



## Alcatel-Lucent Enterprise

OmniAccess Stellar AP User Guide - AWOS 3.0.5

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# 1 How to Use This Manual

This manual describes all features supported by the Stellar AP and provides instructions and examples for configuring ALE series Access Point (AP). It is designed for network administrators who are responsible for configuring and maintaining the Wi-Fi network. It assumes the reader is familiar with Layer2 and Layer3 networks and 802.11 protocols and related technologies. The manual covers an introduction to the Stellar AP and configuration samples. The examples describe the general steps of setting up a Wi-Fi network based on several typical deployment scenarios. It is useful for those new to the ALE Access Point configuration and those already familiar with the software wanting to know more about certain functions.

## Access Stellar AP Through the GUI

This manual is developed for the Stellar AP GUI (WiFi Express mode). Each Stellar AP supports up to three simultaneous GUI connections. The GUI is accessible through a standard web browser from a remote management console or workstation. The GUI includes configuration wizards that guide you to change administrator password and complete basic WLAN configuration. In addition to the wizards, the GUI includes a Dashboard monitoring feature that provides visibility into your wireless network's performance and usage. This allows you to easily locate and diagnose WLAN issues. For details on the GUI Dashboard, see [Dashboard Overview](#).

## Document Conventions

The following conventions are used throughout this manual to emphasize important concepts:



**Note**

It indicates helpful suggestions, pertinent information, and important things to remember.



**CAUTION**

It indicates a risk of damage to your hardware or loss of data or some incorrect or improper operation that should be avoided.

## 2 Configuration Sample

This chapter describes the general steps to configure the Stellar AP with respect to several deployment topologies. Follow the configuration steps in the guide to configure your Stellar AP. This chapter contains the following topics:

[AP Group without ALE OXO server](#)

[AP Group with ALE OXO server \(ZTP\)](#)

### Scenario 1: AP Group Without ALE OXO server

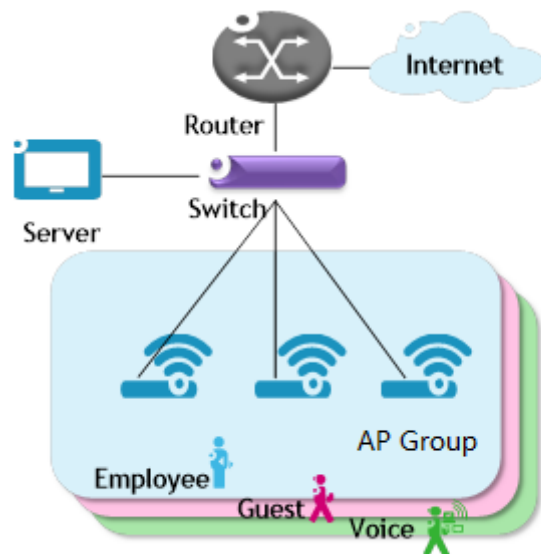


Figure 2-1 AP group without OXO

Following are the requirements for this scenario,

- ➔ There are three APs in this group. All APs connect to a standard PoE switch and the PoE switch connects to the core router. The core router provides DHCP server function to both APs and clients. The Primary Virtual Controller (PVC) in the group will be responsible for portal server, AP and client management and monitoring.
- ➔ All three APs broadcast three SSIDs: Employee, Guest and Voice.
- ➔ The Employee WLAN is used for company staff, by which both internal servers and the internet are accessible.

For security, this WLAN will use 802.1x authentication methods. Anyone who tries connecting to this WLAN will be requested to input the user name and password registered in an internal RADIUS server.



## Configuration Sample

- ➔ The Guest WLAN is designed for guests and can access the internet ONLY. It uses a captive portal authentication and a portal page will pop up when browsing any website. Guest can access the Internet only after inputting the access code or user name and password provided by the network administrator. The splash page can be customized to the customer's style.
- ➔ The Voice WLAN is designed for VoIP application ONLY. It will authorize voice traffic to be highest priority in QoS profile so as to provide a stable voice connection. The SSID will be hidden and inaccessible to both internal and external networks.
- ➔ ALL APs usage and client connections are visible in the UI dashboard.

According to the topology, the clients are separate in three service VLANs (For example: VLAN 100, VLAN 200 and VLAN 300) while APs are in the management VLAN (default VLAN of the switch ports, for example: VLAN 1). The APs and clients will be assigned an IP address from the DHCP server via the router. The router is the default gateway for APs and clients. Following are the detailed configuration steps:

- ➔ **Step1:** Configure a PoE switch as follows:
  - 1) The ports used to connect the APs have their default (untagged) VLAN as the AP management VLAN;
  - 2) Add tagged VLANs to the ports for all WLANs that will be created on the APs;
  - 3) Tag (trunk) all of the user and AP-Management VLANs on the uplink between the switch and the router.
- ➔ **Step2:** Connect all APs to the PoE switch and all APs will obtain an IP address from the DHCP server. Login to the AP group, change the administrator password and initially create WLAN 'Employee' using the wizard. Refer to [Connect to pre-defined SSID and browse URL](#) and [Using the Initializing Wizard for details](#). Refer to [Modify Your WLAN](#) to set the mapping VLAN for WLAN 'Employee'.
- ➔ **Step3:** Create WLAN 'Guest' as per the steps in '[Create New WLAN](#)' and configure the captive portal authentication according to '[How to configure captive portal authentication](#)'.
- ➔ **Step4:** Create WLAN 'Voice' as per the steps in '[Create New WLAN](#)'.
- ➔ **Step5:** Configure ACLs according to [Access Control List](#) to restrict the access domain of each WLAN.
- ➔ **Step6:** Check AP, Client and monitor the performance in the dashboard. Refer to [Dashboard Overview](#) for detail.

## Scenario 2: AP Group With ALE OXO Server (ZTP)

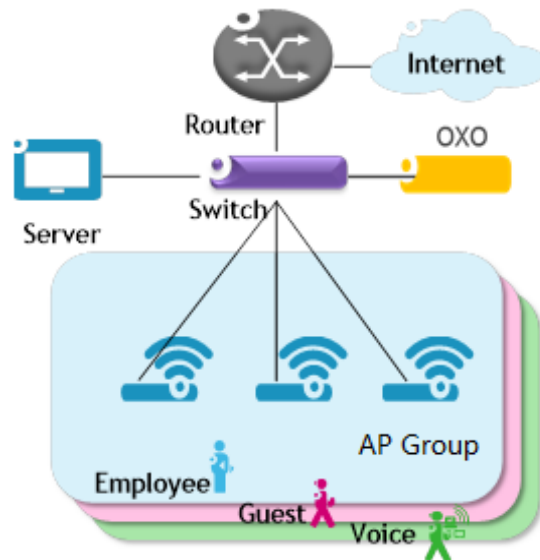


Figure 2-2 AP group with OXO

Following are the requirements for this scenario,

- ➔ There are three APs in this group. All APs connect to a standard PoE switch and the PoE switch connects to the core router and an ALE OXO server.
- ➔ All three APs broadcast three SSIDs: Employee, Guest, and Voice.
- ➔ The Employee WLAN is used for company staff, by which both internal servers and the internet are accessible.  
For security, this WLAN will use 802.1x authentication methods. Anyone who tries connecting to this WLAN will be requested to input the user name and password registered in an internal RADIUS server.
- ➔ The Guest WLAN is designed for guests and has access to the internet ONLY. It uses a captive portal page authentication and a portal page will pop up when browsing any website. Guest can access the Internet only after inputting the access code or user name and password provided by the network administrator. The splash page of captive portal authentication can be customized to customer's style.
- ➔ The Voice WLAN is designed for VoIP application ONLY. It will authorize voice traffic to be highest priority in QoS profile so as to provide a stable voice connection. It will be hidden and inaccessible to both internal and external networks.
- ➔ ALL APs usage and client connections are visible in AP UI dashboard.

According to the topology, APs will be assigned an IP address from the OXO server. Router is the DHCP server for the clients. Following is the detailed configuration steps:

- ➔ **Step1:** Connect all APs to the PoE switch and all APs will obtain an IP address, download firmware (if necessary) and configuration file from the OXO server.

## Configuration Sample

- ➔ **Step2:** The APs will reboot automatically to setup a group and allow configuration from the OXO server take effect, all three WLANs are created.
- ➔ **Step3:** Check AP, Client and monitor the performance in the dashboard. Refer to [Dashboard Overview](#) for detail.

## 3 Connecting AP Group via Web Browser

### Prerequisites for Setting up and Accessing AP Group

- Connect all APs to switch and power up.
- Ensure that a DHCP server is present and accessible in the network. The AP group uses an external DHCP server for IP address management of the access points and the wireless clients.
- Ensure that a DNS server is available in the network, which helps to parse the web URL used to access the AP. (Refer to Note 3-1)
- It is recommended that your configuring terminal should have a compatible operating system and browser.

Recommended OS	Recommended Browser
<ul style="list-style-type: none"> <li>• Windows 7</li> <li>• Window 8</li> <li>• Window 10</li> <li>• MAC OS X 10.10</li> <li>• MAC OS X 10.11</li> </ul>	<ul style="list-style-type: none"> <li>• Google Chrome 48 and later</li> <li>• Mozilla Firefox 48 and later</li> <li>• Internet Explorer 11 and later</li> </ul>

After above prerequisites are met, proceed to: [Connect to pre-defined SSID and browse URL.](#)



Note 3-1: The process of connecting to a single AP through web is same as connecting to AP group.

Note 3-2: It is recommended to connect only one AP at a time to the network and complete the configuration, then plug in other APs one by one to synchronize the configurations.

### Connect to Pre-defined SSID and Browse URL

The ALE WLAN solution is based on a group architecture. A maximum of 64 APs are supported in one AP Group. All APs have the same group ID that uniquely defines the AP group and all APs have to be in the same VLAN because the communication between group members is based on multicast. The group will select the Primary Virtual Controller (PVC) and Secondary Virtual Controller (SVC) based on AP model and MAC address. Stellar AP models AP12XX have higher preference than AP1101/AP1201H and then the highest MAC address will be selected as the PVC and the one with the second highest MAC address will be set as the SVC. The PVC is responsible for the group management, such as configuration synchronization, usage data statistics, firmware upgrading, etc. and the SVC is the backup of the PVC. By default, the AP group will advertise the pre-defined SSID ‘mywifi-xxxx’ and you can connect to ‘mywifi-xxxx’ to browse the AP group GUI through <http://mywifi.al-enterprise.com:8080> to the initializing wizard. After you complete [Using the Initializing Wizard](#), the SSID ‘mywifi-xxxx’ will be deleted. (‘xxxx’ is the last two bytes of PVC’s MAC address)

Note: AP1101/AP1201H/AP1201 only cluster can scale to 32 APs. To go higher you will need at least 4 AP12XX (AP1220/AP1230/AP1251) in the cluster.



Note 3-3: Besides the HTTP login method (port 8080), you can also login to the web manager using HTTPS protocol with the URL <https://mywifi.al-enterprise.com,more> details please refer to [Web management with](#)

Note [HTTPS](#)

Note 3-4: If there is no DNS server in the network, you can connect to the AP group directly using the IP address of any AP in the group, accessing “<http://a.b.c.d:8080>”. (a.b.c.d is the AP’s IP address)

Note 3-5: If there is no DHCP server in the network, the AP will default to the 192.168.1.254 address. See [How to Configure the AP if there is no DHCP server.](#)

## Using the Initializing Wizard

Initializing wizard page is loaded by connecting to the pre-defined SSID accessing the URL <http://mywifi.al-enterprise.com:8080>. Login with the Administrator account and the default password ‘admin’, illustrated in Figure 3-1. If you want to manage the AP group with HTTPS protocol, refer to [Web management with HTTPS](#).

The screenshot shows a login interface with a light gray background. At the top, there is a dropdown menu with a person icon on the left and a downward arrow on the right, containing the text 'Administrator'. Below this is a password input field with a lock icon on the left and the placeholder text 'password'. At the bottom right of the form area is a blue button with the text 'Login'.

Figure 3-1 AP Group Login Page

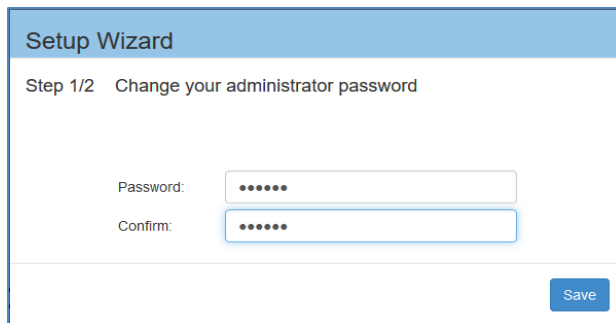
The following are the Initialization Wizards:

**Step1:** Welcome Page

The screenshot shows a 'Setup Wizard' page. It has a blue header bar with the text 'Setup Wizard'. Below the header, the main content area is white and contains the text 'Welcome to the AP Group Web Manager' and '---The AP Group Management System'. At the bottom right of the page is a blue button with the text 'Next'.

Figure 3-2 Initialization Wizard-Welcome Page

**Step2:** Change your Administrator password.



Setup Wizard

Step 1/2 Change your administrator password

Password:

Confirm:

Save

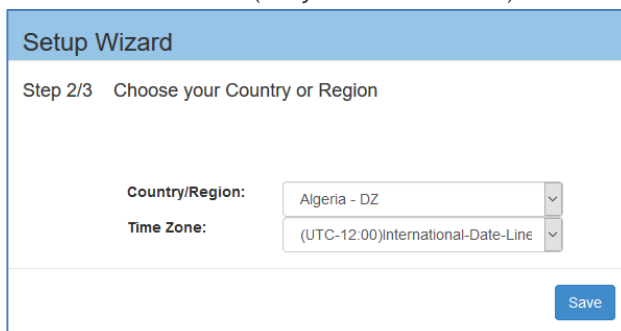
Figure 3-3 Initialization Wizard-Modify Administrator Password



Note 3-6: It is highly recommended and a best security practice to change the default passwords for the predefined login accounts.

Note

**Step3:** Select your country code and time zone. (Only for -RW models)



Setup Wizard

Step 2/3 Choose your Country or Region

Country/Region:

Time Zone:

Save

Figure 3-4 Initialization Wizard-Select country code and time zone

**Step4:** Create your own WLAN. You can click '[Create New WLAN](#)' for details.

**Setup Wizard**

Step 2/2 Create New WLAN

WLAN Name:

Band:  2.4GHz  5GHz

Security Level:

Key Management:

Password Format:

Password:

Confirm:

Figure 3-5 Initialization Wizard-Create New WLAN



Note 3-7: The VLAN assignment for the WLAN is not available in the initial wizard phase. You can modify the mapping VLAN value after the initial setup is completed, using the steps described in “[Modify your WLAN](#)” section which can be used to modify existing WLANs.

Note

Step5: Complete Confirmation Page

**Notice**

The setup wizard has completed. You can create more WLANs and perform other configurations in main page.  
Please connect to the WLAN **mywifi-employee**.  
and login to the main page with your new administrator password.

Figure 3-6 Initialization Wizard-Complete Notice



Note 3-8: While configuring the Initialization Wizards, please make sure your configuring terminal is connected to the pre-defined WLAN 'mywifi-xxxx' to keep the communication operational between AP group (or AP) and web browser. If not, you may encounter the following prompt and fail to complete the wizard configuration correctly:

Note





**Note**

Note 3-9: The pre-defined WLAN 'mywifi-xxxx' is deleted when the wizard is completed. For additional configuration through the wireless connection you need to connect to the new WLAN created in the wizard and then login to the web main page with your new administrator password.

---

## Connecting to the AP Group via Web

When the initializing wizard has completed and new WLANs have been created, you can connect to each of the WLANs and browse the URL <http://mywifi.al-enterprise.com:8080> to manage the AP group.

Another way of connecting to the AP group web management system is through the AP group management IP address. For information on setting of the Management IP address refer to [AP Group Management](#).

The AP group web management system can be accessed through the wired network if the group management IP address is configured and is reachable.



# 4 Introduction to the AP Group Web Management System

## Dashboard Overview

The Stellar AP provides a visualized dashboard for AP and client monitoring and configuration. As illustrated in Figure 4-1 Dashboard Overview, the dashboard is split into sub-windows for [WLAN Window](#), [AP Window](#), [Client Window](#) and [Monitoring Window](#), [System Page](#), [Wireless Page](#) and [Access Page](#). You can briefly check the WLANs, APs or Clients in the dashboard or double click the framework of each window to see the details.

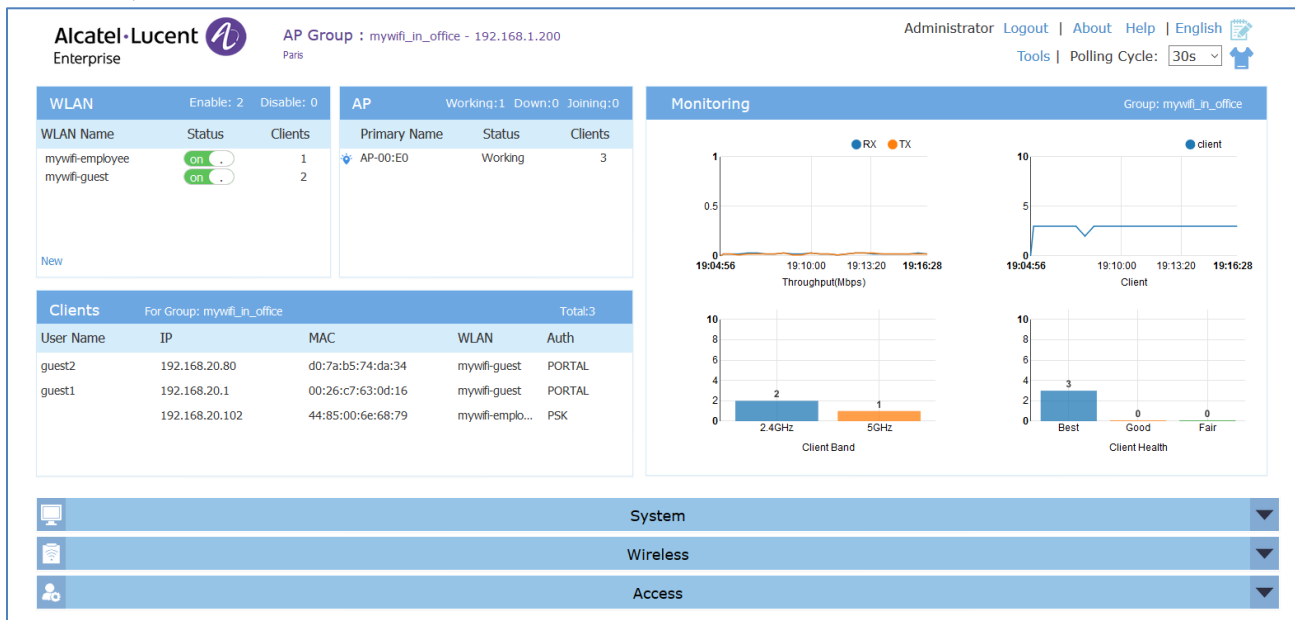


Figure 4-1 Dashboard Overview

## WLAN Window

The WLAN configuration window is integrated with all WLAN related monitoring and operation tasks. There are two modes for the WLAN Window, Simplified Mode illustrated in Figure 4-2 and Advanced Mode illustrated in Figure 4-3. You can easily launch the Advanced Mode from Simplified Mode by clicking the WLAN Window Frame.

WLAN			Enable: 2	Disable: 0
WLAN Name	Status	Clients		
mywifi-employee	<input checked="" type="checkbox"/> on	1		
mywifi-guest	<input checked="" type="checkbox"/> on	2		

New

Figure 4-2 WLAN Window-Simplified Mode



Note 4-1: The label below displays the number of enabled or disabled WLANs.

Note

WLAN	Enable: 0	Disable: 1
------	-----------	------------

Table 4-1: Key word specification in WLAN Window (Simplified Mode)






<b>WLAN Name</b>	Label or name of WLAN, which is composed by 0-9, a-z or other string.
<b>Status</b>	Indicates the WLAN state, <input checked="" type="checkbox"/> on indicates that WLAN is in broadcast state, while <input type="checkbox"/> off indicates WLAN is not in broadcast state.
<b>Clients</b>	The number of users connected to the WLAN.
<b>New</b>	Launch the WLAN creation window.

WLAN Configuration				
WLAN Name	Status	Security Level	Captive Portal	Operate
mywifi-1X	Enable	enterprise	No	wmm
mywifi-employee	Enable	personal	No	wmm
mywifi-guest	Enable	open	Yes	wmm
mywifi-portal	Enable	open	Yes	wmm

Create

Figure 4-3 WLAN Window-Advanced Mode

**Table 4-2 Key word specification in WLAN Configuration Window (Advanced Mode)**

<b>WLAN Name</b>	Label or name of WLAN.
<b>Status</b>	Indicates the WLAN state,  indicates that WLAN is in broadcast state, while  indicates WLAN is not in broadcast state.
<b>Security Level</b>	Security Level of WLAN, from high to low is Enterprise>Personal>Open.
<b>Captive Portal</b>	Indicates whether the WLAN is using captive portal authentication. Yes means the WLAN is configured with captive portal authentication, while No means the WLAN is without captive portal authentication.
<b>Operate</b>	Operation for the WLAN.  see <a href="#">Modify Your WLAN</a> ,  see <a href="#">Delete Your WLAN</a> , <a href="#">wmm</a> see <a href="#">Modify WLAN QoS</a> .
	Link for Creating new WLAN, see <a href="#">Create New WLAN</a> .

## AP Window

AP Window is integrated with all APs and group related monitoring and configuration functions. Similar to the WLAN Window, there are two modes for AP Window, Simplified Mode illustrated in Figure 4-4 and Advanced Mode illustrated in Figure 4-5. You can easily launch the Advanced Mode from Simplified Mode by clicking the AP Window Frame.



AP		Working: 2	Down:0	Joining:0
	Primary Name	Status	Clients	
	AP-00:E0	Working	2	
	AP-00:F0	Working	3	

Figure 4-4 AP Window-Simplified Mode

**Table 4-3 Key word specification in AP Window (Simplified Mode)**

<b>Primary Name</b>	AP Mac address.
<b>Status</b>	Connection status of AP, there are three indication for AP status, they are Working, Down and Joining. See more in Note 4-2.
<b>Clients</b>	The total number of users currently connected to AP.



### Note

Note 4-2: AP has three status indications when connecting to group, they are 'working' which indicates that AP has connected to the PVC successfully and is working normally, 'Down' indicates that AP is disconnected from the group, and 'Joining' indicates that AP is requesting to join the group but hasn't completed yet. The Label in AP Window indicates the number of APs in each status.

AP Working:2 Down:0 Joining:0

## Introduction to the AP Group Web Management System

Select an AP from the AP Configuration Window (Advanced Mode), you can learn the detailed information of the AP, see in Figure 4-5.

The screenshot shows the 'AP Configuration' window. On the left, there is a table with columns: Primary Name, IP, Firmware, and Operate. The table lists several APs, with 'AP-11:10' selected. The 'Operate' column for 'AP-11:10' shows three icons: a gear (config), a power button (reboot), and a refresh (firmware). Below the table, there are buttons for 'Reboot All AP', 'Clear All Configuration', 'Backup All Configuration', 'Restore All Configuration', 'Upgrade All Firmware', 'Connect To Cloud', and 'Convert To Enterprise'.

The 'Detailed Information' panel on the right shows the following details for AP-11:10:







- AP Name: AP-11:10 [Edit](#)
- MAC: 34:E7:0B:11:11:10
- Location: [Edit](#)
- Status: Working
- Role in Group: PVC
- Serial Number: 11111111
- Model: OAW-AP1101
- Firmware: 3.0.4.1025
- Upgrade Time: Wed Aug 29 20:43:24 2018
- Upgrade Flag: successfully

Below the detailed information, there is another section for IP settings:

- IP Mode: DHCP [Edit](#)
- IP: 192.168.20.107
- Netmask: 255.255.254.0
- Default gateway: 192.168.21.254
- DNS: 219.141.136.10
- AP Mode: Express [Edit](#)

Figure 4-5 AP Window-Advanced Mode

Table 4-4: Key word specification in AP Configuration Window (Advanced Mode)

<b>Primary Name</b>	Name of the AP.
<b>IP</b>	IP address of the AP.
<b>Firmware</b>	Firmware version of the AP.
<b>Operate</b>	There are three optional operations for the AP:  ,  and  .
<b>PVC</b>	Primary Virtual Controller in the AP group.
<b>SVC</b>	Secondary Virtual Controller in the AP group.
<b>MEMBER</b>	Other member APs in the group except PVC/SVC.
<b>Joining</b>	APs in joining state, needs to be authorized to join the group.
<b>Pending</b>	APs in pending state, needs to upgrade the software to join the group.
<b>Neighboring Group</b>	Neighboring AP groups with different group ID.
	Checking the detailed configuration on the AP.
	Upgrading firmware for the AP.
	Execute to reboot the AP.

Reboot All AP	Reboot all the APs in the group.
Clear All Configuration	Restore factory settings for all the APs in the group.
Backup All Configuration	Backup the configuration of the AP group.
Restore All Configuration	Restore the configuration for the AP group.
Upgrade All Firmware	Update the firmware for all the APs in the group.
Connect To Cloud	<ul style="list-style-type: none"> <li>• Contact to Cloud - Enable/Disable contacting to OmniVista Cirrus periodically. If AP in the cluster are authorized to register OV Cirrus, the AP will reboot the register to OV Cirrus, then user can monitor and manage the AP from OV Cirrus. By default, it is enabled.</li> <li>• Management Server - OV Cirrus server address to which AP send the register request. User can modify the management server address for the purpose of using other OV Cirrus server than the default one.</li> </ul>
Convert To Enterprise	<p>Convert all the APs in the cluster to be managed through OmniVista On-Premise. Once configured, AP will reboot and register to On-Premise OV server.</p> <ul style="list-style-type: none"> <li>• Management Server - OV On-Premise server address to which AP register. DHCP Option - Obtain the On-Premise OV server address through DHCP option 138 or option 43 during AP booting up state. Static - Configure a static On-Premise OV server to which AP will register after rebooting.</li> </ul>
Detailed Information	Detailed information for the selected AP.
AP Name	Name of the AP.
Location	Location of the AP.
Status	Connection status of AP, there are three indications for AP status, they are Working, Down and Joining. See more in Note 4-2.
Kick Off	Remove the AP from the group. When an AP is removed from the group, it changes into <b>Joining</b> state until the administrator permits it to join the group again. See more in <a href="#">Allow an AP to Join the Group</a> .
Role in Group	AP role in the group, including PVC, SVC and Member.
Update to PVC	Upgrade the member or SVC to be the PVC of the AP group.
Serial Number	Serial Number of the AP selected.
Model	Product Model of the AP selected.
Upgrade Time	Last firmware upgrade time.
Upgrade Flag	Flag of last time firmware upgrade. Success means the firmware was upgraded successfully on the Upgrade Time, Failed means the firmware wasn't upgraded successfully on the Upgrade Time.
IP Mode	<p>The way by which the AP attains its IP address, dynamically assigned from</p> <p style="text-align: right;"> <input checked="" type="radio"/> DHCP   <input type="radio"/> Static         </p> <p>DCHP server or static IP configured manually.</p>
IP	IPv4 address of the AP selected.
Netmask	Netmask of the IPv4 address of the AP selected.
Default Gateway	Default Gateway of the AP selected.
DNS	DNS server in the network.
AP Mode	<ul style="list-style-type: none"> <li>• Express - AP working in cluster mode.</li> <li>• Enterprise - Change the AP to be managed and configured through OmniVista On-Premise edition. You need to specify the OmniVista server address when changing to Enterprise mode. DHCP Option - Obtain the On-Premise OV server address through DHCP option 138 or option 43 during AP booting up state. Static - Configure a static On-Premise OV server to which AP will register after rebooting.</li> </ul>

## Client Window

Client Window displays all the connected clients. Similar to the WLAN Window, there are two modes for Client Window, Simplified Mode illustrated in Figure 4-6 and Advanced Mode illustrated in

User Name	IP	MAC	WLAN	Access Point		
	192.168.20.17	44:85:00:6e:68:79	2g5gmixed	AP-00:E0	✖	🗑️
guest1	192.168.20.12	a4:08:ea:02:10:e8	mywifi-g...	AP-00:E0	✖	🗑️
	192.168.20.210	98:f1:70:2c:52:e5	mywifi-psk	AP-00:E0	✖	🗑️

Client Detail	
User Name:	
IP:	192.168.20.17
MAC:	44:85:00:6e:68:79
WLAN:	2g5gmixed
Access Point:	34:e7:0b:00:00:e0
AP Name:	AP-00:E0
Auth:	PSK
Attached Band:	5GHz
Online Time:	0days 0h 8m 52s
Session Time:	
RSSI:	46
Working Mode:	11AC_VHT80
PHY Rx rate:	761Mbps
PHY Tx rate:	761Mbps
Rx rate:	0.01Mbps

Figure 4-7. You can launch the Advanced Mode from Simplified Mode by clicking the Client Window Frame.

Clients					For Group: mywifi_in_office	Total:3
User Name	IP	MAC	WLAN	Auth		
guest2	192.168.20.80	d0:7a:b5:74:da:34	mywifi-guest	PORTAL		
guest1	192.168.20.1	00:26:c7:63:0d:16	mywifi-guest	PORTAL		
	192.168.20.102	44:85:00:6e:68:79	mywifi-empl...	PSK		

Figure 4-6 Clients Window-Simplified Mode

Table 4-5: Key word specification in Client Window (Simplified Mode)

For Group: mywifi_in_office	Clients connected to the group.
For WLAN: mywifi-employee	Clients connected to the specified WLAN in the group.
For AP: 34:e7:0b:00:00:e0	Clients connected to the specified AP in the group.
User Name	User Name of the client.
IP	IPv4 address of the client.
MAC	MAC address of the client.
WLAN	WLAN to which the client connected.
Auth	Authentication type: Open, Portal (Captive portal), PSK (Personal), 802.1X (Enterprise).

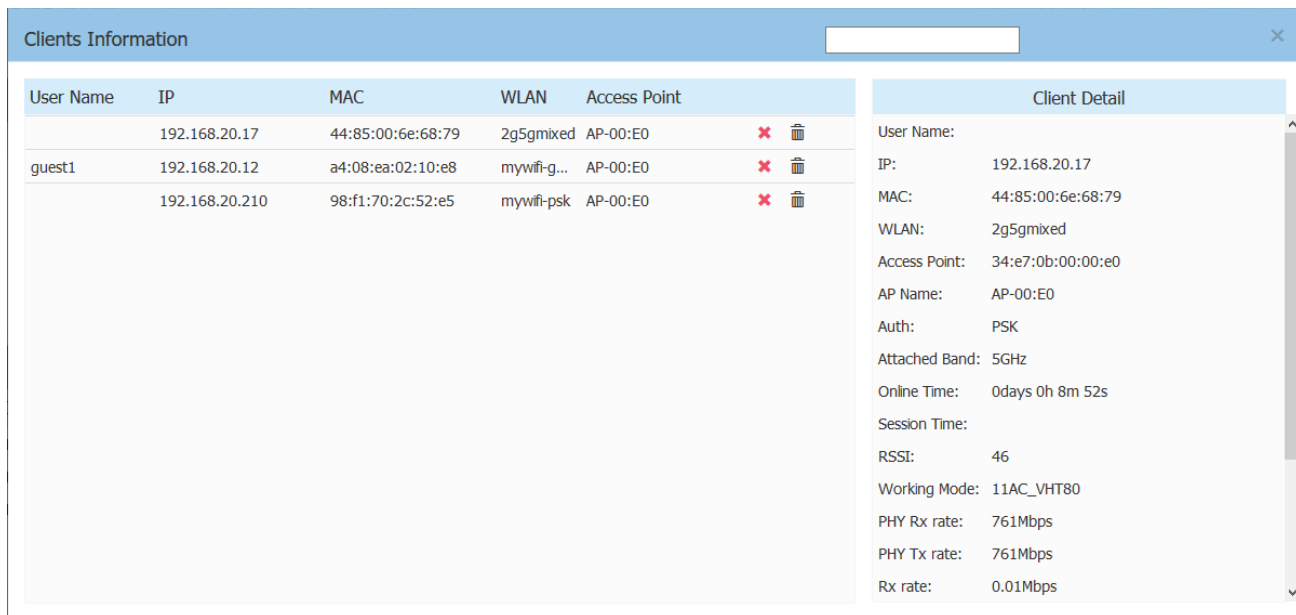


Figure 4-7 Clients Window-Advanced Mode

Table 4-6: Key word specification in Client Information Window (Advanced Mode)

User Name	User Name of the client.
IP	IPv4 address of the client.
MAC	MAC address of the client.
WLAN	WLAN to which the client connected.
Access Point	Access point to which the client connected.
✖	Force the client to disconnect the wireless network.
🗑️	Remove the client from the wireless network and put it within the blacklist. If removed, the client can be displayed and operated in the <a href="#">blacklist window</a> .
AP Name	Name of access point that the client connected.
Auth	Authentication type: Open, Portal (Captive Portal), PSK (Personal), 802.1X (Enterprise).
Attached Band	The radio band through which the client attach to AP, 2.4GHz or 5GHz.
Online Time	Time when the client attached to the wireless network.
Session Time	Time when the client has passed the captive portal authentication, only for captive portal clients.
RSSI	Received Signal Strength Indication of the client, Value 0-99.
Working Mode	Wireless working mode of the client.
PHY Rx rate	Physical receive rate of the client.
PHY Tx rate	Physical sending rate of the client.
Rx rate	Packet receive rate of the client.
Tx rate	Packet sending rate of the client.
Download	Total download data size since the client connected to the wireless network.
Upload	Total upload data size since the client connected to the wireless network.
Device type	Device type of the client.
OS Type	Operating system type of the client.

## Monitoring Window

The monitoring window displays the utilization of the wireless network, including statistics of traffic throughput and client working state.

The monitoring window can monitor from four different levels: group level, WLAN level, AP level and client level, illustrated in Figure 4-8, Figure 4-9, Figure 4-10 and Figure 4-11.

The group monitoring is the default display, you can select to monitor certain WLAN/AP/client from the WLAN Window/AP Window/Client Window on left side of the [Dashboard](#).

The monitoring window is automatically refreshed every 30 seconds by default, and the data polling cycle can be set to 30s /60s /120s.



Figure 4-8 Monitoring Window - AP Group

Table 4-7: Key word specification in AP group Monitoring Window

RX	Total receiving rate of the AP group.
TX	Total sending rate of the AP group.
Client	The number of clients connected to the AP group.
Client Band	The working band distribution of clients connected to the AP group, including number of clients working on 2.4GHz band and number of clients working on 5GHz band.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: <ul style="list-style-type: none"> <li>Best— Number of clients whose signal strength is more than 30.</li> <li>Good— Number of clients whose signal strength is between 15 -30.</li> <li>Fair—Number of clients whose signal strength is less than 15.</li> </ul>



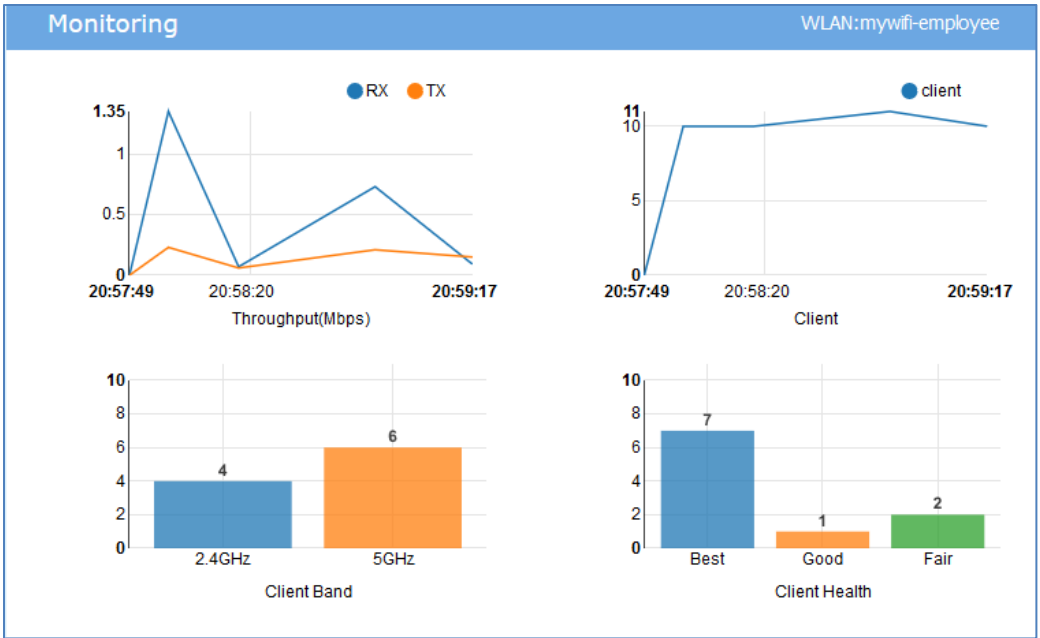


Figure 4-9 Monitoring Window - WLAN

Table 4-8: Key word specification in WLAN Monitoring Window

RX	Total receiving rate of the WLAN.
TX	Total sending rate of the WLAN.
Client	The number of clients connected to the WLAN.
Client Band	The working band distribution of clients connected to the WLAN, including number of clients working on 2.4GHz band and number of clients working on 5GHz band.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: <ul style="list-style-type: none"> <li>• Best— Number of clients which signal strength is more than 30.</li> <li>• Good— Number of clients which signal strength is between 15 ~30.</li> <li>• Fair—Number of clients which signal strength is less than 15.</li> </ul>

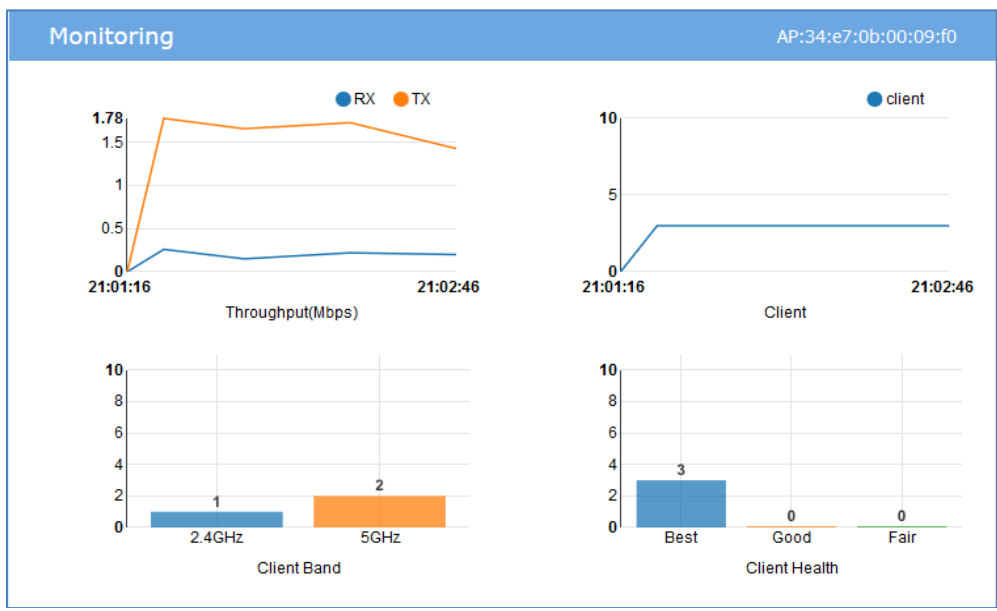
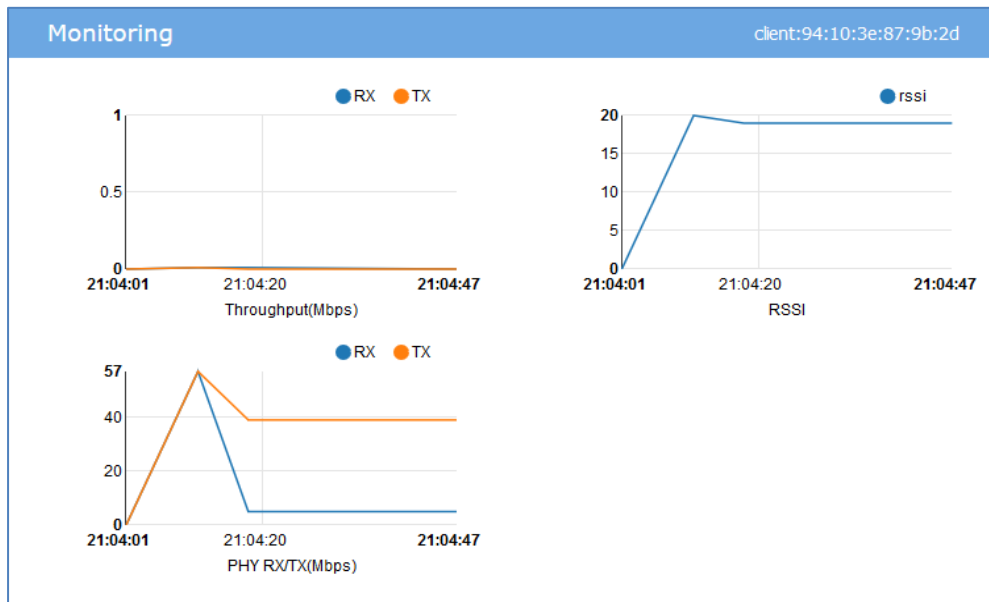


Figure 4-10 Monitoring Window - AP

**Table 4-9: Key word specification in AP monitoring Window**

RX	Total receiving rate of the AP.
TX	Total sending rate of the AP.
Client	The number of clients connected to the AP.
Client Band	The working band distribution of clients connected to the AP, including number of clients working on 2.4GHz band and number of clients working on 5GHz band.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: <ul style="list-style-type: none"> <li>• Best— Number of clients which signal strength is more than 30.</li> <li>• Good— Number of clients which signal strength is between 15 ~30.</li> <li>• Fair—Number of clients which signal strength is less than 15.</li> </ul>



**Figure 4-11 Monitoring Window - Client**

**Table 4-10: Key word specification in Client Monitoring Window**

RX	Receiving rate of the client.
TX	Sending rate of the client.
RSSI	Received Signal Strength Indication of the client
PHY RX	Physical receiving rate of the client.
PHY TX	Physical sending rate of the client.



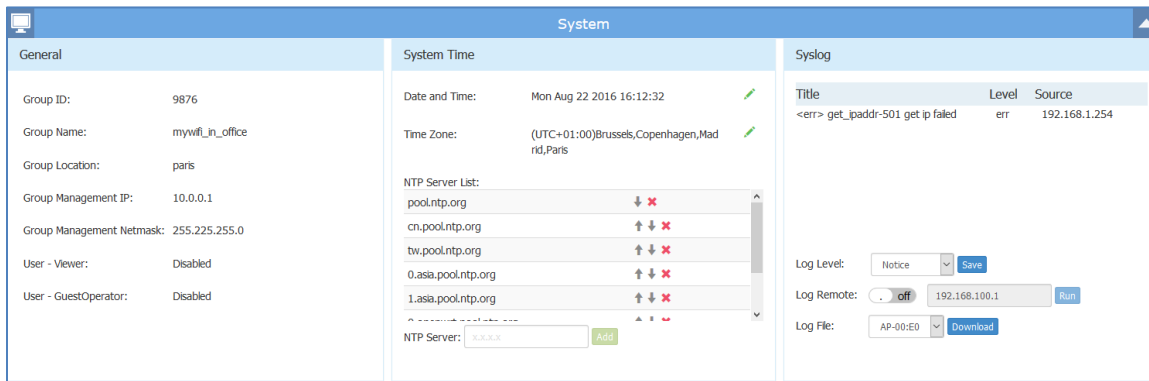
Note 4-3: The data shown in the monitoring window is collected and displayed while the window is open. The data is not stored and no historical view of the data is available.

**Note**

## System Page

The System page focus on the basic settings of the AP group, including: AP group attributes, system management accounts, system time and syslog.

It is divided into three windows in System Page: General window, System Time window and Syslog window, illustrated in Figure 4-12 System page.



**Figure 4-12 System page**

## General Window

General Window displays the basic information of the wireless system. There are two modes for General Window, Simplified Mode illustrated in Figure 4-13 General Window - Simplified Mode and Advanced Mode illustrated in Figure 4-14 General Configuration Window -Advanced Mode. You can launch the Advanced Mode from Simplified Mode by clicking the General Window Frame.

General	
Group ID:	8818
Group Name:	mywifi_in_office
Group Location:	Paris
Group Management IP:	192.168.20.162
Group Management Netmask:	255.225.255.0
User - Viewer:	Enable
User - GuestOperator:	Enable

Figure 4-13 General Window - Simplified Mode

The General Configuration window includes two tabs: **Group Info Management** and **Account management**, illustrated in Figure 4-14 .

### Group Info Management

Group Info Management contains the basic information of the AP group, you can edit it with your own group settings to identify a private Wi-Fi network.

Figure 4-14 General Configuration Window -Advanced Mode

Table 4-11: Key word specification in Group Info Management Tab

<b>Group Name</b>	Name of the AP group.
<b>Location</b>	Location of the AP group.
<b>Group Management IP</b>	A virtual IP address for AP group management, default is 10.0.0.1, see more in Note 4-4.
<b>Group Management Netmask</b>	Netmask of Group Management IP.
<b>Group ID</b>	Identification of the AP group, default is 100.



### Note

Note 4-4: AP of a group usually obtains its IP address dynamically from a DHCP server, and it is difficult to keep the same assigned IP address for the AP. So managing the AP group by the AP's dynamic IP address can be difficult. The Group Management IP (GMIP) is a static IP address configured for the AP group web management, and you can manage the AP group via accessing the URL: <http://GMIP:8080> by wired or wireless. The GMIP is configured on the PVC of the AP group, and you have to make sure the GMIP on the PVC is routable from your configuring terminal (browser). A recommended method is to choose an idle IP address from the AP group domain to configure as a GMIP.

## Account Management

There are three login accounts with different privileges: Administrator, Viewer, and GuestOperator.

Administrator account allows configuring and viewing the whole system, Viewer account allows checking configuration and monitoring of WLAN operations, while GuestOperator ONLY has the privilege to edit the guest portal users. Each account can be logged in at the same time.

By default, only the Administrator account is enabled; Viewer and GuestOperator are disabled.

In the Account Management tab, you can enable/disable the Viewer and GuestOperator account, change the password for Administrator, Viewer and GuestOperator, illustrated in Figure 4-15.

General Configuration

Group Info Management Account Management

**Administrator** -----

Password:  (4-16 chars)

Confirm:

**Viewer** -----  Enable  Disable

Password:  (4-16 chars)

Confirm:

**GuestOperator** -----  Enable  Disable

Password:  (4-16 chars)

Confirm:

Tip: In order to ensure user security, please set the different password!

Figure 4-15 Account Management Tab

The password must be composed by 0-9 or a-z with the length of 4 to 16 characters.

## Certificate Management

AP support 3 types of build-in certificates, user can customize their own certificate on demand:

- (1) Internal Web Server - The certificate is utilized to setup the secure connection between web browser and AP web server for https management. By default, there is a build-in CA certificate generated by ALE with the domain 'mywifi.al-enterprise.com'. User can use open SSL to generate his/her own CA certificate and replace the default one (User needs to use domain 'mywifi.al-enterprise.com' for your own certificate because the login URL cannot be changed).
- (2) Internal Portal Server - The certificate is utilized to setup the secure connection between captive portal page and the AP web server for protecting the user login credentials being stolen. User can define its own captive login URL and replace the certificate accordingly.
- (3) External Portal Server - The certificate is utilized to setup the secure connection between captive portal page and the AP web server for protecting the user login credentials being stolen. User can define its own captive login URL and replace the certificate accordingly.

The screenshot shows the 'General Configuration' window with the 'Certificate Management' tab selected. The 'Certificate' section contains the following fields:

- Name: (4-20 chars)
- Certificate Type: Internal Web Server(Domain)
- Certificate File: Choose File | No file chosen
- Password: (4-16 chars)
- Confirm:
- Certificate Format: PEM

Buttons for 'Cancel' and 'Add' are located below the form. Below the form is a 'Certificate List' table with the following columns: Name, Certificate, Type, Format, Status, and Operate.

Figure 4-16 Certificate Management Tab

## System Time Window

It is important to ensure the system time is correct, this is because proper communication between network elements and syslog for troubleshooting are based on the correct time.

Network Time Protocol (NTP) is a networking protocol for time synchronization between the elements across the network. If you don't have a private NTP server in your network, it is suggested to add your favorite NTP server and prioritize it to the top of the NTP Server List, or use the default NTP servers in the system, illustrated in Figure 4-17 System Time.

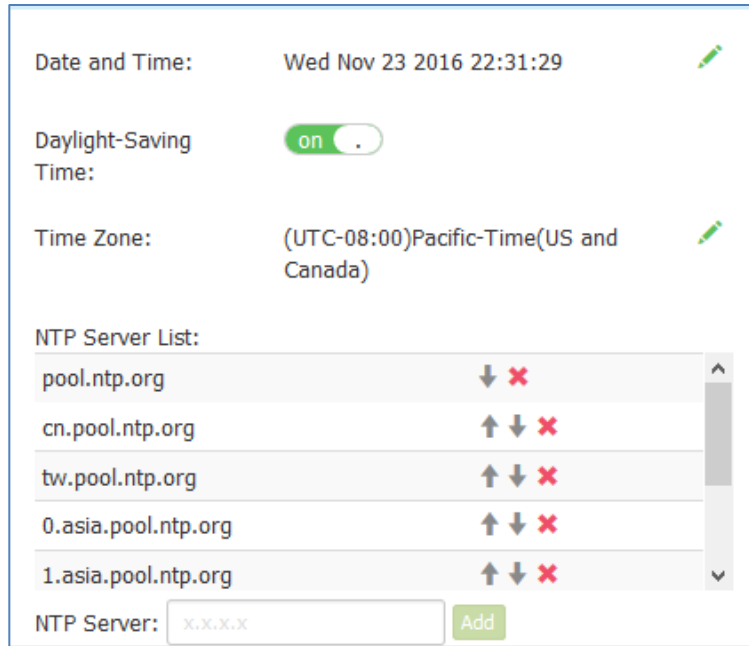


Figure 4-17 System Time Window

If configured, APs in the group synchronize the time with NTP sever in 15-minute intervals.

You can also specify the **Time Zone** and daylight-saving time of the AP group to coordinate with the local time. The daylight-saving time is automatically enabled on supporting time zone.



**Note**

Note 4-5: In order to ensure time synchronization, it is recommended to check the reachability before adding an NTP server. If the NTP server is not configured or is unreachable, an AP reboot may lead to variation in time.

## Syslog & SNMP Window

Syslog is a standard for message logging. Syslog is used for system management and security auditing as well as general informational, analysis, and debugging messages.

APs in group generate logs following the standard of Syslog, you can view logs and configure corresponding attributes in the Syslog Window.

Upper part of the Syslog Window displays **error** (and lower, see in Note 4-5) level Syslog generated by APs in the group.

**Title** is the content of the log message;

**Level** is the severity of the log message;

**Source** is the generator's IP address of the log message;

When you move the mouse cursor to certain row of log message, the generating time of the log displays, illustrated in Figure 4-18 Syslog Window.

Figure 4-18 Syslog Window

**Log Level:** Setting of Syslog message severity. If certain level is specified, the AP group will generate Syslog messages including all lower levels. That is, if Syslog messages are separated by individual severity, a Warning level entry will also be included in Notice, Info and Debug processing. Notice is the default level of Syslog setting, and the system generates logs including levels of Notice, Warning, Error, Critical, Alert and Emergency.

**Log Remote:** Setting of remote log server. If configured and enabled, besides storage in local file, Syslog messages of all APs in group can be sent to and stored in the server once generated.

**Log File:** Download the log file on a selected AP in the group to your configuring machine. Syslog messages are stored in a local file when generated. For one AP, up to 1MB size of syslog messages can be saved in the local log file. The log file is FIFO, new syslog messages will replace the old ones if the size exceeds 1MB.

**Note**

Note 4-5: Syslog is divided into eight levels, and lowest level 0 is Emergency severity while highest level 7 is Debug severity. Definition of Syslog severity as follow:

Level Value	Severity	Keyword	Description
0	Emergency	emerg	System is unusable
1	Alert	alert	Should be corrected immediately
2	Critical	crit	Critical conditions
3	Error	err	Error conditions
4	Warning	warning	May indicate that an error will occur if action is not taken
5	Notice	notice	Events that are unusual, but not error conditions
6	Informational	info	Normal operational messages that require no action
7	Debug	debug	Information useful to developers for debugging



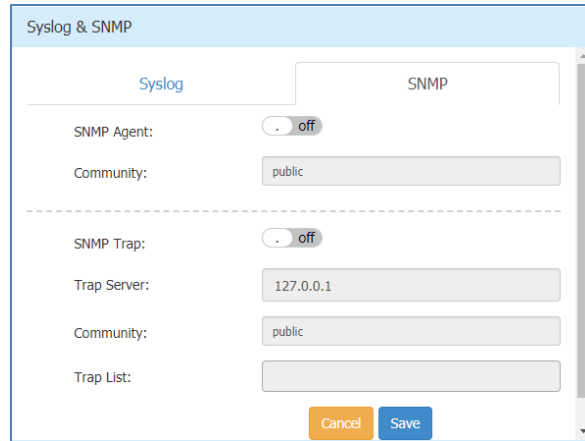


Figure 4-19 SNMP Window

With SNMP user can monitor AP status in the group through traditional network management platform.

- **SNMP Agent** - Enable/Disable the SNMP agent on AP. Network management platform can fetch information from AP through SNMP protocol.
- **Community** - The credential used to communicate between AP and network management platform.
- **SNMP Trap** - Enable/Disable AP to send trap to network management platform.
- **Trap Server** - Network management platform to which AP send SNMP traps.
- **Trap List** - Specify the trap items needs to be sent to network management platform.

## Wireless Page

The Wireless page focuses on advanced wireless functions, including three windows: RF (Radio Frequency), Wireless Intrusion Detection System/Wireless Intrusion Prevention System (wIDS/wIPS), and wireless performance optimization, illustrated in Figure 4-20 Wireless Page.

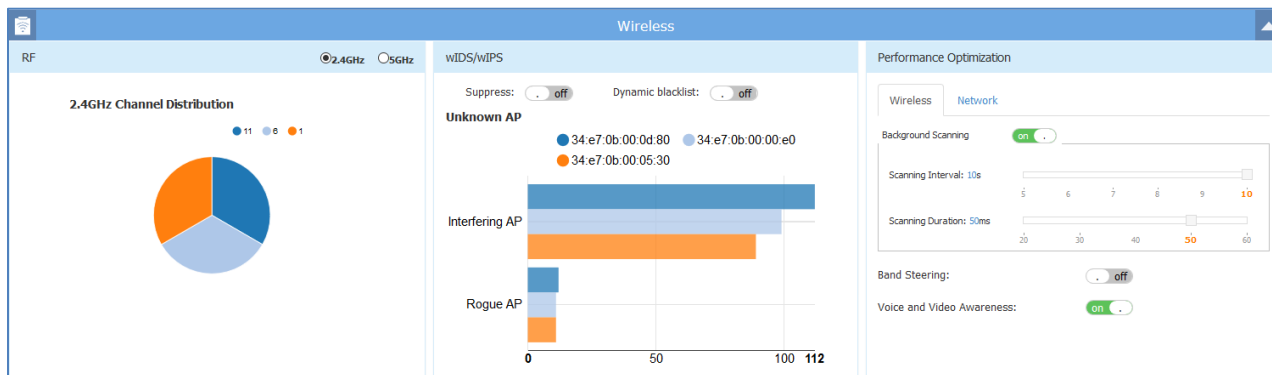


Figure 4-20 Wireless Page

## RF Window

Radio Frequency (RF) window is for monitoring the wireless utilization and configuring wireless attributes like channel and transmitting power.

There are two modes for RF Window, Simplified Mode illustrated in Figure 4-21 RF-2.4GHz and Advanced Mode illustrated in Figure 4-23. You can launch the Advanced Mode from Simplified Mode by clicking the RF Window Frame.

Panel of RF displays the monitoring information of channel distribution, can be selected on 2.4G band or 5G band. Channels are separated by different colors, when you move the mouse cursor to the colored section of the pie chart, it displays the clients connected to the AP group through 2.4G band or 5G band, illustrated in Figure 4-21 RF-2.4GHz and Figure 4-22 RF-5GHz.

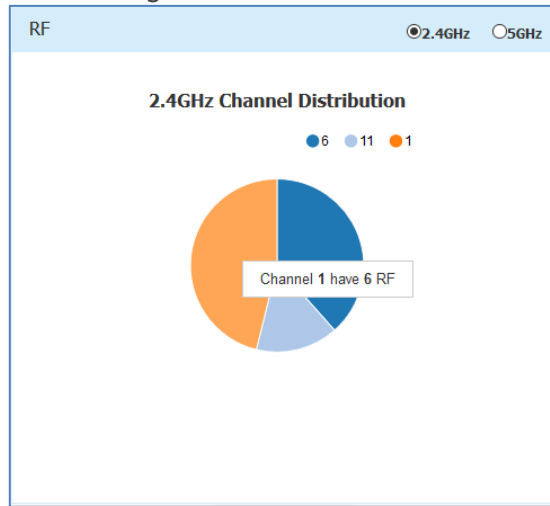


Figure 4-21 RF-2.4GHz

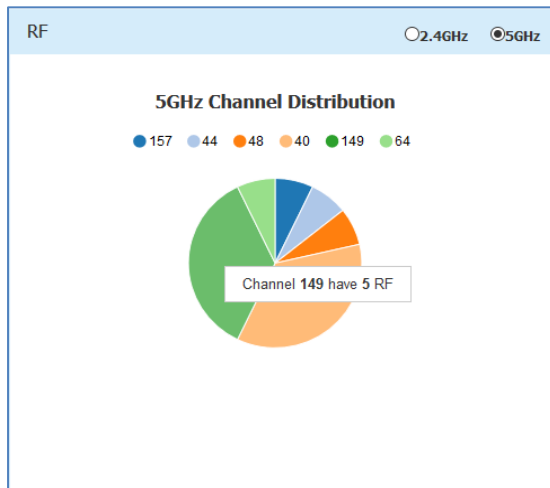


Figure 4-22 RF-5GHz

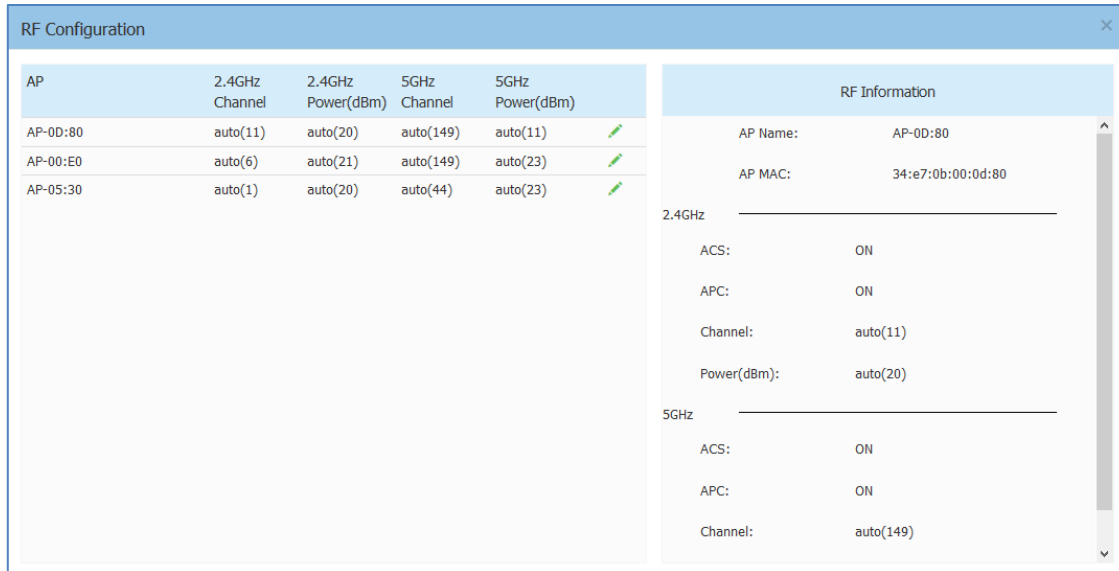


Figure 4-23 RF Configuration Window

The left side of the RF Configuration window displays the list of working channels and transmitting power of all APs in the group. When you pick an AP from the list, its detailed RF information is displayed on the right side of the window, illustrated Figure 4-23.

By default, the working channel and transmitting power are automatically managed by Radio Dynamic Adjustment™ (RDA) technology. If you want to set the channel and power values for an AP manually, you need to disable the ACS/APC function on the AP, illustrated in Figure 4-24.

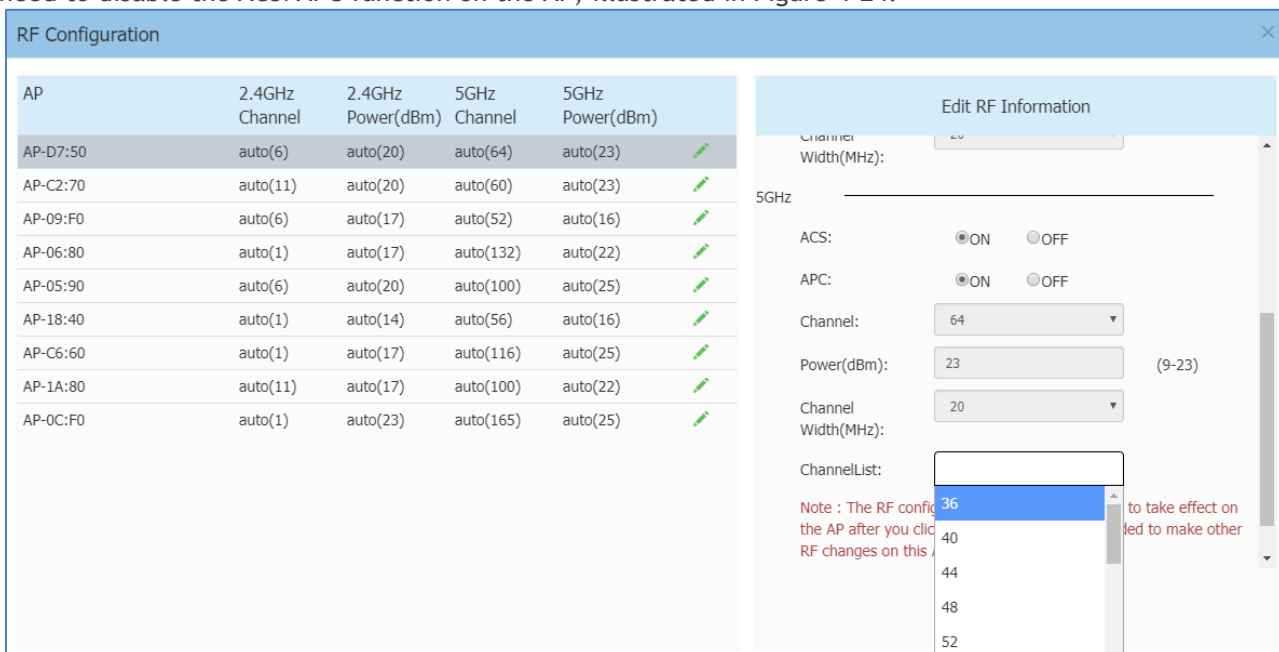


Figure 4-24 Edit RF Information



**Note** Note4-6: Radio Dynamic Adjustment™ (RDA) is a technology that adjusts the radio working channel and transmitting power according to the wireless environment around it. It includes Auto Channel Selection (ACS) and Auto Power Control (APC) functions. By default, RDA is enabled.

RDA relies on the background scanning feature. To ensure the RDA is effective, make sure the background scanning is ON, see “[Performance optimization Window](#)”.

## wIDS/wIPS Window

wIDS/wIPS window focus on the wireless security of the Stellar AP network.

Wireless is a borderless network and always works in an open environment which can be interfered with and attacked. It is useful to discover the surrounding wireless conditions, and based on that, provide instructions and tools to help administrators improve the quality of the wireless network. Usually there are two types of foreign unknown APs having a negative effect on the wireless network, they are interfering APs and rogue APs.

An **interfering AP** is an AP seen in the wireless environment but not connected to the wired network. The interfering AP can provide RF interference potentially, however, it is not considered a direct security threat, because it is not connected to the wired network.

A **rogue AP** is an unauthorized AP plugged into the wired side of the network or a foreign interfering AP broadcasting the same SSID with the AP group. A rogue AP is considered a security threat to the AP group.

Panel of wIDS/wIPS displays top 5 Stellar APs with interference from surrounding APs, and the top 5 Stellar APs with the most rogue APs surrounding, illustrated in Figure 4-25.

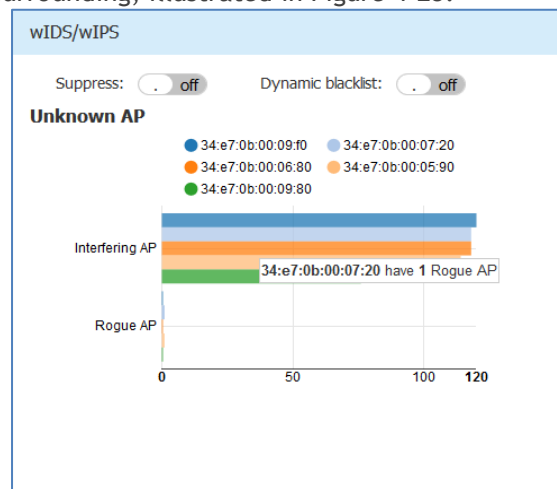


Figure 4-25 Top 5 AP interfered

**AP whitelist:** Both interfering APs and rogue APs are foreign unknown APs which can be found by background scanning and are listed in the unknown AP table, illustrated in Figure 4-26. However, some foreign APs found are trusted APs, those are not suitable for being classified as interfering APs or rogue APs. To avoid trusted foreign APs from being classified as interfering APs or rogue APs, you can add the trusted MAC address or MAC prefix to the AP whitelist, illustrated in Figure 4-27. If a foreign AP MAC address is added to the whitelist, it will not be displayed in the unknown AP list.

**AP blacklist:** Only rogue APs can be added to the blacklist. If a rogue AP is added to the blacklist, it cannot change its role to act as a client and access to the Stellar AP wireless network, illustrated in Figure 4-28.

**Suppress:** Enable/disable the function of rogue AP suppress. If enabled, the detecting Stellar AP will send DEAUTH frames to clients that have associated to the rogue AP, keeping the clients away from the unsafe wireless network. By default, the detecting Stellar AP does not send DEAUTH frames, see in Figure 4-25.

**Dynamic blacklist:** If enabled, all the rogue APs found will be added to the AP blacklist automatically, which prevents the rogue AP from changing its role to act as a client and access to Stellar AP wireless network. By default, the rogue AP is not added to the blacklist automatically, see in Figure 4-25.

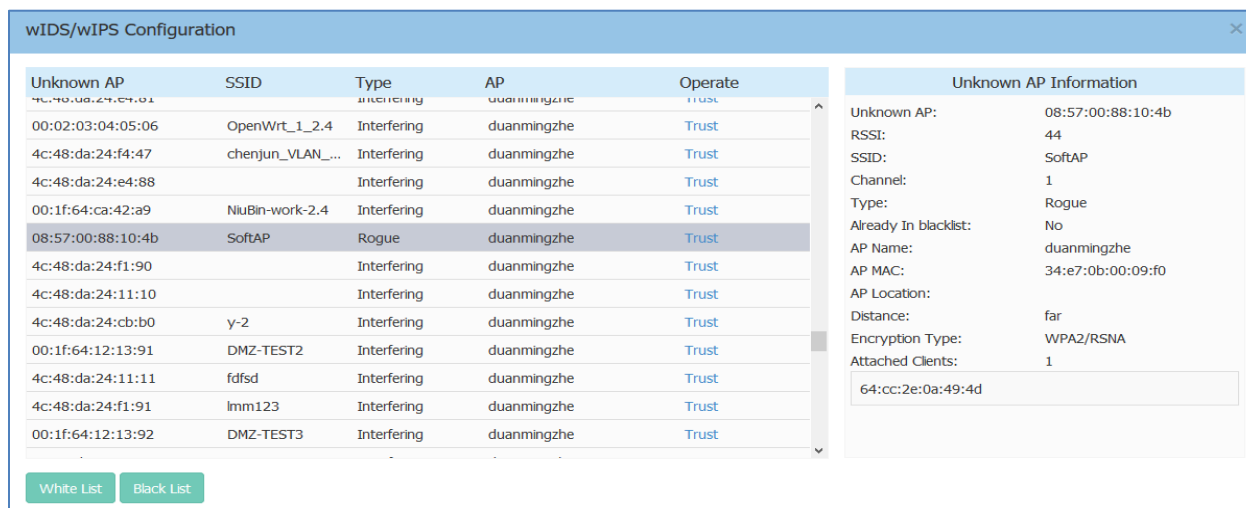


Figure 4-26 wIDS/wIPS Configuration Window

Table 4-12: Key word specification in wIDS/wIPS Configuration Window

Unknown AP Parameter	Specification
Unknown AP	MAC address of the unknown AP detected in the nearby.
SSID	SSID broadcasting by the unknown AP.
Type	Classified result of the unknown AP, can be interfering AP or rogue AP.
RSSI	Received Signal Strength Indication of the unknown AP.
Channel	Working channel of the unknown AP.
Already In Blacklist	Flag of rogue AP, depends on “the Dynamic blacklist” switch. If on, the rogue AP will be automatically added to the blacklist and the flag is true (Yes); If off or the unknown AP in list is not a rogue AP, the flag is false (No).
AP/AP Name	Name of detecting AP in the group.
AP MAC	MAC of detecting AP in the group.
AP Location	Location of detecting AP in the group.
Distance	Distance between unknown AP and the detecting AP in the group, it is measured by RSSI of the unknown AP: Nearest- RSSI>75; Near- 50<RSSI<75; Far-25<RSSI<50; Farthest-RSSI<25;
Encryption Type	The encryption type of the SSID being broadcast by the unknown AP.
Attached Clients	The number of clients attached to the unknown AP, and MAC of each client.
Operate	Operation to trust the foreign AP and delete it from the unknown AP list. If the foreign AP is trusted, its MAC address will be added to the whitelist.
White List	Whitelist of foreign APs. Those not considered as security threat to the Stellar AP network, you can add the trusted MAC address into whitelist manually, see more in Figure 4-27.

Black List	<p>Blacklist of foreign APs. Those classified as rogue APs and pretending to act as a client to access the Stellar AP network. If <b>Dynamic blacklist:</b> <span style="color: green;">on</span> and there are detected rogue APs, all the rogue APs will be added to the blacklist automatically. You can remove a foreign AP from the blacklist by the <b>Trust</b> operation, see more in Figure 4-28.</p>
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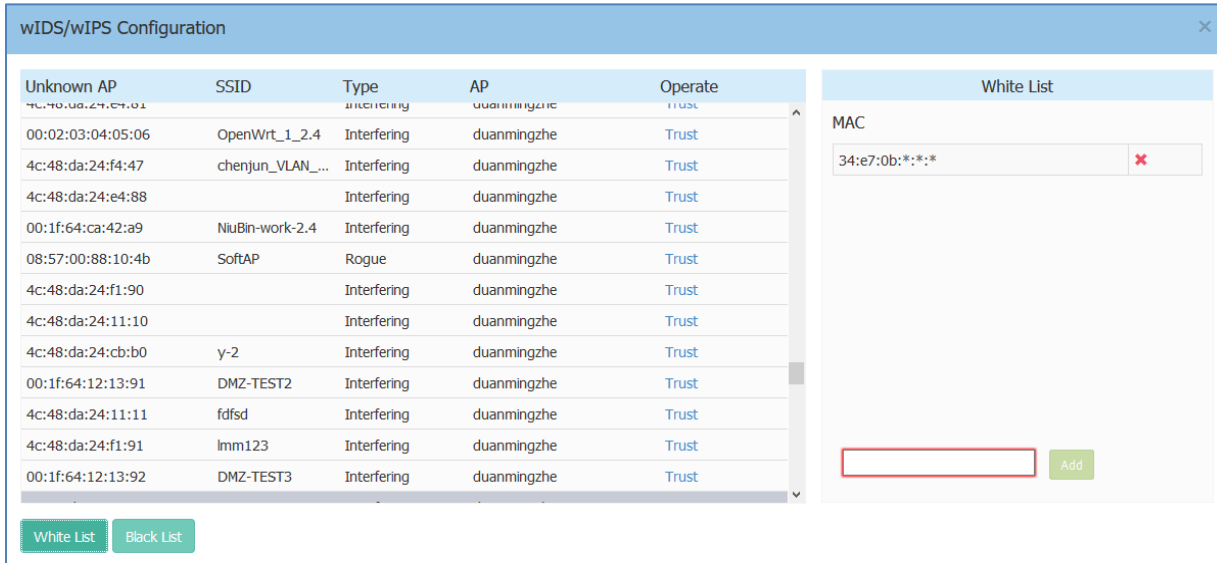


Figure 4-27 Foreign AP Whitelist

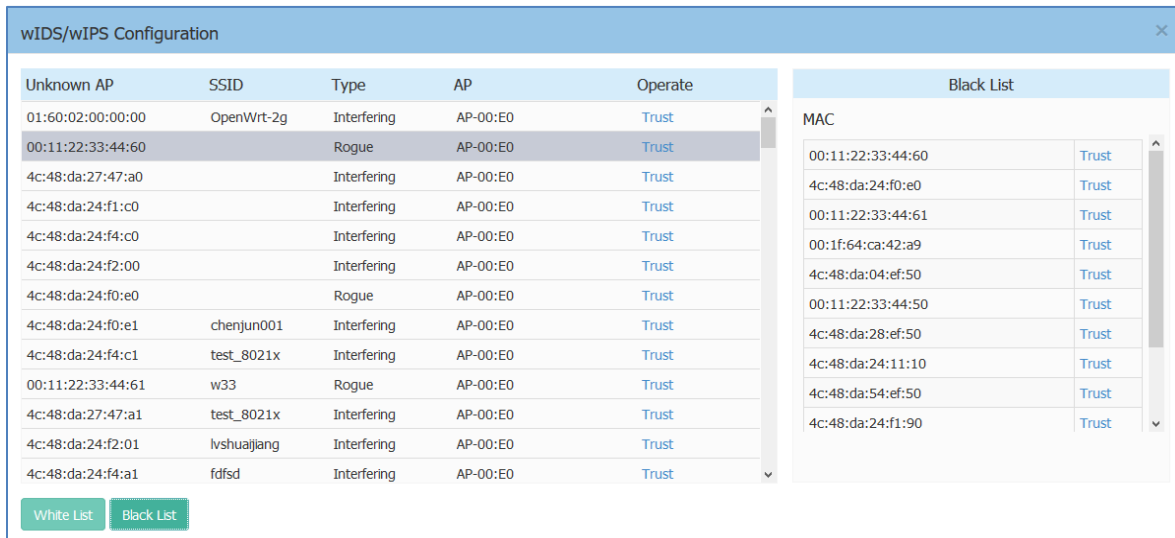


Figure 4-28 Foreign AP Black List

You can remove a foreign AP from the Unknown AP list or blacklist by the **Trust** operation. If you trust an unknown AP (interfering AP/rogue AP), it is removed from the Unknown AP list and blacklist, and its MAC address will be added to whitelist.

## Performance Optimization Window

Wireless performance optimization is useful to enhance the quality of wireless service for users. The performance optimization includes Background Scanning, Band Steering, Load Balance, RSSI Threshold, Roaming RSSI, Voice and Video Awareness, and Airtime Fairness, illustrated in Figure 4-29.

The screenshot shows the 'Performance Optimization' configuration page. It features several sections:

- Background Scanning:** A toggle switch is turned 'on'. Below it are two sliders: 'Scanning Interval: 11s' (set to 11) and 'Scanning Duration: 50ms' (set to 50).
- Band Steering:** A toggle switch is turned 'on'. There is a 'Force 5G' checkbox (unchecked) and an 'Exclude' button.
- Load Balance:** A toggle switch is turned 'on'.
- RSSI Threshold:** Input fields for '2.4G' and '5G' are both set to '0', with a 'Save' button.
- Roaming RSSI:** Input fields for '2.4G' and '5G' are both set to '0', with a 'Save' button.
- Voice and Video Awareness:** A toggle switch is turned 'off'.
- Airtime Fairness:** Toggle switches for '2.4G' and '5G' are both turned 'off'.

Figure 4-29 Wireless Optimization Tab

**Background Scanning:** Wireless networks operate in environments with electrical and radio frequency devices that can interfere with network communications. Microwave ovens, cordless phones, and even adjacent Wi-Fi networks are all potential sources of continuous or intermittent interference. The background scanning is able to examine the radio frequency (RF) environment in which the Wi-Fi network is operating, identify interference and classify its sources.

Background scanning is the basis for some advanced features such as: wIDS/wIPS, RDA (ACS/APC) etc. When it's turned OFF, the foreign AP detection and rogue suppression will stop and the RDA will drop its precision. By default, background scanning is enabled.

**Band Steering:** Band steering supports **Prefer 5GHz**.

**Prefer 5GHz** feature assigns the dual band clients to the 5 GHz band prior to the 2.4G band. Thus can reduce co-channel interference and increase available bandwidth for clients, because there are more channels on 5 GHz band. By default, band steering is enabled. When Band Steering is enabled and Force 5G is NOT selected, AP is working in Prefer 5G mode.

**Force 5G:** AP forces dual band clients to connect to the 5 GHz band. Dual band clients are not allowed to connect 2.4G radio. Those clients only supporting 2.4G band are permitted to connect to 2.4G radio. When Band Steering is enabled and Force 5G is selected, AP is working in Force 5G mode.

**Exclude:** Excludes the clients from Band Steering. For example, user can exclude some dual band voice terminals from Band Steering and AP will let those terminals choose wireless band to connect freely.

**Load Balance:** The principle of this is to provide fair distribution of clients among neighboring APs. Based on the client density, channel utilization on adjacent APs, and associating clients RSSI value, it is steered from a busy AP to an idle AP. The thresholds for client density is 10, channel utilization is 70% for 2.4G and 70% for 5G. By default, Load Balance is enabled.

**RSSI Threshold:** Wireless access control, client with lower RSSI value than configured setting is forbidden to access. By default, RSSI threshold is disabled (0). RSSI threshold can be applied to 2.4G band or 5G band separately. Recommended 2.4G (5), 5G (10). RSSI threshold is recommended to be deployed in high density scenario.

**Roaming RSSI:** Wireless access control, client with lower RSSI value than setting is forced to roaming. By default, roaming RSSI is disabled (0). Roaming RSSI can be applied to 2.4G band or 5G band separately. Roaming RSSI is used in conjunction with 802.11k and 802.11v. Clients that support these protocols will be informed with sufficient information on which AP to roam to when the threshold is breached. When 802.11k and 802.11v is enabled. Recommended 2.4G (10), 5G (15).

**Voice and Video Awareness:** Background scanning needs to be aware of existing traffic on the Stellar AP, if there is an ongoing voice/video service, scanning should not be done to ensure uninterrupted traffic; and allows to resume scanning when there is no active voice/video session. By default, Voice and Video Awareness feature is disabled.

**Airtime Fairness:** All clients share the wireless transition time slice equally, even with traditional low speed clients present. By default, Airtime fairness is disabled.

## Access Page

The Access page focuses on user access management including: user authentication, user blacklist and whitelist and user access control list.

The Access page is divided into three windows: Authentication window, Blacklist & Whitelist window, ACL window, illustrated in Figure 4-30.

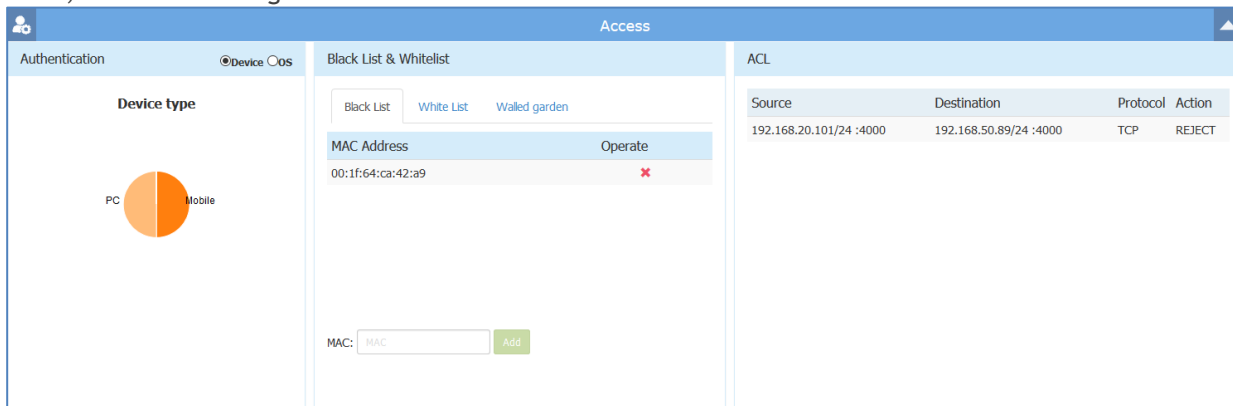


Figure 4-30 Access Page

## Authentication Window

Authentication Window displays the user authentication and accessing information.



There are two modes for Authentication Window, Simplified Mode illustrated in Figure 4-31 and Advanced Mode illustrated in Figure 4-32. You can launch the Advanced Mode from Simplified Mode by clicking the Authentication Window Frame.

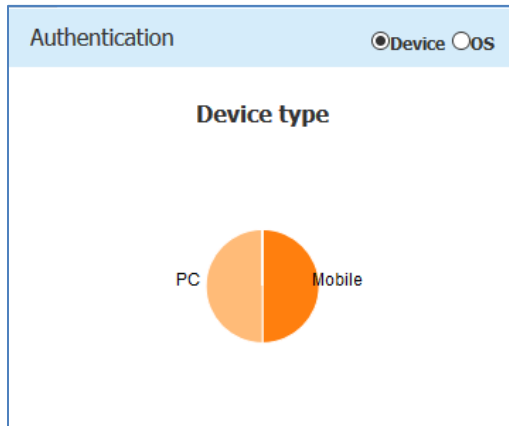


Figure 4-31 Authentication Window - Simplified Mode

The simplified Authentication Window displays the statistics information of the users' device and operating system, illustrated in Figure 4-31.

The advanced Authentication Window is mainly used to configure the captive portal authentication, illustrated in Figure 4-32.

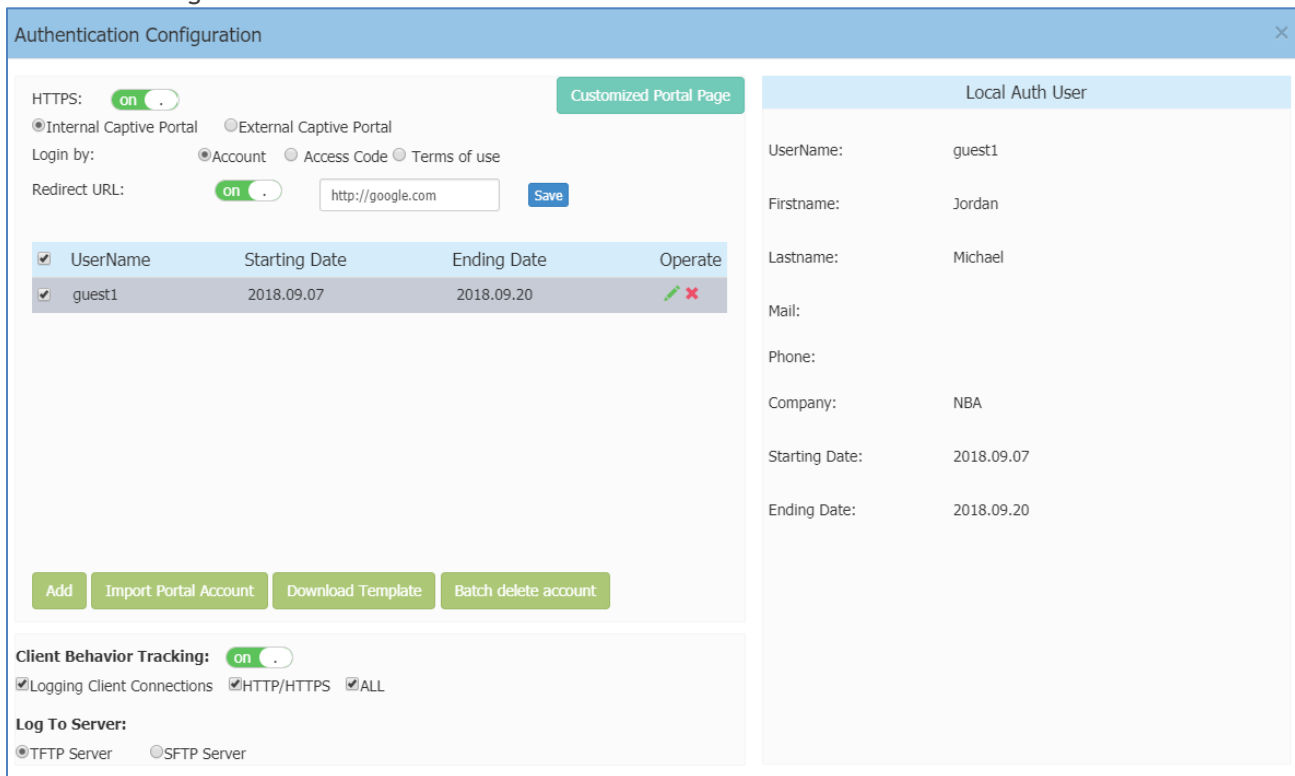


Figure 4-32 Authentication Window - Internal Portal Server

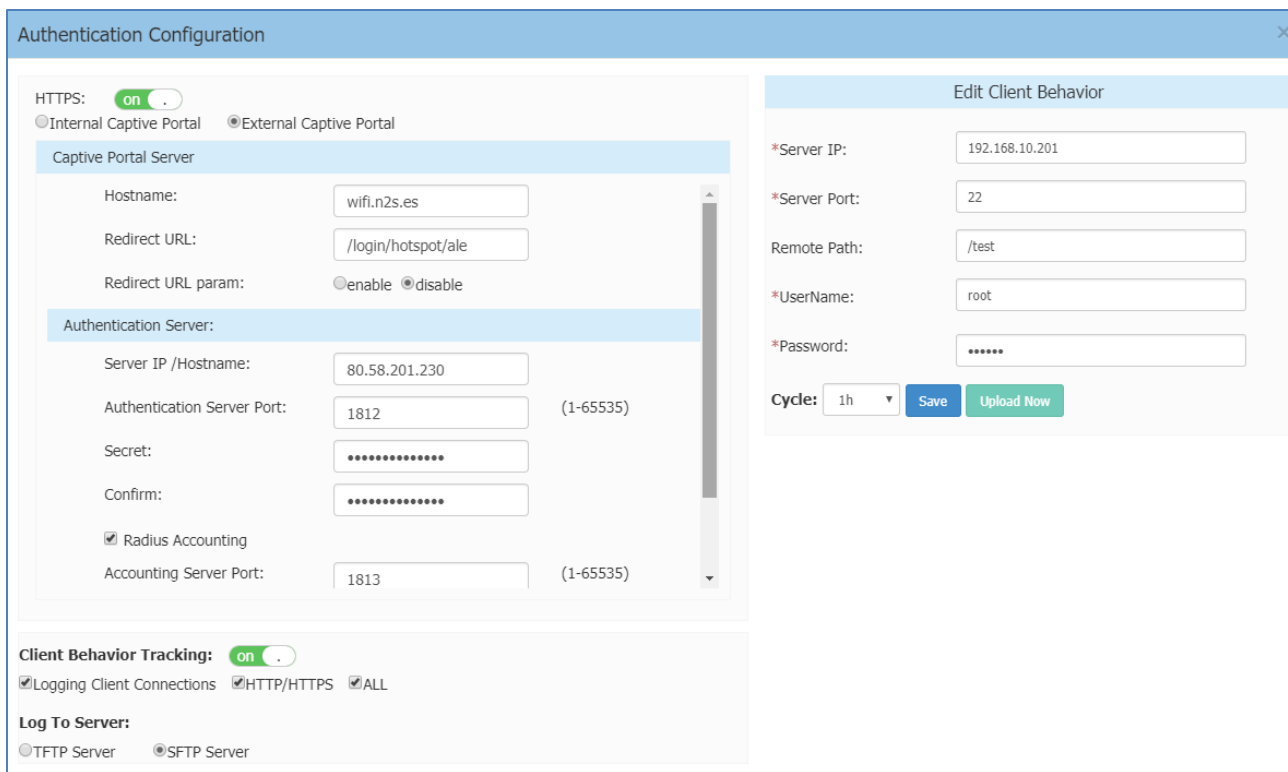


Figure 4-33 Authentication Window - External Portal Server

Table 4-13: Key word specification in Authentication Window (Advanced Mode)

HTTPS	Specify the captive portal login protocol, https or http.
Captive Portal Type	<ul style="list-style-type: none"> <li>Internal Captive Portal - Use AP internal captive portal server for authentication.</li> <li>External Captive Portal - Use external captive portal server for authentication.</li> </ul>
<b>Login by:</b> <input checked="" type="radio"/> Account <input type="radio"/> Access Code <input type="radio"/> Terms Of use	Login method used by the captive portal users, corresponding to different login page and credentials: <ul style="list-style-type: none"> <li>Account - Login by user account, you need to add accounts for portal users, see <a href="#">Create Users or Access Code</a>. The users enter their usernames and passwords to pass the authentication and access the wireless network, see more in <a href="#">Customized Portal Page - Login by Account</a>.</li> <li>Access Code - Login by access code, you need to add access code for portal user, see <a href="#">Create Users or Access Code</a>. The users enter the access code to pass the authentication, see more in <a href="#">Customized Portal Page - Login by access code</a>.</li> <li>Terms of use - Login by terms of use. The users accept the terms of use and pass the authentication, see more in <a href="#">Customized Portal Page - Login by Terms of use</a>.</li> </ul>
<b>Redirect URL:</b> <input checked="" type="checkbox"/>	Redirect user to a specific URL defined by administrator. By default, it is disabled.
UserName	Account of captive portal user.
Starting Date	Account effective starting date.

Ending Date	Account effective ending date.
Operate	Edit or delete captive portal users.
Add	Add users for captive portal authentication when using login by account.
Import Portal Account	Import portal user account through excel file. Suggest downloading the excel template, add user accounts into it and then upload to the AP. Maximum 2000 accounts supported in AP local database for internal captive portal authentication.
Download Template	Download the user account template.
Batch delete account	Batch delete unnecessary user account from AP.
Customized Portal Page	Customized portal web page according to application requirement.
Preview	Preview the customized portal web page.
Default	Return the customized portal web page to the system default.
Client Behavior Tracking	Enable logging user behavior to a TFTP server, including: client online and client offline. More details can see in Note4-7.
Logging Client Connections	<ul style="list-style-type: none"> <li>• HTTP/HTTPS - Record the HTTP/HTTPS web session of wireless clients</li> <li>• ALL - Record the all the session including HTTP/HTTPS of wireless clients</li> </ul>
Log To Server	Specify the TFTP/sFTP server to restore the user behavior logs.
Cycle: 1h	Specify the cycle for uploading user behavior logs to TFTP server, can be set to 1 hour, 2 hours and 4 hours.
Save	Save the TFTP setting for uploading user behavior logs.
Upload Now	Upload the user behavior logs to the TFTP server manually.



Note 4-7: The log information of user behavior includes: username, user MAC, user IP, connecting WLAN, Online/Offline behavior and time stamp.

**Note**

## Customized Portal Page Panel

You can customize your splash page used in the captive portal authentication by changing the Logo, background and terms of use, illustrated in Figure 4-34.

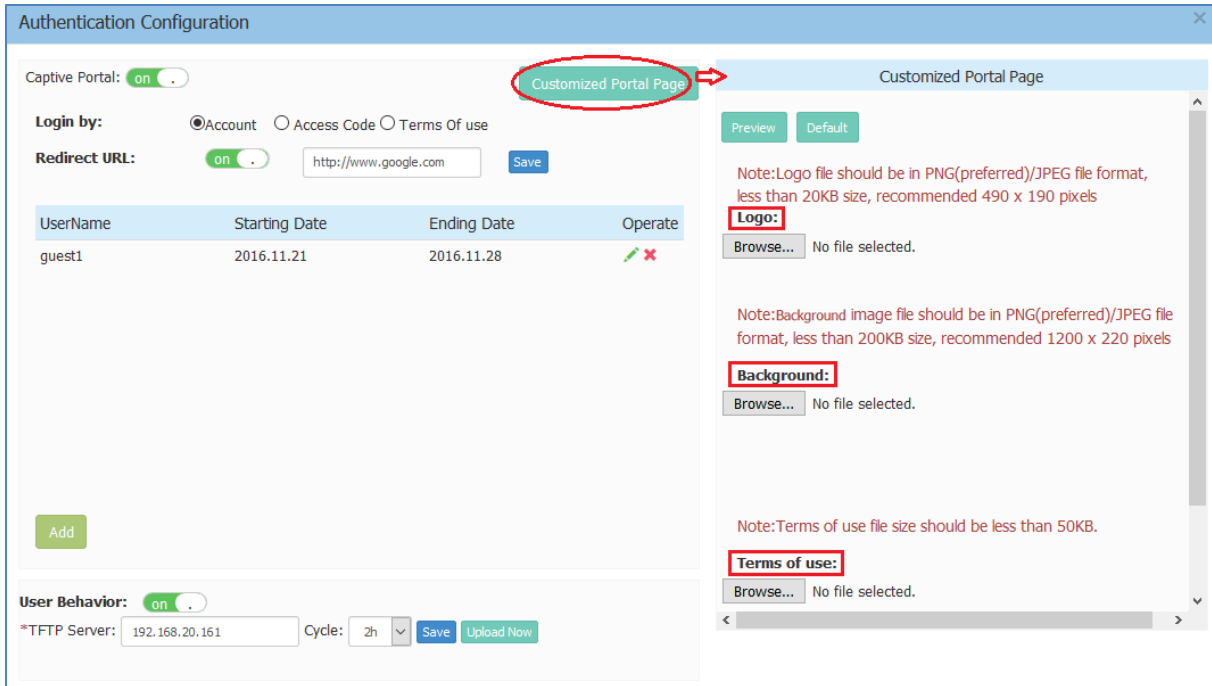


Figure 4-34 Customized Portal Page

There are three splash page templates provided by the system, you can choose your captive portal login method and customize your own splash page accordingly, see more in [Customized Portal Page - Login by Account](#), [Customized Portal Page - Login by access code](#) and [Customized Portal Page - Login by Terms of use](#).

### Customized Portal Page - Login by Account

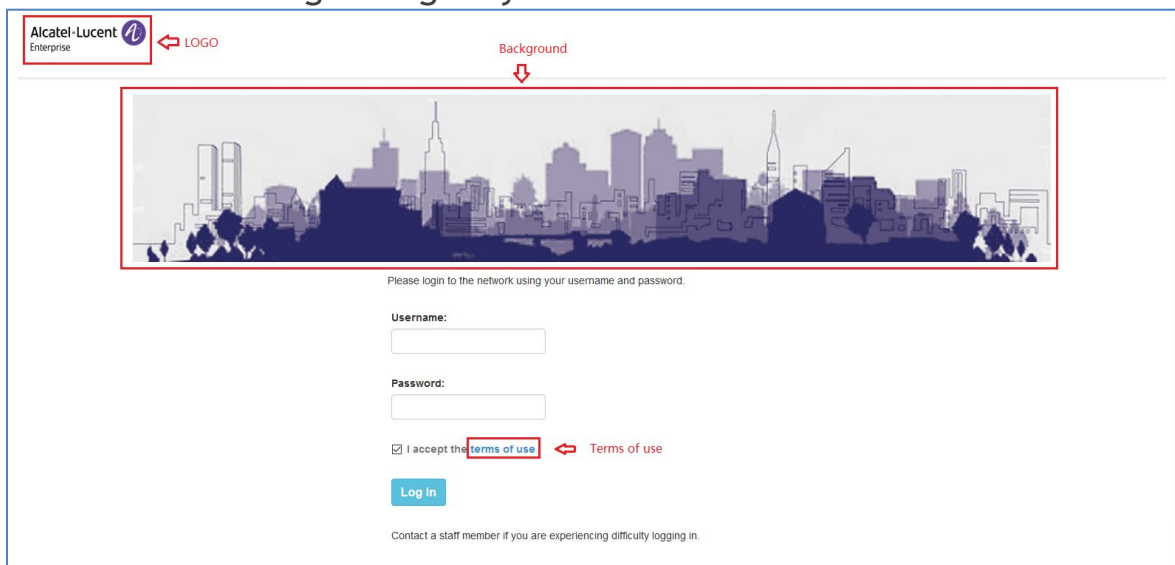


Figure 4-35 Customized Portal Page - Login by account

## Customized Portal Page - Login by Access Code

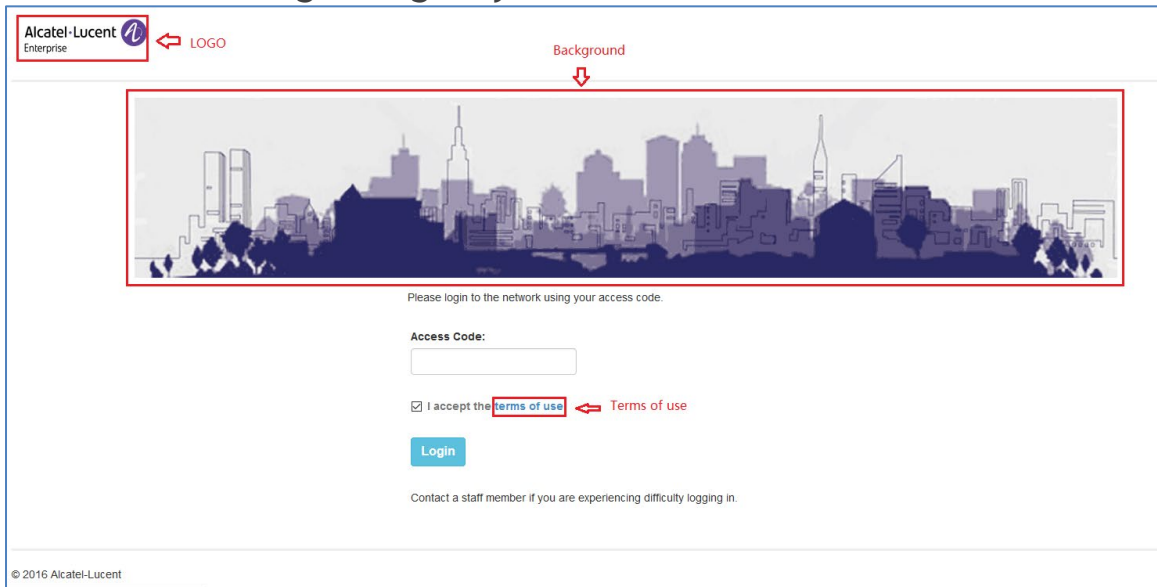


Figure 4-36 Customized Portal Page - Login by access code

## Customized Portal Page - Login by Terms of Use

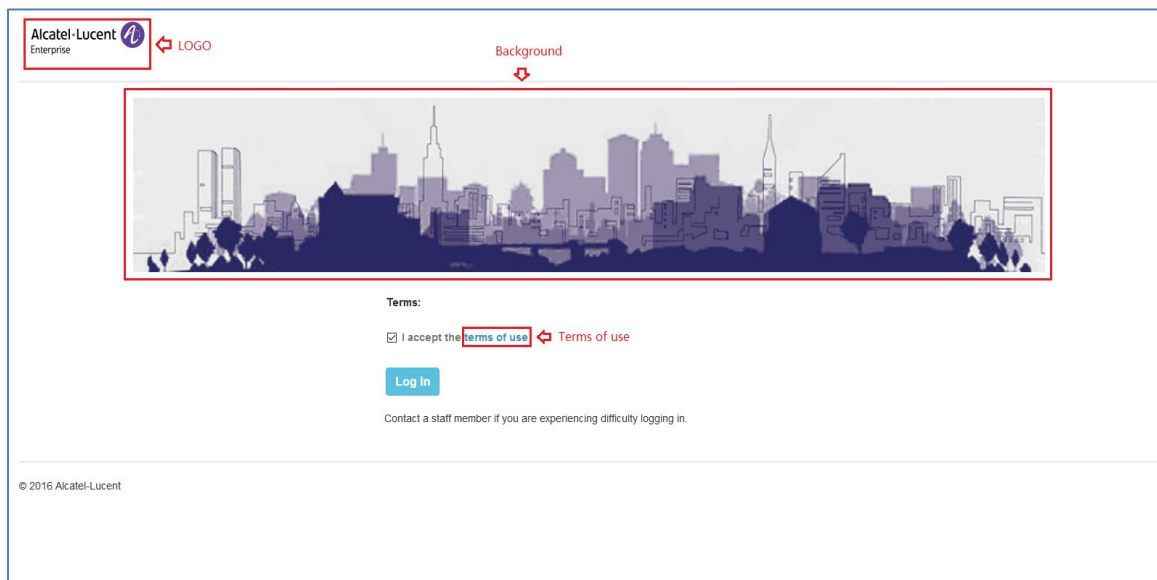


Figure 4-37 Customized Portal Page - Login by Terms of use



Figure 4-38 Customized Portal Page - Terms of use

## Client Blacklist & Whitelist Window

Blacklist & Whitelist Window focuses on the basic access control mechanism for users connecting to the ALE WLAN network based on the client level. It includes three tabs: Black List Tab, Whitelist Tab and Wall Garden Tab.

Those clients on the blacklist are denied to associate to the Stellar AP wireless network. Once a client is in the blacklist, it cannot connect to any WLAN of any security level (Enterprise/Personal/Open). You can add/delete the blacklist based on client's MAC address, illustrated in Figure 4-39.

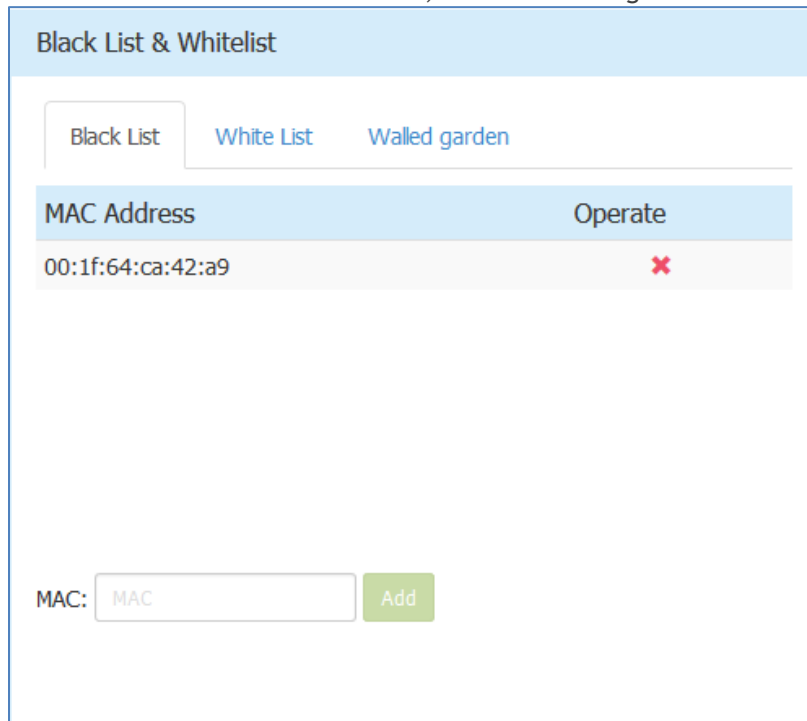


Figure 4-39 Black List Tab

The whitelist is applied to captive portal authentication ONLY. Those clients on the whitelist are permitted to access the network resource without passing the captive portal authentication. You can manually add/remove client(s) to/from the whitelist for captive portal authentication by MAC address, illustrated in Figure 4-40. The whitelist does not support Enterprise/Personal WLANs. This means that the clients in the whitelist are not allowed to access Enterprise/Personal WLANs without using correct credentials.

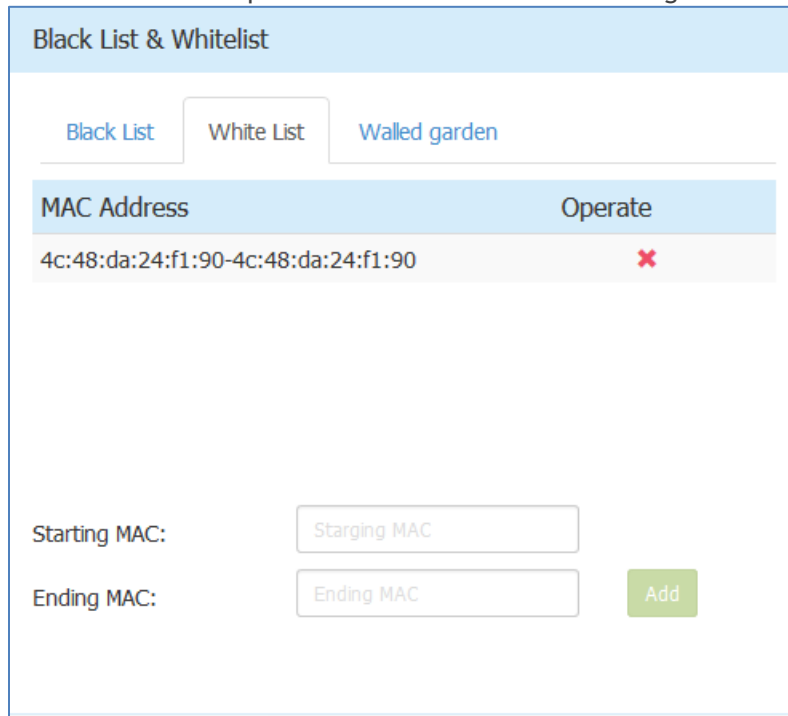


Figure 4-40 Whitelist Tab

The walled garden is a control mechanism over network resources, it restricts access to non-approved applications or content. The walled garden is applied for captive portal authentication ONLY. The client is able to access the network resource (For example: website of the hotel) before passing the captive portal authentication. You can add/remove allowed IP(s) to/from the walled garden, illustrated in Figure 4-41.

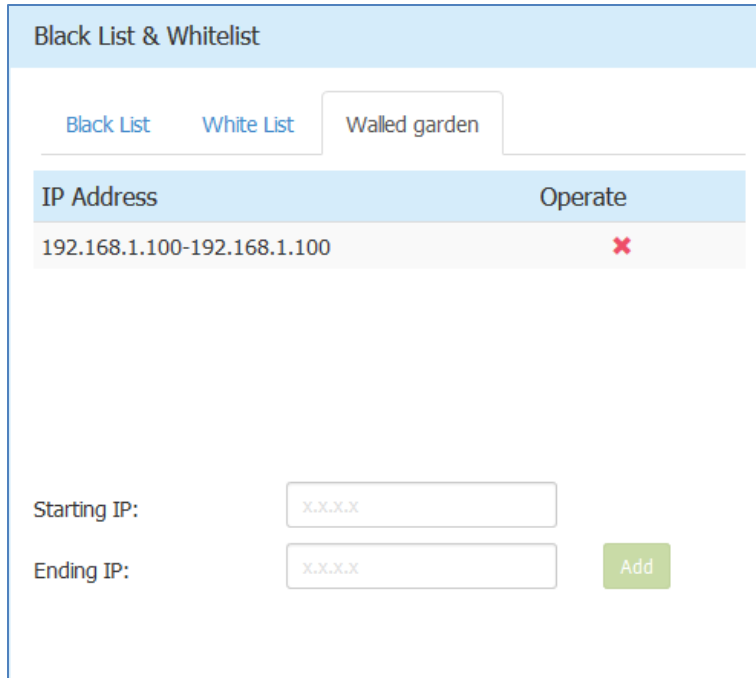


Figure 4-41 Walled Garden Tab



**Note**

Note 4-7: To allow the user to access some network resources (For example: office website or open file server) before passing the captive portal authentication, you have to know the IP address of the network resource and add it into the walled garden.

## Access Control List Window

There are two modes for ACL Window, Simplified Mode illustrated in Figure 4-42 and Advanced Mode illustrated in Figure 4-43. You can launch the Advanced Mode from Simplified Mode by clicking the ACL Window Frame.

The simplified ACL Window displays the ACLs configured, illustrated in Figure 4-42.

You can create L3 ACLs using wildcard entries for both IP address and TCP/UDP/ICMP ports. See the advanced ACL Window illustrated in Figure 4-43.

The ACL rules created in the list are applied sequentially, based on the precedence of top-to-bottom.

By default, traffic is allowed to pass if no ACL rules are matched (Default ACL action is 'Accept').



ACL			
Source	Destination	Protocol	Action
192.168.20.101/24 :4000	192.168.50.89/24 :4000	TCP	REJECT

Figure 4-42 ACL Window - Simplified Mode

ACL Configuration
×

Default ACL Action:  Accept  Reject

Source IP	Destination IP	Protocol	Action	Apply To	Operate

Add

Add ACL

Source IP:   Any

\*Destination IP:   Any

Source Port:   Any

Destination Port:   Any

Protocol Type:  ▼

Action:  ▼

Apply To WLAN:   Any

Apply To EthPort:   Any

Cancel
Save

Figure 4-43 ACL Window - Advanced Mode

Table 4-14 ACL Parameter Specification

Parameter	Specifications
Source IP	The source IP address.
Destination IP	The destination IP address.
Source Port	Source UDP or TCP port.
Destination Port	Destination UDP or TCP port.
IP Protocol	There are three options for IP Protocol, TCP, UDP or ICMP.
Action	Accept or Reject
Apply To WLAN	Indicate the range which the ACL rule take effect for wireless connection, specific SSID or any SSID.
Apply To EthPort	Indicate the range which the ACL rule take effect for downlink wired connection, dedicated for AP1201H.

**Note**

Note 4-8: Stellar AP supports L2 ACLs, you can blacklist/white-list certain MACs or a range of MAC addresses, see [Blacklist & Whitelist Window](#). Also, you can setup rules based on 802.1p/DSCP while creating a new SSID, see [Modify WLAN QoS](#).

## Network Page

The Network page is mainly focus on wired network configuration. For example, user can view and configure AP1201H downlink ports in network page.

AP Model	Ethernet	VLAN ID	Admin Status	Operate
OAW-AP1201H	Eth3		Enable	
	Eth2		Enable	
	Eth1		Enable	

Wired Network Configuration

AP Model: OAW-AP1201H

Ethernet: Eth1

VLAN ID:  (0,2-4090)

Admin Status:  On

Figure 4-44 Network Page

The AP1201H downlink configuration template is always displayed in the Web-UI, even when there is no AP1201H in the cluster. If there isn't any AP1201H in the AP Group, you don't need to change this configuration.

Table 4-15 Wired Network

Parameter	Specifications
AP Model	AP model needs to configure wired link
Ethernet	Ethernet port of AP
VLAN ID	VLAN ID assigned to the Ethernet port
Admin Status	Enable/Disable Ethernet port

# 5 WLAN Configuration

Configuring WLAN should be the first step when setting up your Wi-Fi network. This section contains the following topics:

- [Create NEW WLAN](#)
- [Delete Your WLAN](#)
- [Modify Your WLAN](#)
- [Modify WLAN Qos](#)

## Create New WLAN

To create a new WLAN, click on the hyperlink 'New' to launch the WLAN creation window. There are three security levels of WLANs that can be created: Enterprise, Personal and Open (Captive Portal).

**Enterprise:** Also referred to as 802.1X mode, this is designed for enterprise networks and requires a RADIUS authentication server. This requires a more complicated setup, but provides additional security (e.g. protection against dictionary attacks on short passwords). Various kinds of the Extensible Authentication Protocol (EAP) are used for authentication. Enterprise mode is available with both WPA and WPA2.

**Personal:** Also referred to as PSK (pre-shared key) mode, this is designed for home and small office networks and doesn't require an authentication server. Each wireless network device encrypts the network traffic using a 256 bit key. This key may be entered either as a string of 64 hexadecimal digits, or as a passphrase of 8 to 63 printable ASCII characters. Personal mode is available with both WPA and WPA2.

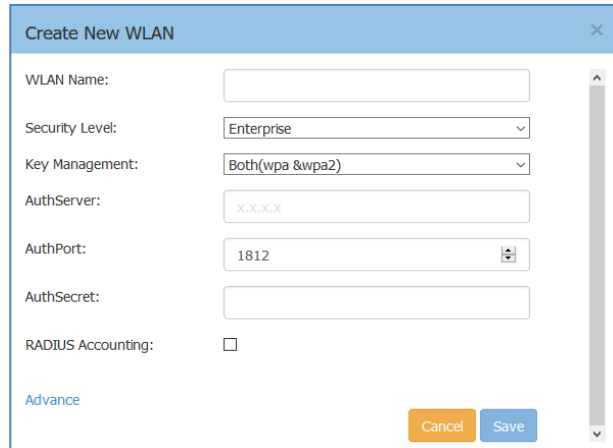
**Open (Captive Portal):** No Authentication or encryption method for the wireless network. User data will be transmitted as plain text transmit mode over the air. Captive portals are mainly used in wireless open networks where the users are shown a welcome message informing them of the conditions of access. Often captive portals are used for marketing and commercial communication purposes and they allow the providers of this service to display or send advertisements to users who connect to the Wi-Fi access points.

## Create an Enterprise WLAN

Enterprise WLAN creation window has two display modes, simplified mode and advanced mode, respectively illustrated in Figure 5-1 and Figure 5-2. You can switch to advanced mode from simplified mode by clicking the hyperlink [Advance](#).

There are six essential parameters needed to be configured in simplified mode, they are WLAN Name, Security Level, Key Management and AuthServer, AuthPort and AuthSecret. Other parameters will be considered as per the default value. To configure other advanced parameters, you must switch to advanced mode. Refer to Table 5-1 for details about each parameter.

## WLAN Configuration



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

- WLAN Name:** An empty text input field.
- Security Level:** A dropdown menu with "Enterprise" selected.
- Key Management:** A dropdown menu with "Both(wpa & wpa2)" selected.
- AuthServer:** A text input field containing "X.X.X.X".
- AuthPort:** A text input field containing "1812" and a small icon to its right.
- AuthSecret:** An empty text input field.
- RADIUS Accounting:** A checkbox that is currently unchecked.
- Advance:** A blue text link.
- Buttons:** "Cancel" (orange) and "Save" (blue) buttons are located at the bottom right.

Figure 5-1 Create Enterprise WLAN - Simplified Mode

# WLAN Configuration

### Create New WLAN

WLAN Name:  (1-32 chars)

Security Level:

Key Management:

AuthServer:

AuthPort:

AuthSecret:

Nas Identifier:

Radius Accounting:

AcctServer:

AcctPort:

AcctSecret:

Inactivity Timeout Status:  off

Inactivity Timeout Interval:  (60-1200)s

Enable:  Yes  No

Hidden:  Yes  No

Multicast:  Yes  No

Broadcast ARP:  Yes  No

VLAN ID:  (0-4090)

Band:  2.4GHz  5GHz

WLAN Access Timer:  off

MaxClients Per Band:  (1-256)

Upstream Per Client:  (0-65536)kbps

Downstream Per Client:  (0-65536)kbps

Client Isolate:  off

802.11r:  off

802.11v:  on

802.11k:  on

802.11b:  on

802.11g:  on

OKC:  off

2.4G Client Rate Control:  off

2.4G Client Rate:  Mbit/s

5G Client Rate Control:  off

5G Client Rate:  Mbit/s

2.4G MGMT Rate control:  off

2.4G MGMT Rate:  Mbit/s

5G MGMT Rate control:  off

5G MGMT Rate:  Mbit/s

[Hide](#)

Figure 5-2 Create Enterprise WLAN - Advanced Mode

Table 5-1: Key word specification in Enterprise WLAN Configuration Window

WLAN Parameter	Specification
WLAN Name	Label or name of WLAN.
Security Level	Security mode of WLAN, from high to low is Enterprise>Personal>Open. Here select the Enterprise mode.
Key Management	WPA2/WPA encryption method. It is applicable to Enterprise/Personal WLANs only.
AuthServer	IPv4 address of the authentication server (RADIUS).
AuthPort	Communication port of the authentication server. The default value is 1812.
AuthSecret	Shared secret key used by the authentication server, in ASCII format.
RADIUS Accounting	Select the checkbox if accounting service is needed. By default it is not selected.
AcctServer	IPv4 address of the accounting server.
AcctPort	Communication port of the accounting server. The default value is 1813.
AcctSecret	Shared secret key used by the accounting server, in ASCII format.
Inactivity Timeout Status	Enable/Disable inactivity timeout control
Inactivity Timeout Interval	Specify the inactivity timeout interval, default is 15 minutes
Enable	Specify the WLAN state, Yes indicates that WLAN is in broadcast state, while No indicates WLAN is not in broadcast state.
Hidden	Specify visibility of the WLAN, Yes indicates that WLAN is visible to users, while No indicates WLAN is invisible.
Multicast	This feature allows APs to convert multicast streams into unicast streams over the wireless network based on the IGMP snooping table. Enabling Multicast to Unicast (for up to 6 clients) can enhance the quality and reliability of video streams, while preserving the bandwidth available to the non-video services.
Broadcast ARP	If enabled, AP will reply to client's ARP request instead of forwarding.
VLAN ID	Identifier of the VLAN to which the WLAN mapping, it is a user VLAN.
Band	Select a value to specify the band at which the network transmits radio signals. You can set the band to 2.4 GHz, 5 GHz, or All. The All option is selected by default.
WLAN Access Timer	Specify the WLAN working period, in which only SSID broadcasts. If NOT configured (Disabled), SSID will always broadcast if the WLAN is activated. <ul style="list-style-type: none"> <li>• Access Days - Specify the days for broadcasting SSID per week.</li> <li>• Operational Hours - Specify the time of the day in which broadcasting SSID.</li> </ul>
Max Clients per band	Specify the maximum number of clients that can be configured for each BSSID on a WLAN. You can specify a value within the range of 1 to 256. The default value is 64.
Upstream Per Client	Specify the maximum upstream bandwidth limitation for each user.
Downstream Per Client	Specify the maximum downstream bandwidth limitation for each user.
Client Isolate	Not permit the clients attached to the same WLAN to communicate with each other, they can only communicate with upstream gateway.
802.11r	Select to enable IEEE 802.11r (Fast BSS Transition). The Fast BSS Transition mechanism minimizes the delay when a client transitions from one BSS to another within the same group.
802.11v	Enables/Disables 802.11v. 802.11v standard defines mechanisms for wireless network management enhancements and BSS transition management. It allows client devices to exchange information about the network topology and RF environment. The BSS transition management mechanism enables an AP to request a voice client to transition to a specific AP, or suggest a set of preferred

	APs to a client, due to network load balancing or BSS termination. It also helps the client identify the best AP to transition to as they roam.
<b>802.11k</b>	Enables/Disables 802.11k. The 802.11k protocol enables APs and clients to dynamically measure the available radio resources. When 802.11k is enabled, APs and clients send neighbor reports, beacon reports, and link measurement reports to each other.
<b>802.11b</b>	Enables/Disables allowing 11b legacy clients connect to AP
<b>802.11g</b>	Enables/Disables allowing 11g legacy clients connect to AP
<b>2.4G Client Rate Control</b>	Enables/Disables 2.4G band access control based on client data rate
<b>2.4G Client Rate</b>	2.4G band client with lower data speed will not be allowed to access, recommended value 12
<b>5G Client Rate Control</b>	Enables/Disables 5G band access control based on client data rate
<b>5G Client Rate</b>	5G band client with lower data speed will not be allowed to access, recommended value 24
<b>2.4G MGMT Rate Control</b>	Enables/Disables 2.4G band wireless management frame rate control
<b>2.4G MGMT Rate</b>	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>5G MGMT Rate Control</b>	Enables/Disables 5G band wireless management frame rate control
<b>5G MGMT Rate</b>	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>OKC</b>	If OKC is enabled, a cached pairwise master key (PMK) is used when the client roams to a new AP. This allows faster roaming of clients without the need for a complete 802.1x authentication.
<b>Cancel</b>	The WLAN Creation Window is closed if you click 'Cancel' button.
<b>Save</b>	Click 'Save' to save the configuration and create the WLAN.

## Create a Personal WLAN

Personal WLAN creation window has two display modes, simplified mode and advanced mode, respectively illustrated in Figure 5-3 and Figure 5-4. You can switch to advanced mode from simplified mode by clicking the hyperlink [Advance](#).

There are five essential parameters to be configured for a Personal WLAN in simplified mode, they are WLAN Name, Security Level, Key Management, Password Format and Password. Other parameters will be considered as per the default value. To configure other advanced parameters, you must switch to advanced mode. Refer to Table 5-2 for details about each parameter.

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

- WLAN Name:** An empty text input field.
- Security Level:** A dropdown menu with "Personal" selected.
- Key Management:** A dropdown menu with "Both(wpa &wpa2)" selected.
- Password Format:** A dropdown menu with "8-63 chars" selected.
- Password:** An empty text input field.
- Confirm:** An empty text input field.

At the bottom left of the window is a blue link labeled "Advance". At the bottom right are two buttons: an orange "Cancel" button and a blue "Save" button.

Figure 5-3 Create Personal WLAN - Simplified Mode



# WLAN Configuration

### Create New WLAN

WLAN Name:  (1-32 chars)

Security Level:

Key Management:

Password Format:

Password:

Confirm:

Inactivity Timeout Status:  off

Inactivity Timeout Interval:  (60-1200)s

Enable:  Yes  No

Hidden:  Yes  No

Multicast:  Yes  No

Broadcast ARP:  Yes  No

VLAN ID:  (0-4090)

Band:  2.4GHz  5GHz

WLAN Access Timer:  on  off

Access Days:  Mon  Tue  Wed  Thu  Fri  Sat  Sun

Operational Hours:  on  off

Start Time:  hr:min

End Time:  hr:min

MaxClients Per Band:  (1-256)

Upstream Per Client:  (0-65536)kbps

Downstream Per Client:  (0-65536)kbps

Client Isolate:  on  off

802.11r:  on  off

802.11v:  on  off

802.11k:  on  off

802.11b:  on  off

802.11g:  on  off

2.4G Client Rate Control:  on  off

2.4G Client Rate:  Mbit/s

5G Client Rate Control:  on  off

5G Client Rate:  Mbit/s

2.4G MGMT Rate control:  on  off

2.4G MGMT Rate:  Mbit/s

5G MGMT Rate control:  on  off

5G MGMT Rate:  Mbit/s

[Hide](#)

Figure 5-4 Create Personal WLAN - Advanced Mode

Table 5-2: Key word specification in Personal WLAN Configuration Window

WLAN Parameter	Specification
WLAN Name	Label or name of WLAN.
Security Level	Security Level of WLAN, from high to low is Enterprise>Personal>Open. Here select the Personal type.
Key Management	WPA2/WPA encryption method. It is applicable to Enterprise/Personal WLANs only.
Password Format	Password format of Personal WLAN. There are two password formats to be selected: Either as a string of 64 hexadecimal digits, or as a passphrase of 8 to 63 printable ASCII characters.
Password	Enter the password for the Personal WLAN.
Confirm	Reenter the password for the Personal WLAN.
Inactivity Timeout Status	Enable/Disable inactivity timeout control
Inactivity Timeout Interval	Specify the inactivity timeout interval, default is 15 minutes
Enable	Specify the WLAN state, Yes indicates that WLAN is in broadcast state, while No indicates WLAN is not in broadcast state.
Hidden	Specify visibility of the WLAN, Yes indicates that WLAN is visible to users, while No indicates WLAN is invisible.
Multicast	This feature allows APs to convert multicast streams into unicast streams over the wireless network based on the IGMP snooping table. Enabling Multicast to Unicast (for up to 6 clients) can enhance the quality and reliability of video streams, while preserving the bandwidth available to the non-video services
Broadcast ARP	If enabled, AP will reply to client's ARP request instead of forwarding.
VLAN ID	Identifier of the VLAN to which the WLAN mapping, it is a user VLAN.
Band	Select a value to specify the band at which the network transmits radio signals. You can set the band to 2.4 GHz, 5 GHz, or All. The All option is selected by default.
WLAN Access Timer	Specify the WLAN working period, in which only SSID broadcasts. If NOT configured (Disabled), SSID will always broadcast if the WLAN is activated. <ul style="list-style-type: none"> <li>Access Days - Specify the days for broadcasting SSID per week.</li> <li>Operational Hours - Specify the time of the day in which broadcasting SSID.</li> </ul>
Max Clients per band	Specify the maximum number of clients that can be configured for each BSSID on a WLAN. You can specify a value within the range of 1 to 256. The default value is 64.
Upstream Per Client	Specify the maximum upstream bandwidth limitation for each user.
Downstream Per Client	Specify the maximum downstream bandwidth limitation for each user.
Client Isolate	Not permit the clients attached to the same WLAN to communicate with each other, they can only communicate with upstream gateway.
802.11r	Select to enable IEEE 802.11r (Fast BSS Transition). The Fast BSS Transition mechanism minimizes the delay when a client transitions from one BSS to another within the same group.
802.11v	Enables/Disables 802.11v. 802.11v standard defines mechanisms for wireless network management enhancements and BSS transition management. It allows client devices to exchange information about the network topology and RF environment. The BSS transition management mechanism enables an AP to request a voice client to transition to a specific AP, or suggest a set of preferred APs to a client, due to network load balancing or BSS termination. It also helps the client identify the best AP to transition to as they roam.

<b>802.11k</b>	Enables/Disables 802.11k. The 802.11k protocol enables APs and clients to dynamically measure the available radio resources. When 802.11k is enabled, APs and clients send neighbor reports, beacon reports, and link measurement reports to each other.
<b>802.11b</b>	Enables/Disables allowing 11b legacy clients connect to AP
<b>802.11g</b>	Enables/Disables allowing 11g legacy clients connect to AP
<b>2.4G Client Rate Control</b>	Enables/Disables 2.4G band accessing control based on client data rate
<b>2.4G Client Rate</b>	2.4G band client with lower data speed will not be allowed to access, recommended value 12
<b>5G Client Rate Control</b>	Enables/Disables 5G band accessing control based on client data rate
<b>5G Client Rate</b>	5G band client with lower data speed will not be allowed to access, recommended value 24
<b>2.4G MGMT Rate Control</b>	Enables/Disables 2.4G band wireless management frame rate control
<b>2.4G MGMT Rate</b>	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>5G MGMT Rate Control</b>	Enables/Disables 5G band wireless management frame rate control
<b>5G MGMT Rate</b>	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>Cancel</b>	The WLAN Creation Window is closed if you click 'Cancel' button.
<b>Save</b>	Click 'Save' to save the configuration and create the WLAN.

## Create a Captive Portal WLAN

Captive Portal WLAN creation window has two display modes, simplified mode and advanced mode, respectively illustrated in Figure 5-5 Create Captive Portal WLAN - Simplified Mode and Figure 5-6 Create Captive Portal WLAN - Advanced Mode. You can switch to advanced mode from simplified mode by clicking the hyperlink [Advance](#).

There are three essential parameters to be configured for a Captive Portal WLAN in simplified mode, they are WLAN Name, Security Level (Open) and Captive Portal (Yes). Other parameters will be considered as per the default value. To configure other advanced parameters, you must switch to advanced mode. Refer to Table 5-3 for details about each parameter.

Figure 5-5 Create Captive Portal WLAN - Simplified Mode

Create New WLAN
✕

WLAN Name:  (1-32 chars)

Security Level: Open ▼

Captive Portal:  Yes  No

Inactivity Timeout Status:  on  off

Inactivity Timeout Interval:  (60-1200)s

Enable:  Yes  No

Hidden:  Yes  No

Multicast:  Yes  No

Broadcast ARP:  Yes  No

VLAN ID:  (0-4090)

Band:  2.4GHz  5GHz

WLAN Access Timer:  on  off

MaxClients Per Band:  (1-256)

Upstream Per Client:  (0-65536)kbps

Downstream Per Client:  (0-65536)kbps

Client Isolate:  on  off

802.11v:  on  off

802.11k:  on  off

802.11b:  on  off

802.11g:  on  off

2.4G Client Rate Control:  on  off

2.4G Client Rate:  Mbit/s

5G Client Rate Control:  on  off

5G Client Rate:  Mbit/s

2.4G MGMT Rate control:  on  off

2.4G MGMT Rate:  Mbit/s

5G MGMT Rate control:  on  off

5G MGMT Rate:  Mbit/s

[Hide](#)

Cancel
Save

Figure 5-6 Create Captive Portal WLAN - Advanced Mode

Table 5-3: Key word specification in Captive Portal WLAN Configuration Window

WLAN Parameter	Specification
WLAN Name	Label or name of WLAN.
Security Level	Security Level of WLAN, from high to low is Enterprise>Personal>Open. Here select the Open type.
Captive Portal	Specify the captive portal authentication supporting state. Yes indicates the WLAN supports captive portal authentication, while No indicates the WLAN does not support captive portal authentication.
Inactivity Timeout Status	Enable/Disable inactivity timeout control
Inactivity Timeout Interval	Specify the inactivity timeout interval, default is 15 minutes
Enable	Specify the WLAN state, Yes indicates that WLAN is in broadcast state, while No indicates WLAN is not in broadcast state.
Hidden	Specify visibility of the WLAN, Yes indicates that WLAN is visible to users, while No indicates WLAN is invisible.
Multicast	This feature allows APs to convert multicast streams into unicast streams over the wireless network based on the IGMP snooping table. Enabling Multicast to Unicast (for up to 6 clients) can enhance the quality and reliability of video streams, while preserving the bandwidth available to the non-video services
Broadcast ARP	If enabled, AP will reply to client's ARP request instead of forwarding.
VLAN ID	Identifier of the VLAN to which the WLAN mapping, it is a user VLAN.
Band	Select a value to specify the band at which the network transmits radio signals. You can set the band to 2.4 GHz, 5 GHz, or All. The All option is selected by default.
WLAN Access Timer	Specify the WLAN working period, in which only SSID broadcasts. If NOT configured (Disabled), SSID will always broadcast if the WLAN is activated. <ul style="list-style-type: none"> <li>Access Days - Specify the days for broadcasting SSID per week.</li> <li>Operational Hours - Specify the time of the day in which broadcasting SSID.</li> </ul>
Max Clients per band	Specify the maximum number of clients that can be configured for each BSSID on a WLAN. You can specify a value within the range of 1 to 256. The default value is 64.
Upstream Per Client	Specify the maximum upstream bandwidth limitation for each user.
Downstream Per Client	Specify the maximum downstream bandwidth limitation for each user.
Client Isolate	Not permit the clients attached to the same WLAN to communicate with each other, they can only communicate with upstream gateway.
802.11r	Select to enable IEEE 802.11r (Fast BSS Transition). The Fast BSS Transition mechanism minimizes the delay when a client transitions from one BSS to another within the same group.
802.11v	Enables/Disables 802.11v. 802.11v standard defines mechanisms for wireless network management enhancements and BSS transition management. It allows client devices to exchange information about the network topology and RF environment. The BSS transition management mechanism enables an AP to request a voice client to transition to a specific AP, or suggest a set of preferred APs to a client, due to network load balancing or BSS termination. It also helps the client identify the best AP to transition to as they roam.
802.11k	Enables/Disables 802.11k. The 802.11k protocol enables APs and clients to dynamically measure the available radio resources. When 802.11k is enabled, APs and clients send neighbor reports, beacon reports, and link measurement reports to each other.
802.11b	Enables/Disables allowing 11b legacy clients connect to AP
802.11g	Enables/Disables allowing 11g legacy clients connect to AP

<b>2.4G Client Rate Control</b>	Enables/Disables 2.4G band accessing control based on client data rate
<b>2.4G Client Rate</b>	2.4G band client with lower data speed will not be allowed to access, recommended value 12
<b>5G Client Rate Control</b>	Enables/Disables 5G band accessing control based on client data rate
<b>5G Client Rate</b>	5G band client with lower data speed will not be allowed to access, recommended value 24
<b>2.4G MGMT Rate Control</b>	Enables/Disables 2.4G band wireless management frame rate control
<b>2.4G MGMT Rate</b>	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>5G MGMT Rate Control</b>	Enables/Disables 5G band wireless management frame rate control
<b>5G MGMT Rate</b>	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
<b>Cancel</b>	The WLAN Creation Window is closed if you click 'Cancel' button.
<b>Save</b>	Click 'Save' to save the configuration and create the WLAN.

After the WLAN has been created, proceed to: [How to Configure Captive Portal Authentication](#) to complete the configuration.

## Delete Your WLAN

In WLAN Window Advanced Mode Figure 4-3 WLAN Window-Advanced Mode, you can delete the WLAN by clicking the '✖' Button, as shown in Figure 5-7.










WLAN Configuration				
WLAN Name	Status	Security Level	Captive Portal	Operate
mywifi-1x	Enable	enterprise	No	  wmm
mywifi-employee	Enable	personal	No	  wmm
mywifi-guest	Enable	open	Yes	  wmm
mywifi-portal2	Disable	open	No	  wmm

Figure 5-7 Delete a WLAN

## Modify Your WLAN

In WLAN Window Advanced Mode Figure 4-3 WLAN Window-Advanced Mode, you can modify the WLAN by clicking the '' Button, shown in Figure 5-8. All configurable WLAN parameters will be displayed on the right of WLAN Window Advanced Mode, Enterprise WLAN see Table 5-1, Personal WLAN see Table 5-2 and

## WLAN Configuration

Captive Portal WLAN see Table 5-3. Click **Cancel** to cancel the modification or click **Save** to save the configuration.

The dialog box titled 'WLAN Configuration' contains a table of WLANs and an 'Edit WLANInfo' panel. The table lists four WLANs: mywifi-1x, mywifi-employee, mywifi-guest, and mywifi-portal2. The 'mywifi-employee' row is selected. The 'Edit WLANInfo' panel shows configuration options for the selected WLAN, including Name, Security Level, Key Management, Password Format, Password, Confirm, Enable, Hidden, MaxClients Per Band, and RSSI Threshold.

WLAN Name	Status	Security Level	Captive Portal	Operate
mywifi-1x	Enable	enterprise	No	wmm
mywifi-employee	Enable	personal	No	wmm
mywifi-guest	Enable	open	Yes	wmm
mywifi-portal2	Disable	open	No	wmm

**Edit WLANInfo**

WLAN Name: mywifi-employee (1- 32 chars)

Security Level: Personal

Key Management: Both(wpa &wpa2)

Password Format: 8-63 chars

Password: .....

Confirm: .....

Enable:  Yes  No

Hidden:  Yes  No

MaxClients Per Band: 64 (1-120)

RSSIThreshold: n (0-100)db

Create

Figure 5-8 Modify a WLAN

## Modify WLAN QoS

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance interoperability certification, based on the IEEE 802.11e standard. It provides basic Quality of service (QoS) features to IEEE 802.11 networks. WMM prioritizes traffic according to four Access Categories (AC): voice (AC\_VO), video (AC\_VI), best effort (AC\_BE), and background (AC\_BK). It is suitable for well-defined applications that require QoS, such as Voice over IP (VoIP) on Wi-Fi phones.

You can edit the mapping relationship between DSCP/802.1p values and WMM priorities for a WLAN on Stellar AP, illustrated in Figure 5-9.

The dialog box titled 'WLAN Configuration' shows the 'WMM Edit' panel for the selected 'mywifi-employee' WLAN. The 'WMM Edit' panel includes uplink and downlink mapping options and a table for mapping DSCP values to 802.1p values for different WMM categories. The 'mywifi-employee' row in the table is circled in red.

WLAN Name	Status	Security Level	Captive Portal	Operate
mywifi-1x	Enable	enterprise	No	wmm
mywifi-employee	Enable	personal	No	wmm
mywifi-guest	Enable	open	Yes	wmm
mywifi-portal2	Disable	open	No	wmm

**WMM Edit**

Uplink:WMM->DSCP/802.1P      Downlink:DSCP/802.1P->WMM

	DSCP	802.1P
Background	10	1
Best effort	0	0
Video	40	4
Voice	46	6

Each WMM corresponds to a unique DSCP/802.1p value, and the DSCP/802.1p value of each type of WMM cannot be duplicated. The range of the DSCP value is 0-63, the range of the 802.1p value is 0-7.

Cancel    Reset    Save

Create

Figure 5-9 Modify WLAN QoS

## 6 AP Management

This chapter describes how to configure and manage your AP. The ALE Wi-Fi solution is a controller-less based architecture. The APs can establish an autonomous group, in which there are three types of AP roles, Primary Virtual Controller (PVC), Secondary Virtual Controller (SVC) and member AP. This chapter describes how to manage the group and how to check, backup, restore AP configuration and to upgrade firmware in GUI.

AP Management procedures described in this chapter include:

- [AP Group Management](#)
- [Import and Export AP Configuration](#)
- [Upgrade AP Firmware](#)
- [Modify AP Name and IP Address](#)
- [Check AP Configuration Detail](#)
- [Modify AP Transmission Power and Channel](#)
- [AP LED Specification](#)
- [Locate AP or Turn LED Off](#)
- [Kick off an AP from the group](#)
- [Allow an AP to join the group](#)
- [How to add a new AP to the group](#)
- [How to replace an current AP in the group](#)
- [How to Setup Wireless Networks with more than 64 APs](#)
- [How to Configure the AP if there is no DHCP server](#)

### AP Group Management

By default, APs will have the group ID 100 and all APs that have the same group ID will align to the same group. The group will select the AP which has the highest MAC address as the PVC and the AP which has the second highest MAC address as the SVC. Each group has a management IP address that is a virtual IP and will be assigned to the PVC. When the PVC fails to respond due to an unexpected error or issue, the SVC will automatically upgrade to act as the PVC. There will be no interruption or service disturbance to member APs or any of the wireless users.

Table 6-1 describes the several group attributes parameters.

To configure or modify the group attributes, launch the window 'System-General Configuration', as shown in Figure 6-1. AP group information will be displayed at the top of the Dashboard, as shown in Figure 6-2.

**Table 6-1: AP Group Attribution Parameters Specification**

Parameter	Specification
Group ID	Define a unique AP Group
Group Name	Name of the group
Location	Specify where you will deploy this group of APs. Provide specific name to identify the group location.
Group Management IP	It is a virtual IP address and will be dynamically assigned to the PVC. It is used for the group management and can be configured manually.
Group Management Netmask	Netmask of Group Management IP.



General Configuration

Group Info Management Account Management

Group Name: mywifi\_in\_office (1-25 chars)

Location: Paris (1-32 chars)

Group Management IP: 192.168.1.200

Group Management Netmask: 255.225.255.0

Group ID: 8848 (1-9999)

Figure 6-1 AP Group Configuration Window

Alcatel-Lucent Enterprise

AP Group : mywifi\_in\_office - 192.168.1.200 Paris

Administrator Logout | About Help | English

Tools | Polling Cycle: 30s

Figure 6-2 AP Group Information Location

Primary Name	IP	Firmware	Operate
		PVC	
AP-00:E0	192.168.20.162(AP) 192.168.1.200(M)	2.1.0.63	ⓘcfg ⓘfirmware ⓘreboot
		SVC	
		MEMBER	
		Joining	

Figure 6-3 AP Group Management IP

There are two IP addresses on the PVC of the group, illustrated in Figure 6-3 (Navigate:Dashboard - AP Window - AP Configuration Window).

1. AP IP address [e.g.: 192.168.20.162(AP)] - The IP of the PVC which used to communicate with other Stellar APs in the group and with network entities outside the group. It can be set manually or assigned from a DHCP server in the network.

2. AP Group Management IP address [e.g.: 192.168.1.200(M)] - The virtual IP for the group management. It can be set by the administrator manually and as a static group management entrance through wired or wireless access.

# Import and Export AP Configuration

In the AP Configuration Window (Navigate:Dashboard - AP Window - AP Configuration Window), you can backup, recover or clear the group configuration, illustrated in Figure 6-4 and Figure 6-5.

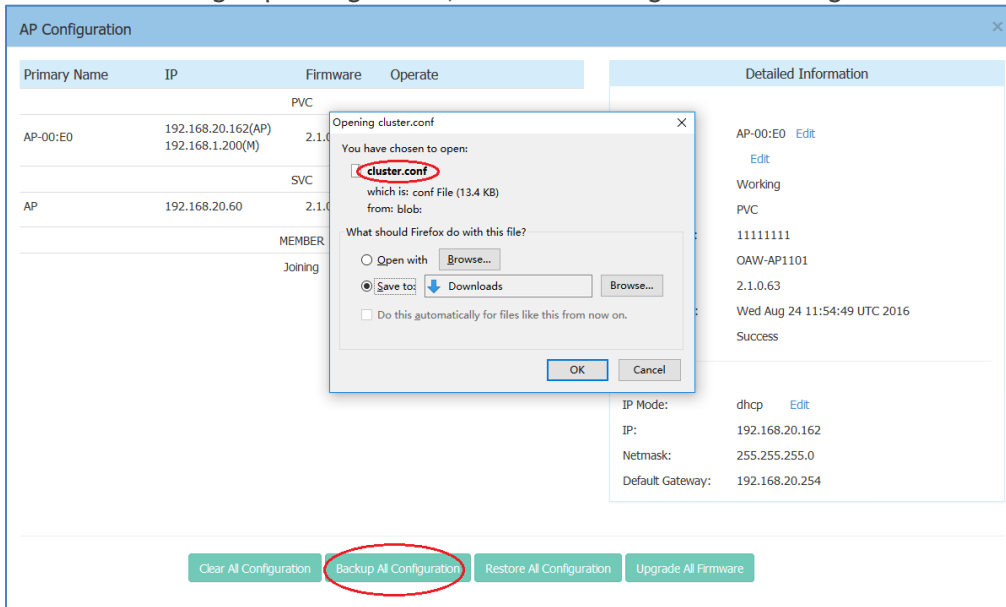


Figure 6-4 Export AP Group Configuration

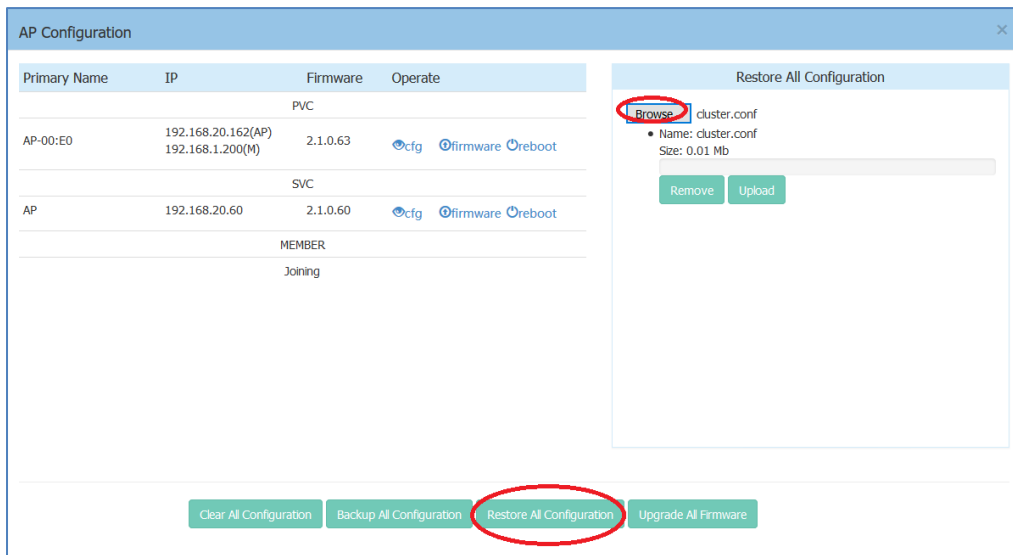


Figure 6-5 Import AP Group Configuration

Table 6-2: AP Group Configuration

Parameter	Specification
Clear All Configuration	Clear all AP configurations, return to factory state.
Backup All Configuration	Download and backup configuration file of AP group, it is recommended to do this when you have completed all configuration.
Restore All Configuration	Upload configuration file to all APs.

Upgrade All Firmware	Upgrade all AP's firmware.
----------------------	----------------------------



**Note**

Note6-1: All configuration settings (clear, backup or restore) will be applied to the entire group. There is no need to select specific APs to apply configuration settings. The entire group of APs have one configuration file.

## Upgrade AP Firmware

Before upgrading the AP you should prepare the firmware file to be upgraded. You can download the firmware file and save it in the local drive of the machine you are using to connect to the Stellar AP or save the firmware file in a remote TFTP server.

In the AP Configuration Window (Navigate: **Dashboard-AP Window-AP Configuration Window**), there are separate entrances for upgrading a single AP or all the APs in a group:

- Upgrade single AP:** Select the AP to be upgraded from the AP list, click **firmware** to upload firmware, illustrated in Figure 6-6 and Figure 6-7. Generally, it takes approximately five minutes to upgrade the AP firmware.
- Upgrade all APs:** Click on **Upgrade All Firmware** to open a dedicated upgrade page to upload separate AP firmware for each AP model and upgrade, illustrated in Figure 6-8.

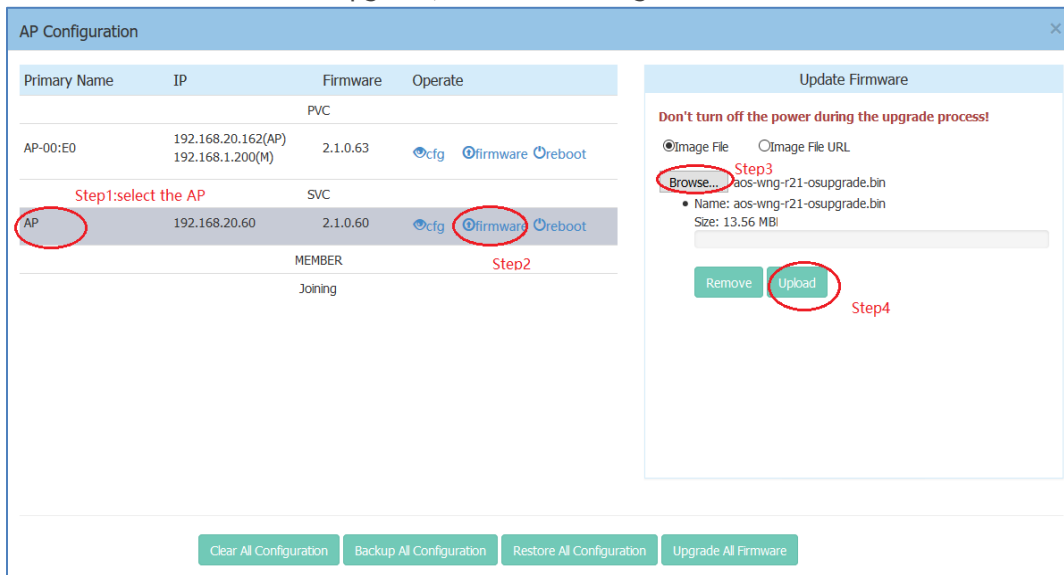


Figure 6-6 Update Single AP using Local Image File

You can also upload the AP firmware from a specified URL as shown in Figure 6-7.

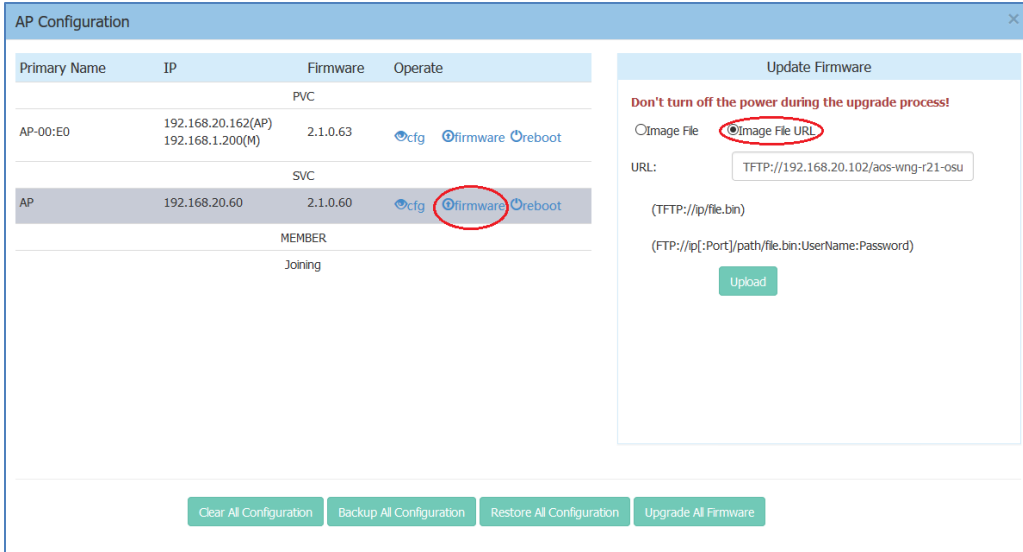


Figure 6-7 Update Single AP from Remote TFTP Server

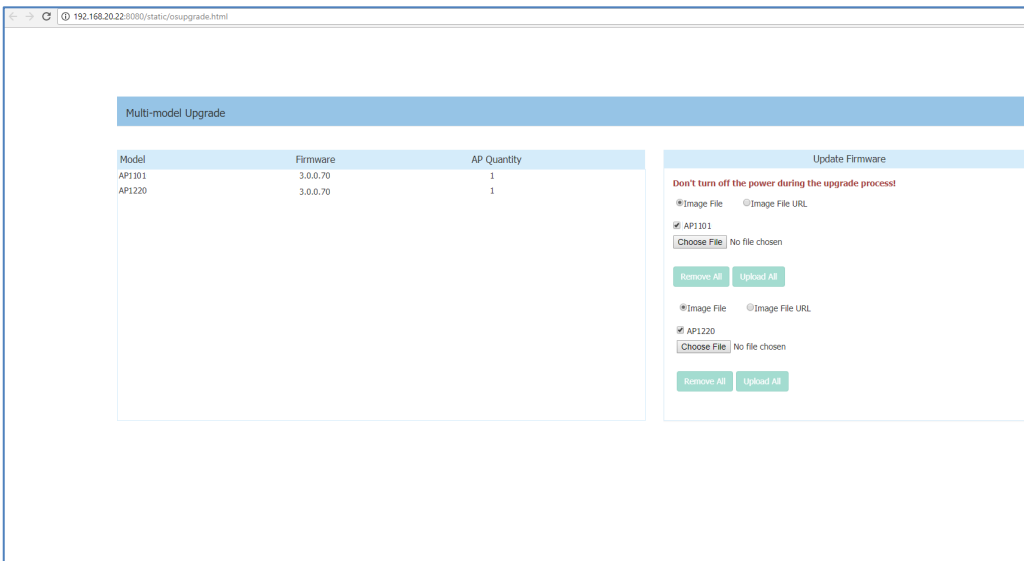


Figure 6-8 Update all APs' Firmware



Warning 6-1:

**Don't turn off the power during the upgrade process!**



Note

Note 6-2: In order to make sure you're running the latest software, we strongly recommend to clear the browsing data in your browser after the software upgrade, including:

- Cookies

- Cache
- 

## Modify AP Name and IP Address

In the AP Configuration Window (Navigate: **Dashboard-AP Window-AP Configuration Window**), you can modify the name and other parameters as needed for the AP in Detailed Information panel.

### → **Modify AP Name**

Detailed Information	
APName:	AP-05:30 <a href="#">Edit</a>
Location:	<a href="#">Edit</a>
Status:	Working
Role in Group:	PVC
Serial Number:	NI9GG22Y006UC01
Model:	OAW-AP1101
Firmware:	2.1.0.65
Upgrade Time:	Wed Sep 7 02:27:11 UTC 2016
Upgrade Flag:	Success

Figure 6-9 Modify AP Name

Click on “**Edit**” to modify the AP name. Enter a name to identify the AP. By default, an Stellar AP is named with the last two bytes of its MAC address (e.g. 05:30 is the last-two-byte MAC address of the Stellar AP in Figure 6-9).

### → **Modify AP IP Address**

Enter an IP address to modify AP IP address. Stellar AP supports both static and dynamic IP addresses, illustrated in Figure 6-10.

Detailed Information	
APName:	AP <a href="#">Edit</a>
Location:	<a href="#">Edit</a>
Status:	Working <a href="#">Kick Off</a>
Role in Group:	SVC
Serial Number:	NI9GG22Y006UC01
Model:	OAW-AP1101
Firmware:	2.1.0.60
Upgrade Time:	Fri Aug 19 15:18:42 UTC 2016
Upgrade Flag:	Success
<hr/>	
IP Mode:	dhcp <a href="#">Edit</a>
IP:	192.168.20.60
Netmask:	255.255.255.0
Default Gateway:	192.168.20.254
<hr/>	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static <a href="#">Cancel</a> <a href="#">Save</a>
IP:	<input type="text" value="192.168.20.60"/>
Netmask:	<input type="text" value="255.255.255.0"/>
Default Gateway:	<input type="text" value="192.168.20.254"/>

Figure 6-10 Modify AP IP Address

## Check AP Configuration Detail

Click  to verify AP configuration in the AP Configuration Window (Navigate: **Dashboard-AP Window-AP Configuration Window**).

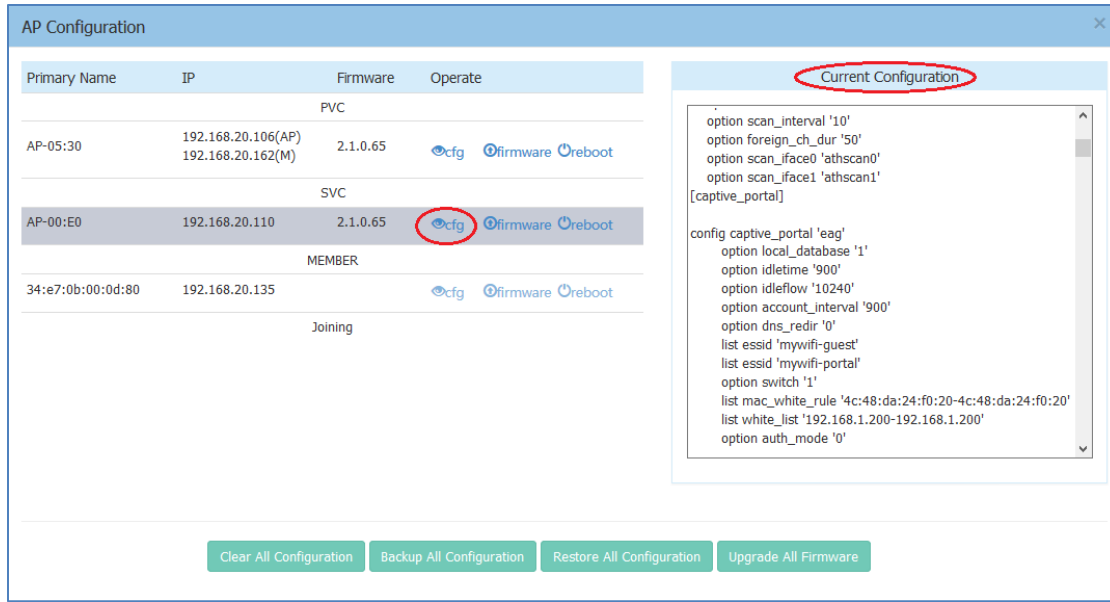


Figure 6-11 Check AP Configuration Detail

## Modify AP Transmission Power and Channel

You can modify the transmission power and working channel for the Stellar AP in the RF Configuration Window. (Navigate: Dashboard-Wireless Page-RF Window-RF Configuration Window)

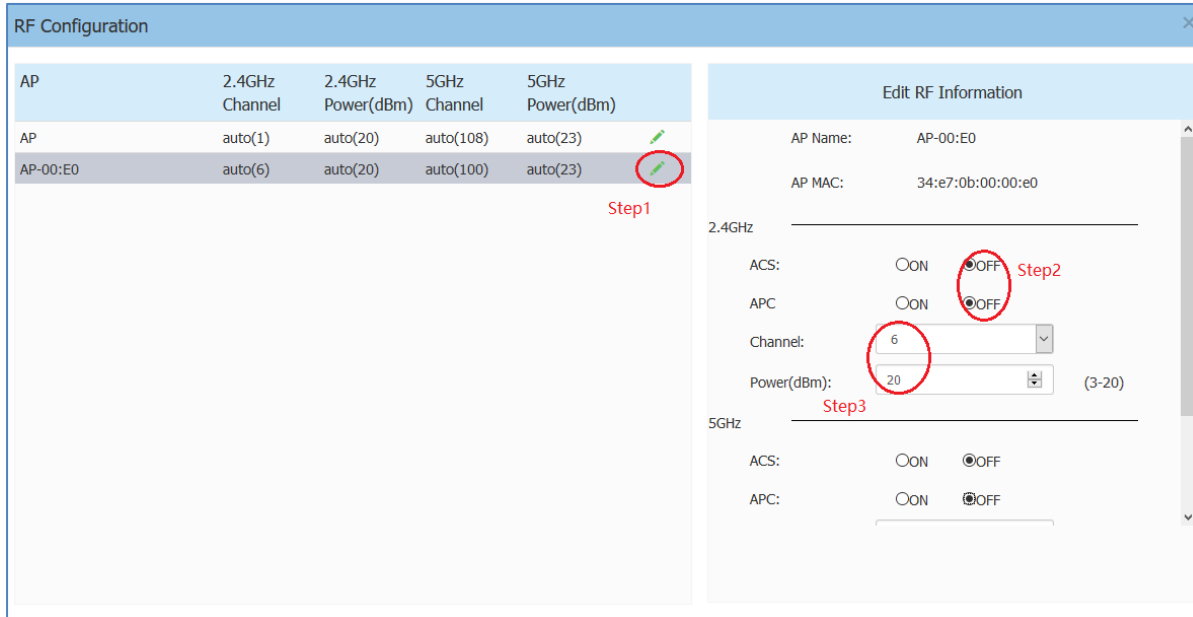


Figure 6-12 RF Management


Automatic Channel Selection (ACS) and Automatic Power Control (APC) are turned ON by default. The AP transmission power and channel are adjusted dynamically by default. If you disable ACS and APC the channel used by the AP and the transmit power must be set manually. In manual mode the AP transmit power can be adjusted in 1 dB increments. These values must be set for both radio bands.

## AP LED Specification

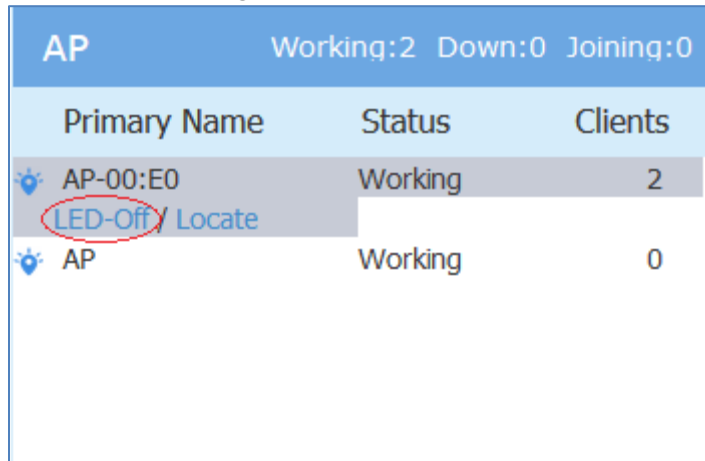
**Table 6-3: Describes the LED status during different stages of Stellar AP.**



Red	Blue	Green	Time Line	Status
ON			Power on	Power on
ON			Bootloader-OS loading	System start up
Flash			System running	Network abnormal (Interface down)
		Flash	System running	Network normal, without SSID created
		ON	System running	Network normal, single band working, ether 2.4Ghz or 5Ghz working
	ON		System running	Network normal, dual bands working, 2.4Ghz and 5Ghz are both working
Flash	Flash		System running	Red and Blue LED rotate flash in a specific frequency; OS upgrading
Flash	Flash	Flash	System running	3 LED rotate flash in a specific frequency; Used for location an AP

## Locate AP or Turn LED Off

**Step1:** Click  in AP Window of Dashboard to launch 'LED-Off/Locate' buttons.

**Step2:** Click 'LED-Off' to turn off the LED light.



AP			Working:2	Down:0	Joining:0
Primary Name	Status	Clients			
 AP-00:E0	Working	2			
<a href="#">LED-Off / Locate</a>					
 AP	Working	0			

**Figure 6-13 Turn LED off**

**Step3:** Click "Locate" to locate AP.





AP Working:2 Down:0 Joining:0		
Primary Name	Status	Clients
 AP-00:E0 LED-On / <b>Locate</b>	Working	2
 AP	Working	0

Figure 6-14 Locate AP

The Restore window appears. The LED blinks with red, blue and green color.

**Step 4:** Click "Restore" to return to the normal state.



AP Working:2 Down:0 Joining:0		
Primary Name	Status	Clients
 AP-00:E0 <b>Restore</b>	Working	2
 AP	Working	0

Figure 6-15 Restore AP state

## Remove an AP from the Group

An AP is removed from the AP group list (PVC/SVC/Member) by selecting “kick off”. Then the AP enters a group blacklist, if it is not disconnected from the network it will move to the ‘**Joining**’ state, and without authorization is not permitted to be a member of group again.

See in Figure 6-16 and Figure 6-17.

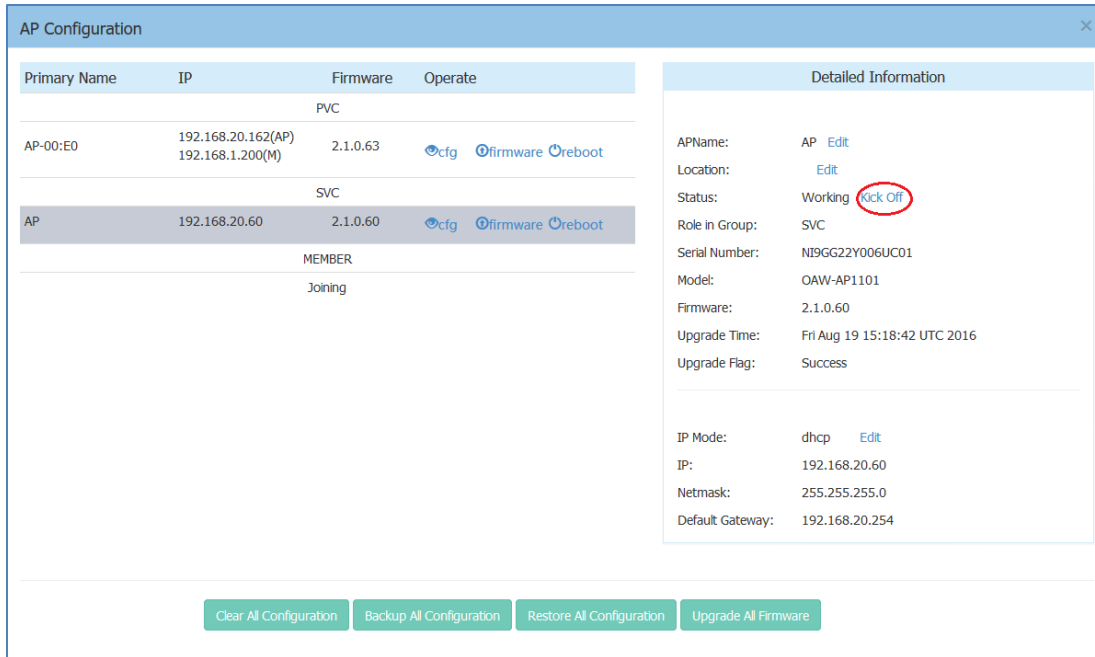


Figure 6-16 Remove an AP from Group

## Allow an AP to Join the Group

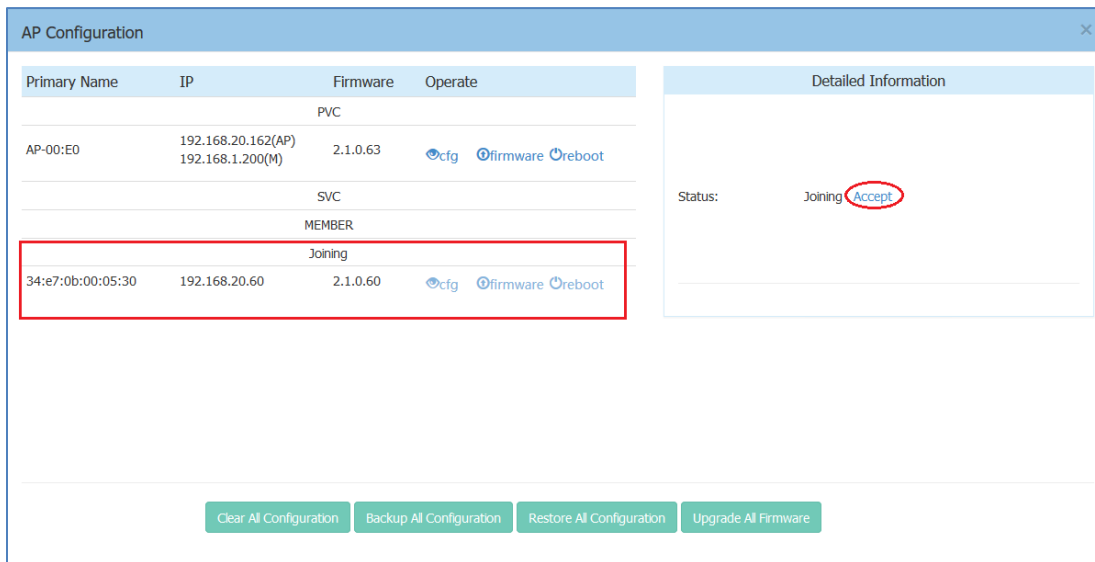


Figure 6-17 Allow AP to join group

In the displayed AP Configuration screen, an AP in 'Joining' state is in the group blacklist, the 'Accept' operation lets it join the group and removes it from the group blacklist.

## How to Add a New AP to Group

To add a new AP to the group, ensure that the PVC is not in the 'Down' state. If the PVC is down, upgrade the SVC to be the PVC before plugging in the new AP.

## How to Replace a Current AP in Group

1. **To replace the current PVC:** Upgrade the SVC to the PVC before disconnecting the old PVC. Then replace the old PVC with a new Stellar AP.
2. **To replace the SVC or a MEMBER of the group:** Disconnect and replace the SVC or member directly with a new Stellar AP, users on other Stellar APs will not be affected.

## How to Setup Wireless Networks With More Than 64 APs

If you have more than 64 Stellar APs, you can setup more than one AP group to provide Wi-Fi service.

There are three methods to setup more than one AP group in the network:

**Method one:** Divide the Stellar APs into different subnets by changing the default VLAN of the switch ports to which the Stellar APs connect; for example: subnet-A uses default VLAN 100 while subnet-B uses default VLAN 200.

**Method two:** Setup up different group IDs for each AP group respectively. Perform the following steps:

1. Select the APs which you want to work in Group-A, plug in to the switch to build the first AP group;
2. Browse to the Group-A management interface and change its group ID. (For example: change the group ID from 100 to 8818), see in [General Window](#).
3. Repeat the above process to setup Group B/C/etc.

**Method three:** Deploy Stellar AP with ALE Omni Vista can scale up to 512 AP in one network.



Note

Note 6-3: Without Omni Vista management, each group is managed independently and roaming between groups is not supported.

---

## How to Configure the AP if There is No DHCP server

**Case one:** If the APs reboot and the DHCP server is not accessible, all the APs return to the system default IP -192.168.1.254. This means there are duplicate IPs in the broadcast domain. All the APs work separately as the PVC and broadcast the same WLANs. In this case, it is highly recommended to fix the DHCP sever in the network and let the wireless service recover.

**Case two:** If you want to configure a single Stellar AP without a DHCP server, perform the following steps:

1. Connect the Stellar AP (default IP address is 192.168.1.254) to your configing terminal (laptop for example) directly with an Ethernet cable.
2. Specify a static IP address and a DNS sever for the network card of your laptop, for example: IP Address - 192.168.1.100; Subnet Mask - 255.255.255.0; Default Gateway - 192.168.1.254; DNS sever -192.168.1.254.
3. Browse <http://mywifi.al-enterprise.com:8080> or <http://192.168.1.254:8080> to configure the Stellar AP.

# 7 Authentication Management

As WLANs evolve from best-effort to mission-critical infrastructure, organizations are finding that the operational aspects of network security take on much greater importance. The ALE Wi-Fi solution supports enhanced security methods to assure your wireless connection is more secure to eliminate any type of potential sniffers and other security threats. The major features of the ALE WLAN are:

- **To secure users and network traffic in a WLAN** - ALE provides a full suite of authentication, encryption, and policy enforcement capabilities in an architecture that allows easy integration of additional security services.
- **Wireless Intrusion Prevention System (WIPS)** - To enforce no-wireless policies or detect attacks against a WLAN, ALE AP provides advanced threat detection and suppressing functions. An AP can scan the wireless environment and detect the potential rogue and restrict it from replying to user connection requests.

AP Security described in this chapter includes:

- [Authentication and Encryption Methods](#)
- [How to Configure Captive Portal Authentication](#)

## Authentication and Encryption Methods

When creating a WLAN, select the security type as illustrated in Figure 7-3.

- **Open:** No Authentication or encryption method for this WLAN. User data will be transmitted as Plain text Transmit Mode.
- **Personal:** There will be several WPA, WPA2, AES and TKIP combinations available once you select Personal. This does not require an external RADIUS server as illustrated in Figure 7-3.
- **Enterprise:** Authentication method will be based on WPA Enterprise Architecture. Encryption method TKIP or AES is selected. An external RADIUS server is required as illustrated in Figure 7-4.



**Note**

Note 7-1: WPA uses 802.1X authentication which is one of the Extensible Authentication Protocol (EAP) types available today. 802.1X is a port-based network access control method for wired, as well as wireless, networks.

It was adopted as a standard by the IEEE in August of 2001. EAP handles the presentation of users' credentials, in the form of digital certificates (already widely used in Internet security), unique usernames and passwords, smart cards, secure IDs, or any other identity credential that the IT administrator is comfortable deploying. WPA allows flexibility in both the type of credentials that are used and in the selection of an EAP type.

TKIP encryption, 802.1X/EAP authentication and PSK technology in WPA are features that have been brought forward from WPA2. Additionally, WPA2 will provide a new, encryption scheme, the Advanced Encryption

Standard (AES). WPA2 offers a graceful transition path from WPA that presents a compelling case for upgrading to WPA now. WPA2 will offer a highly secure “mixed mode” that supports both WPA and WPA2 client workstations. This will allow for an orderly transition in large enterprises that cannot readily upgrade in a short period of time. Unlike the WEP/WPA mixed mode in WPA devices, WPA2’s mixed mode will support both WPA and WPA2. It delivers a high level of security to enterprises as they make the move to the even higher level of security offered in WPA2. Since Wi-Fi Protected Access (WPA) already provides strong encryption, the transition to WPA2 clients and APs can be done gradually, seamlessly, and with a high level of confidence that security will not be compromised.

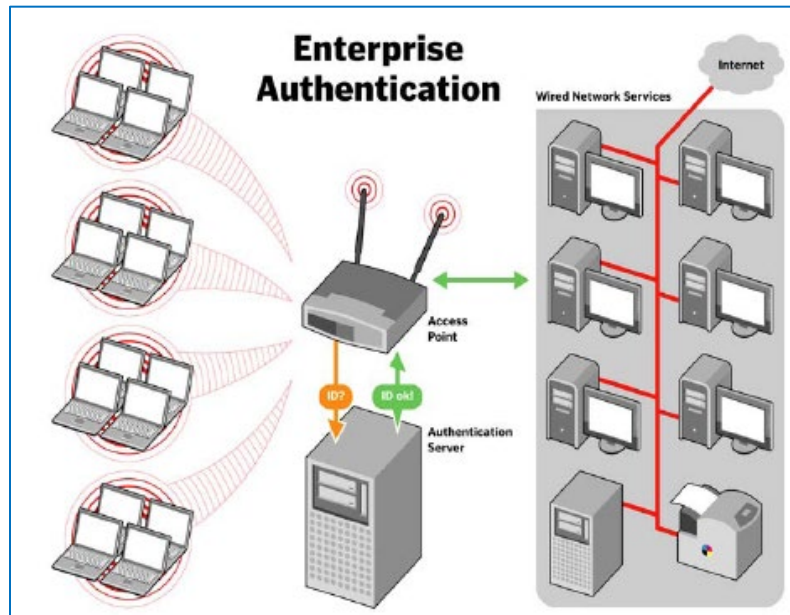


Figure 7-1 Enterprise Authentication

Users in small office and home office (SOHO) environments lack the budget and IT staff to install and maintain RADIUS authentication servers. WPA recognizes this by offering these users the benefits of WPA security through the use of a “pre-shared key” (PSK) or password. The PSK provides home and SOHO users with the same strong TKIP encryption, per packet key construction, and key management that WPA provides in the enterprise. The difference is that here, a password is manually entered on client devices and on the AP or wireless gateway and used for authentication. While not as robust as a full-blown RADIUS, EAP and 802.1X authentication approach, the PSK provides a useful alternative for smaller networks. Upgrading to Wi-Fi Protected Access in home and small office environments is simple. Users can purchase new WPA-enabled equipment or update installed equipment. For most users, the update is as easy as installing a new hardware driver.

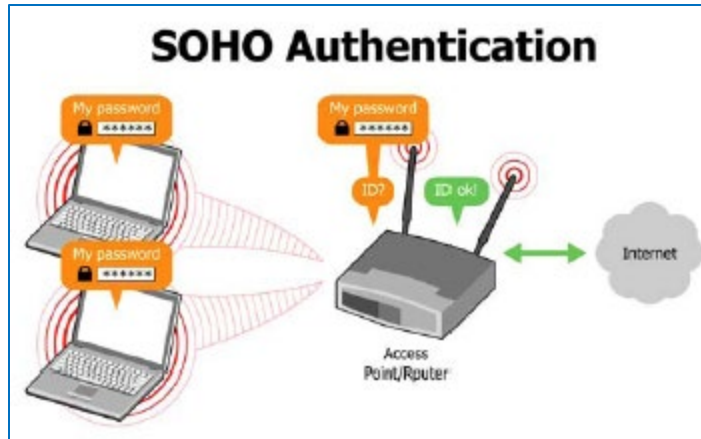


Figure 7-2 SOHO Authentication

One of WEP’s chief weaknesses was that it used a small static key to initiate encryption. This 40-bit key is entered manually on the AP and on all clients that communicate with the AP. It does not change unless it is manually re-entered on all devices, a daunting labor-intensive task in a large organization. Cryptographic studies have demonstrated that an intruder who collects enough data can threaten a WEP network in three ways: by intercepting and decrypting the data that is being transmitted over the air, by altering the data that is communicated, and by deducing and forging the WEP key to gain unauthorized access to network and Internet services. This could be accomplished in a matter of hours on a busy, corporate WLAN.

Also, WEP lacks a means of authentication, validating user credentials to ensure that only those who should be on the network are allowed to access it. WPA addresses these flaws and brings additional safeguards to Wi-Fi security. WPA uses a greatly enhanced encryption scheme, Temporal Key Integrity Protocol (TKIP). Together with 802.1X/EAP authentication, TKIP employs a key hierarchy that greatly enhances protection. It also adds a Message Integrity Check (MIC, sometimes called “Michael”) to protect against packet forgeries.

Figure 7-3 Authentication Security Type-Personal

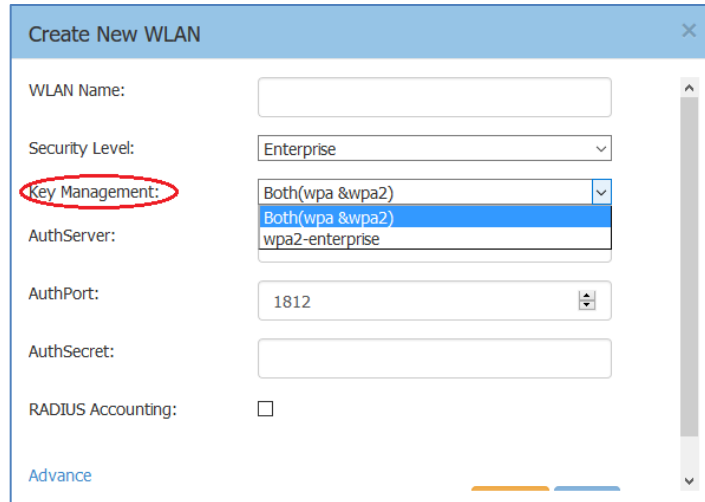


Figure 7-4 Authentication Security Type-Enterprise

## How to Configure Captive Portal Authentication

### Create a Captive Portal WLAN

Navigate: Dashboard-WLAN window->'New' button.

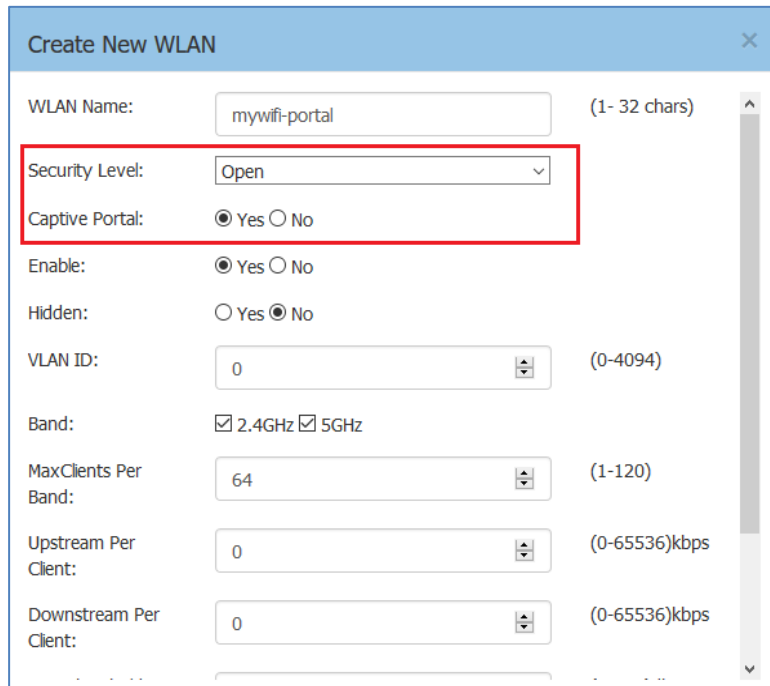


Figure 7-5 Create Captive Portal type WLAN

If you have created the captive portal WLAN, proceed to: [Enable Captive Portal Service.](#)

### Enable Captive Portal Service

Navigate: Dashboard-Access Page-Authentication Window-Authentication Configuration Window.

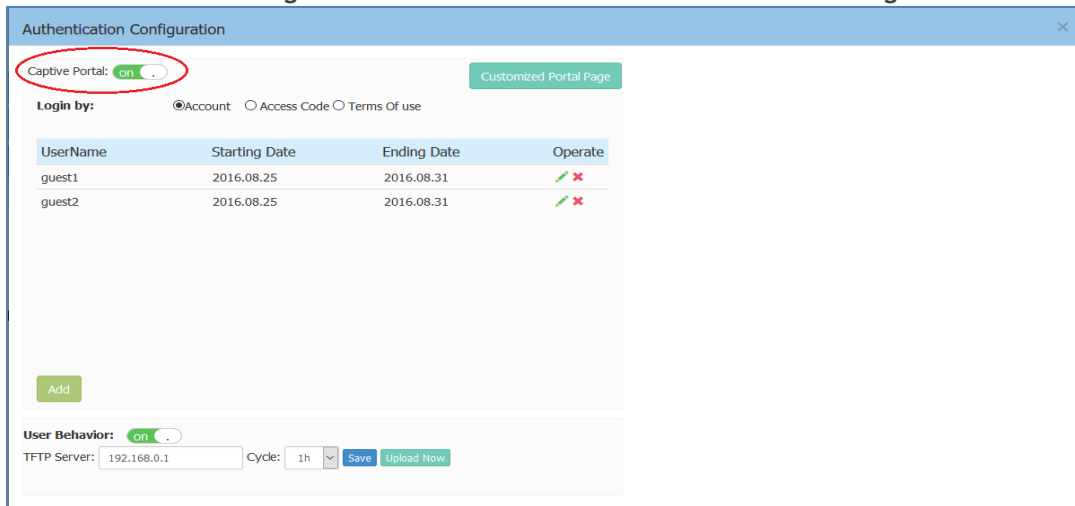


Figure 7-6 Enable Captive Portal Service

After you have enabled the captive portal service, proceed to: [Select Your Login Method.](#)

## Select Your Login Method

Navigate: Dashboard-Access Page-Authentication Window-Authentication Configuration Window.

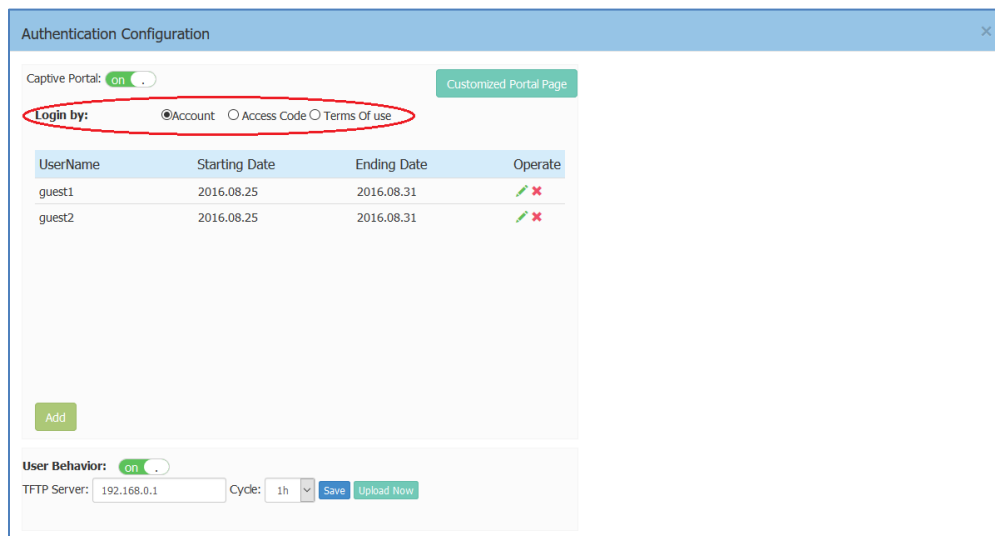


Figure 7-7 Select Your Login Method

There are three login methods for the captive portal authentication:

- (1) Login by account and password;
- (2) Login by unified access code for the organization;
- (3) Login by accepting terms of use;

If you have selected the account or access code login method, proceed to: [Create Users or Access Code.](#)

## Create Users or Access Code

Navigate: Dashboard-Access Page-Authentication Window-Authentication Configuration Window.



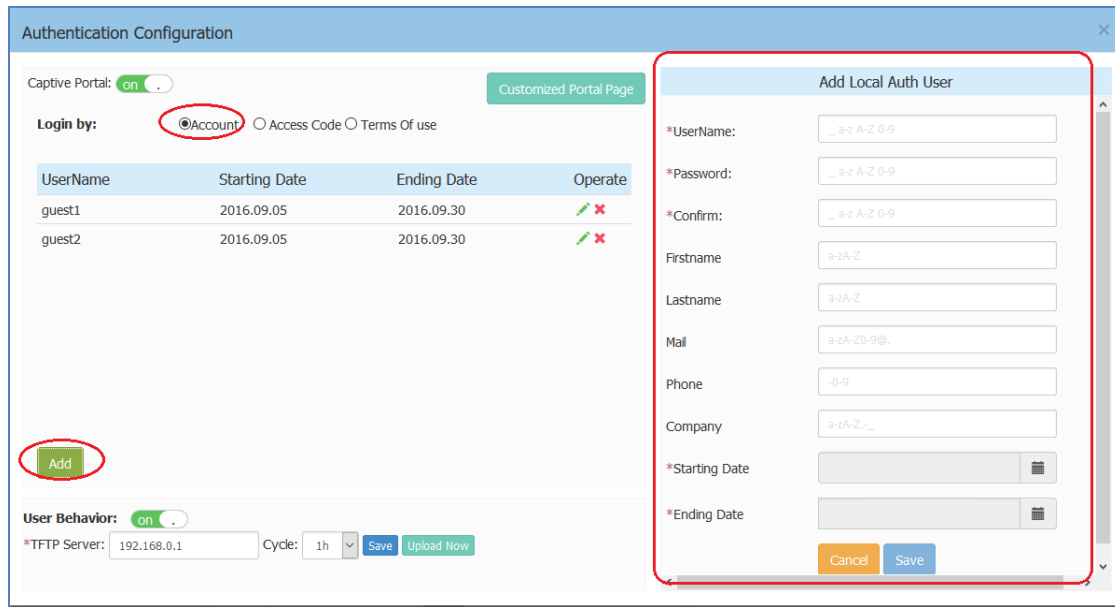


Figure 7-8 Create Captive Portal Users



**Note**

Note 7-2: If you have selected login by account method for the captive portal authentication, it ONLY supports users in the local user database. It does not support connecting to an external authentication server. You can add user accounts to the local user database, see in Figure 7-8.

Note 7-3: Single user account can be used by multiple devices simultaneously, there are no limits to the number of devices a captive portal user account can connect to the network.

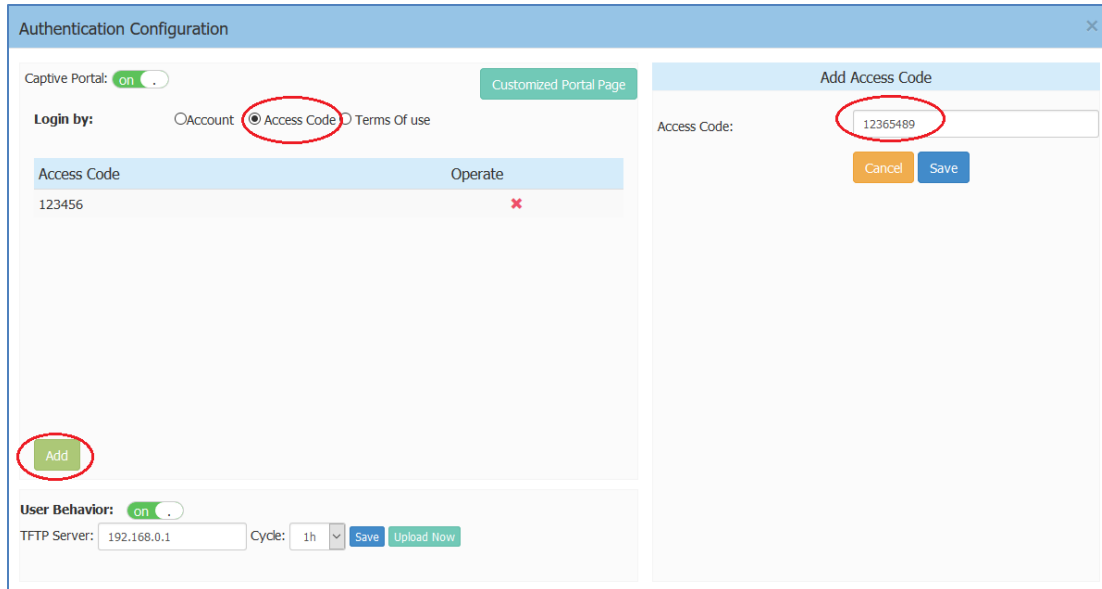


Figure 7-9 Create Access Code

## Customize Your Splash Page (Optional)

Navigate: Dashboard-Access Page-Authentication Window-Authentication Configuration Window-Customized Portal Page Panel.

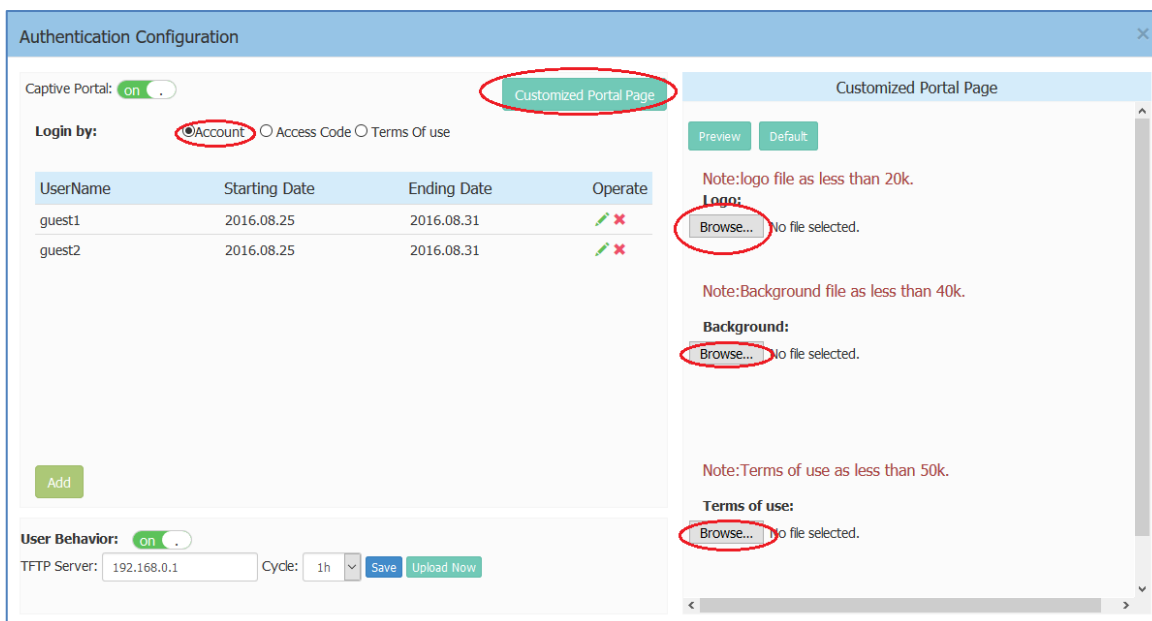


Figure 7-10 Customize Your Splash Page

## Log User Behavior (Optional)

Navigate: Dashboard-Access Page-Authentication Window-Authentication Configuration Window

The user behaviors including online and offline are logged and sent to the specified TFTP server. The detailed information of the user behavior can refer to: [Authentication Configuration Window](#).

## Authentication Management

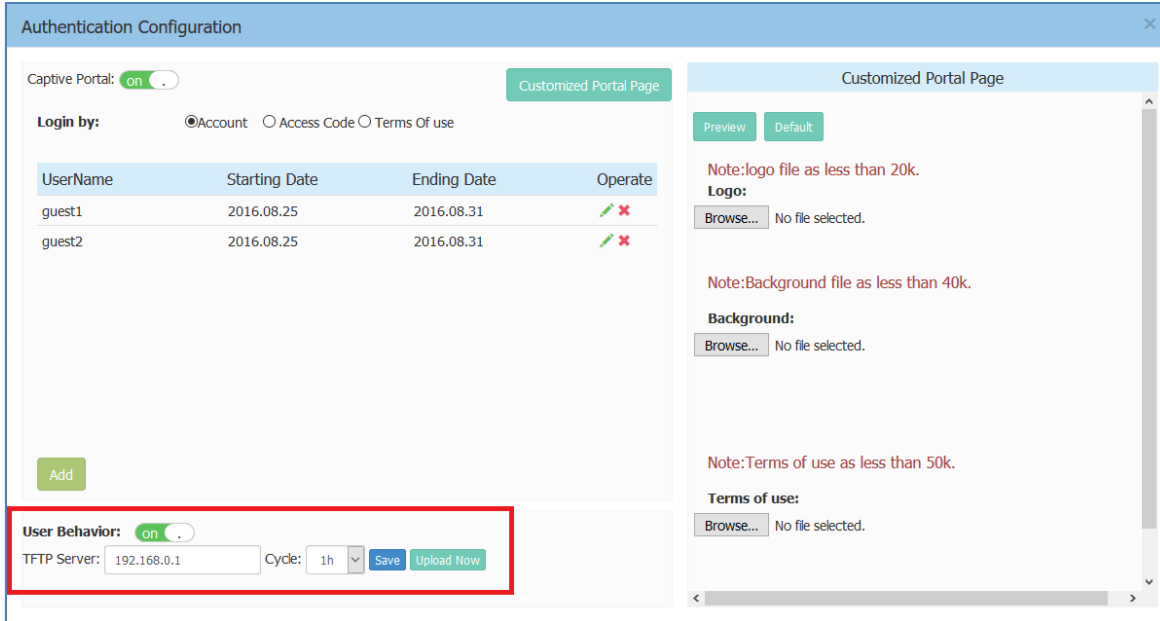


Figure 7-11 Log User Behavior

## Specify Your Walled Garden (Optional)

Navigate: Dashboard-Access Page-Black List & Whitelist Window-Walled Garden Tab.

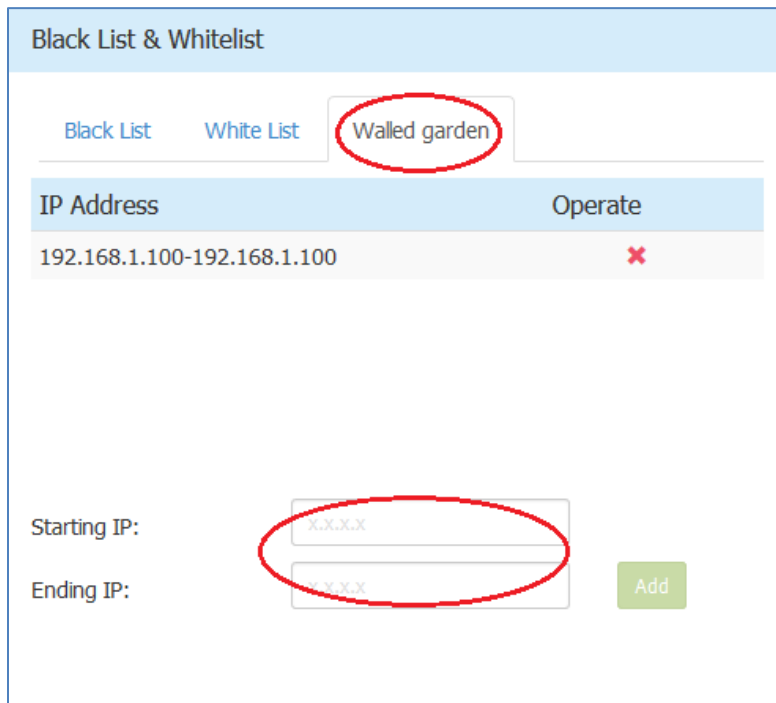


Figure 7-12 Wall Garden

## Specify Your Captive Portal Whitelist (Optional)

Navigate: Dashboard-Access Page-Black List & Whitelist Window-White List Tab.

Black List & Whitelist

Black List **White List** Walled garden

MAC Address	Operate
4c:48:da:24:f1:90-4c:48:da:24:f1:90	✘

Starting MAC:

Ending MAC:

Figure 7-13 Portal Whitelist

# 8 Tools

Tools are several commands provided for diagnosing and troubleshooting. The commands are applied to a single AP in the group. You can select an AP from the group and execute a command to discover the running information of the AP, such as system health, wireless health and reboot reason. Illustrated in Figure 8-1, Figure 8-2.



Figure 8-1 Tools in Dashboard

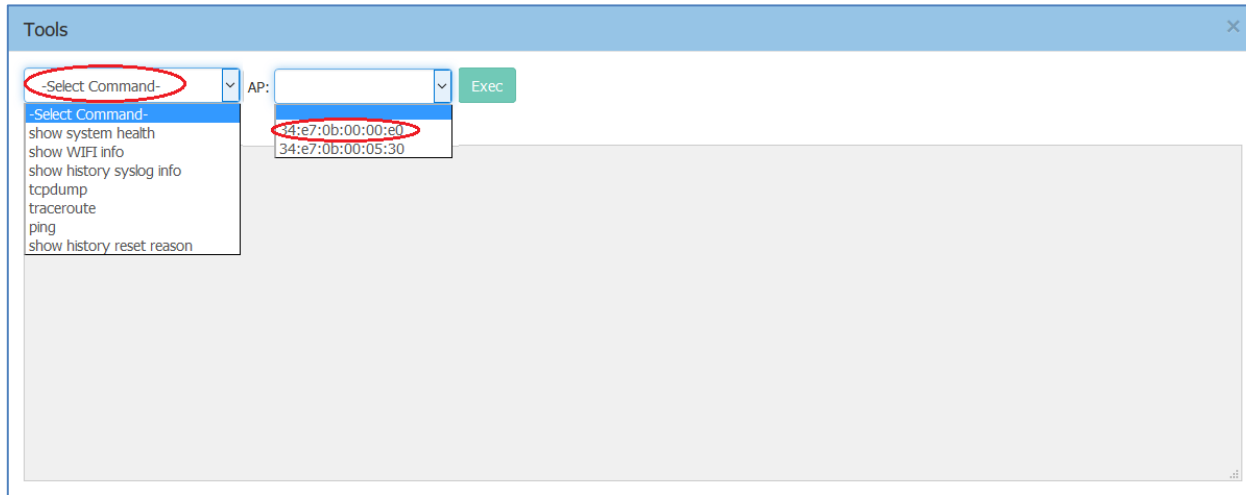


Figure 8-2 Troubleshooting Command

Table 8-1 describes the commands for troubleshooting.

Command	purpose
Show system health	Show system CPU and memory usage information of specified AP
Show WIFI Info	Show wireless interface information of specified AP

## Tools

Show history Syslog info	Show historic Syslog messages generated in last time system running (Before this time system up) of specified AP
tracert	Traceroute from specified AP to another host in the network
Ping	Ping operation from specified AP to another host in the network
Show history reset reason	Show historic reboot reason of specified AP

## PMD

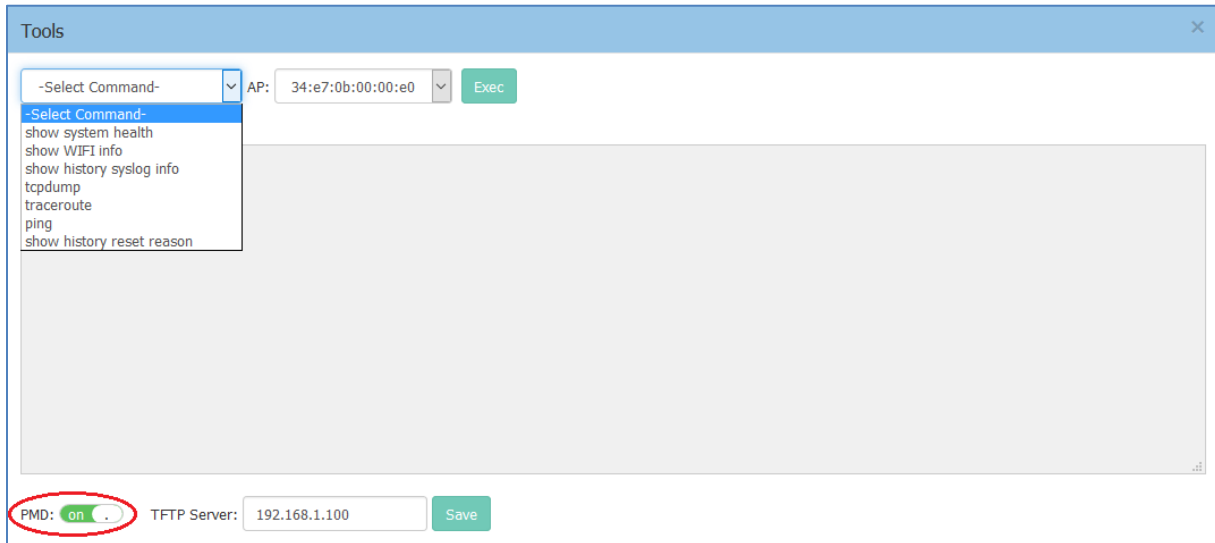


Figure 8-3 PMD

Post Mortem Dump (PMD) is a troubleshooting method helping to identify root cause of a core dump and exception pointers after a fatal crash. If PMD is enabled and configured, the AP will send PMD files to a specific TFTP server immediately when there is key process crashing on the AP. By default, PMD files sending to external TFTP server is disabled.

## Reset the AP to Factory Default Settings

Press and hold the reset button for approximately 5 seconds then release. The LED will turn off and then turn red as the AP reboots to the factory default settings.

## 9 AP UI

AP UI is a dedicated web interface to monitor and configure single AP in the group, while group web management system is focus on cluster configuration as well as monitoring. In AP UI, you can:

- (1) Learn the WLANs status, connecting clients on the AP;
- (2) Configure DHCP/DNS/NAT services on the AP;
- (3) Configure wireless Mesh/Bridge feature for the AP;
- (4) Maintenance - Upgrade/Reset/Reboot the AP.

### Login to AP UI

When AP is working in the Express mode, you need to login the group web management. In the AP List of group web, you can click the link to open a specific AP UI.

Primary Name	IP	Firmware	Operate
PVC			
AP-C2:70	192.168.55.17(AP) 192.168.55.239(M)	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>
SVC			
AP-D7:50	192.168.55.9	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>
MEMBER			
AP-24:00	192.168.55.1	3.0.3.29	<a href="#">cfig</a> <a href="#">reboot</a>
AP-18:40	192.168.55.10	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>
AP-0C:F0	192.168.55.19	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>
AP-09:F0	192.168.55.13	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>
AP-05:90	192.168.55.18	3.0.3.28	<a href="#">cfig</a> <a href="#">reboot</a>

**Detailed Information**

AP Name: AP-C2:70 [Edit](#)

MAC: 34:E7:0B:03:C2:70

Location: [Edit](#)

Status: Working

Role in Group: PVC

Serial Number: SS2170200040

Model: OAW-AP1221

Firmware: 3.0.3.28

Upgrade Time: Thu May 3 17:40:04 2018

Upgrade Flag: successfully

---

IP Mode: DHCP [Edit](#)

IP: 192.168.55.17

Netmask: 255.255.255.0

Default gateway: 192.168.55.254

DNS: 219.141.136.10

[Reboot All AP](#)
[Clear All Configuration](#)
[Backup All Configuration](#)
[Restore All Configuration](#)
[Upgrade All Firmware](#)
[Connect To OmniVista Cirrus](#)

Figure 9-1 AP List - link to AP UI

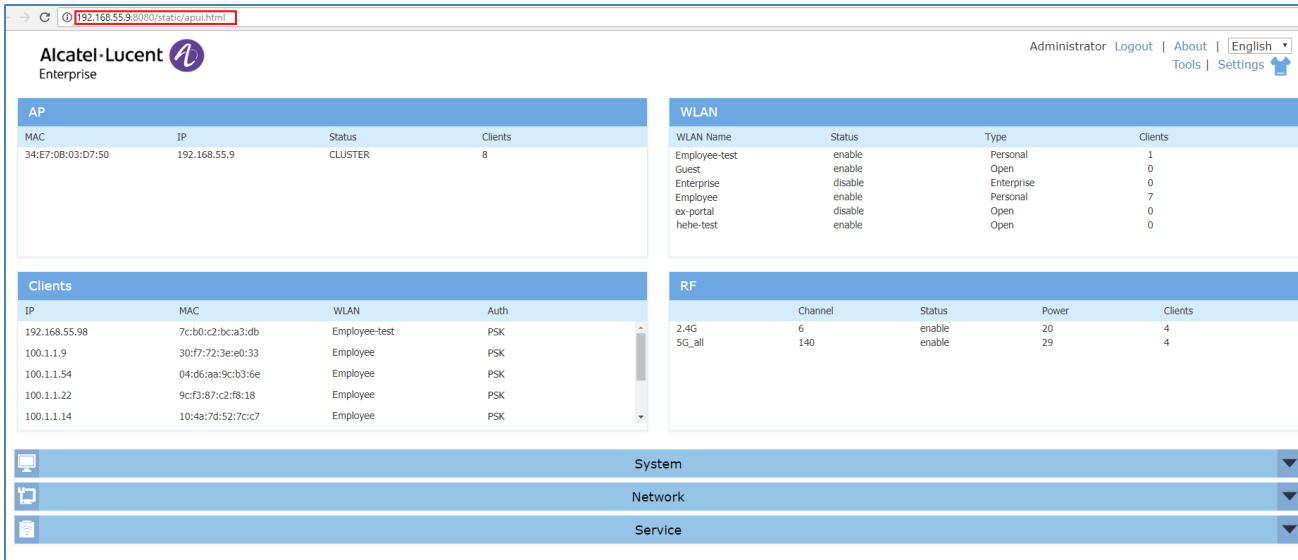


Figure 9-2 AP UI

When AP is working in the OmniVista Enterprise mode, you can open the AP UI through the “AP Web” hyperlink. More information can refer to help information on OmniVista platform.

## AP Interface

Navigate: AP-UI -> Network -> AP Interface -> AP Interface Configuration.

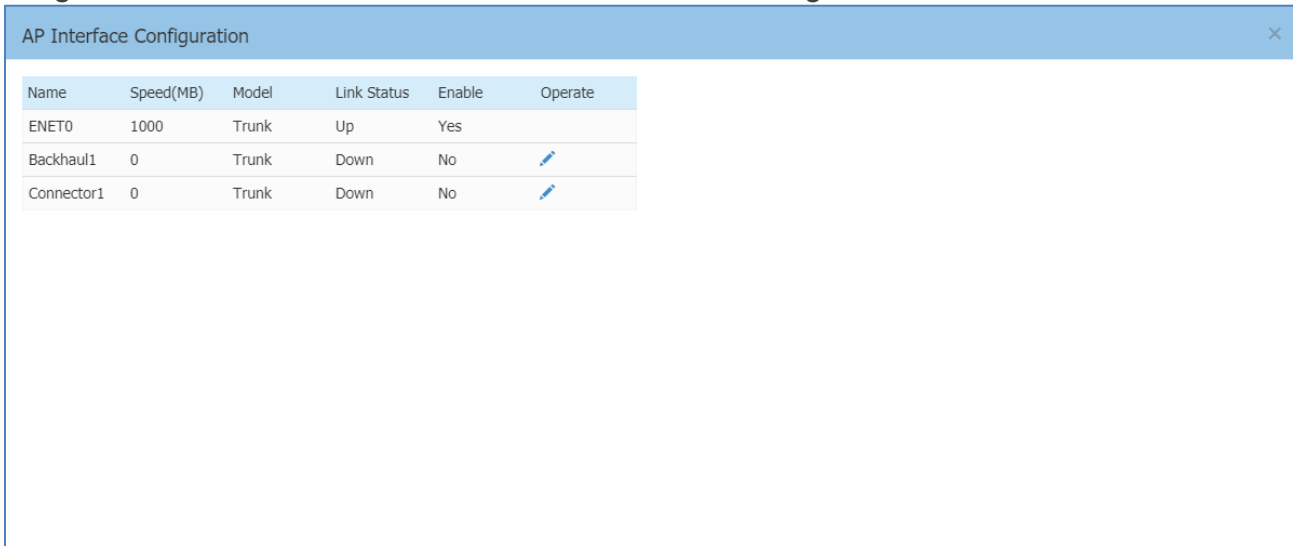


Figure 9-3 AP Interface

- ENET0 - Uplink interface of the AP.
- Backhaul1 - Uplink interface of the Mesh/Bridge link.
- Connector1 - Downlink interface of the Mesh/Bridge link.

For each AP interface

- Speed - Link speed of the AP interface.
- Mode - VLAN access mode or WLAN trunk mode.



- Link Status - Up/down.
- Enable - Indicate whether the AP interface is enabled or disabled.
- Operate - Can be applied to Backhaul1 or Connector1 interface for wireless mesh/bridge configuring.

## AP Network

Navigate: AP-UI -> Network -> AP Networks.

Name	Vlan	Protocol	IP Address	Operate
vlan667	667	Static		
vlan31	31	Static		
wan		DHCP	192.168.55.17	
vlan666	666	Static	100.1.1.1	

### Edit Network

Network Name: vlan666

Vlan: 666

Protocol:

IP Address:

Netmask:

DNS:

Default Route:  off

Figure 9-4 AP Network

- Network Name - Name of the network. There are 2 types of network on AP: VLAN networks mapping to WLAN (SSID); WAN networking mapping to AP uplink port.
- VLAN - VLAN ID mapping to specific WLAN (SSID).
- Protocol - IP address allocation for the network interface. IP address of a network interface is usually set as the gateway of the devices connecting the network.
  - DHCP - Indicates the interface IP address of the network is obtained from an outside DHCP server.
  - Static - Indicates the interface IP address of the network is manually set.
- Operate - Edit the AP network.
- IP Address - Interface IP address of the network.
- Netmask - Netmask of the network.
- DNS - DNS server for the network.
- Default Route - Indicate whether the interface of the network is default route of the AP. By default, WAN interface in the default route of the AP.

## Configure Mesh/Bridge through AP UI

Navigate: AP-UI -> Network -> AP Interface -> AP Interface Configuration.

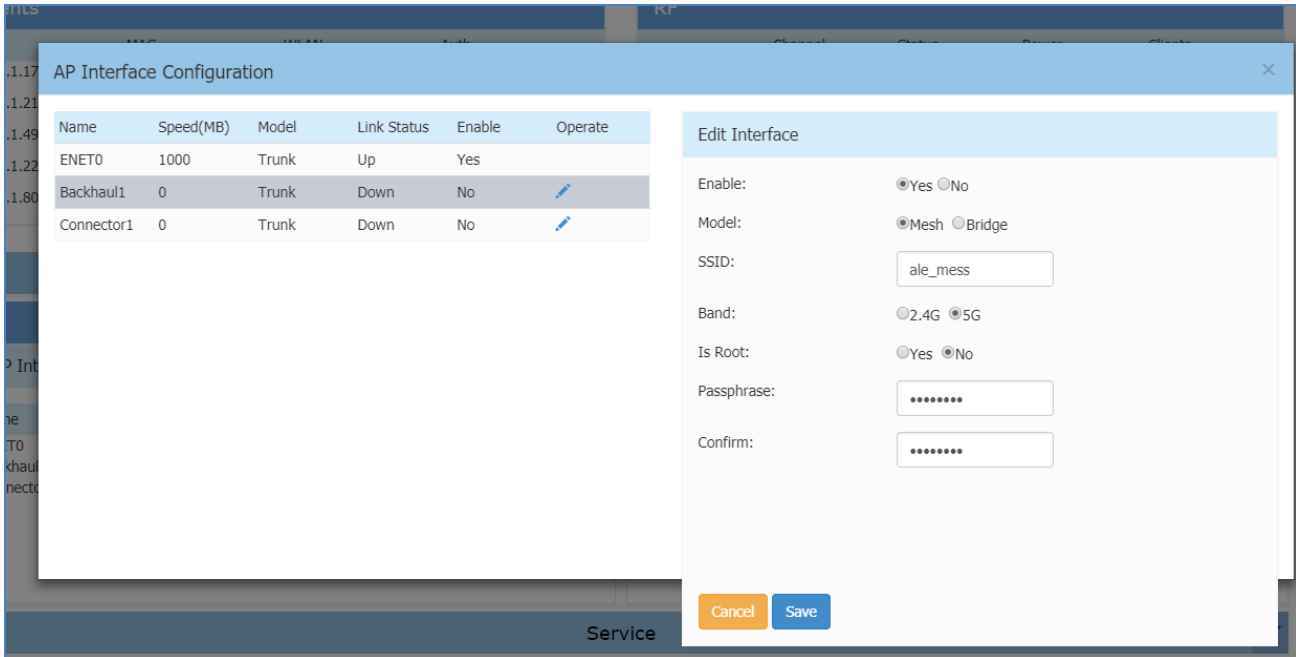


Figure 9-5 Configure Mesh/Bridge

Edit the Backhaul1/Connector1 interface:

- Enable - Enable/disable the wireless mesh/bridge on the AP.
- Mode - AP working mode, mesh mode or bridge mode.
- SSID - WLAN used to setup wireless mesh/bridge connection.
- Band - Mesh/bridge working band. All the mesh connection from root node to leaf shall be in the same band.
- Is Root - Specify the root node of the wireless mesh chain.
- Passphrase - Password of the WLAN used to setup wireless mesh/bridge connection.
- Confirm - Re-enter the password to confirm.

## Configure DHCP through AP UI

Navigate: AP-UI -> Service -> DHCP.

For an AP group in the same L2 domain, you can setup DHCP server on a specific AP in the group.

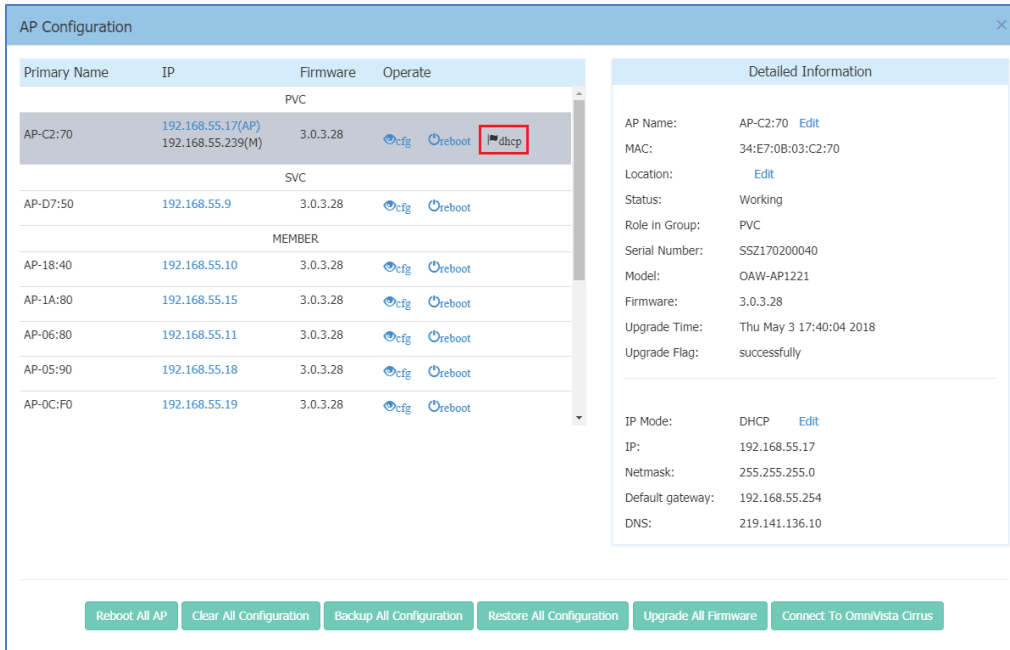


Figure 9-6 DHCP Server in AP group

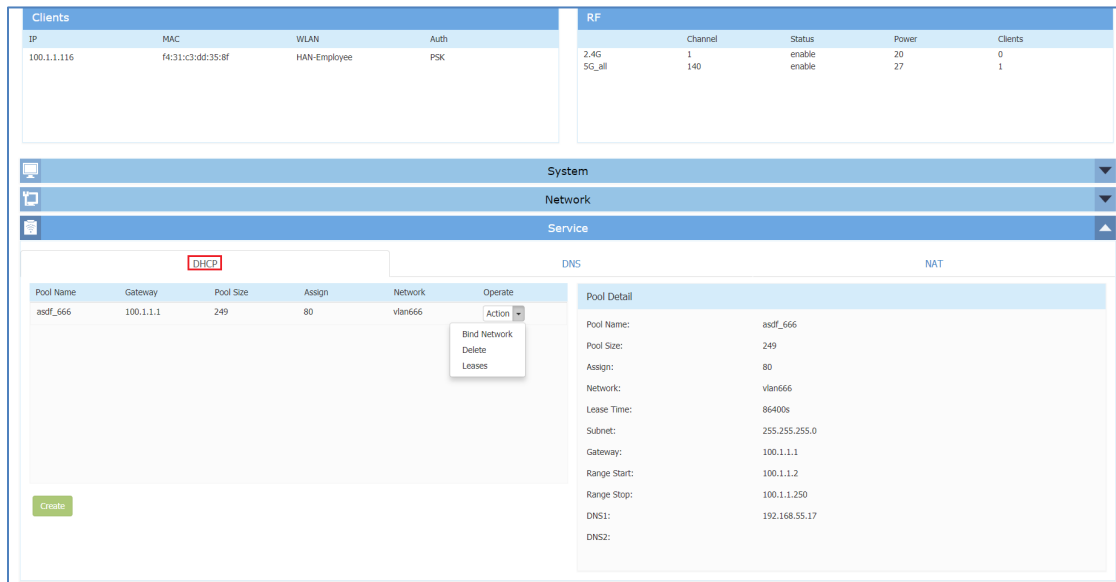


Figure 9-7 DHCP Server

- Pool Name - Name of the DHCP pool.
- Pool Size - Size of the DHCP pool.
- Assign - IP addresses have been allocated.
- Network - Network to which the DHCP pool is bound. A Network usually means the VLAN mapping to specific SSID or the AP WAN interface. All the networks are displayed in the window: AP UI -> Network -> AP Networks. You must map the VLAN to a SSID before it can be displayed in the AP UI.
- Lease Time - Period of time that the IP address allocated can be used by the device. By default, lease time is 24 hours.
- Subnet - Subnet of the DHCP pool.

- Gateway - Specify the gateway for the DHCP pool.
- Range Start - DHCP pool starting IP address.
- Range Stop - DHCP pool ending IP address.
- DNS1 - Primary DNS server for the DHCP pool.
- DNS2 - Secondary DNS server for the DHCP pool.
- Operate
  - Bind Network - Bind the DHCP pool to specific Network. Before binding, you need to configure the Network basic parameters in the 'AP UI -> Network -> AP Networks window'. Only Network with static IP (as gateway) can be bound to a DHCP pool.
  - Delete - Delete the DHCP pool.
  - Leases - Display the IP addresses which have been allocated to devices.

## Configure DNS Cache through AP UI

Navigate: AP-UI -> Service -> DNS.

- Cache Size - Specify the size for the DNS cache.

## Configure NAT through AP UI

Navigate: AP-UI -> Service -> NAT -> Source NAT.

### Source NAT

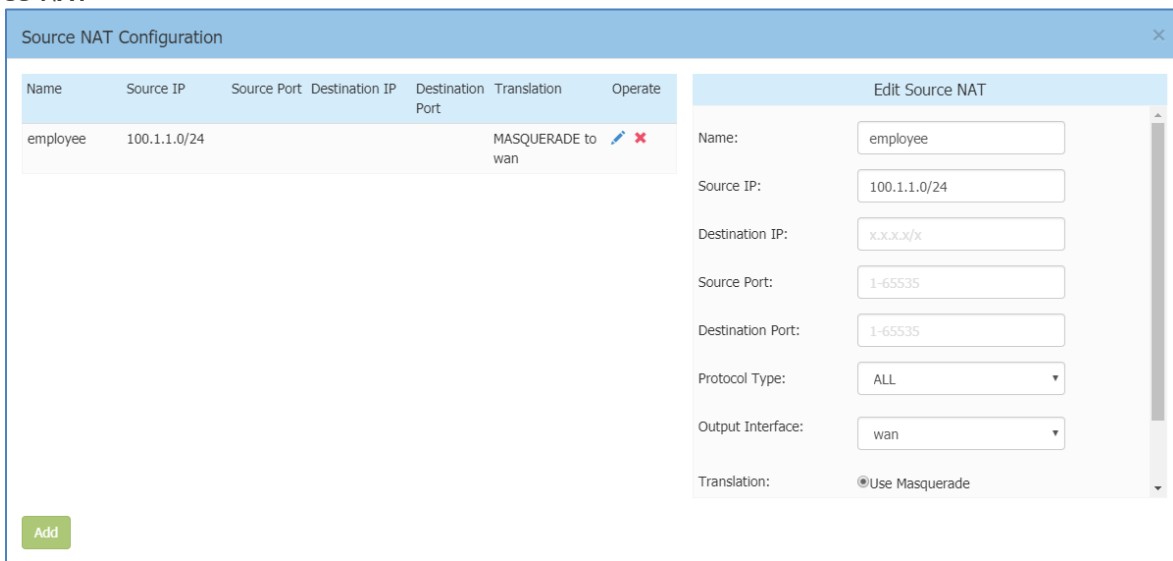


Figure 9-8 Source NAT

Source NAT can be utilized to translate the internal IP addresses to single external IP address while visiting Internet, by saving public IP address.

- Name - Name of the Source NAT rule.
- Source IP - Mapping source IP address of the NAT rule, single IP or segment.
- Destination IP - Mapping destination IP address of the NAT rule, single IP or segment.
- Source Port - Mapping source port of the NAT rule.
- Destination Port - Mapping destination port of the NAT rule.
- Protocol Type - Network protocol to which the NAT rule is applied.
- Output Interface - Specify the outbound interface of the NAT rule.
- Translation - Use Masquerade, indicates the internal IP addresses will be translated to the interface IP address (gateway) of the network.

### Destination NAT

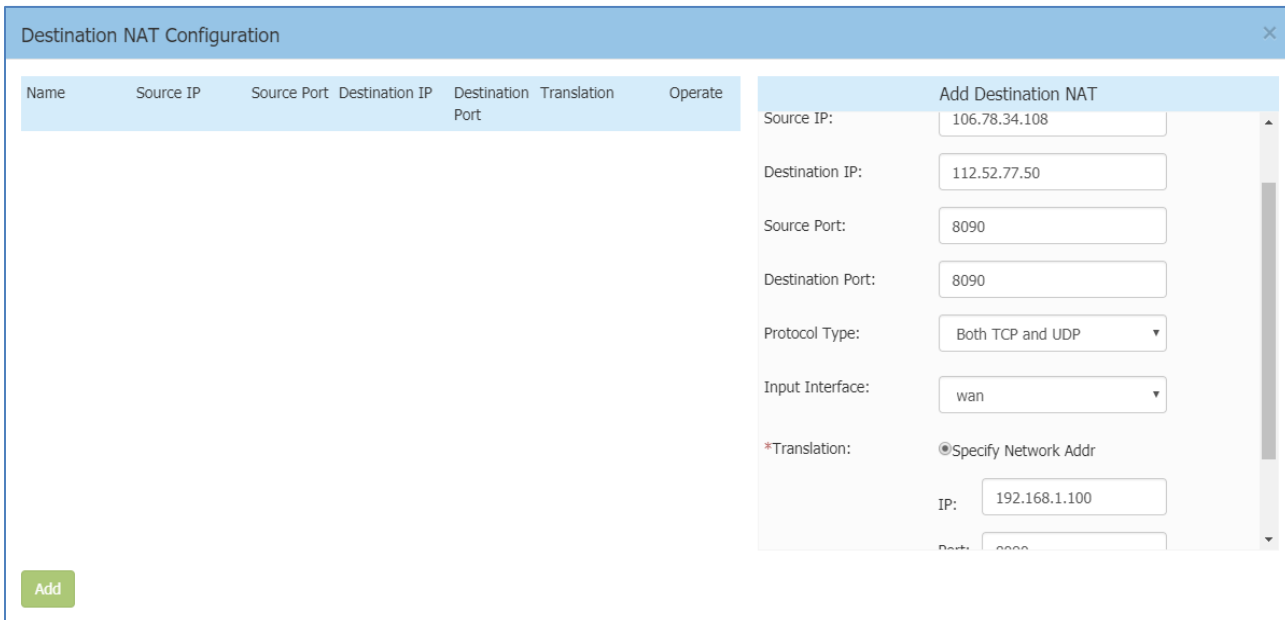


Figure 9-9 Destination NAT

Destination NAT can be utilized to realize visiting specific server in the internal network from internet.

- Name - Name of the destination NAT rule.
- Source IP - Mapping source IP address of the NAT rule, single IP or segment.
- Destination IP - Mapping source port of the NAT rule.
- Source Port - Mapping source port of the NAT rule.
- Destination Port - Mapping destination port of the NAT rule.
- Protocol Type - Network protocol to which the NAT rule is applied.
- Input Interface - Specify the inbound interface of the NAT rule.
- Translation
  - IP - IP address to which the external IP address will be translated
  - Port - Port to which the external IP address will be translated

### Configure Static Neighbor AP through AP UI

Navigate: AP-UI -> Neighbor AP.

Neighbor AP is the candidate to which clients connecting to current AP might roam. There two types of neighbor AP - Auto Neighbor AP as well as Static Neighbor AP. Auto Neighbor AP is discovered through wireless scanning automatically, while Static Neighbor AP is manually added.

Auto AP		
Neighbor AP List		
Order	MAC Address	IP Address
1	dc:00:11:22:34:40	192.168.20.138

Figure 9-10 Auto Neighbor AP

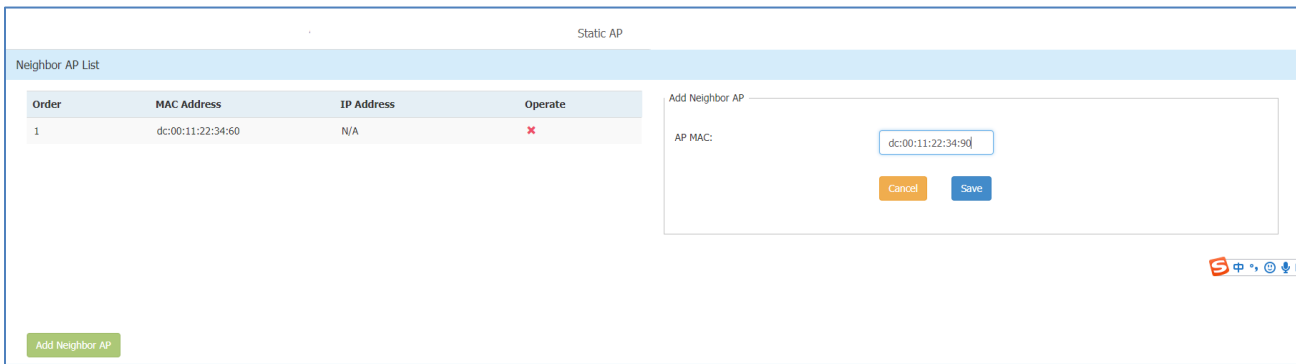


Figure 9-11 Static Neighbor AP

- Order - Item number of the neighbor AP.
- MAC Address - MAC address of the neighbor AP.
- IP Address - IP address of the neighbor AP.
- Operate - Remove the neighbor AP, only applicable for static neighbor APs.

## RF Environment

The RF Environment is used to view Scanning Mode data for APs. Wireless networks operate in environments with electrical and radio frequency devices that can interfere with network communications. APs can examine the radio frequency environment in which the Wi-Fi network is operating, identify interference, and classify its sources. An analysis of the results can then be used to quickly isolate issues with packet transmission, channel quality, and traffic congestion caused by contention with other devices operating in the same band or channel.

Note: To view Scanning Mode data for an AP, the AP must be in "**Scanning Mode**". When an AP is in Scanning Mode, no clients can associate with the AP.

There are two types of AP Scanning Mode:

- One Time - The scanning mode will last for 5 minutes duration and then return to normal AP mode in which wireless clients can associate.
- Always - The scanning mode is always active and wireless client is not allowed to associate if the AP is powered on.

When the scanning mode is terminated automatically (One Time mode) or manually (Always mode), AP will return to normal AP mode and clients are allowed to connect.

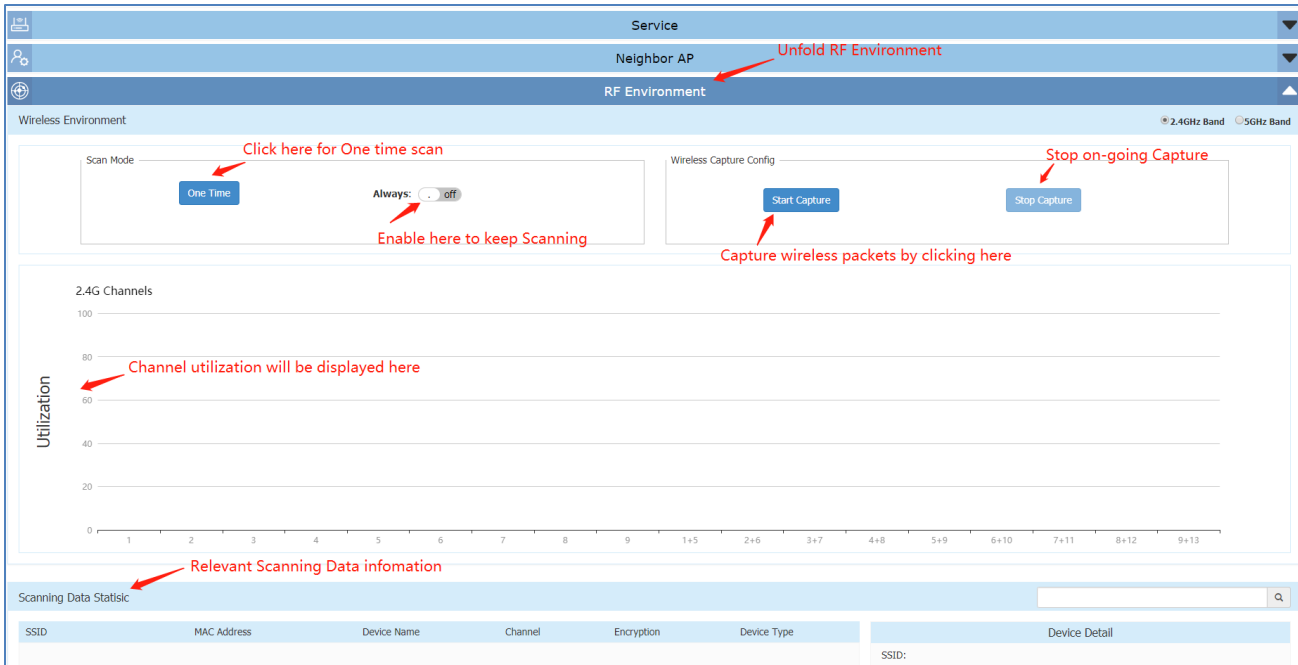


Figure 9-12 RF Environment

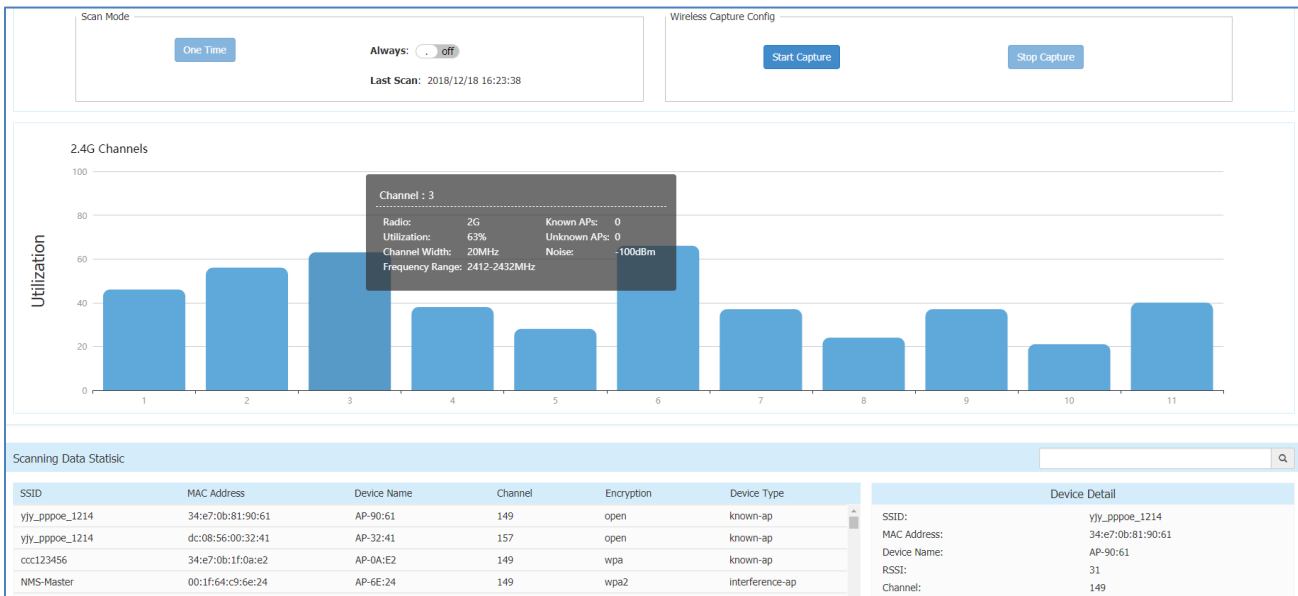


Figure 9-13 RF Scanning Data

The RF scanning data can be viewed by selecting 2.4G/5G radio:

- Channel - Wi-Fi channel.
- Radio - Radio of the Wi-Fi channel.
- Utilization - Utilization of the Wi-Fi channel.
- Channel Width - Width of the Wi-Fi channel.
- Frequency Range - Frequency range of the Wi-Fi channel.
- Known APs - APs which are identified working in the same network with scanning APs on the Wi-Fi channel.
- Unknown APs - Foreign APs including interfering APs and Rogue APs on the Wi-Fi channel.
- Noise - Noise is the measure of the wireless signal created from the sum of all the noise sources and unwanted signals.

## Wireless Packet Capture

The screenshot shows a 'Capture Config' window with the following fields and values:

- Channel: (empty dropdown)
- TFTP Server: 192.168.20.42
- Filter:
- MAC1: (empty text box)
- MAC2: Any Address (dropdown)
- Frame Type: 802.11 ALL (dropdown)

At the bottom, there are two buttons: 'Reset' (orange) and 'Start' (blue).

Figure 9-14 Wireless Packet Capture

User can use specific AP to capture wireless packets for troubleshooting purpose:

- Channel - Specify the Wi-Fi channel for packet capture.
- TFTP Server - The file server to which the packets captured will be uploaded.
- Filter - A filter used to select the Wi-Fi packets wanted to be captured.
  - MAC1 - Target MAC for wireless packet capturing, could be destination MAC or Source MAC. Can be used together with MAC2 to be a combination for specifying the filter condition. For example, to capture the bidirectional packets between client A (MAC1) and client B (MAC2).
  - MAC2 - Target MAC for wireless packet capturing, could be destination MAC or Source MAC. Can be used together with MAC2 to be a combination for specifying the filter condition.
  - Frame Type - Specify the 802.11 packet type that will be captured:
    - 802.11 ALL - All the 802.11 packets mapping MAC address condition on the channel will be captured, including management, data and control packets.
    - 802.11 MGMT - The 802.11 management packets mapping MAC address condition on the channel will be captured (Packet type: beacon/ assoc-req/ assoc-resp/ reassoc-req/ reassoc-resp/ probe-req/ probe-resp/ disassoc/ auth/ deauth/ atim).
    - 802.11 DATA- The 802.11 data packets mapping MAC address condition on the channel will be captured (Packet type: null/data/ data-cf-ack/ data-cf-poll/ data-cf-ack-poll/ cf-ack/ cf-poll/ cf-ack-poll/ qos-data/ qos-data-cf-ack/ qos-data-cf-poll/ qos-data-cf-ack-poll/ qos/ qos-cf-poll/ qos-cf-ack-poll).
    - 802.11 CTRL - The 802.11 control packets mapping MAC address condition on the channel will be captured (ps-poll/ rts/ cts/ ack/ cf-end/ cf-end-ack).

# 10 Web Management with HTTPS

There are two methods to login to the AP group web management system:

(1) HTTP protocol with URL <http://mywifi.al-enterprise.com:8080>, which is simpler and easier for the user without needing to install the digital certificate;



(2) HTTPS protocol with URL <https://mywifi.al-enterprise.com>, which is more secure communication between AP and the browser. User can select his/her preferred managed method accordingly.

User can access the web manager directly with HTTP. If you want to access with HTTPS, a CA root needs to be downloaded from the AP and installed into the trust store of the browser used. The certificate installation procedure varies from operating system and browser combinations. You can follow below illustrated steps to install the root CA accordingly.

## Download the Certificate from AP

In the HTTP login page, you can download the root certificate file “ALE-OmniAccess-WLAN.CRT” from AP, illustrated in Figure 10-1 and Figure 10-2.

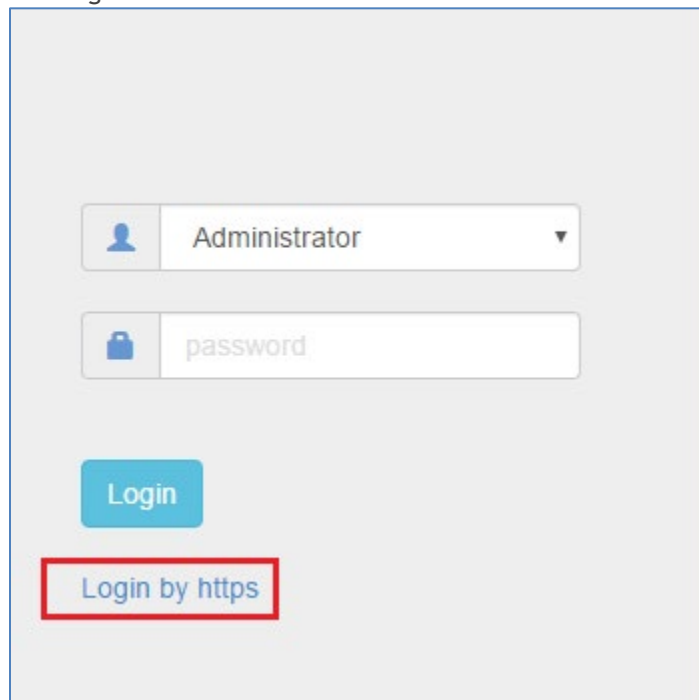


Figure 10-1 HTTP Login Page

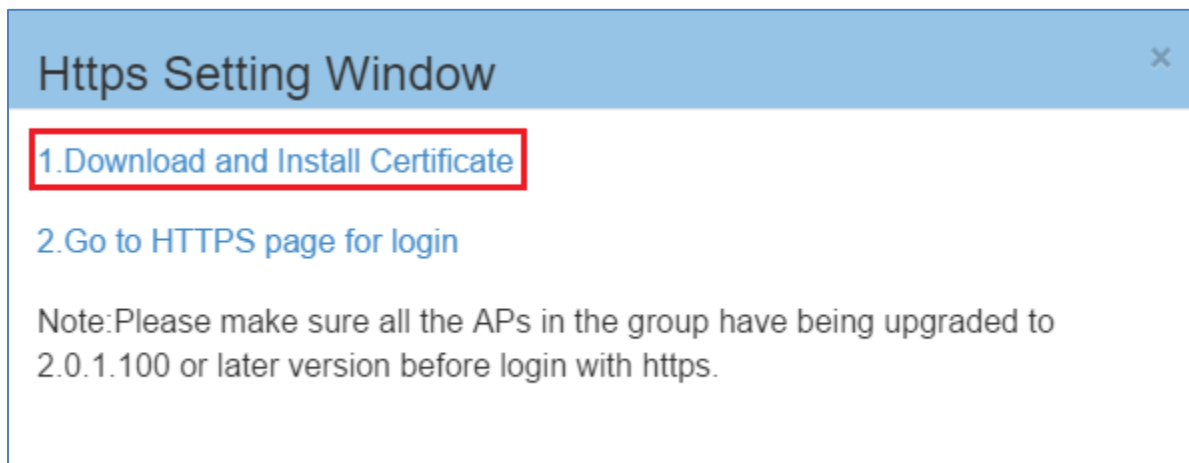


Figure 10-2 Download Certificate from AP

## Install the Certificate on Different Platform accordingly

You can follow the demonstrated steps to install the certificate based on the operating system and browser combinations.

After you have installed the certificate successfully, you can access <https://mywifi.al-enterprise.com> to manage the AP group.

### Case A: Microsoft Windows + Microsoft IE/Google Chrome

When using Microsoft IE or Google Chrome on Microsoft Windows platform, you can follow the steps illustrated from Figure 10-3 to Figure 10-8 to install the certificate.

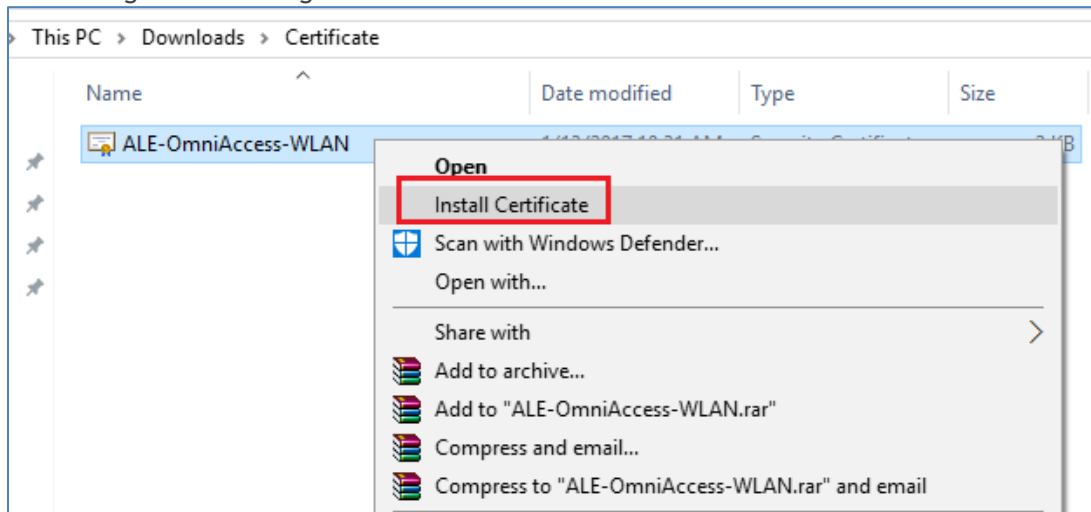


Figure 10-3 Case A - Step 1

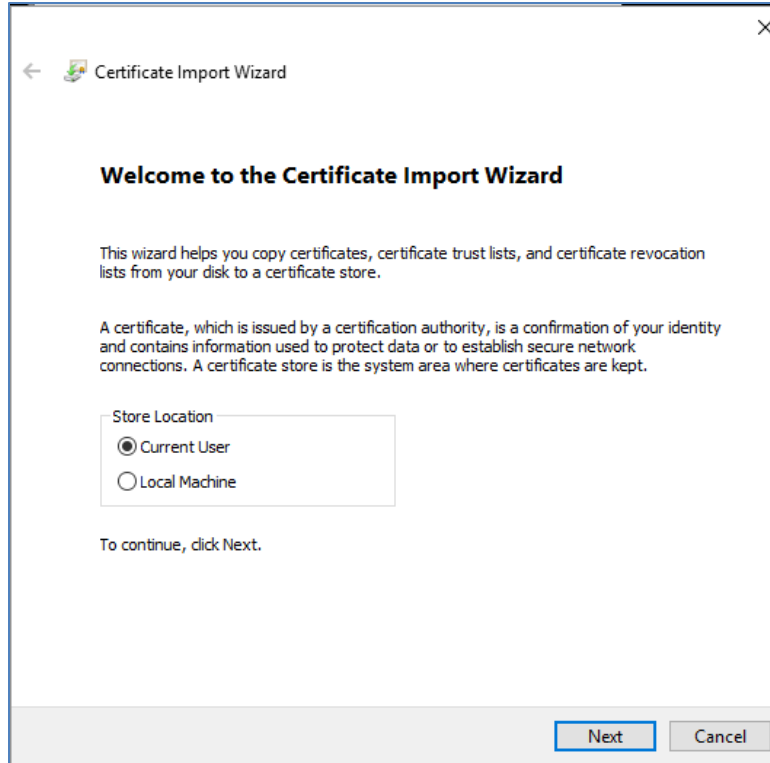


Figure 10-4 Case A - Step 2

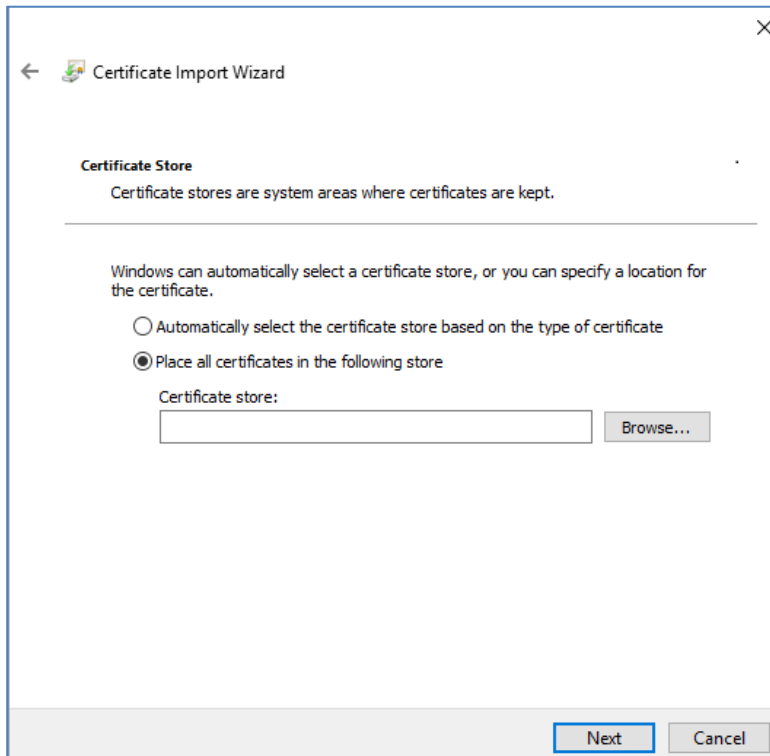


Figure 10-5 Case A - Step 3

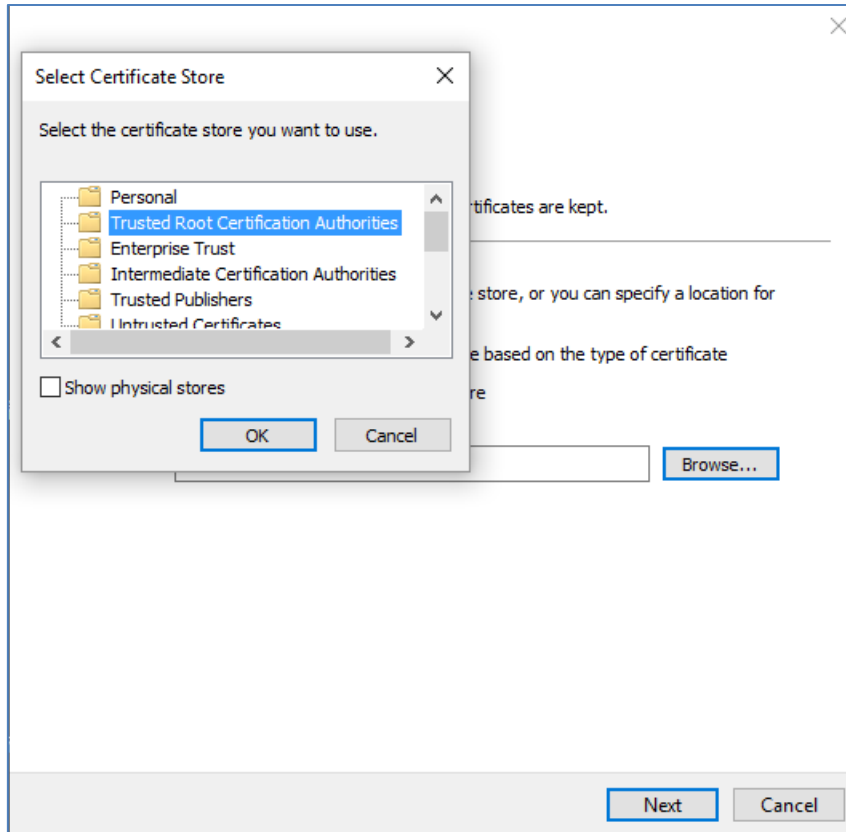


Figure 10-6 Case A - Step 4

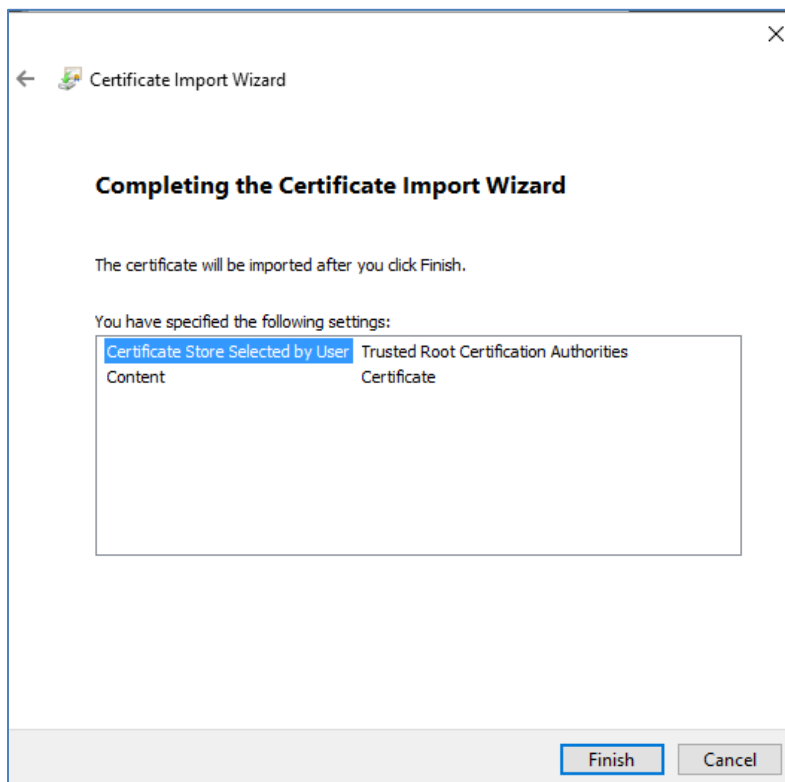


Figure 10-7 Case A - Step 5

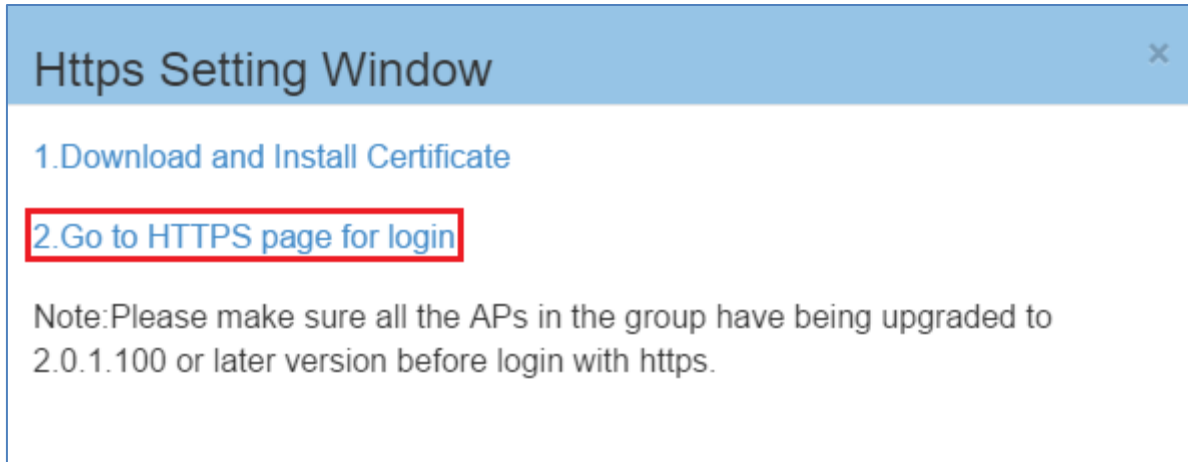


Figure 10-8 Case A - Step 6

### Case B: Microsoft Windows + Mozilla Firefox

When using Mozilla Firefox browser on Microsoft Windows, you can follow the steps illustrated from Figure 10-9 to Figure 10-13 to install the certificate.

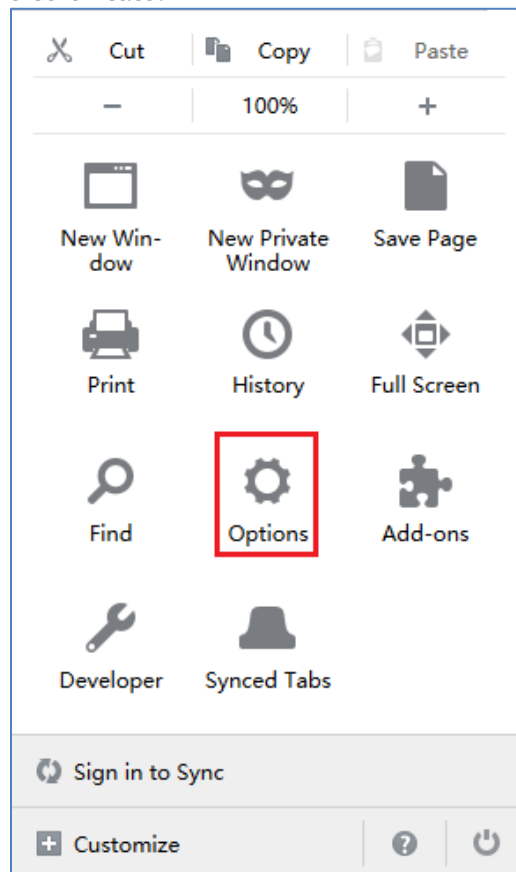


Figure 10-9 Case B - Step 1

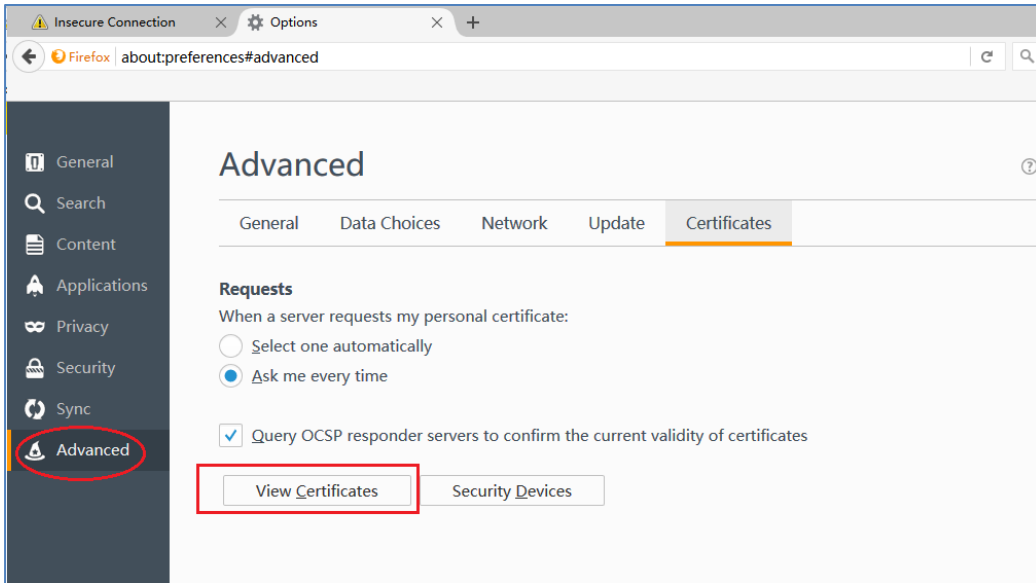


Figure 10-10 Case B - Step 2

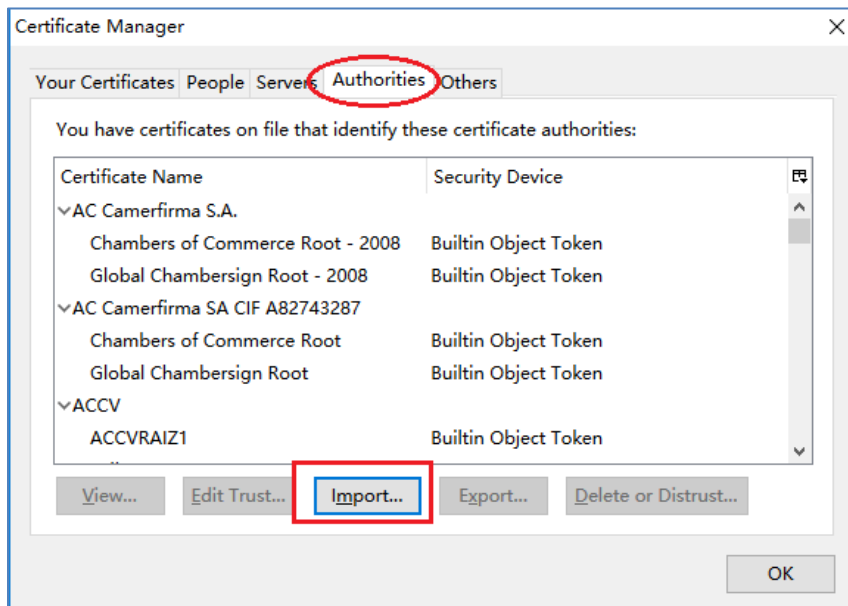


Figure 10-11 Case B - Step 3

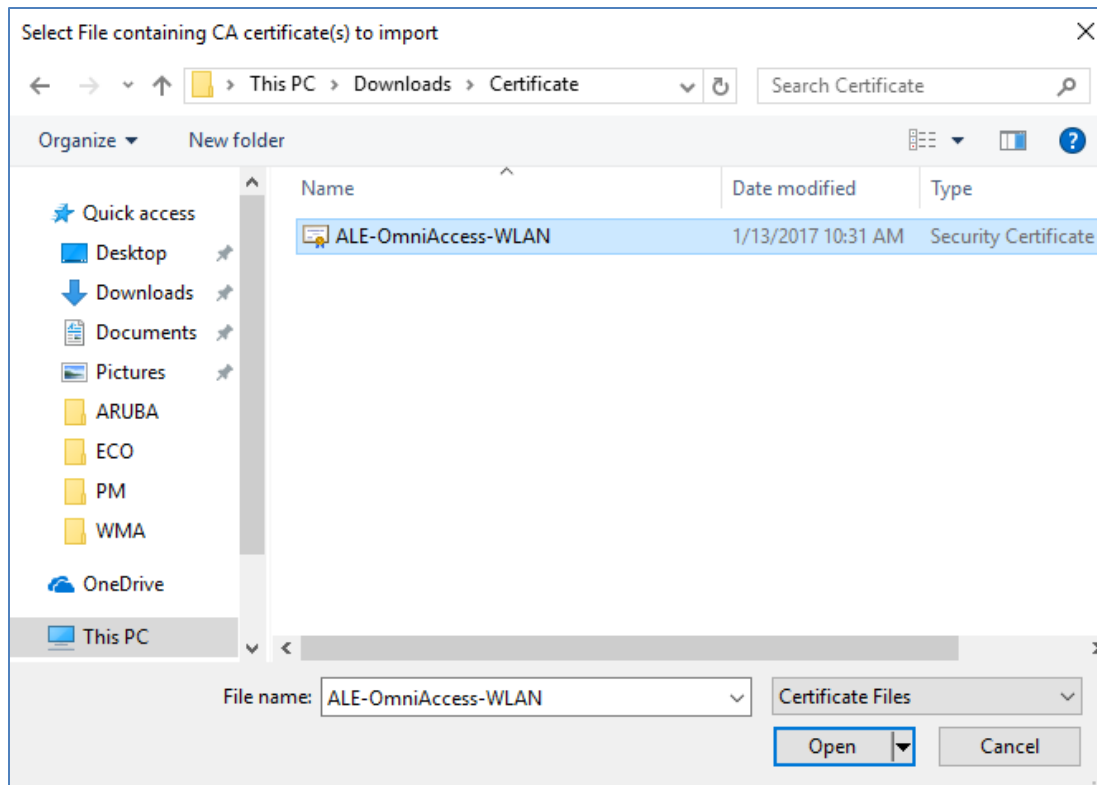


Figure 10-12 Case B - Step 4

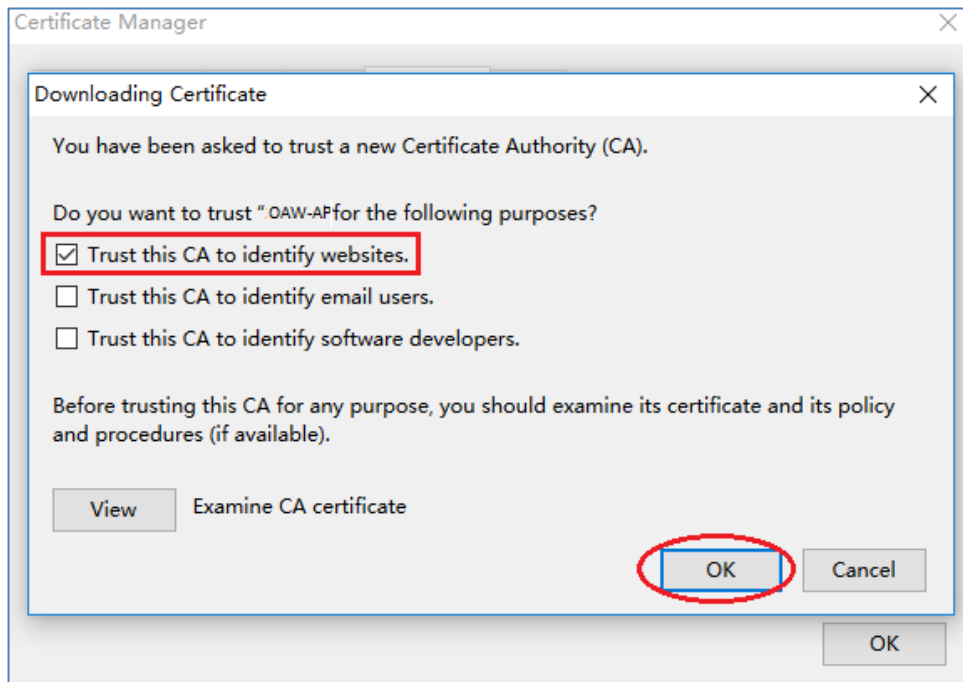


Figure 10-13 Case B - Step 5

## Case C: Apple MAC OS X + Google Chrome

When using Google Chrome on Apple MAC OS X, you can follow the step illustrated from Figure 10-14 to Figure 10-22 to install the certificate.

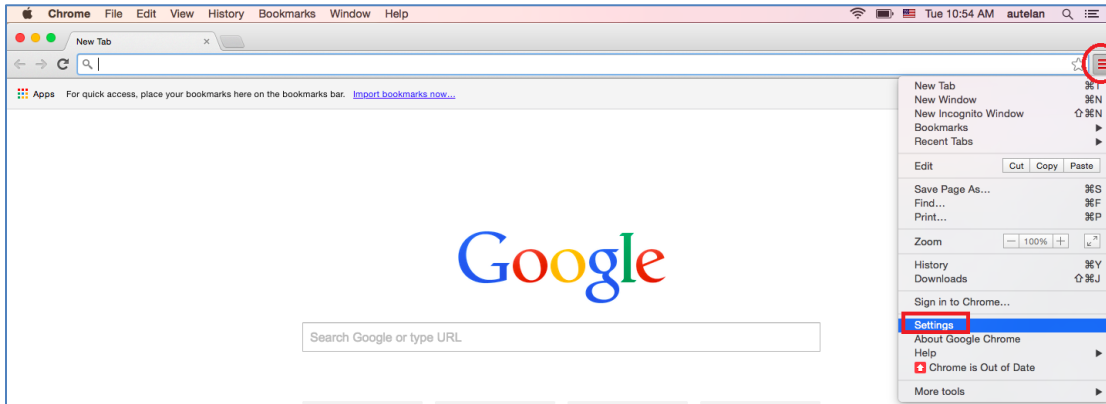


Figure 10-14 Case C - Step 1

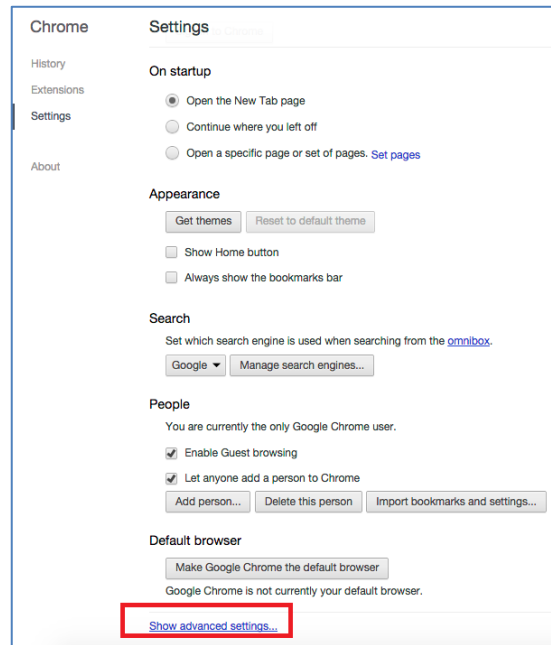


Figure 10-15 Case C - Step 2



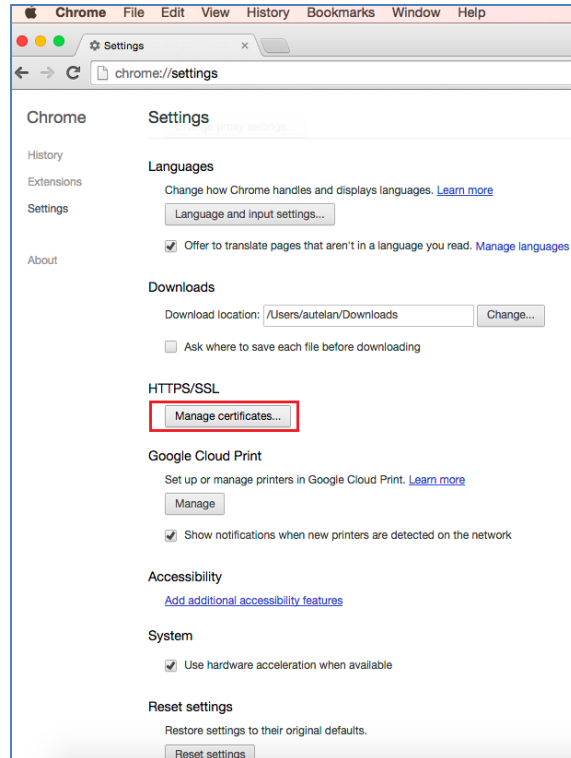


Figure 10-16 Case C - Step 3

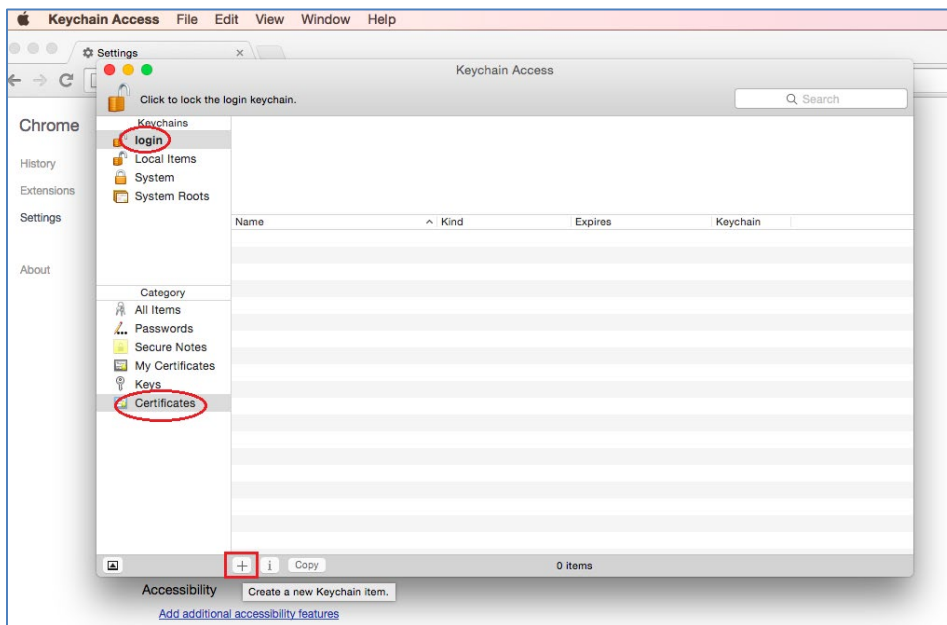


Figure 10-17 Case C - Step 4

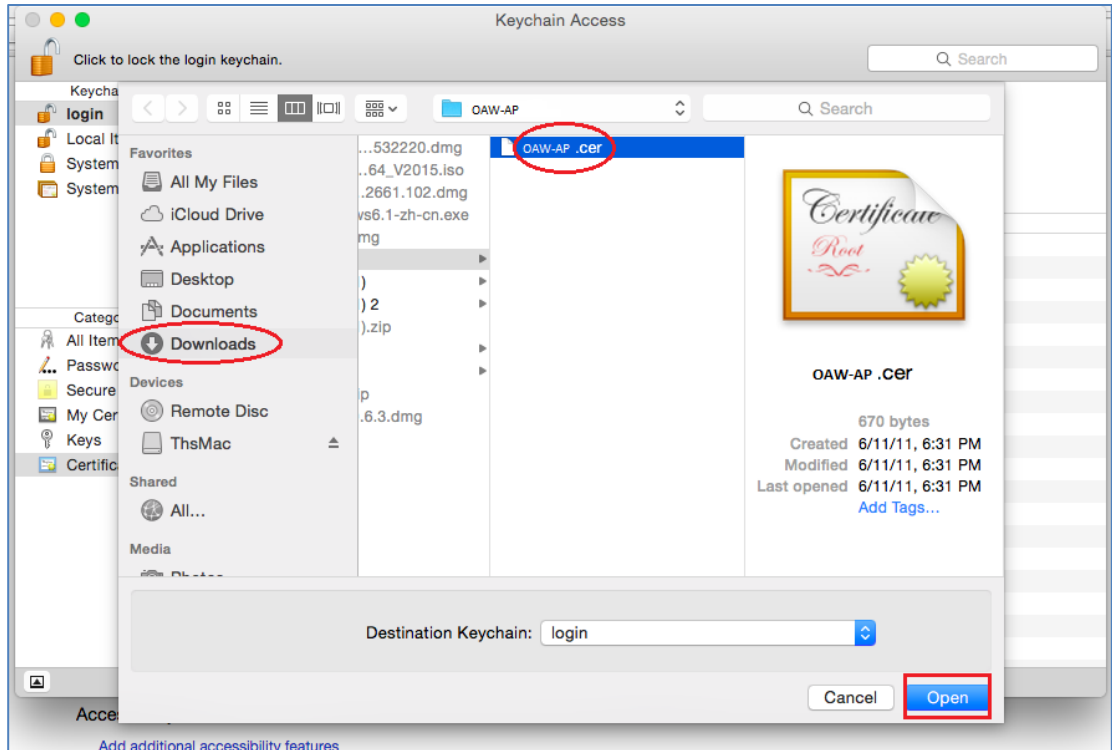


Figure 10-18 Case C - Step 5

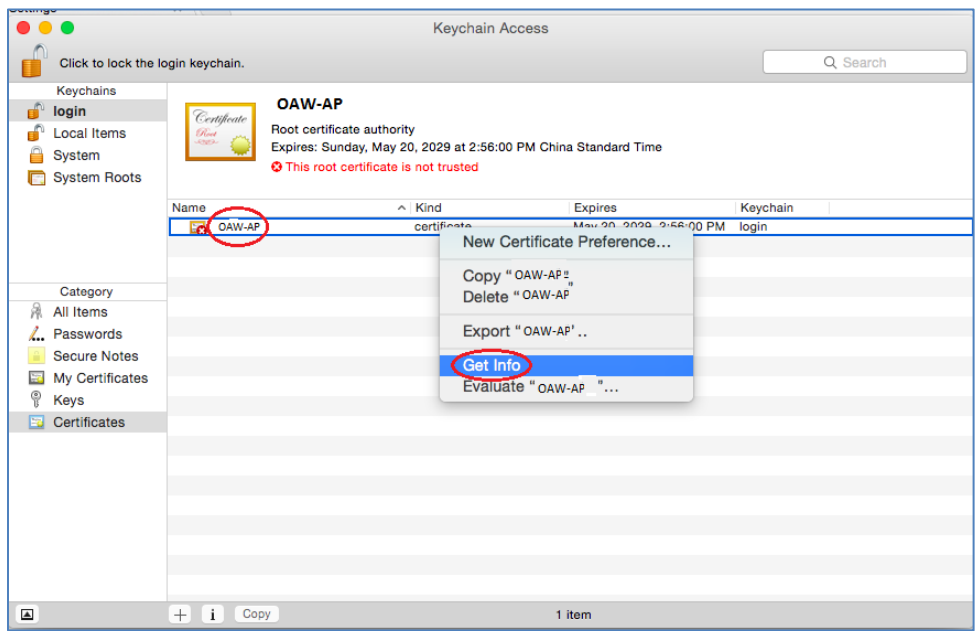


Figure 10-19 Case C - Step 6

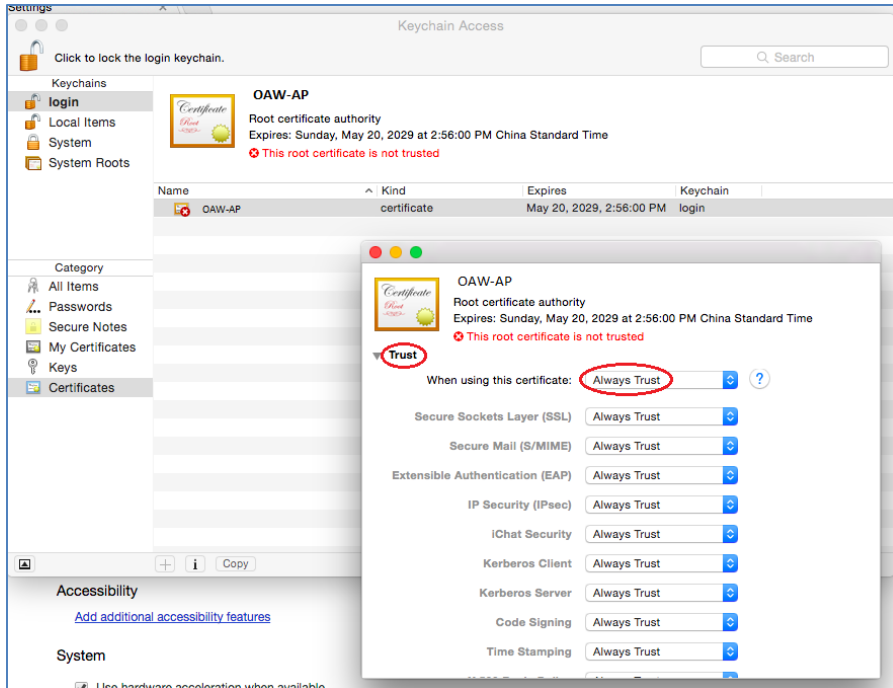


Figure 10-20 Case C - Step 7

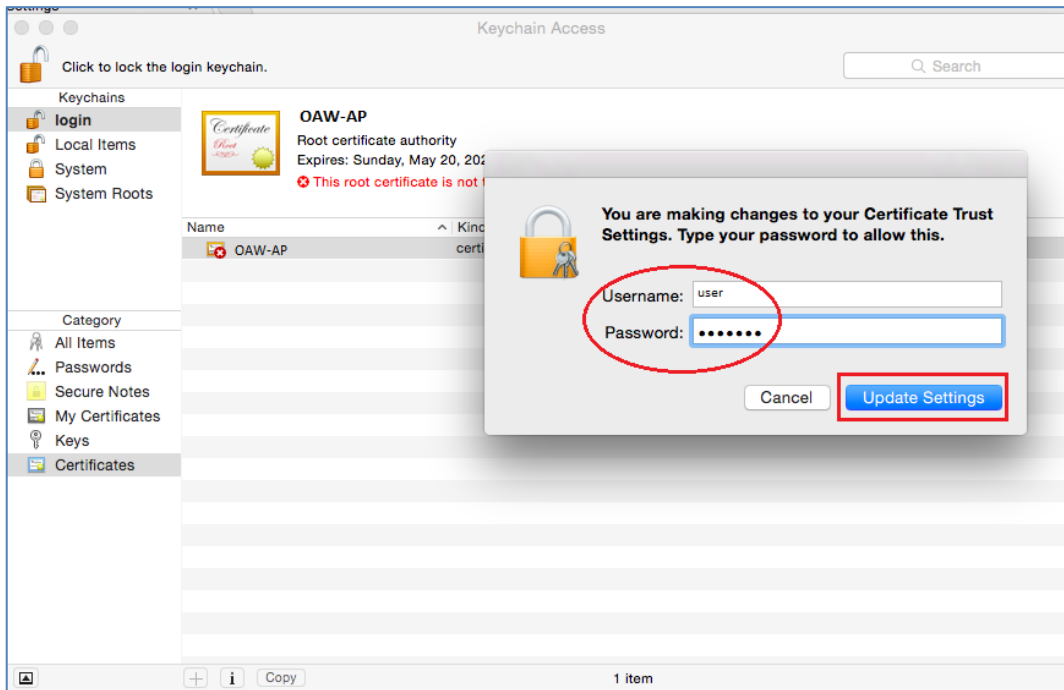


Figure 10-21 Case C - Step 8

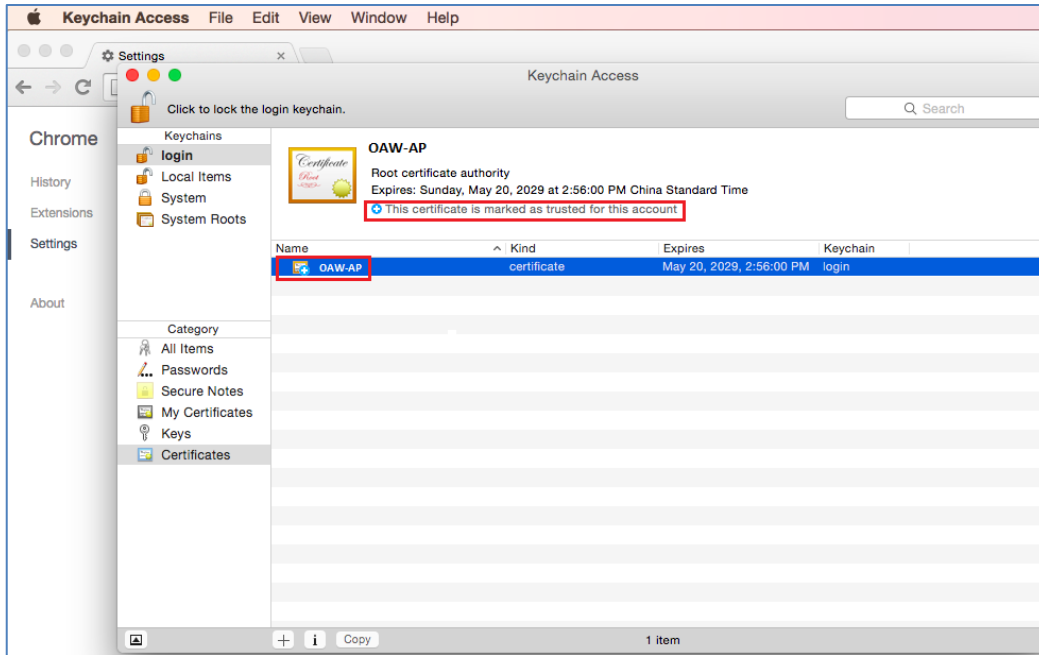


Figure 10-22 Case C - Step 9

## Case D: Apple MAC OS X + Mozilla Firefox

When using Mozilla Firefox browser on Apple MAC OS X platform, go to **Case B: Microsoft Windows + Mozilla Firefox** and follow the steps to install the certificate.



Note

Note 9-1: The recommended operating system and web browser refer to [Prerequisites for Setting up and Accessing AP Group](#).

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