitor the authentication packets.
Billing Port	Specify a port for the server to monitor the billing packets. 0 means disable the billing function.
Share Key	Specify a shared key for the Radius server.

Retry Count	If no reply is received after the client sends a connect request, it will keep resending the request. Specify the number of times the client is allowed to resend the request.
Timeout Interval	Specify the timeout interval after the client sends a request packet.
NAS IP Address	Specify the NAS IP address for the authentication. Generally, it is the address by which the AC and Radius server communicate. This field can be left empty.
Authentication Type	The authentication type includes PAP, CHAP, MSCHAP and MSCHAPv2.

■ Authentication Server

Choose the menu **Authentication > Authentication Server > Authentication Server** to load the following page.

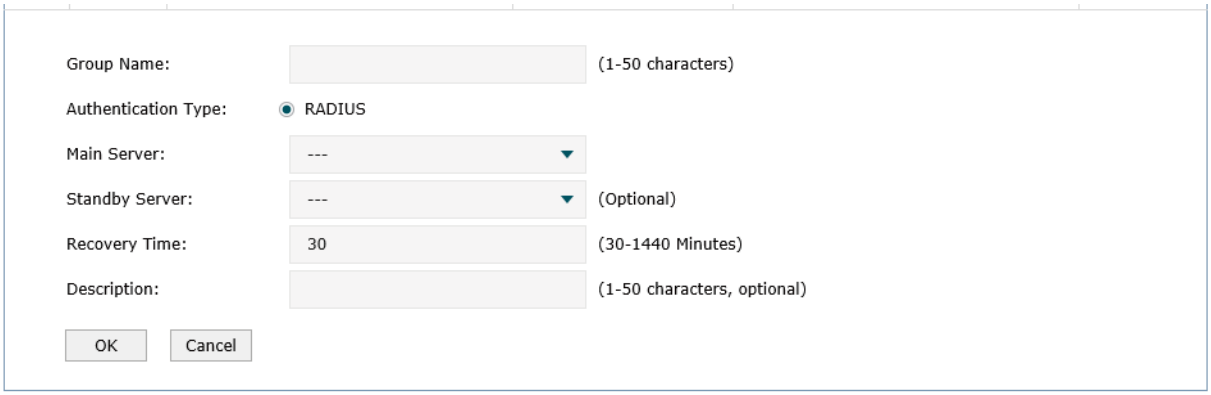
Figure 7-27 Server Group



Here you can view or edit the server group.

Click Add to add a new entry.

Figure 7-28 Add a Serve Group



Group Name	Specify a group name for the authentication server. The group name should not be the same as the existing one.
Authentication Type	Select the authentication server type. Only Radius server is supported so far.
Main Server	Select the main server for the group. The main server will have higher priority.
Standby Server	Select the standby server for the group. If the main server malfunctions, the standby server will come into use.
Recovery Time	Specify the time interval after the main server malfunctions for reconnection.
Description	Specify a description for the authentication server group.

7.4 Applications

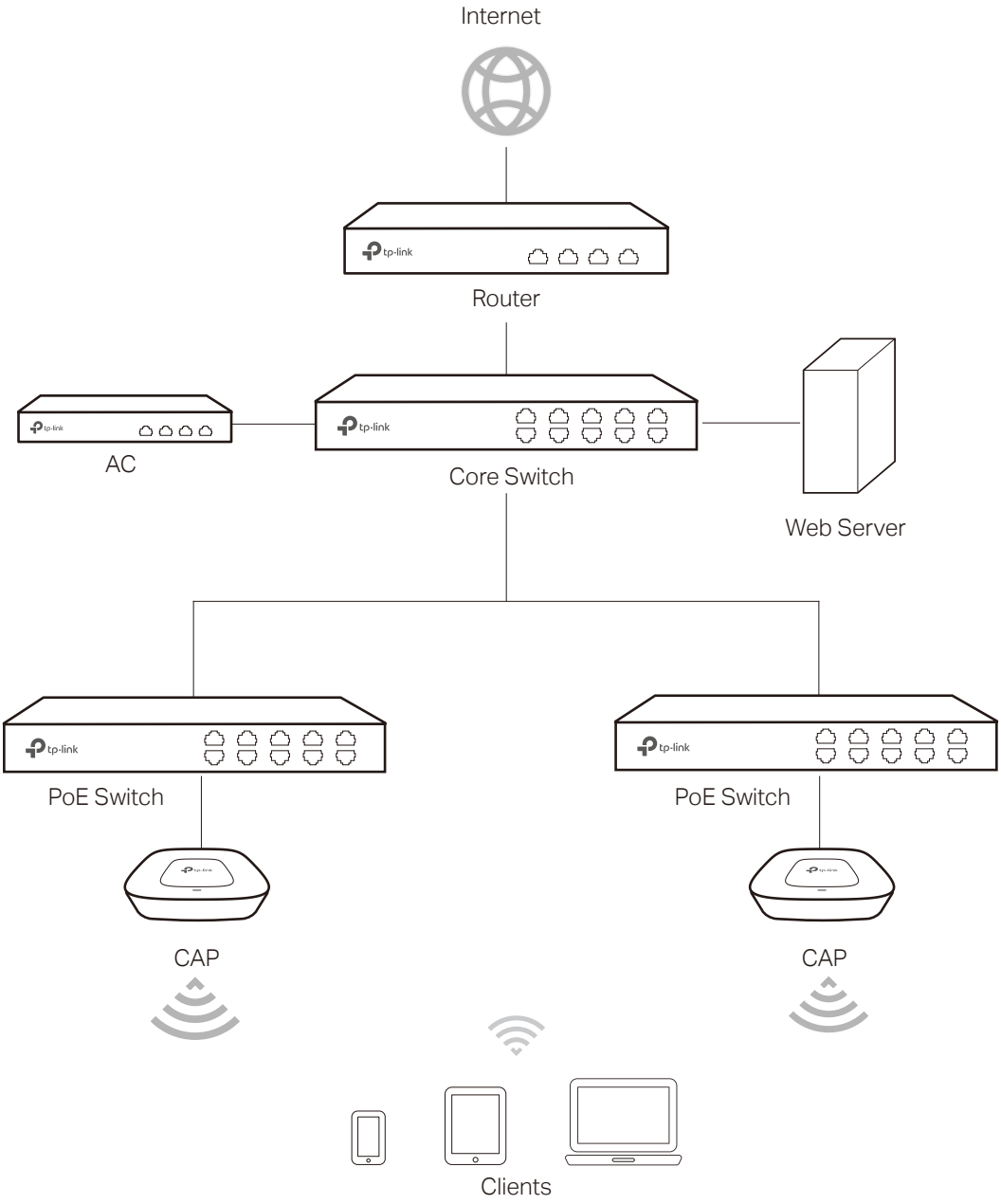
7.4.1 Application for Onekey Online

Network Requirements

A hotel wants to offer customers free internet access and push hotel advertisement through the Web authentication page. In this case, the hotel can use **Onekey Online** to meet the requirements.

- **Network Topology**

Figure 7-29 Network Topology

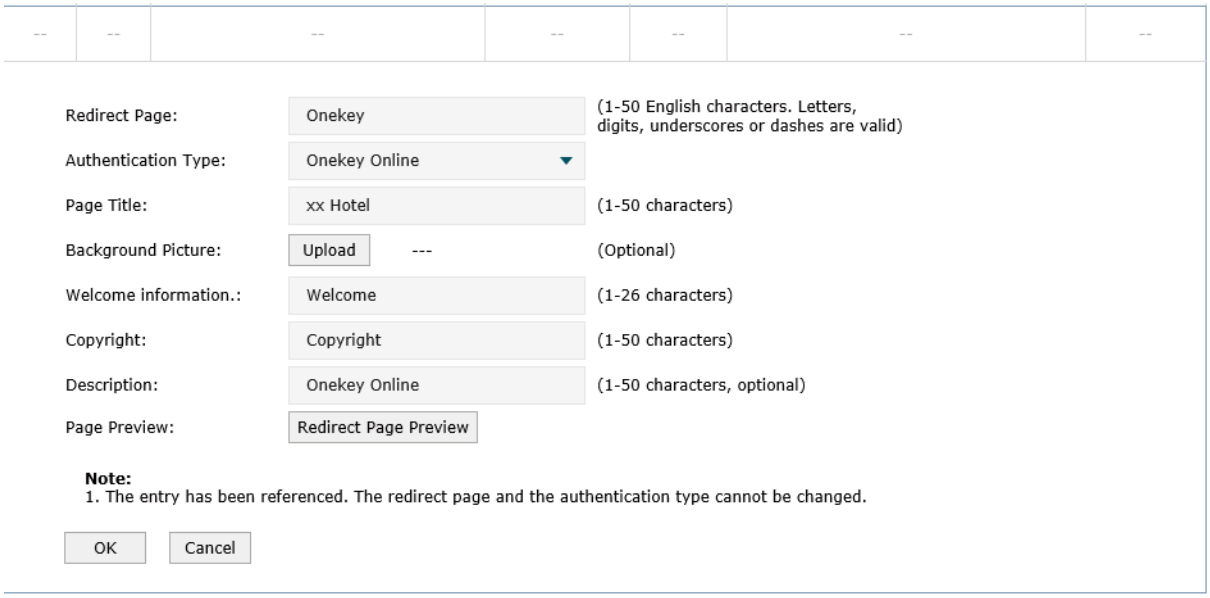


- **Configuration Steps**

1 Configure the redirect page.

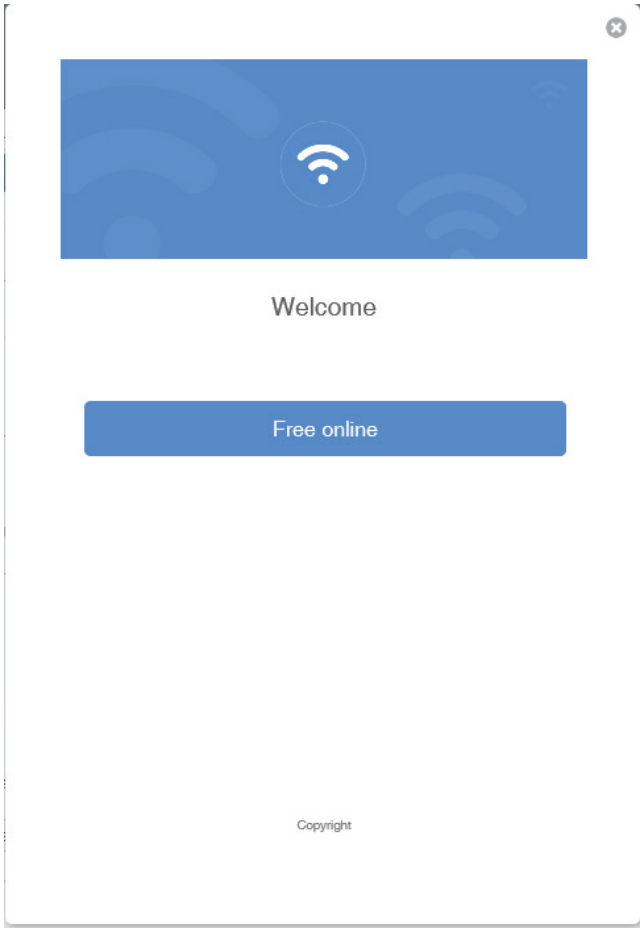
Choose the menu **Authentication > Portal Authentication > Redirect Page,** Click Add to add a new entry. Set the Authentication Type as **Onekey Online** and set the other related parameters. Here you can upload a promotional image of the hotel to the device.

Figure 7-30 Redirect Page Configurations



After all the parameters are configured, click **Redirect Page Preview** to preview the redirect page.

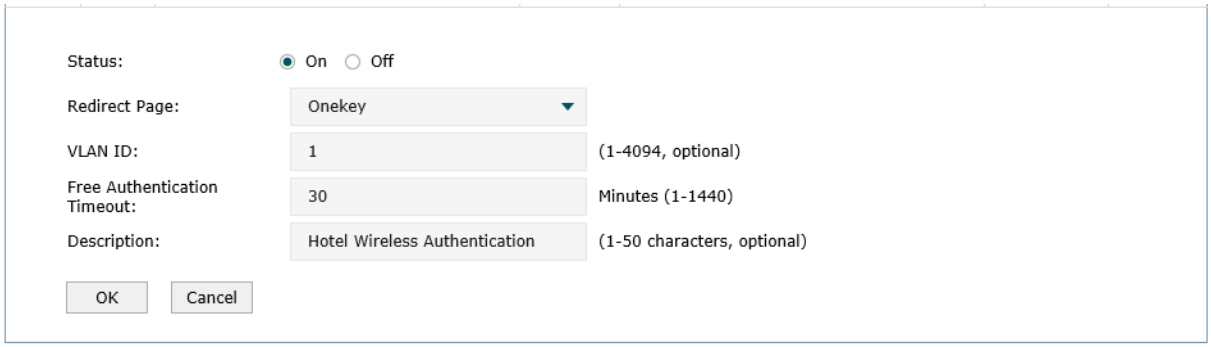
Figure 7-31 Redirect Page Preview



2 Configure Onekey Online

Choose the menu **Authentication > Portal Authentication > Onekey Online,** Click Add to add a new entry. Turn on the Onekey Online and set the related parameters.

Figure 7-32 Onekey Online Configurations



7.4.2 Application for Web Authentication

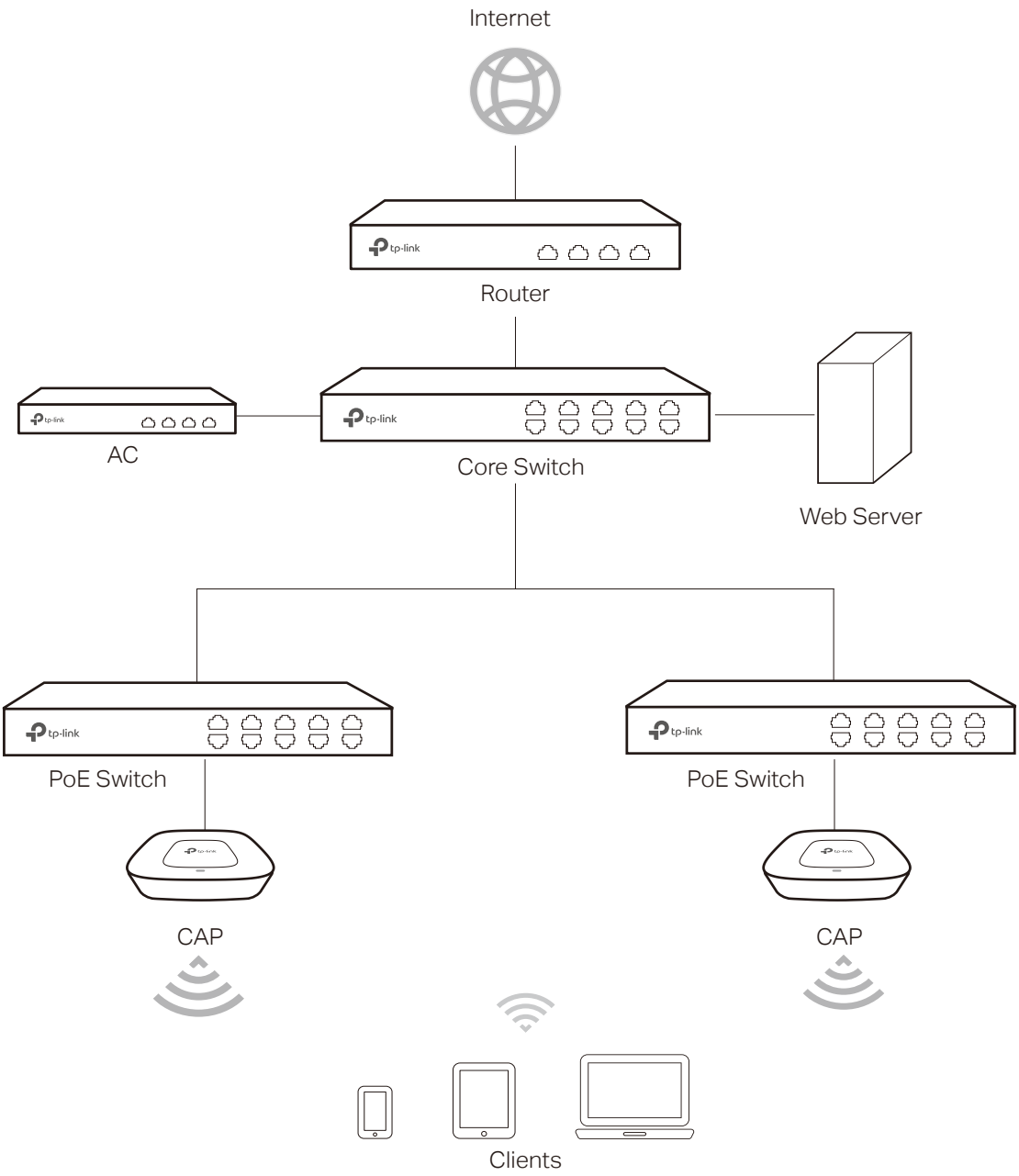
- **Network Requirements**

A hotel wants to offer customers Internet access and push hotel advertisement through the Web authentication page. The clients can access the network only after Web authentication.

In this case, the hotel can use the local authentication server to authenticate the clients.

- **Network Topology**

Figure 7-33 Network Topology



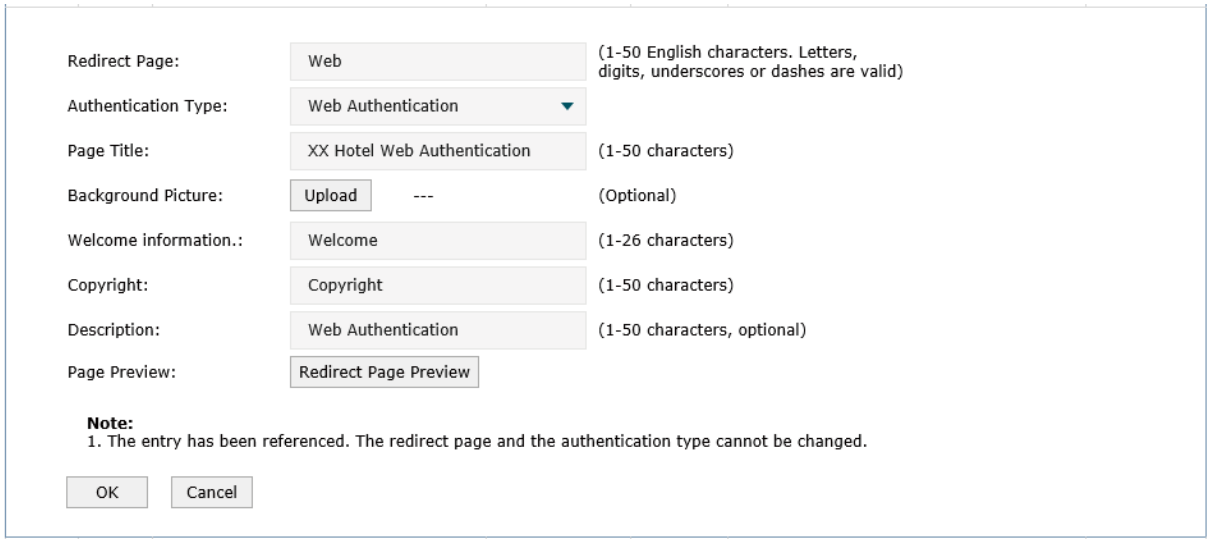
- **Configuration Steps**

1 Configure the redirect page.

Choose the menu **Authentication > Portal Authentication > Redirect Page,** Click Add to add a new entry.

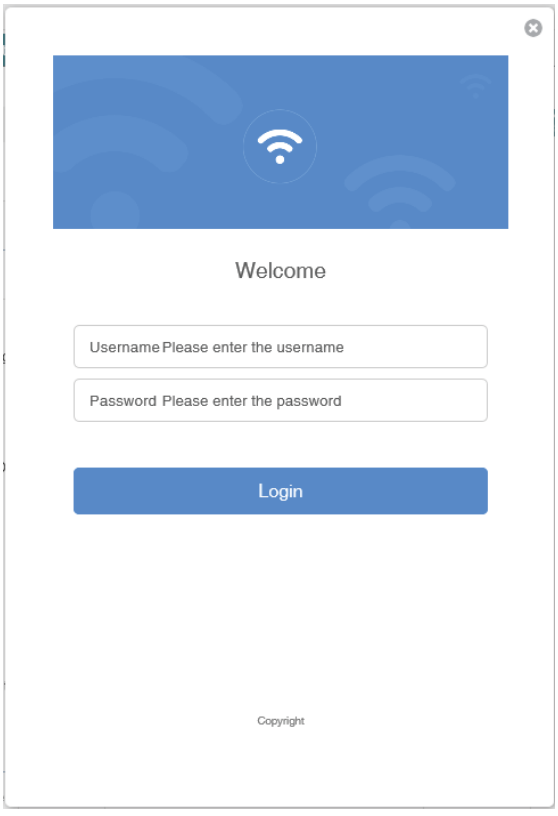
Set the Authentication Type as **Web Authentication** and set the related parameters. Here you can upload a promotional image of the hotel to the device.

Figure 7-34 Redirect Page Configurations



After all the parameters are configured, click **Redirect Page Preview** to preview the redirect page.

Figure 7-35 Redirect Page Preview

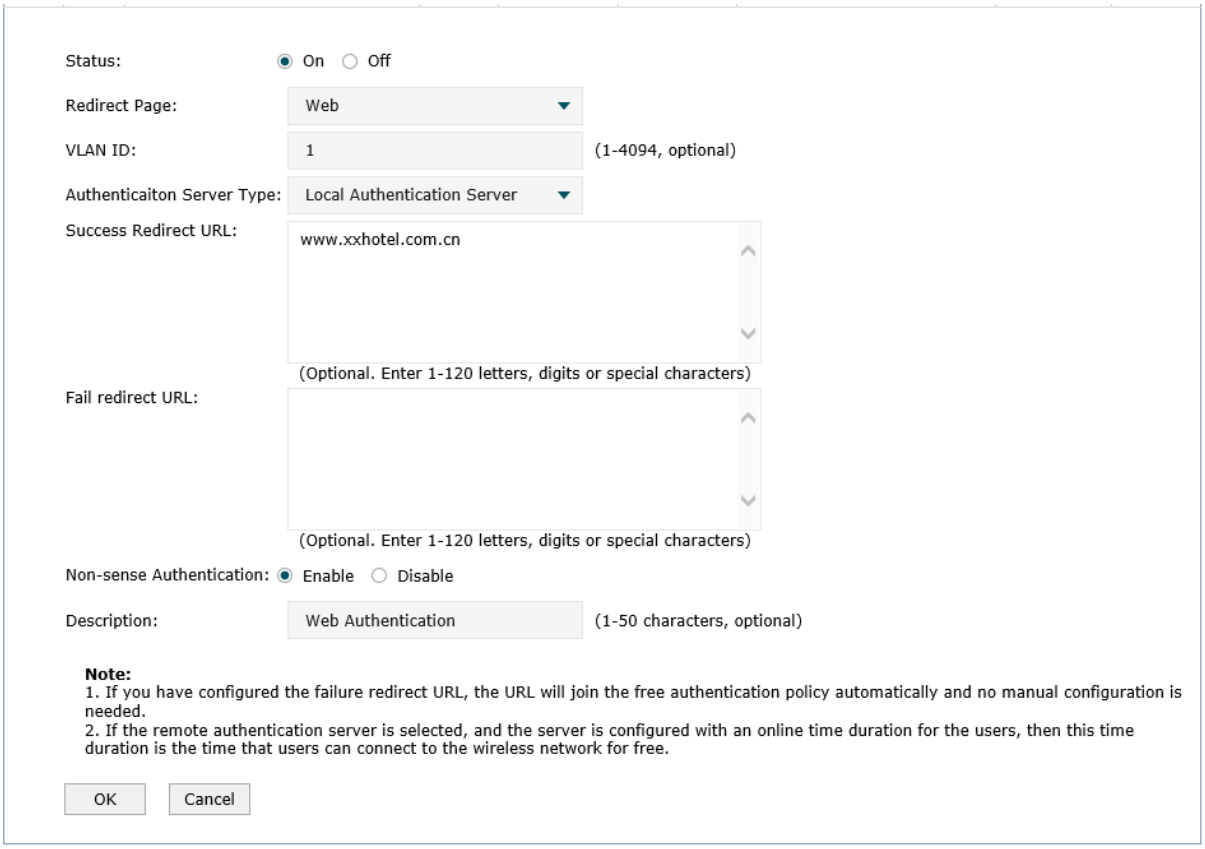


2 Configure the Web Authentication.

Choose the menu **Authentication > Portal Authentication > Web Authentication**, Click Add to add a new entry.

Enable **Web Authentication** and set the related parameters.

Figure 7-36 Web Authentication Configurations



3 Add Authentication Accounts

After Web Authentication configuration, we still need to add user accounts to the device.

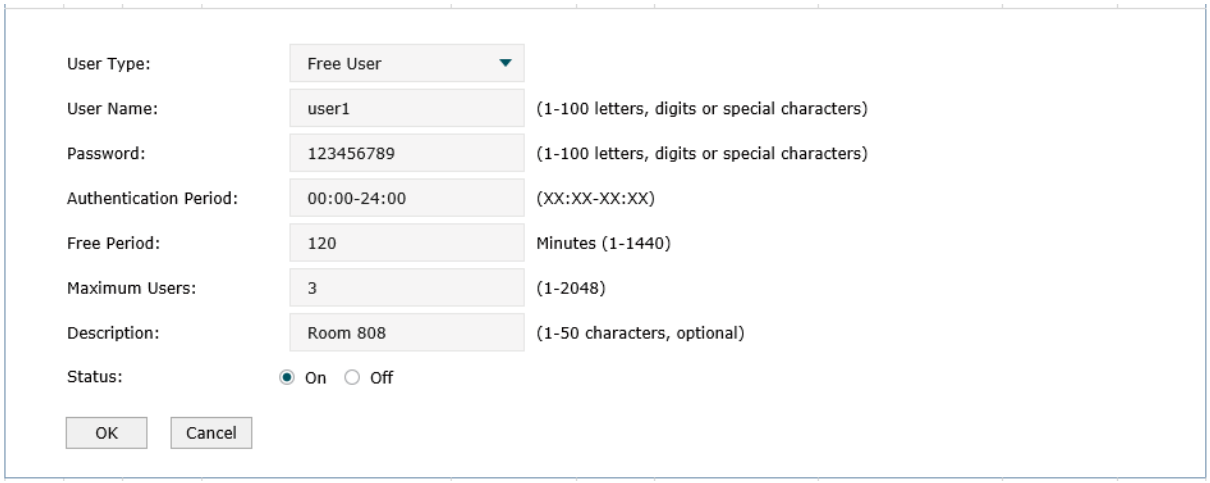
In this example, we create accounts to meet the following requirements:

- Each room is offered a free account, and up to three users are able to use this account to authenticate at the same time. The free time is two hours, and the user needs to restart the authentication after the time expires.
- For the VIPs, the hotel offers each of them a formal account. Formal accounts can access the network throughout their stay at the hotel.

Choose the menu **Authentication > User Management > User Management,** Click Add to add a new entry.

Here we take the free account configuration as an example. Set the related parameters as shown below.

Figure 7-37 Add a Free Account

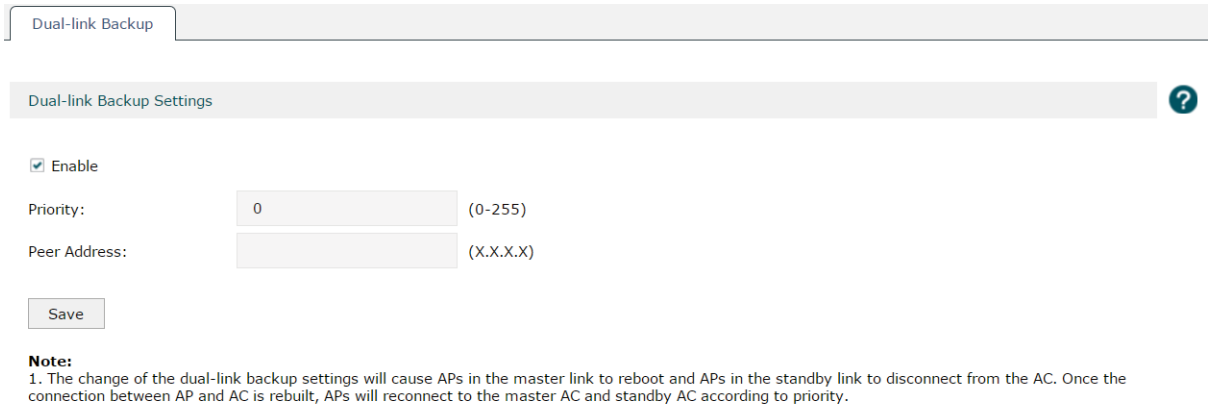


8 Link Backup

8.1 Dual-link Backup

Choose the menu **Link Backup > Dual-link Backup > Dual-link Backup** to load the following page. Check the option to enable the dual-link backup.

Figure 8-1 Dual-link Backup



Enble	Check this option to enable the dual-link backup function.
Priority	Specify the priority of the AC. The AC with a greater number represents a higher priority to be selected as the master link. The modification of priority will result in the reconnection of all CAPs in the master link.
Peer Address	Specify the address of the peer AC as the standby link. The CAP will get the peer address when obtaining the IP address from the DHCP server. You should enable the DHCP service on the AC.

Click **Save** to complete the configuration.

Note:

1. If the priority and peer address are changed, the CAPs in the standby link should be rebooted to make the settings take effect. To keep the settings of the master link and standby link consistent, please reboot all the CAPs in the standby link after the modification of the settings.
2. ACs used in the dual-link backup should be the same models.
3. With the dual-link backup enabled, please ensure the settings of the master AC and standby AC are consistent.
4. When the CAPs switch to the standby link from the master link, the authenticated wireless clients will expire and be required to re-authenticate.

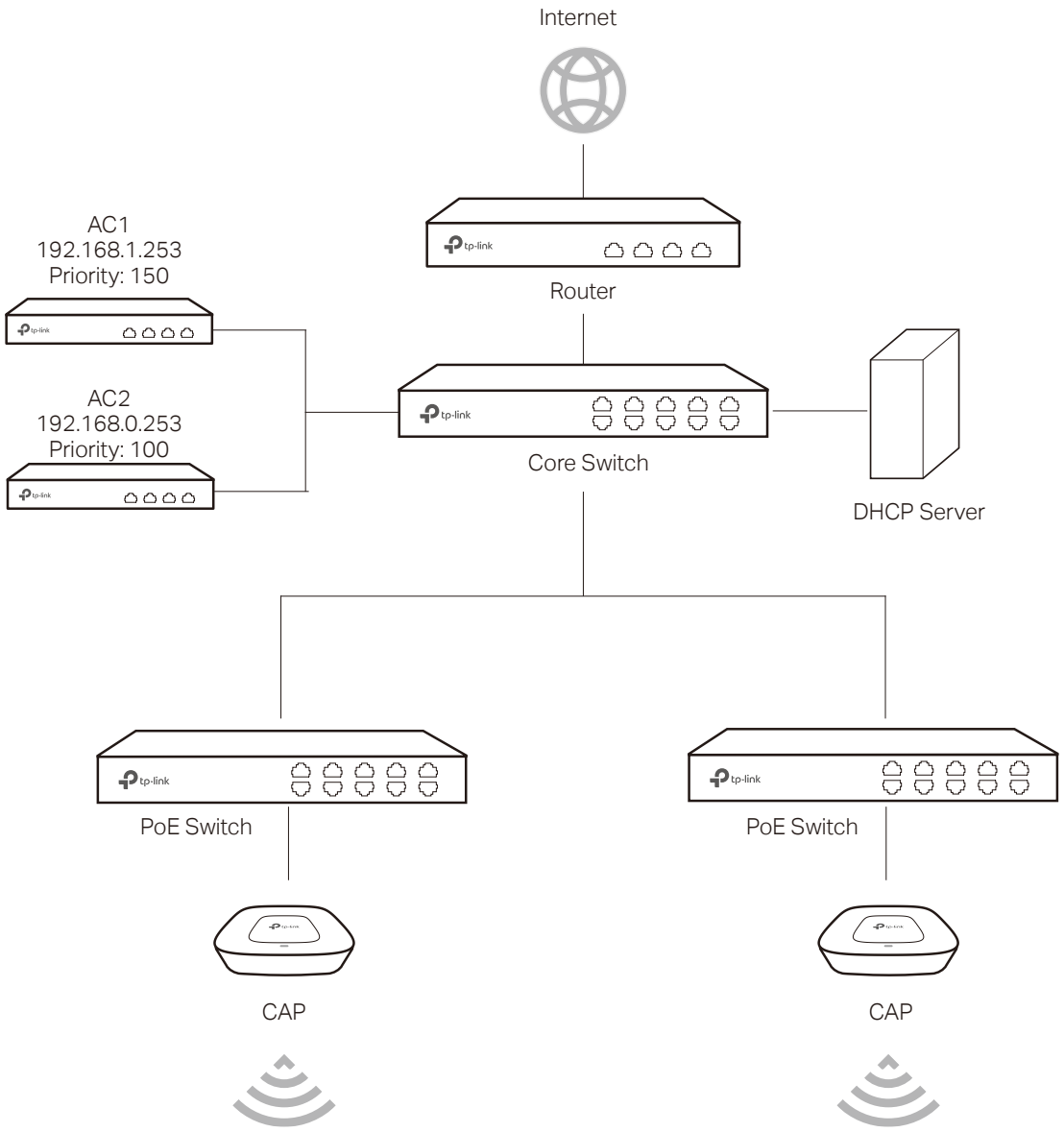
8.2 Application

- **Scenario**

The dual-link backup and the standby AC are applied in the scenario that two ACs are used to manage wireless networks together.

- **Topology**

Figure 8-2 Topology



- **Configuration**

1 Configure the external DHCP server.

The external DHCP should support the configuration of the option field. Refer to the corresponding guide for details of the option settings.

When an AP obtains an IP address from the DHCP server, it also needs the DHCP server to deliver the IP addresses of the two ACs in the network. You should configure the following parameters in the DHCP server:

Enter **TP-LINK** at the DHCP Option 60 field.

Enter the IP addresses of the two ACs into DHCP Option 138 filed, therefore, the CAPs in the network can find the two ACs.

Note:

1. Before configuring the external DHCP server, please disable the DHCP function of the AC to avoid CAPs obtaining IP addresses abnormally.
2. Please enable DHCP Relay function on the core switch to ensure that the DHCP packets can be transmitted.

2 Configure the priority

There are several ACs in the network and they can manage all the CAPs normally. If you want CAPs to be managed by a specified AC, set a higher priority for it. When a new CAP requests to connect to an AC, the AC with higher priority will be connected first. The higher value means higher priority.

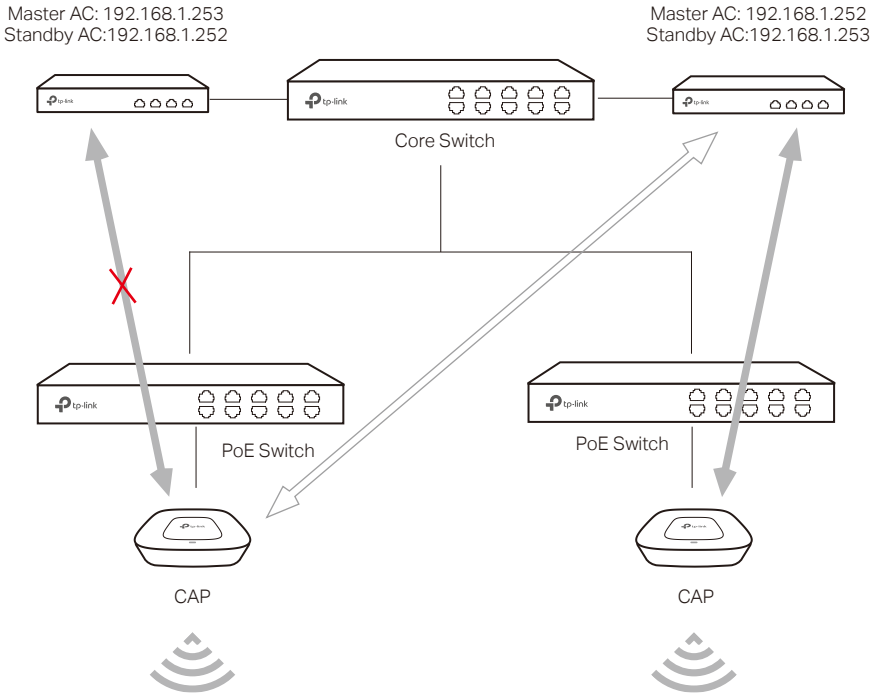
In the above topology, the priority of AC1 is 150 and AC2 is 100. Therefore the AC becomes the master controller of the CAPs and all CAPs will connect to AC1 first. AC2 is the standby controller.

3 Configure the standby AC

The standby AC comes into use when the master AC breaks down and cannot work normally. In this situation, the CAPs will automatically accept the management of the standby AC.

If you want CAPs to connect to another AC when the master AC malfunctions, please enter the IP address of the standby AC into the peer address field. Therefore, the master AC will deliver the IP address of the standby AC to CAPs when assigning IP addresses. CAPs will be associated with master AC and standby AC at the same time. When the master AC breaks down, the standby AC becomes the master AC.

Figure 8-3 Working Process



Note:

Standby AC should be configured along with the link priority. The AC with higher priority becomes the master AC and the lower one is the standby AC.

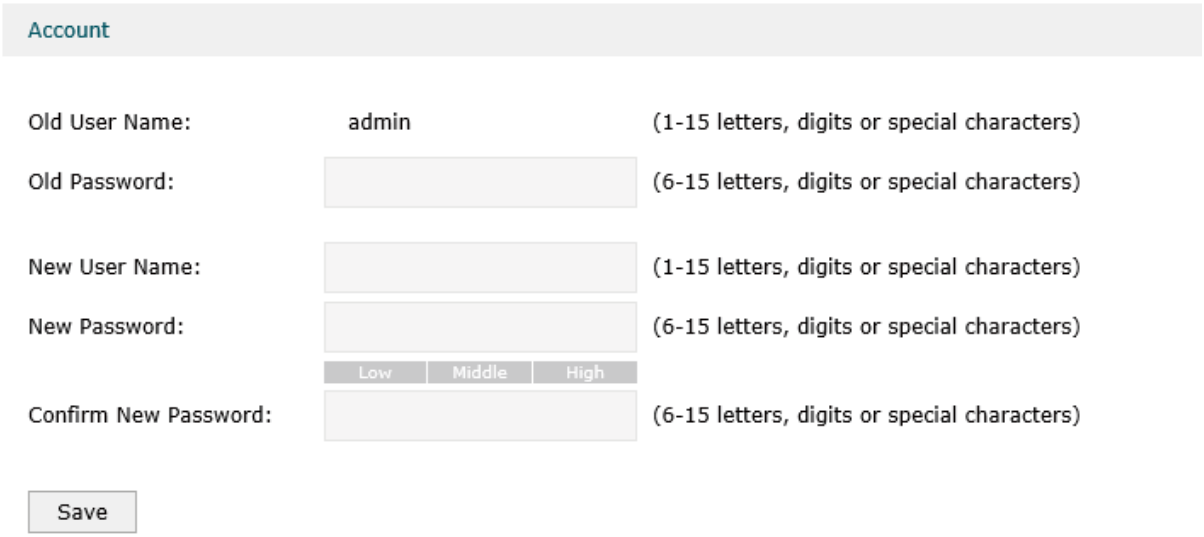
9 System Tools

9.1 Account

9.1.1 Account

Choose the menu **System Tools > Account > Account** to load the following page.

Figure 9-1 Account



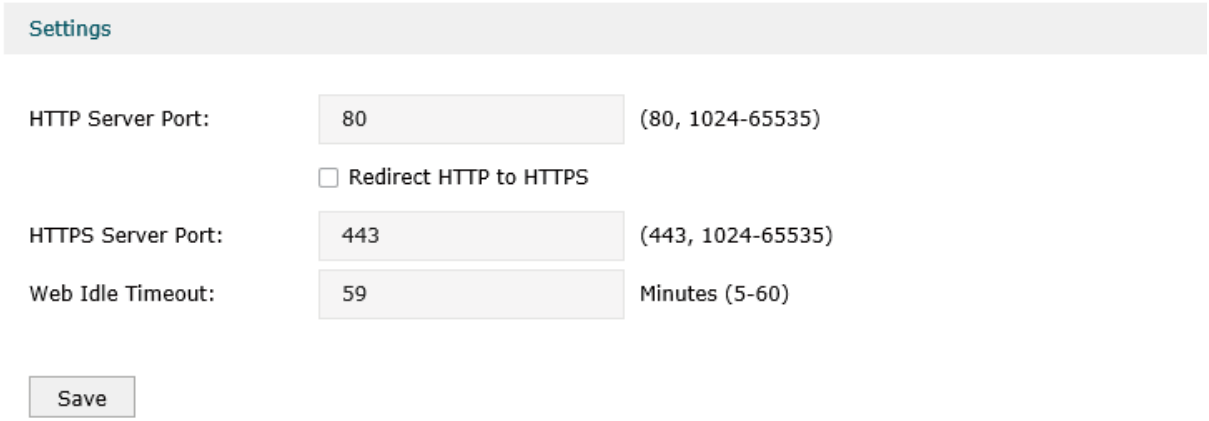
Here you can change the login user name and password.

Old User Name	Enter the current user name.
Old Password	Enter the current password.
New User Name	Enter a new username. Letters, digits and special characters are allowed.
New Password	Enter a new password. Please enter a strong password to secure your device and network.
Confirm New Password	Enter the new password again for confirmation.
Strength	Low, Middle and High indicate the password strength. Tip: Use a combination of letters, digits and symbols to create a strong password.

9.1.2 System Settings

Choose the menu **System Tools > Account > Systems** to load the following page.

Figure 9-2 System Settings



Here you can specify the service port and session timeout.

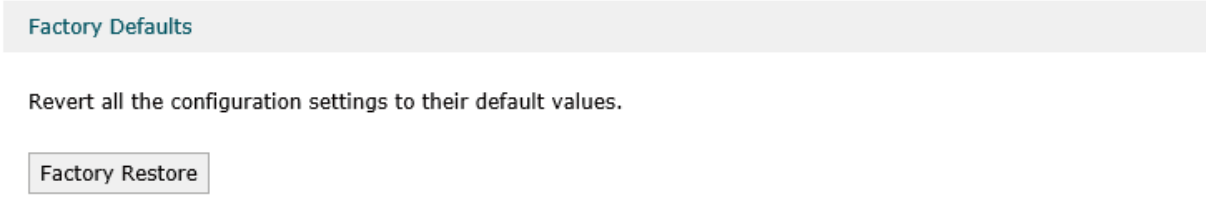
HTTP Server Port	Specify the web server port. Port 80 is the default. The port should not be the the same as other service ports.
Redirect HTTP to HTTPS	With redirect HTTP to HTTPS enabled, the http website will be redirected to https website automatically.
HTTPS Server Port	Specify the secure web server port. Port 443 is the default. The port should not be the same as other service ports.
Web Idle Timeout	If the device does not perform any tasks in the specified time interval, the system will log out automatically to secure the device and network. The default setting is 6 minutes.

9.2 Administration

9.2.1 Factory Default Restore

Choose the menu **System Tools > Administration > Factory Default Restore** to load the following page.

Figure 9-3 Factory Default Restore



Click **Factory Restore** to restore your device to its factory default settings.

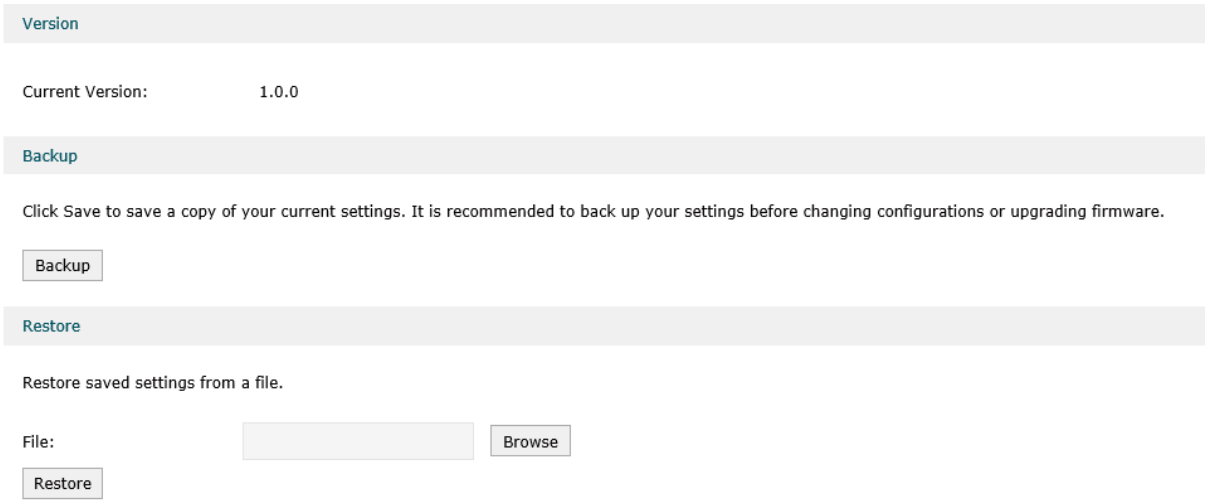
Factory Restore will clear all the configurations. It is highly recommended to back up your current configurations in case a recovery is needed to restore the system to a previous state or from the factory defaults.

The device will reboot after the factory restore is complete.

9.2.2 Backup & Restore

Choose the menu **System Tools > Administration > Backup & Restore** to load the following page.

Figure 9-4 Backup & Restore



- **Version**

View the current version.

- **Backup**

Click **Backup** to save a copy of your current settings. Please save your copy in a secure file location. It is recommended to back up the settings before you change the configurations and upgrade the firmware.

- **Restore**

Click **Browse** to locate and select the backup file, then click **Restore** to import the file to recover the configurations.

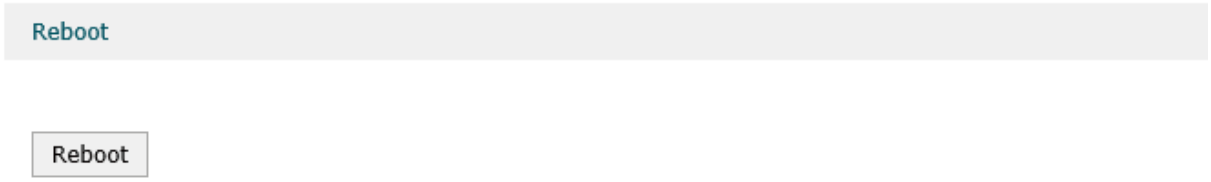
Note:

1. Please keep the power supply stable and avoid power off during the backup and import process.
2. If the version of the imported configuration file differs a lot from the current version of the controller, the configuration information may be lost.

9.2.3 Reboot

Choose the menu **System Tools > Administration > Reboot** to load the following page.

Figure 9-5 Reboot



Click **Reboot** to reboot your device. Some settings will be applied only after the device has rebooted.

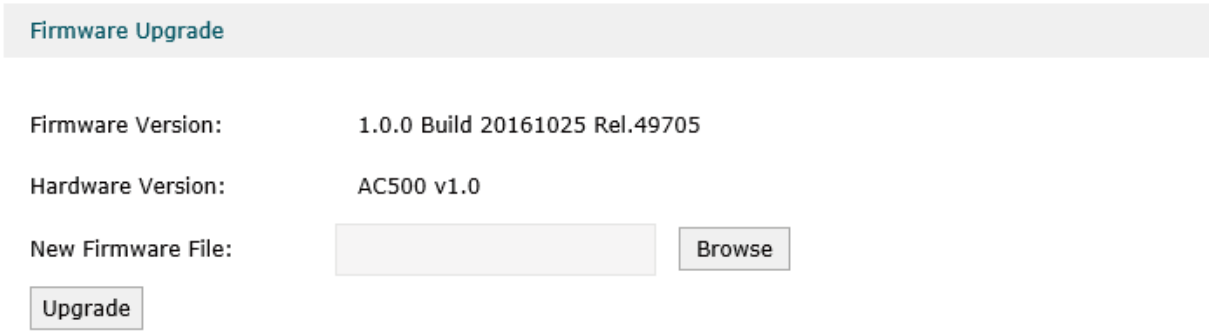
Note:

DO NOT power off your device while it is rebooting.

9.2.4 Firmware Upgrade

Choose the menu **System Tools > Administration > Firmware Upgrade** to load the following page.

Figure 9-6 Reboot



Here you can upgrade your firmware. Please back up your configurations before upgrading.

Click **Browse** to locate the firmware file, then click **Upgrade** to upgrade your firmware.

For the latest firmware version, please go to *www.tp-link.com*

Firmware Version	Displays the current firmware version.
Hardware Version	Displays the current hardware version.

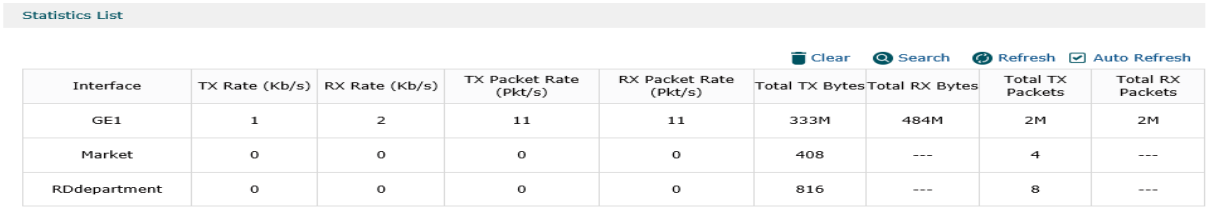
Note:

1. DO NOT power off your device or refresh the page during the upgrade. The device will reboot after the upgrade is complete.
2. The configurations may be lost after upgrading. Please back up your configurations before upgrading.

9.3 Traffic Statistics

Choose the menu **System Tools > Traffic Statistics > Interface Statistics** to load the following page.

Figure 9-7 Interface Statice


Statistics List

Clear Search Refresh Auto Refresh

Interface	TX Rate (Kb/s)	RX Rate (Kb/s)	TX Packet Rate (Pkt/s)	RX Packet Rate (Pkt/s)	Total TX Bytes	Total RX Bytes	Total TX Packets	Total RX Packets
GE1	1	2	11	11	333M	484M	2M	2M
Market	0	0	0	0	408	---	4	---
RDdepartment	0	0	0	0	816	---	8	---

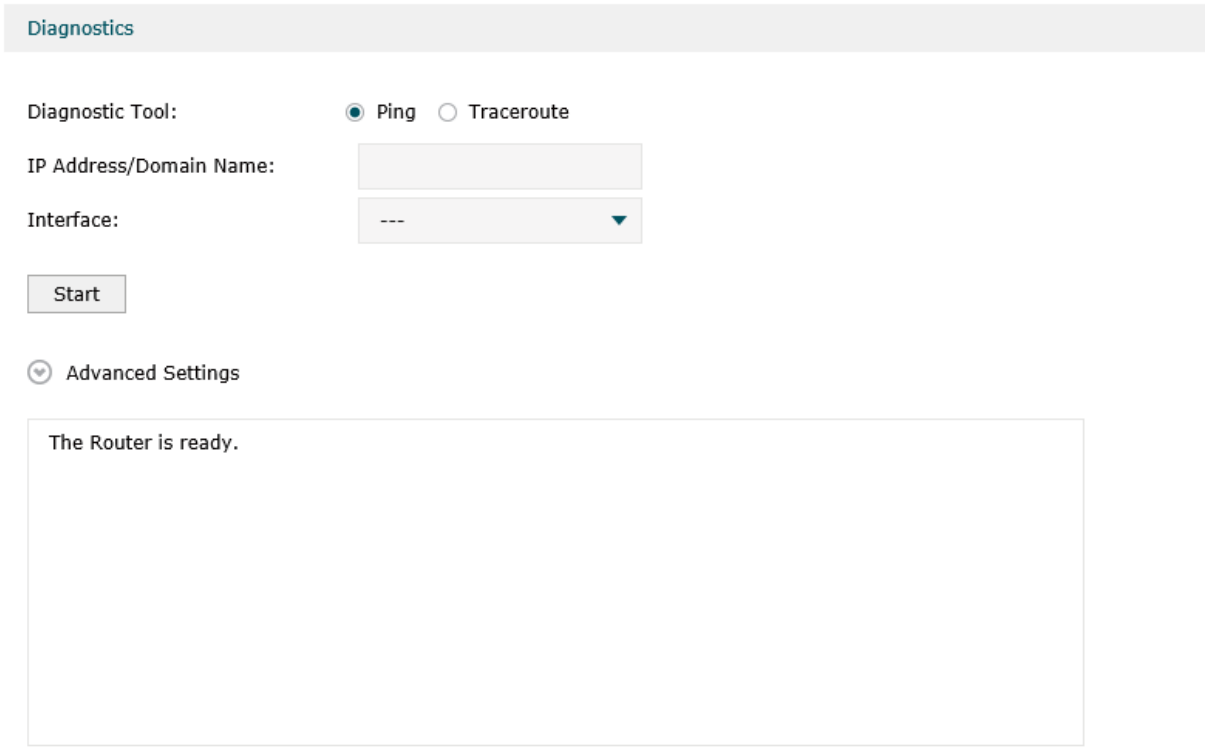
Here you can view the traffic statistics of the interfaces and click the header to display the data in ascending or descending order.

Interface	Displays the current enabled interface of the device.
TX Rate (Kb/s)	Displays the rate data frames are transmitted.
RX Rate (Kb/s)	Displays the rate data frames are received.
TX Packet Rate (Pkt/s)	Displays the rate data packets are transmitted.
Total TX Bytes	Displays the total bytes transimitted by the interface.
Total RX Bytes	Displays the total bytes received by the interface.
Total TX Packets	Displays the total packets transmitted by the interface.
Total RX Packets	Displays the total packets received by the interface.

9.4 Diagnostics

Choose the menu **System Tools > Diagnostics > Diagnostics** to load the following page.

Figure 9-8 Diagnostics



Here you can use the diagnostic tools to detect the current network connection status.

The device provides **Ping** and **Traceroute** tools to help you troubleshoot network connection problems.

The Ping tool sends packets to a target IP Address or Domain Name and logs the results, such as the number of packets sent and received, and the round-trip time.

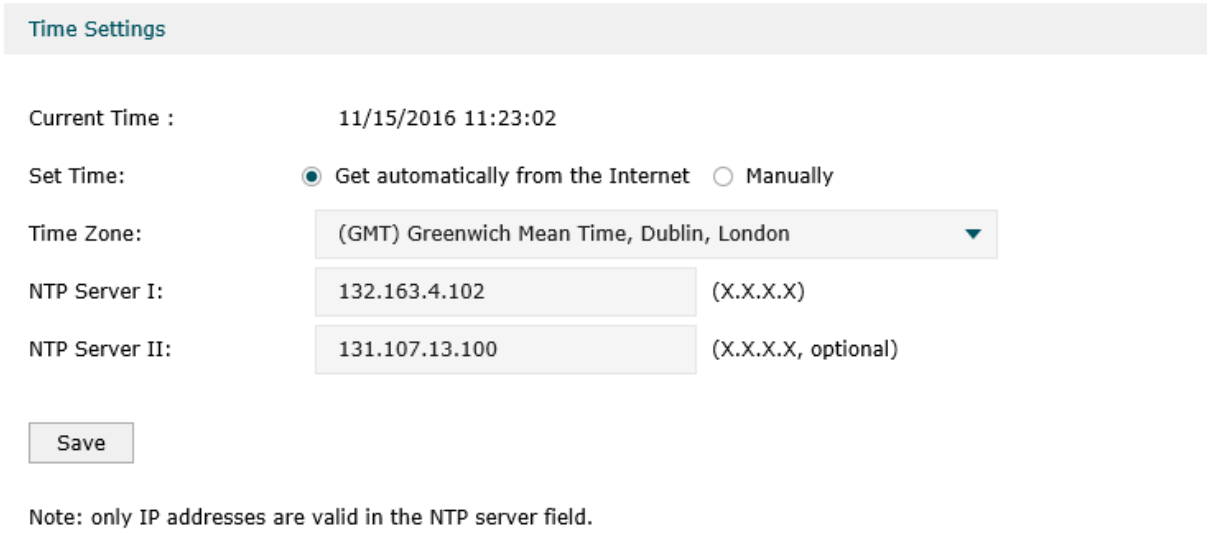
The Traceroute tool sends packets to a target IP Address or Domain Name and displays the number of hops and time to reach the destination.

Diagnostic Tool	Specify the diagnostic tool as Ping/Traceroute.
IP Address/Domain Name	Enter the IP address or the domain name of the Ping host or the traceroute host.
Interface	Enter the interface of the Ping host or the traceroute host.
Ping Count	Specify the ping count.
Ping Packet Size	Specify the ping packet size.
Traceroute Max TTL	Specify the number of hops (to be reached) in the Traceroute Max TTL (Time to Live) field.

9.5 Time Settings

Choose the menu **System Tools > Time Settings > Time Settings** to load the following page.

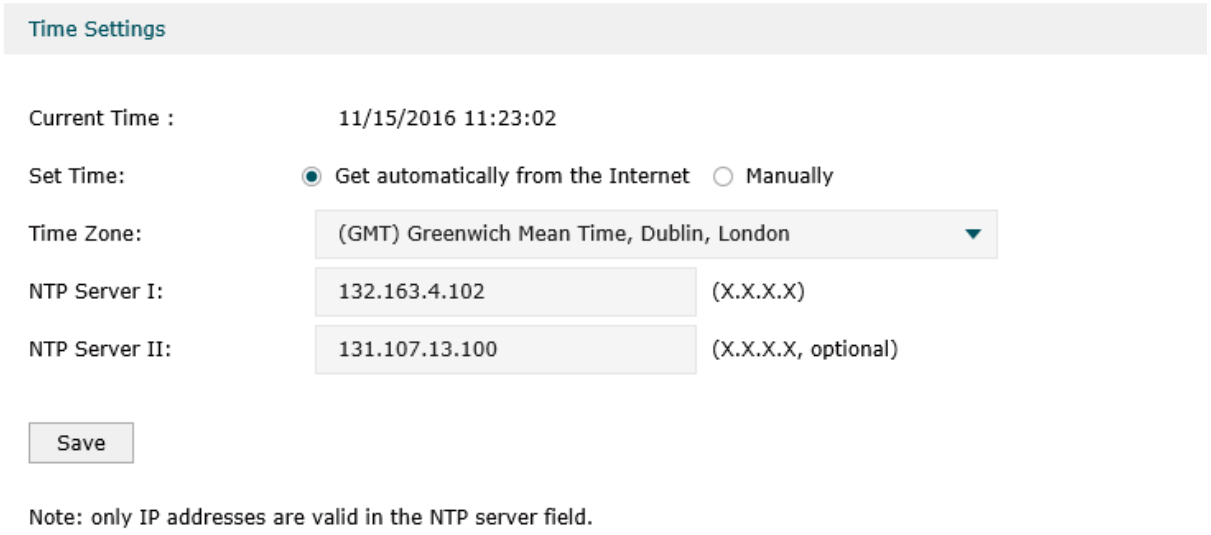
Figure 9-9 Time Settings



Here you can view or set the system time. You can get the system time from the Internet,or set it manually.

- **Get automatically from the Internet**

Figure 9-10 Get Automatically from the Internet



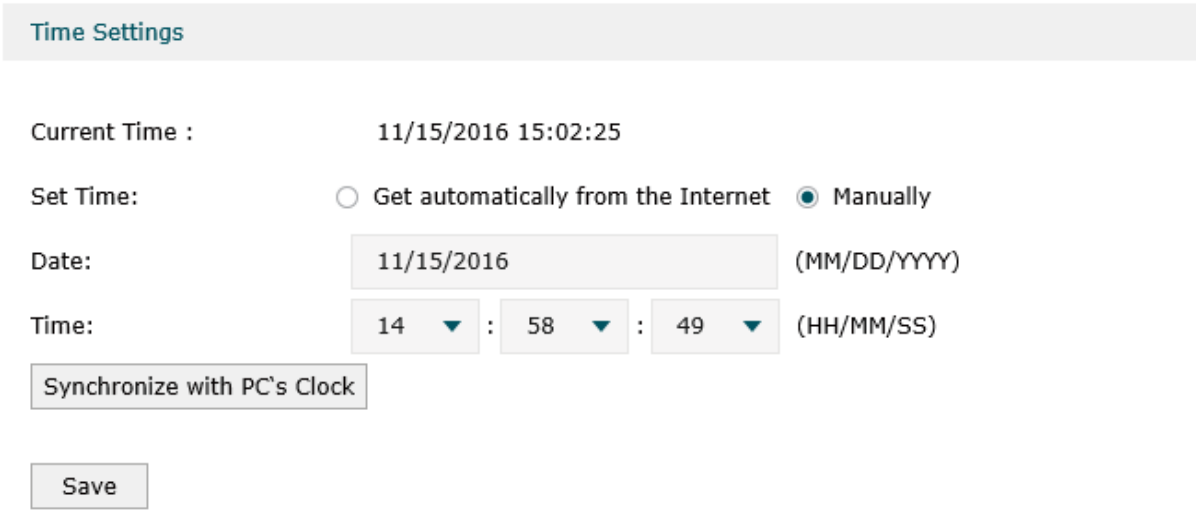
If the AC can access the Internet, you can get the system time automatically from the Internet. The AC will search available internal NTP (Network Time Protocol) server and get the system time. If failed, please set the IP address of the NTP server manually. After the configuration, click **Save**, and the AC will get the system time from the NTP server.

Current Time	Displays the current system time.

Set Time	Specify the way the time is set (get automatically from the internet or manually).
Time Zone	Specify the time zone of the device.
NTP Server I / NTP Server II	IP Address for the NTP Server.

- **Manually**

Figure 9-11 Get Automatically From the Internet



If the AC cannot access the Internet, you should set the system time manually.

Current Time	Displays the current system time.
Set Time	Specify the way the time is set (get automatically from the internet or manually).
Date	Specify the time zone of the device.
Time	IP Address for the NTP Server.
Synchronize with PC's Clock	Click this button, and the system time of the device will be matched with the current time on the host PC.

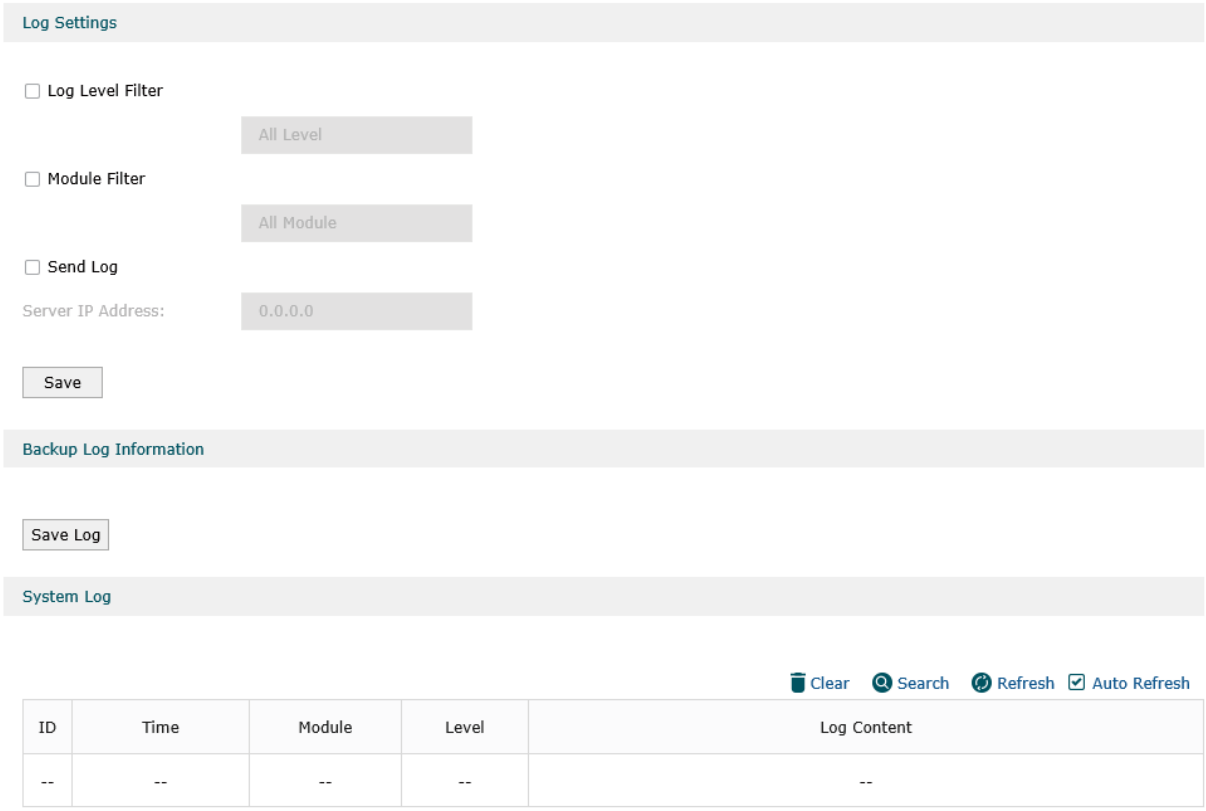
Note:

AC500 has a built-in RTC (Real-time Clock) chip, the system time won't be restored to the default time setting when the AC is rebooted or powered off. AC50 doesn't have an RTC chip. Please set the time manually or connect to the internet to set the time after the device is rebooted or powered off.

9.6 System Log

Choose the menu **System Tools > System Log > System Log** to load the following page.

Figure 9-12 System Log



Log Settings

Log Level Filter

Displays a list of the most recent activity (events) on the network. You can define the level of logs you want to view in the log level filter dropdown list.

All level: Displays all level of the system logs.
EMERGENCY: Displays emergency system logs. These are fatal errors that may result in system breakdown.
ALERT: Displays alert system logs. These are serious errors that require urgent system repair.
CRITICAL: Displays critical system logs. These are fatal errors that may result in danger to the system.
ERRORS: Displays error system logs. These are ordinary errors in the system.
WARNING: Displays warning system logs. These are warning messages that remind the user that there may be some hidden threats to the system.
NOTICE: Displays notice system logs. These are important notices about the system.
INFO: Displays ordinary system information.
DEBUG: Displays the debug information.

Module Filter	You can define the module of logs you want to view in the module filter dropdown list. **ALL Module**: Displays all system log modules. **System Management**: Displays the system's management log, including the account, device management and time settings. **Interface Management**: Displays the system's interface management log. **DHCP server**: Displays the system's DHCP server log. **AP Control**: Displays the system's AP control log. **AP Upgrade**: Displays the system's AP upgrade log. **AP database**: Displays the system's AP database log. **Radio**: Displays the system's radio setings log. **Link Backup**: Displays the system's link backup log. **Portal authentication**: Displays the system's portal authentication log. **MAC Authentication**: Displays the system's MAC authentication log. **User Management**: Displays the system's user management log. **Wireless service**: Displays the system's wireless service log. **Wireless Client**: Displays the system's client log. **Load Balancing**: Displays the system's load balancing log.
Send Log	Check the box and specify the server address the log will be sent to.

- **Backup Log Information**

Click **Save Log** to save the system log.

- **System Log**

Displays the system log.