Alcatel-Lucent Enterprise

OmniAccess Stellar AP User Guide - AWOS 4.0.8
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Alcatel·Lucent
Enterprise

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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 OmniAccess Stellar 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 (Wi-Fi 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

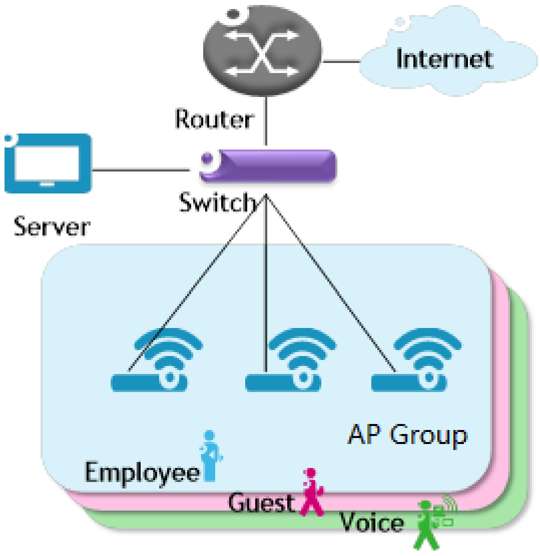


Figure 2-1 AP group without OXO

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 Manager (PVM) 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.

- ➔ 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)

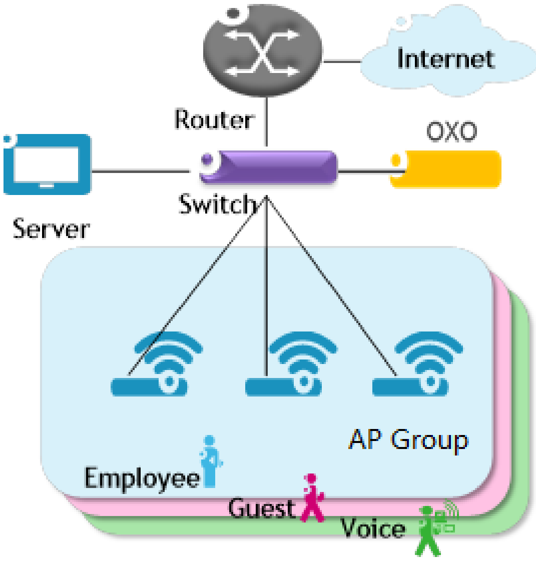


Figure 2-2 AP group with OXO

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.

- ➔ **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
• **Window 10** • **Window 11** • **MAC OS X 10** • **MAC OS X 11** • **MAC OS X 12** • **MAC OS X 13**	• Google Chrome 102 and later • Mozilla Firefox 100 and later • Microsoft Edge 92 and later

After above prerequisites are met, proceed to: Connect to pre-defined SSID and browse URL.

Note

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 cluster architecture. A maximum of 255 APs are supported in one AP cluster/group. All APs have the same cluster 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 Manager (PVM) and Secondary Virtual Manager (SVM) based on AP model and MAC address, more details refer to PVM/SVM Election and AP Group Scalability. The PVM is responsible for the group management, such as configuration synchronization, usage data statistics, firmware upgrading, etc. and the SVM is the backup of the PVM. 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 PVM's MAC address*)

Note

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 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.

Stellar AP1230 series, AP1311, AP1301, AP1351, AP1331, AP1411, AP1431 and AP1451 Access Points support dual uplink connection.

- AP1230 series, AP1311, AP1301, AP1351, AP1331, AP1411, AP1431 and AP1451 will establish a LACP (Linkagg) with upstream switch at boot up.
- AP1230 series supports LACP primarily to address 2GE throughput when connecting to access switches that are limited to 1GE.

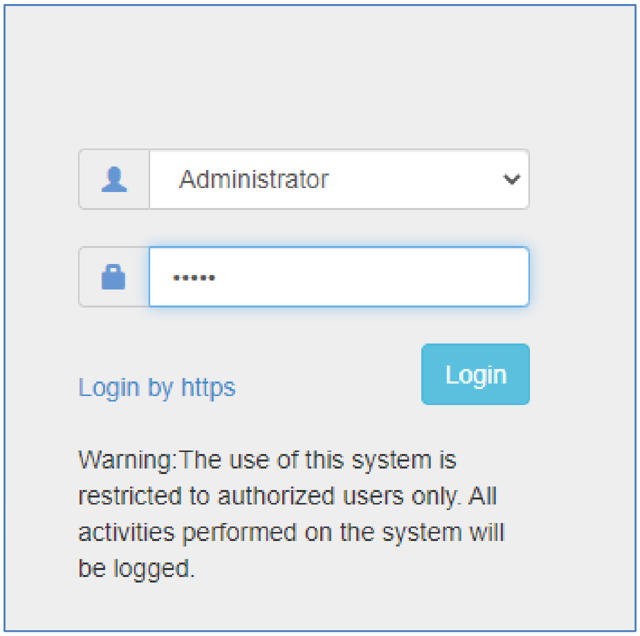
AP1230 series, AP1311 and AP1301 support **PoE Redundancy** – AP will only accept PoE on one of the two uplinks for operation and block another. If the main source goes down, AP will go down first then the backup POE link will power up the access point.

AP1351, AP1331, AP1451 and AP1431 support dual uplink connection with **PoE Sharing** - AP will accept PoE from the two uplinks at the same time for operation. AP1351, AP1451 is class 7 and is supported only on switches that support IEEE802.3bt. To Support IEEE802.3bt, hardware should be compatible and also have appropriate PoE firmware (3.XX) should be loaded.

- OS6860N and last two ports of OS6360P48X supports IEEE802.3bt
- OS6860, OS9900 doesn't support IEEE802.3bt.
- As of AOS 8.7.3, Platforms like OS6865, OS6560, OS6465 supports IEEE802.3bt only when it is enabled.

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.

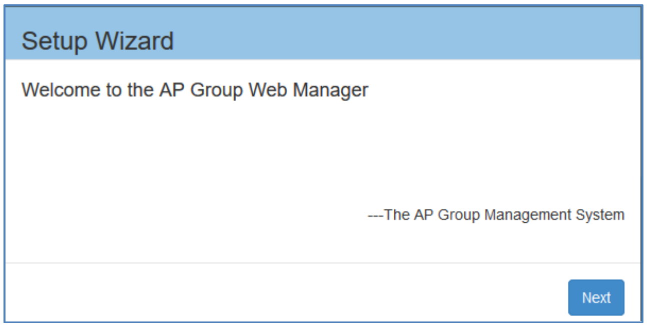


Warning:The use of this system is restricted to authorized users only. All activities performed on the system will be logged.

Figure 3-1 AP Group Login Page

The following are the Initialization Wizards:

Step1: Welcome Page

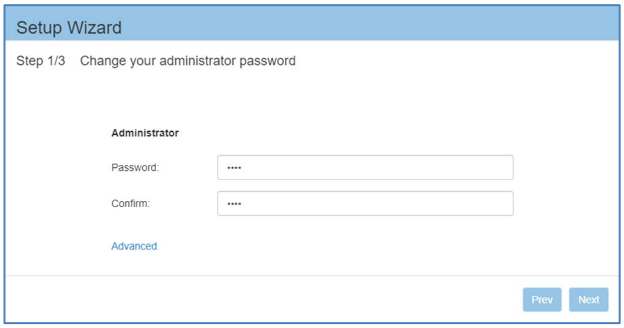


Welcome to the AP Group Web Manager

---The AP Group Management System

Figure 3-2 Initialization Wizard-Welcome Page

Step2: Change your Administrator password.



Step 1/3 Change your administrator password

Administrator

Password: ••••

Confirm: ••••

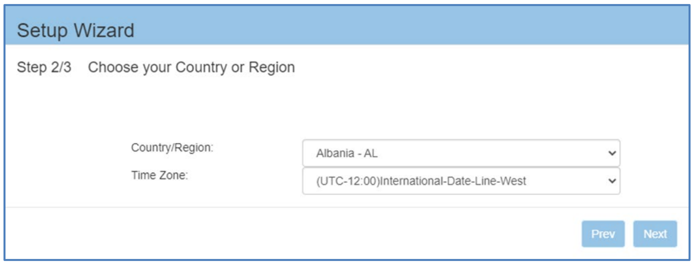
Figure 3-3 Initialization Wizard-Modify Administrator Password

Note

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

Note 3-7: For security the admin must change the CLI root, and support passwords before use. This is available under the advanced window, more can refer to General Window -> Account Management in main page.

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



Setup Wizard

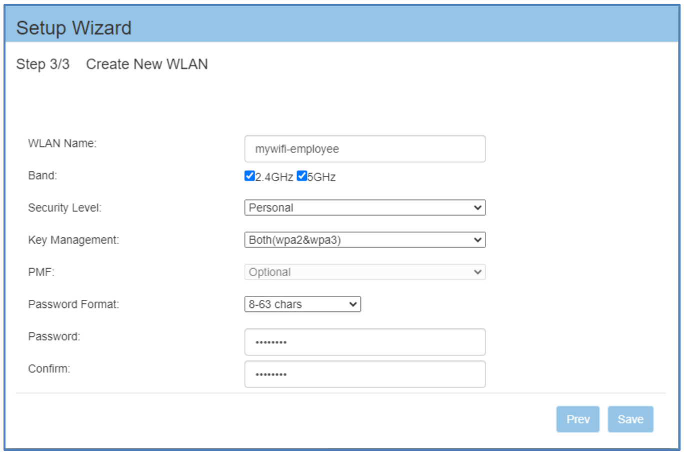
Step 2/3 Choose your Country or Region

Country/Region: Albania - AL

Time Zone: (UTC-12:00)International-Date-Line-West

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 3/3 Create New WLAN

WLAN Name: mywifi-employee

Band: ☑2.4GHz ☑5GHz

Security Level: Personal

Key Management: Both(wpa2&wpa3)

PMF: Optional

Password Format: 8-63 chars

Password: ••••••••

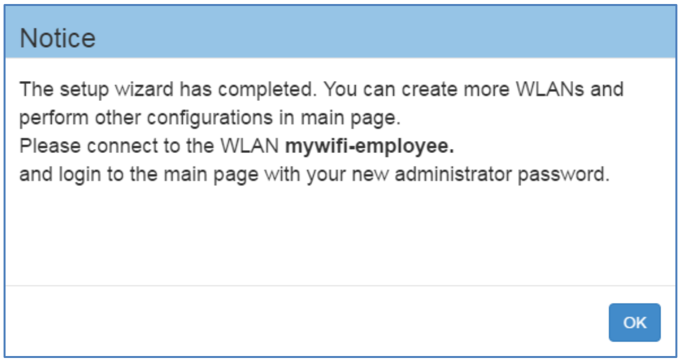
Confirm: ••••••••

Figure 3-5 Initialization Wizard-Create New WLAN

Note

Note 3-8: 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.

Step5: Complete Confirmation Page



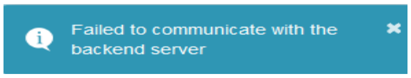
Notice

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

Note 3-9: 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:



Failed to communicate with the backend server

Note

Note 3-10: 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.

PVM/SVM Election and AP Group Scalability

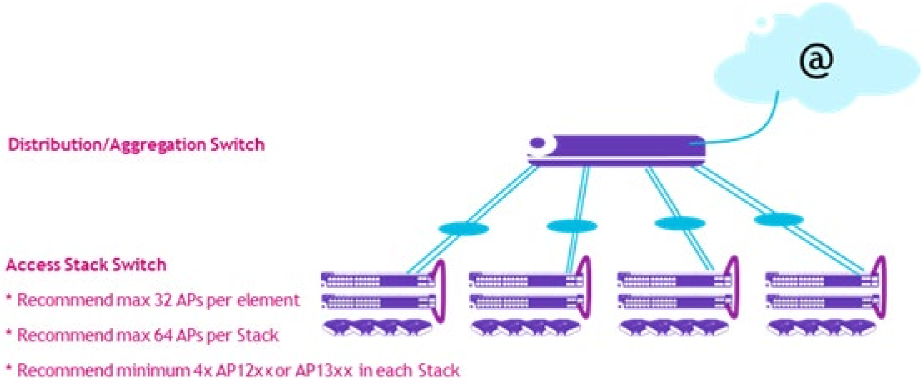
The APs with the same cluster ID will form a group and it will select the Primary Virtual Manager (PVM) and Secondary Virtual Manager (SVM) based on AP model and MAC address. The PVM election rules are as following:

1. PVM/SVM election priority:

AP>1451>AP1351>AP1320/AP1360>AP1311/AP1301>AP1301H>AP1220/AP1230/AP1251/AP1201>AP1101/AP1201H/AP1201L/AP1201HL>AP1201BG

2. Among the APs with same priority, the one with highest MAC address will be selected as PVM, the second highest MAC address AP will be selected as SVM.
3. AP1101/AP1201H/AP1201L/AP1201HL as PVM in the cluster, it can scale to 32 APs.
4. AP1451>AP1351/AP1431/AP1411/AP1320/AP1360/AP1311/AP1301/AP1301H/AP1220/AP1230/AP1251/AP1201/AP1201BG as PVM in the cluster, it can scale to 255 APs.
5. The idea in general is to be able to have enough resiliency in the network design, so if there is a cluster size >64 always there is either (AP1220 series, AP1230 series, A1251, AP1320 series or AP1360 series, AP1311, AP1301, AP1351, AP1451, AP1431, AP1411) to take up PVM/SVM role. Recommend in network segments of every 64 APs there are at least 4x APs of either AP1220 series, AP1230 series, AP1251, AP1320 series, AP1360 series, AP1311, AP1351, AP1451, AP1431, AP1411.
6. For resiliency deployment, to scale to 64 APs you will need at least 4 AP12XX (AP1220/AP1230/AP1251) or 4 AP13xx (AP1351, AP1320/AP1360/AP1311) or 4 AP14xx (AP1451/AP1431/AP1411) in the cluster.
7. For resiliency deployment, to scale even further for 255 APs you will need at least 16 AP12XX (AP1220/AP1230/AP1251) or 16 AP13XX (AP1351/AP1320/AP1360/AP1311) or 16 AP14XX (AP1451/AP1431/AP1411) in the cluster.
8. If AP1201 coexists with AP1220/AP1230/AP1251 in the same cluster, and AP1201 is selected as PVM by the system automatically, suggest to manually intervene and turn one of the AP1220/AP1230/AP1251 to be PVM for better management performance consideration. (*See "Update to PVM" parameter in Chapter 4 – AP Window*)
9. If a higher priority AP joins an existed AP group, it will take over the PVM role. For example, an AP1221 will become PVM after it joins an existed pure AP1101 group, and the old PVM will change to SVM or member in the AP group.

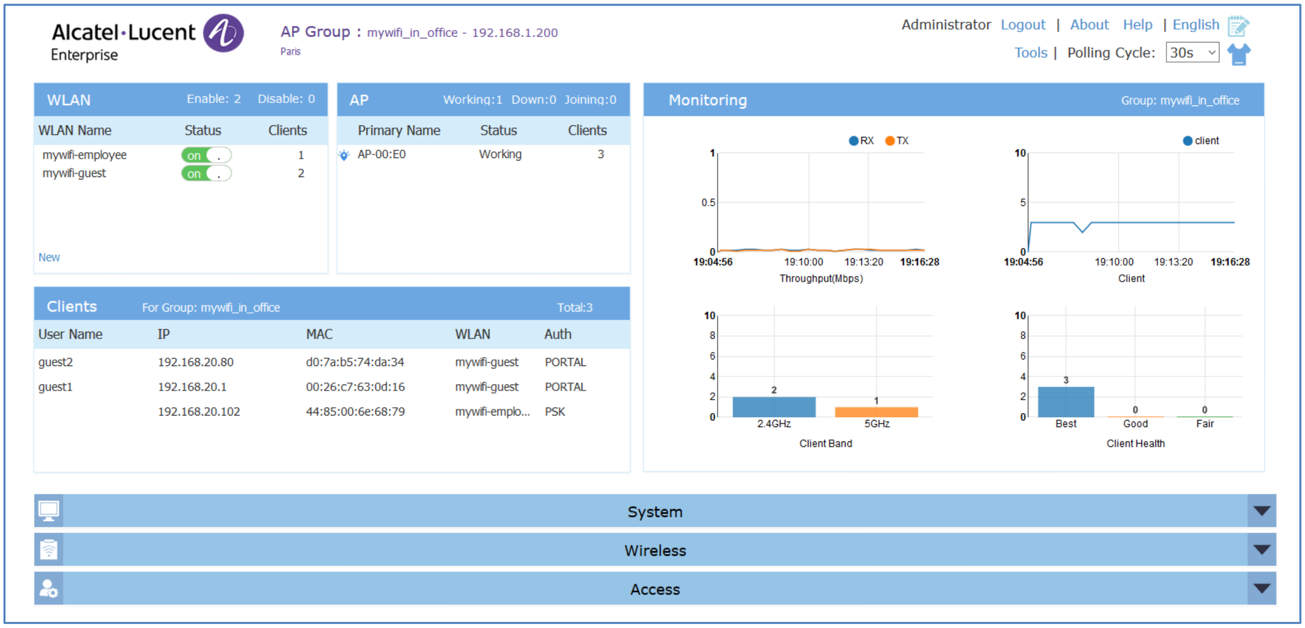
Example network design …


@
Distribution/Aggregation Switch
Access Stack Switch
* Recommend max 32 APs per element
* Recommend max 64 APs per Stack
* Recommend minimum 4x AP12xx or AP13xx in each Stack

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.



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AP Group : mywifi_in_office - 192.168.1.200

Paris

Administrator Logout | About Help | English

Tools | Polling Cycle: 30s

WLAN Enable: 2 Disable: 0

WLAN Name	Status	Clients
mywifi-employee	on	1
mywifi-guest	on	2

New

AP Working:1 Down:0 Joining:0

Primary Name	Status	Clients
AP-00:E0	Working	3

Clients For Group: mywifi_in_office Total:3

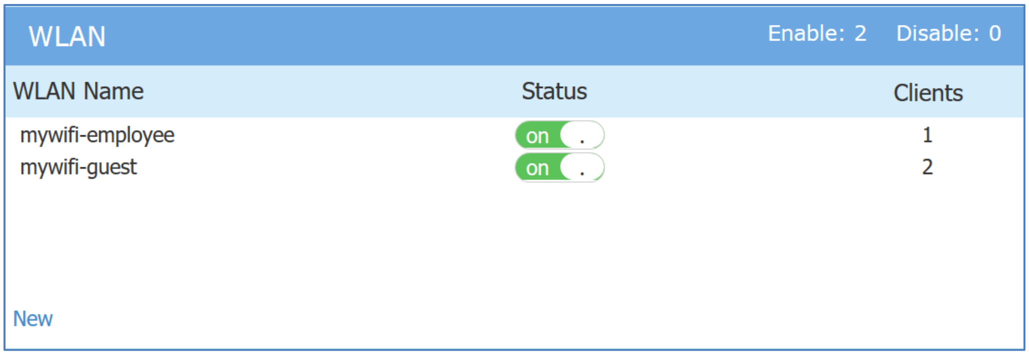
User Name	IP	MAC	WLAN	Auth
guest2	192.168.20.80	d0:7a:b5:74:da:34	mywifi-guest	PORTAL
guest1	192.168.20.1	00:26:c7:63:0d:16	mywifi-guest	PORTAL
	192.168.20.102	44:85:00:6e:68:79	mywifi-emplo...	PSK

Monitoring Group: mywifi_in_office

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.



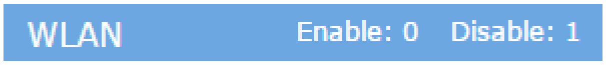
WLAN Enable: 2 Disable: 0

WLAN Name	Status	Clients
mywifi-employee	on	1
mywifi-guest	on	2

Figure 4-2 WLAN Window-Simplified Mode

Note

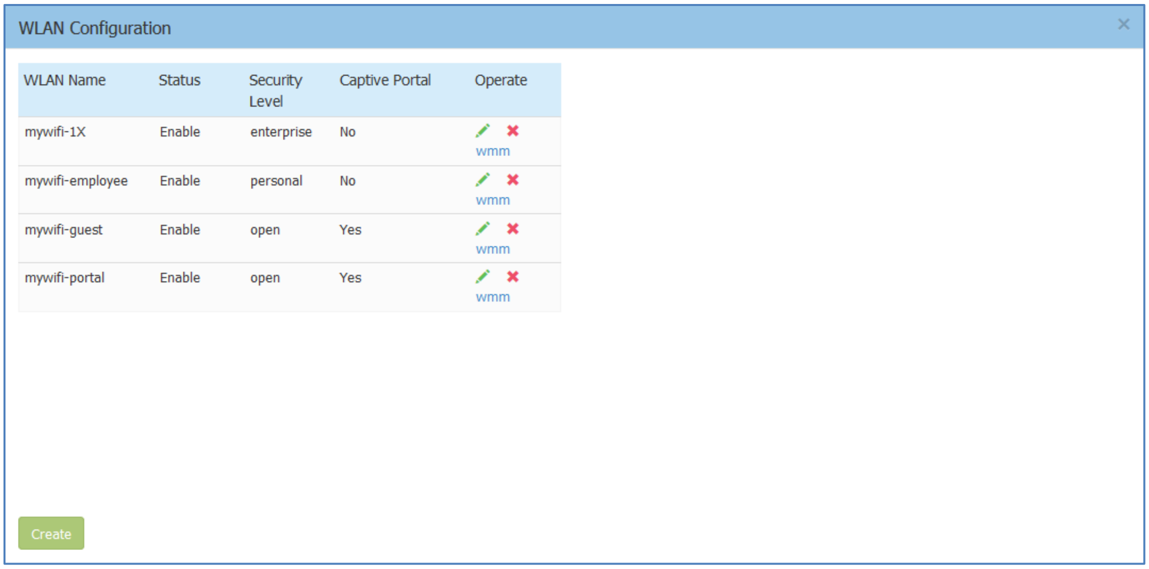
Note 4-1: The label below displays the number of enabled or disabled WLANs.



WLAN Enable: 0 Disable: 1

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

WLAN Name	Label or name of WLAN, which is composed by 0-9, a-z or other string.
Status	Indicates the WLAN state, on indicates that WLAN is in broadcast state, while off indicates WLAN is not in broadcast state.
Clients	The number of users connected to the WLAN.
New	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

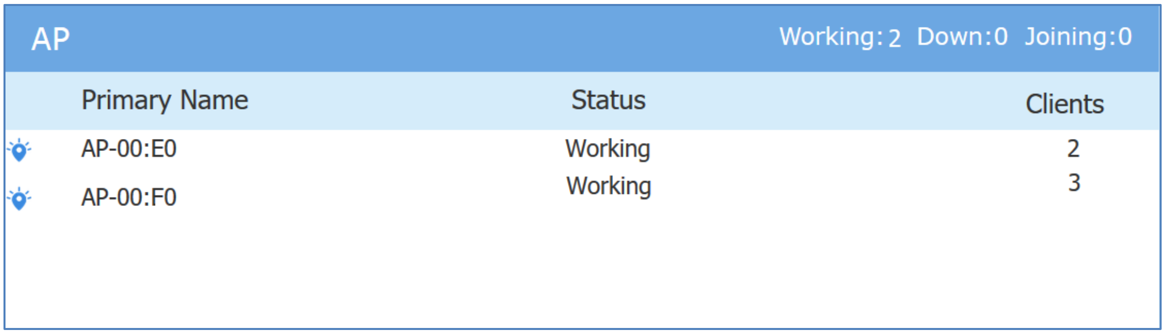
Figure 4-3 WLAN Window-Advanced Mode

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

WLAN Name	Label or name of WLAN.
Status	Indicates the WLAN state, on indicates that WLAN is in broadcast state, while off indicates WLAN is not in broadcast state.
Security Level	Security Level of WLAN, from high to low is Enterprise>Personal>Open.
Captive Portal	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.
Operate	Operation for the WLAN. ✎ see Modify Your WLAN, ✖ see Delete Your WLAN, wmm see Modify WLAN QoS.
Create	Link for Creating new WLAN, see Create New WLAN.

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

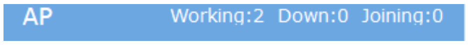
Figure 4-4 AP Window-Simplified Mode

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

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

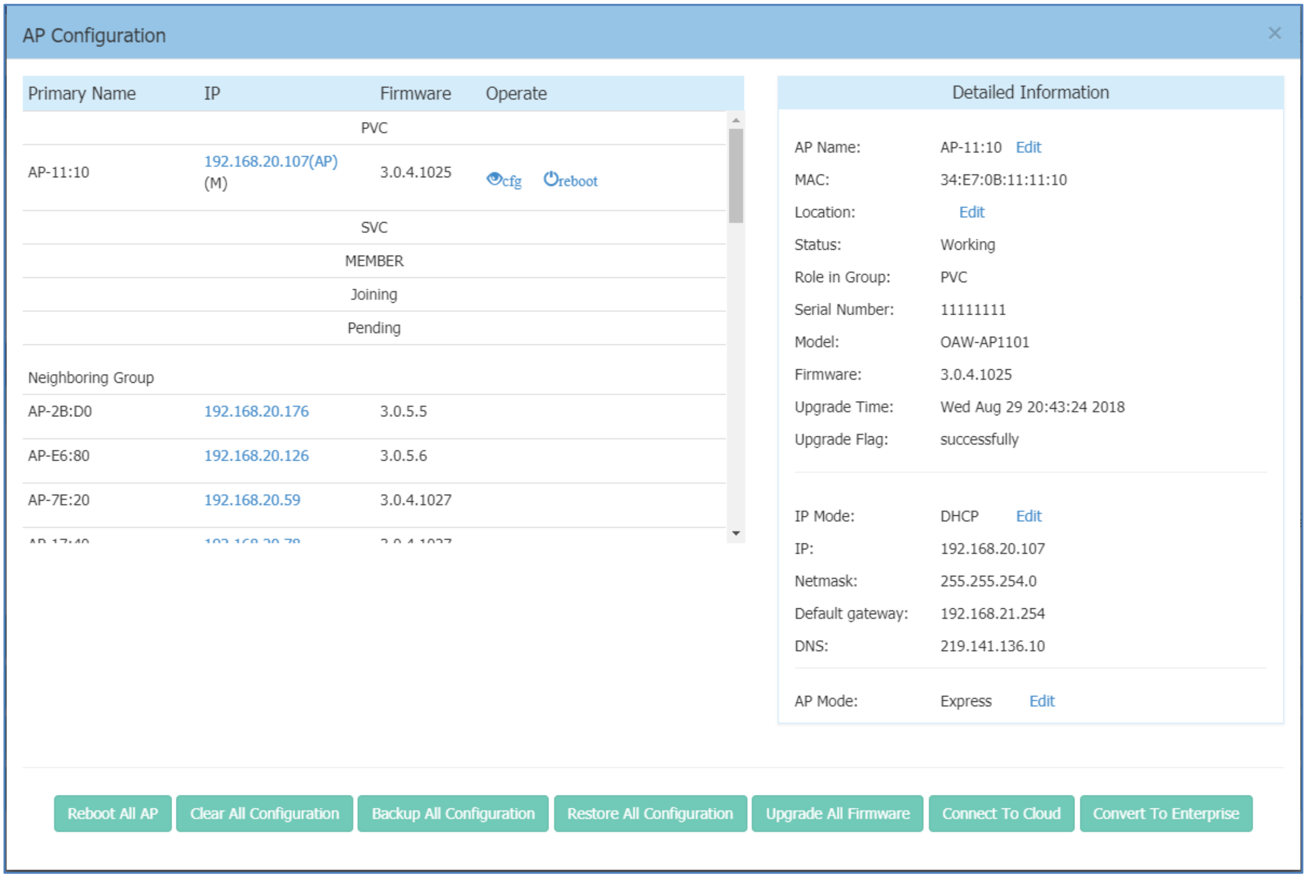
Note

Note 4-2: AP has three status indications when connecting to group, they are 'working' which indicates that AP has connected to the PVM 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

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



AP Configuration

Primary Name	IP	Firmware	Operate
	PVC		
AP-11:10	192.168.20.107(AP) (M)	3.0.4.1025	cfg reboot
	SVC		
	MEMBER		
	Joining		
	Pending		
Neighboring Group			
AP-2B:D0	192.168.20.176	3.0.5.5	
AP-E6:80	192.168.20.126	3.0.5.6	
AP-7E:20	192.168.20.59	3.0.4.1027	

Detailed Information

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
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

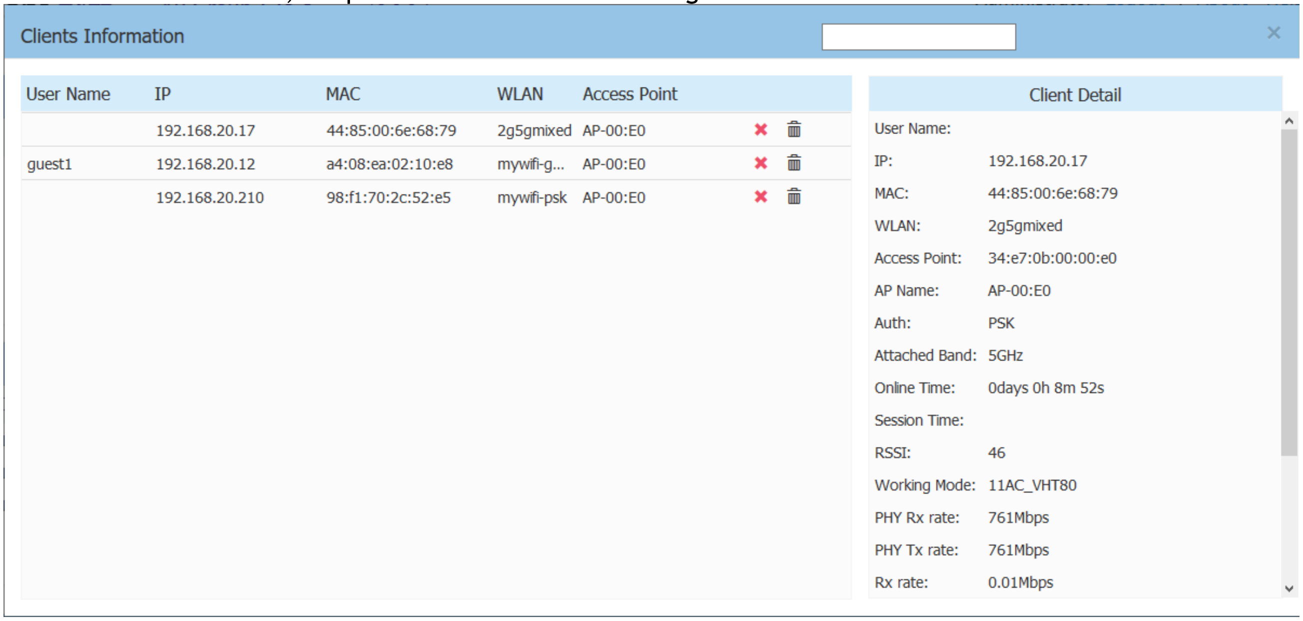
Table 4-4: Key word specification in AP Configuration Window (Advanced Mode)

Primary Name	Name of the AP.
IP	IP address of the AP.
Firmware	Firmware version of the AP.
Operate	There are three optional operations for the AP: cfg , firmware and reboot .
PVM	Primary Virtual Manager in the AP group.
SVM	Secondary Virtual Manager in the AP group.
MEMBER	Other member APs in the group except PVM/SVM.
Joining	APs in joining state, needs to be authorized to join the group.
Pending	APs in pending state, needs to upgrade the software to join the group.
Neighboring Group	Neighboring AP groups with different group ID.
cfg	Checking the detailed configuration on the AP.
firmware	Upgrading firmware for the AP.
reboot	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	• 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. • 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.
Convert To Enterprise	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. • 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.
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 **Joining** state until the administrator permits it to join the group again. See more in Allow an AP to Join the Group.
Role in Group	AP role in the group, including PVM, SVM and Member.
Update to PVM	Upgrade the member or SVM to be the PVM 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	The way by which the AP attains its IP address, dynamically assigned from DCHP server or static IP configured manually. Only IPv4 static address can be configured for AP.
IP	IPv4/IPv6 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	• Express – AP working in cluster mode. • 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.

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



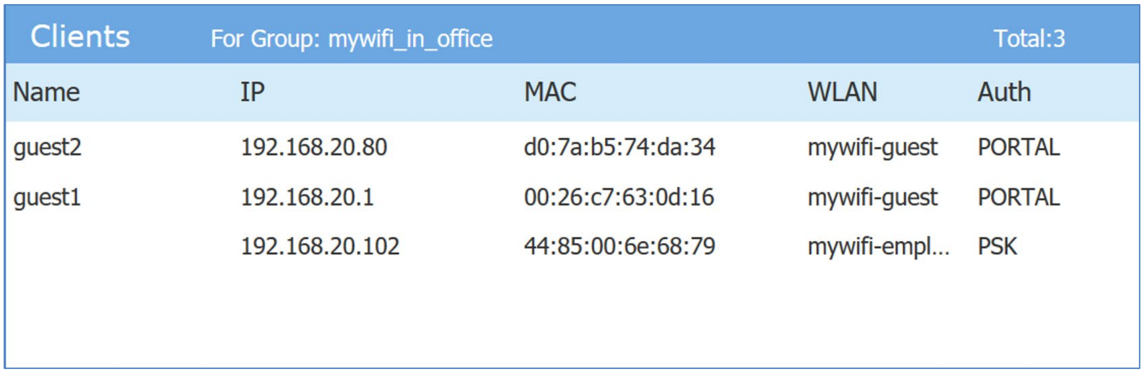
Clients Information

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

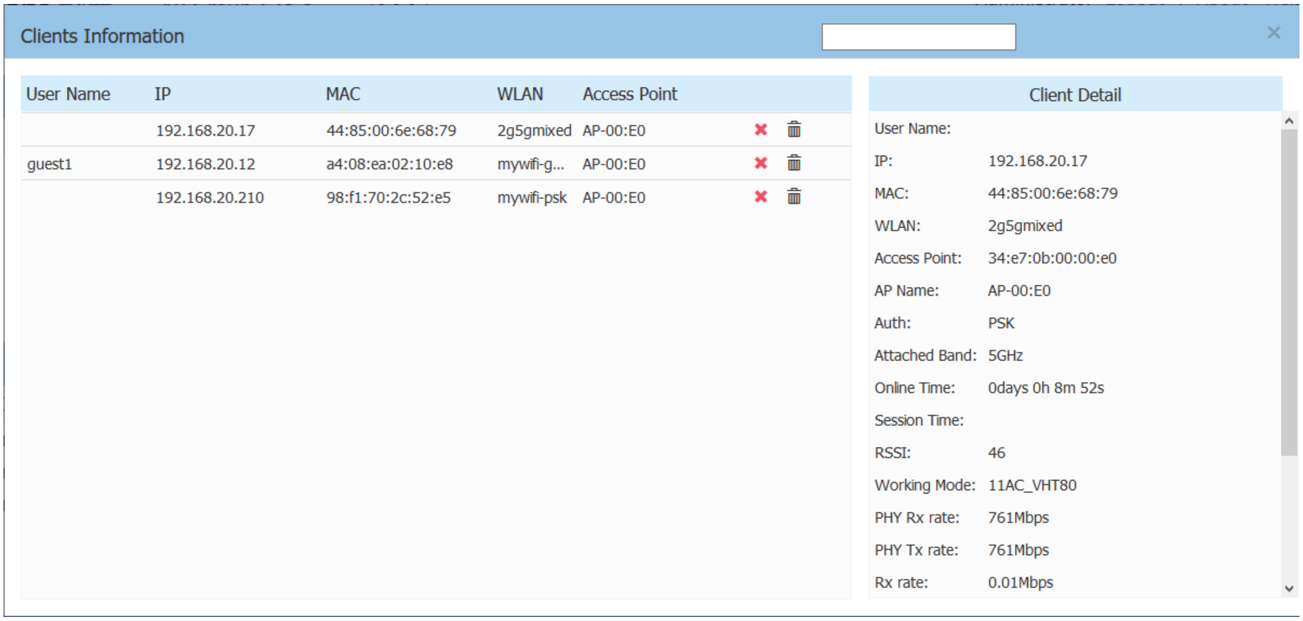
Name	IP	MAC	WLAN	Auth
guest2	192.168.20.80	d0:7a:b5:74:da:34	mywifi-guest	PORTAL
guest1	192.168.20.1	00:26:c7:63:0d:16	mywifi-guest	PORTAL
	192.168.20.102	44:85:00:6e:68:79	mywifi-empl...	PSK

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.
Name	User name or host name of the client. For 802.1X or captive portal authentication through username & password, username is populated in the field. For client authentication without username (Open/PSK/Captive portal through terms and conditions check only), hostname is populated in the field. Stellar AP obtains client hostname from client DHCP packets. For some cases of client DHCP packets not being carried, hostname cannot be obtained, and the Name filed could be empty.
IPv4	IPv4 address of the client.
IPv6	IPv6 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).



Clients Information

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 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 blocklist. If removed, the client can be displayed and operated in the Blocklist window.
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 attaching to AP, 2.4GHz or 5GHz or 6GHz.
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 receiving rate of the client.
PHY Tx rate	Physical sending rate of the client.
Rx rate	Packet receiving 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.
Rx Error	The number of error packets received by the client. Interference is the most major cause of packet error. Another cause of packet error is the mismatch of broadcast

	power levels (Tx Power). If an AP and client device are communicating at much different broadcast strengths, then this can cause packet error.
Tx Retry	The number of retry packets sent by the client. The Retry indicates packets that had to be re-sent because they were corrupted upon arriving at the proper destination.
Roaming History	Showing roaming history between SSID/AP/Band for the client, total 32 roaming records can be displayed and will be separated by connection sessions. • Connection Session – A session represent a period which starting from associating to the wireless network and ending by disassociating. Roaming records are distributed within sessions. • The connection sessions are arranged based to time sequence. The latest session will be positioned on the top of roaming history display. • The Offline status represent the connection session has ended. The Online status represent an ongoing session and the client is not disassociated.

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.

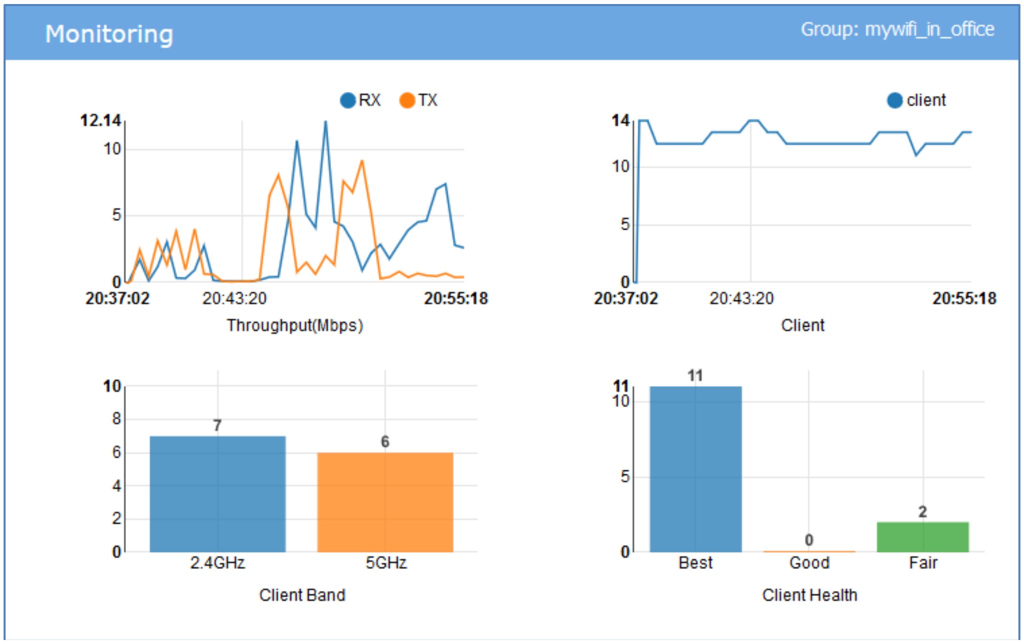


Figure 4-8 Monitoring Window - AP Group

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, and number of clients working on 6GHz if applicable.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: • Best— Number of clients whose signal strength is more than 30. • Good— Number of clients whose signal strength is between 15 ~30. • Fair—Number of clients whose signal strength is less than 15.

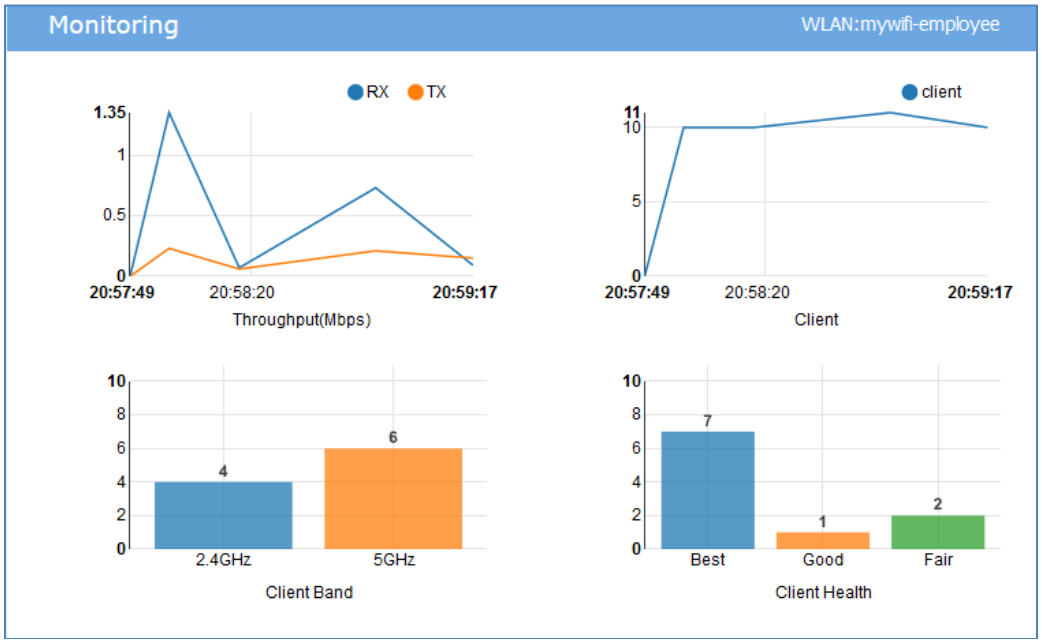


Figure 4-9 Monitoring Window - WLAN

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, and number of clients working on 6GHz if applicable.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: • Best— Number of clients which signal strength is more than 30. • Good— Number of clients which signal strength is between 15 ~30. • Fair—Number of clients which signal strength is less than 15.

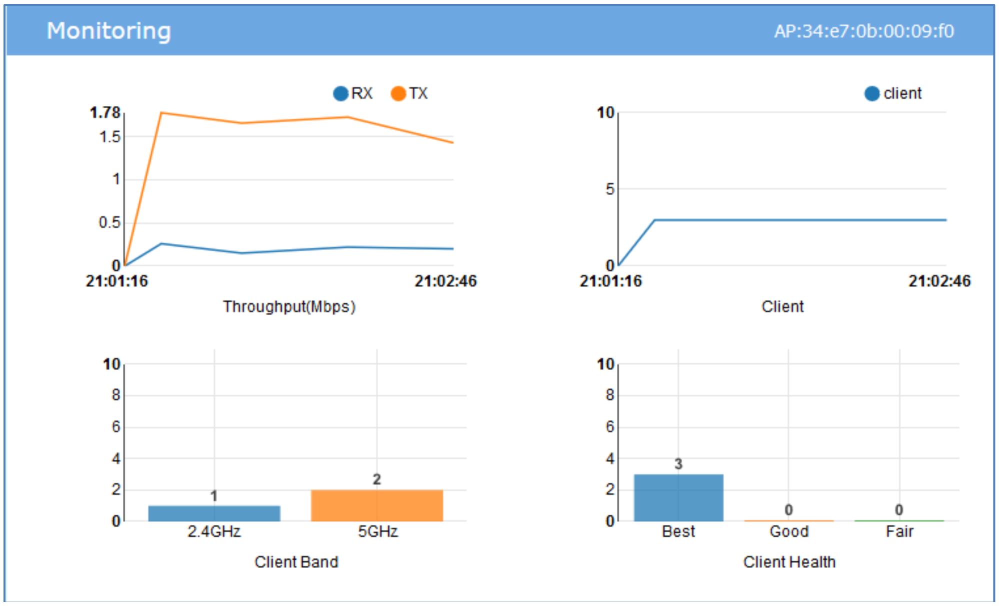


Figure 4-10 Monitoring Window - AP

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, and number of clients working on 6GHz if applicable.
Client Health	The wireless connection quality between client and Stellar AP, it is judged by the signals of client, and classified as below: • Best— Number of clients which signal strength is more than 30. • Good— Number of clients which signal strength is between 15 ~30. • Fair—Number of clients which signal strength is less than 15.

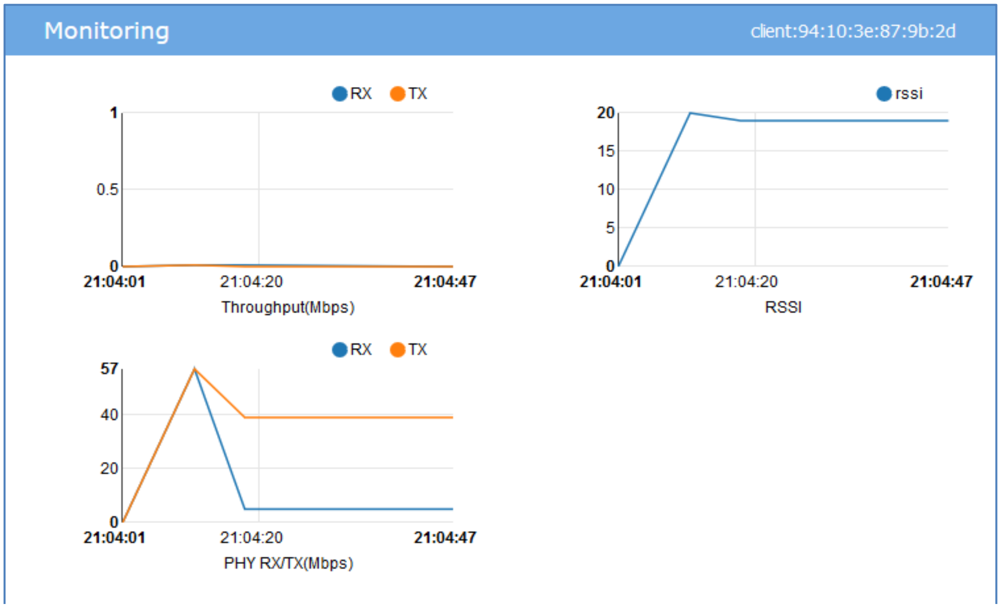


Figure 4-11 Monitoring Window - Client

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.

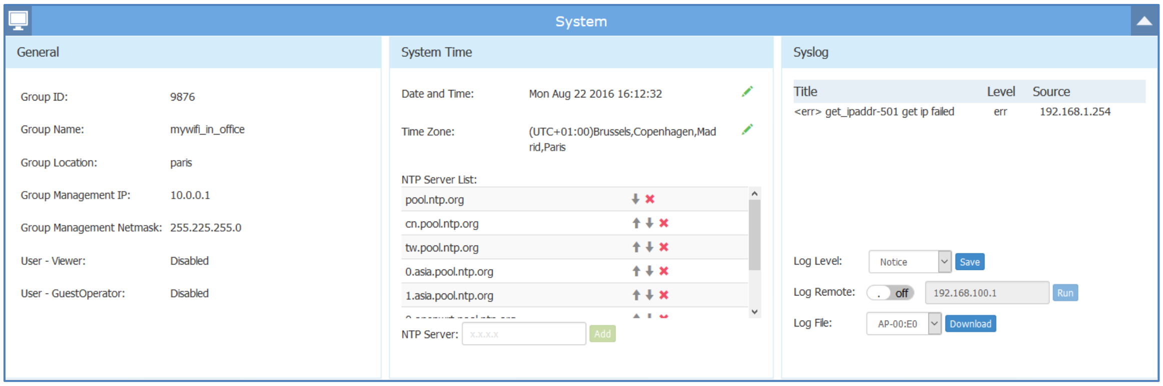
Note

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.

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.



Group ID: 9876
Group Name: mywifi_in_office
Group Location: paris
Group Management IP: 10.0.0.1
Group Management Netmask: 255.225.255.0
User - Viewer: Disabled
User - GuestOperator: Disabled

Date and Time: Mon Aug 22 2016 16:12:32
Time Zone: (UTC+01:00)Brussels,Copenhagen,Madrid,Paris
NTP Server List:
pool.ntp.org
cn.pool.ntp.org
tw.pool.ntp.org
0.asia.pool.ntp.org
1.asia.pool.ntp.org
NTP Server: x.x.x.x

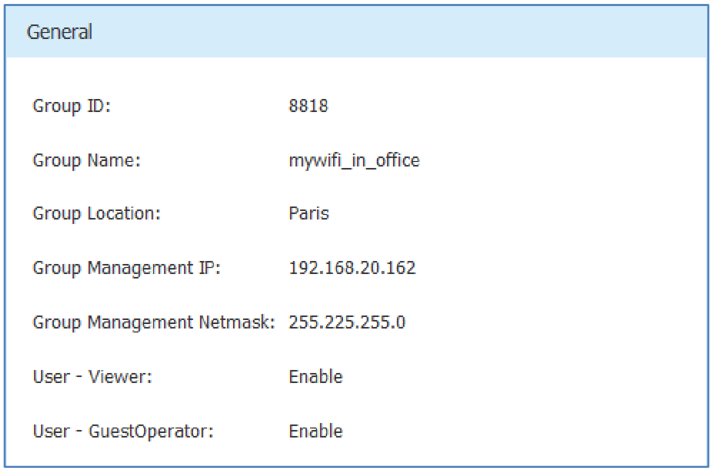
Title	Level	Source
<err> get_ipaddr-501 get ip failed	err	192.168.1.254

Log Level: Notice
Log Remote: off 192.168.100.1
Log File: AP-00:E0

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

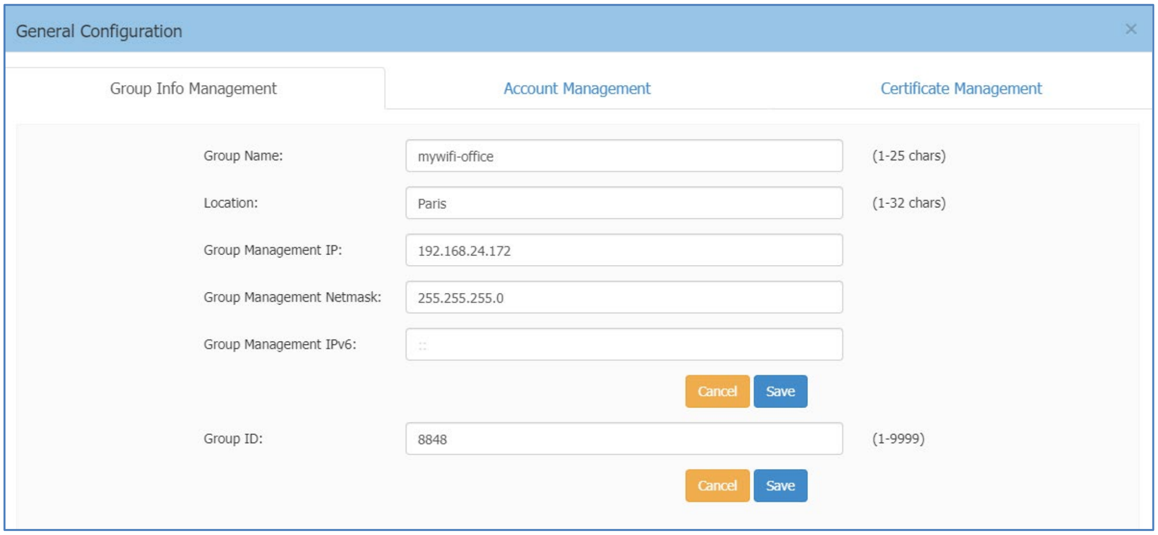
User - GuestOperator: Enable

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.



General Configuration

Group Name: mywifi-office (1-25 chars)

Location: Paris (1-32 chars)

Group Management IP: 192.168.24.172

Group Management Netmask: 255.255.255.0

Group Management IPv6: ::

Group ID: 8848 (1-9999)

Figure 4-14 General Configuration Window -Advanced Mode

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

Group Name	Name of the AP group.
Location	Location of the AP group.
Group Management IP	A virtual IP address for AP group management, default is 10.0.0.1, see more in Note 4-4.
Group Management Netmask	Netmask of Group Management IP.
Group Management IPv6	A virtual IPv6 address for AP group management.

Group ID	Identification of the AP group, default is 100.
MQTT Compatibility	Enable to allow AP with lower version firmware (AWOS4.0.0 and before) to join. The lower version firmware is low-level security on MQTT. By default, it is not allowed AWOS4.0.0 and before version AP to join.

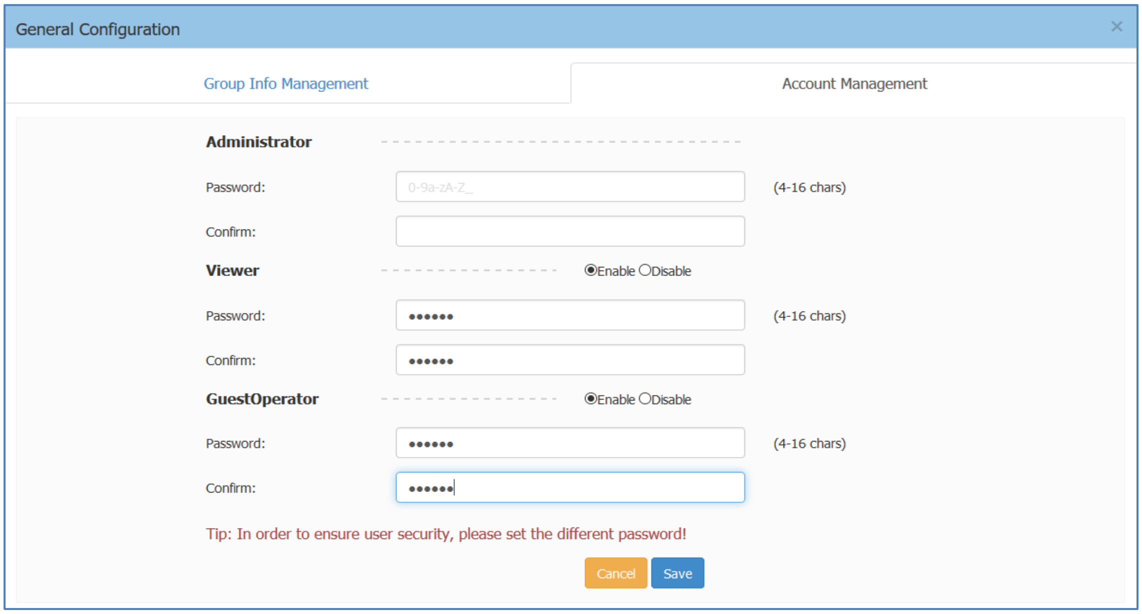
Note

Note 4-4: AP of a group usually obtains its IP address dynamically from a DCHP 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 PVM of the AP group, and you have to make sure the GMIP on the PVM 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 accounts can login to the Web GUI 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.



Administrator

Password: 0-9a-zA-Z_ (4-16 chars)

Confirm:

Viewer ● Enable ○ Disable

Password: •••••• (4-16 chars)

Confirm: ••••••

GuestOperator ● Enable ○ Disable

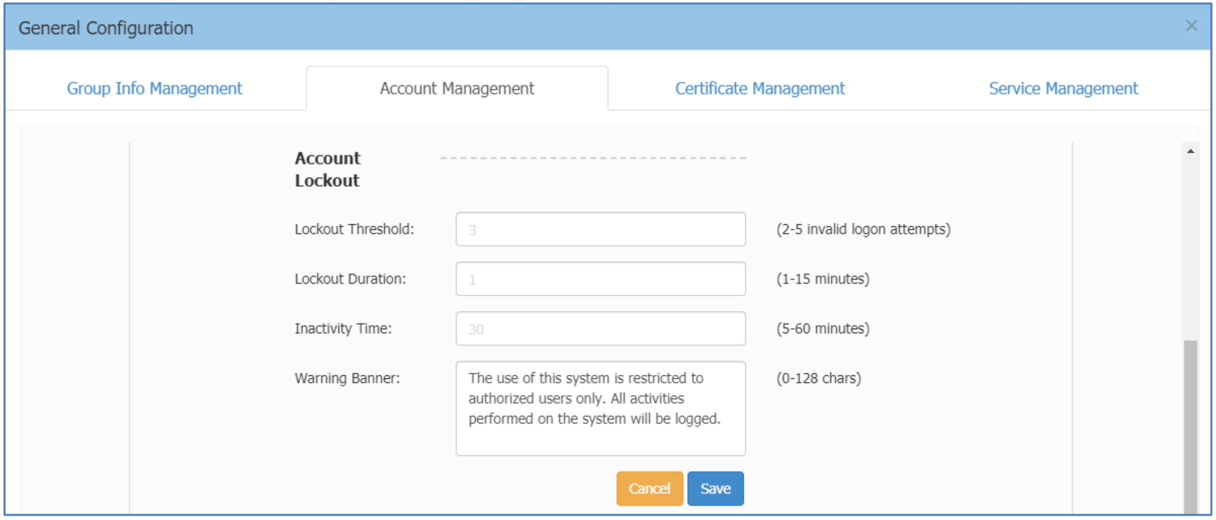
Password: •••••• (4-16 chars)

Confirm: ••••••

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

Figure 4-15 Account Management Tab

There are security methods to protect AP group management web UI from unsecure usage:



Account Lockout

Lockout Threshold: 3 (2-5 invalid logon attempts)

Lockout Duration: 1 (1-15 minutes)

Inactivity Time: 30 (5-60 minutes)

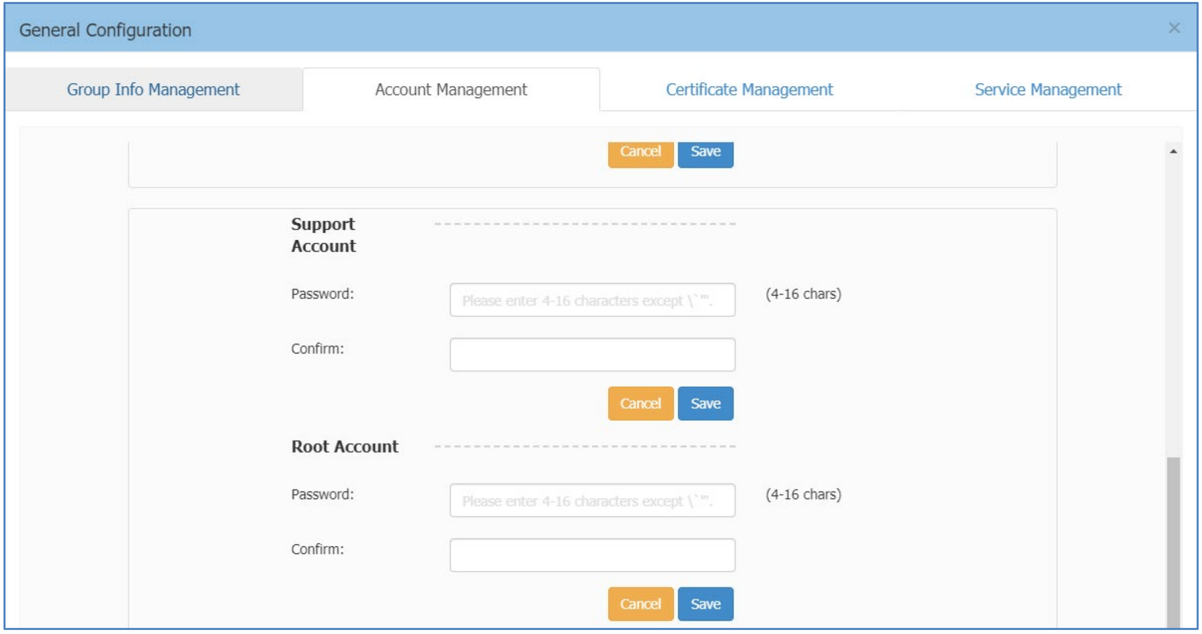
Warning Banner: The use of this system is restricted to authorized users only. All activities performed on the system will be logged. (0-128 chars)

Figure 4-16 Account Lockout

Account Lockout Threshold – Specify how many times a user must fail against a valid account before the user is denied login. By default, the lockout threshold is 3 times of invalid login attempts.
Account Lockout Duration – Specify how long will the user be denied from login after exceeding invalid attempts. Be default, the lockout duration is 1 minute.
Inactivity Time – Specify the inactivity time for automatic lock due to no operation.
Warning Banner – Warning banners are brief messages that are used to inform users of policies and legislation regarding the use of Stellar AP group web management system. User can customize the content for Warning Banner on demand.

There are two accounts can login to the Stellar AP command line interface with different privileges: support and root. Administrator can change the login password for those command line accounts. The root password is a string held by the customer only and is used to generate real root access credential by AP.

Notice: For security the admin should change the CLI root, and support passwords before use.



Support Account

Password: Please enter 4-16 characters except \`'". (4-16 chars)

Confirm:

Root Account

Password: Please enter 4-16 characters except \`'". (4-16 chars)

Confirm:

Figure 4-17 Command line Account

Certificate Management

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

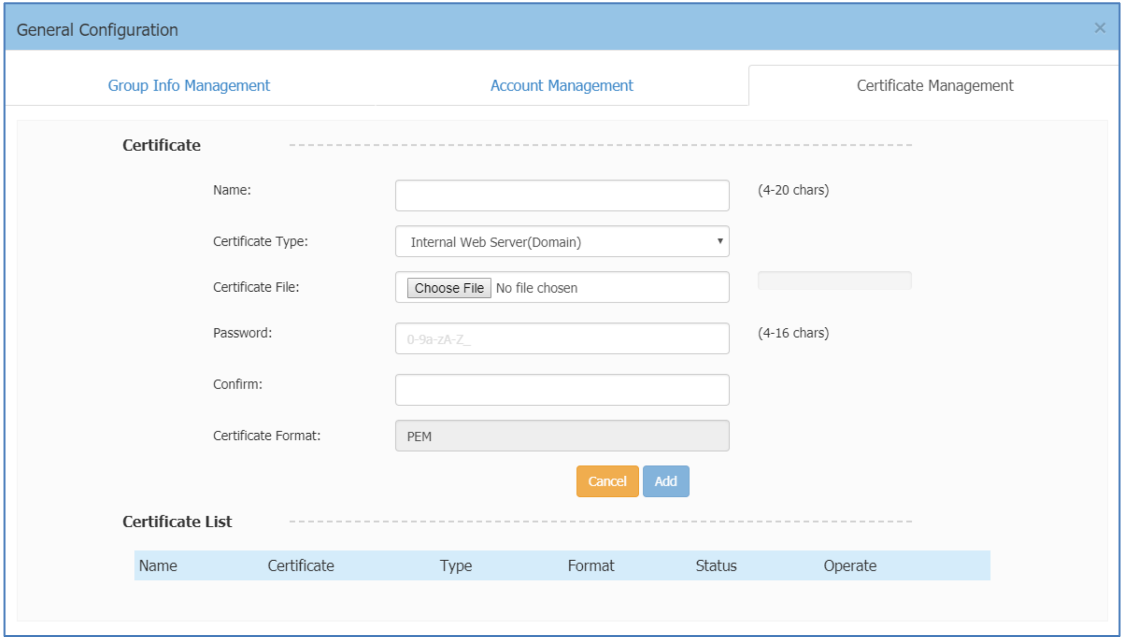
(1) Internal Web Server – The certificate is utilized to setup the secure connection between web browser and AP web server for https management. By default, there is a build-in CA certificate generated by ALE with the domain ‘mywifi.al-enterprise.com’. User can use open SSL to generate his/her own CA 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.

(4) Syslog Server – The certificate is utilized to setup the secure connection between AP and syslog server. User can define his/her own certificate for syslog over TLS accordingly.

(5) Radsec - The certificate is utilized to setup the secure connection between AP and Radius server. User can define his/her own certificate for Radsec accordingly.



Certificate

Name: (4-20 chars)

Certificate Type: Internal Web Server(Domain)

Certificate File: No file chosen

Password: 0-9a-zA-Z_ (4-16 chars)

Confirm:

Certificate Format: PEM

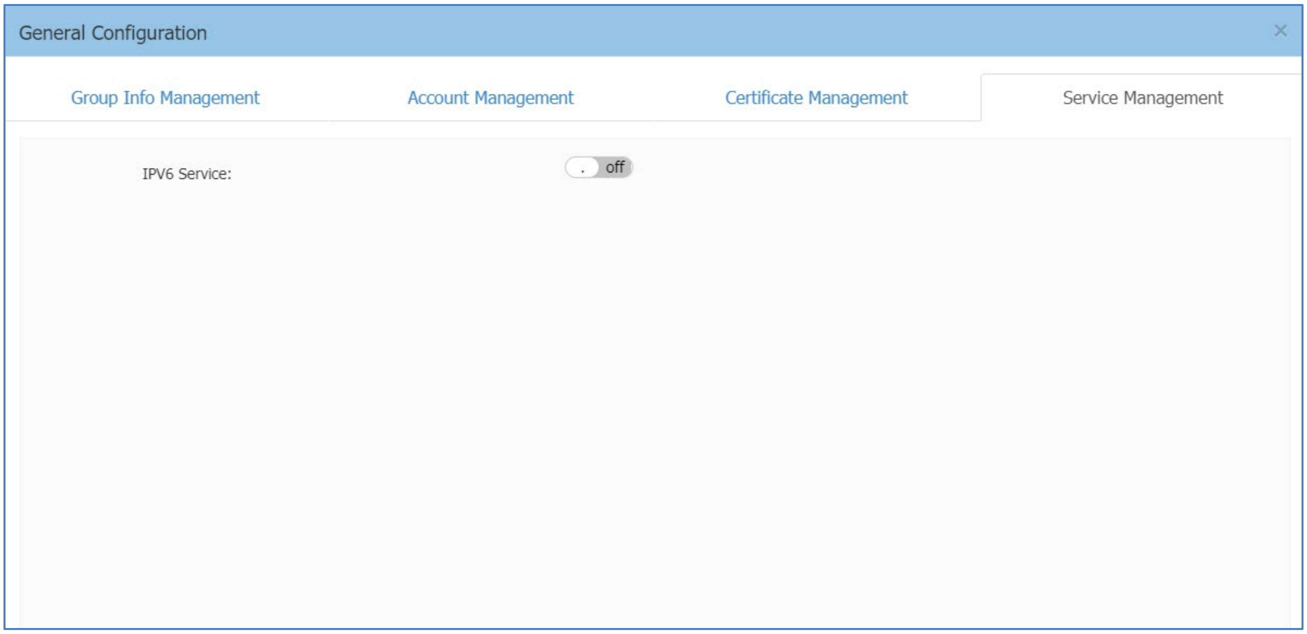
Certificate List

Name	Certificate	Type	Format	Status	Operate

Figure 4-18 Certificate Management Tab

Service Management

Stellar AP support Layer 3 IPv6 traffic forwarding between clients and other network elements if the IPv6 Service is enabled. By default, it is disabled.



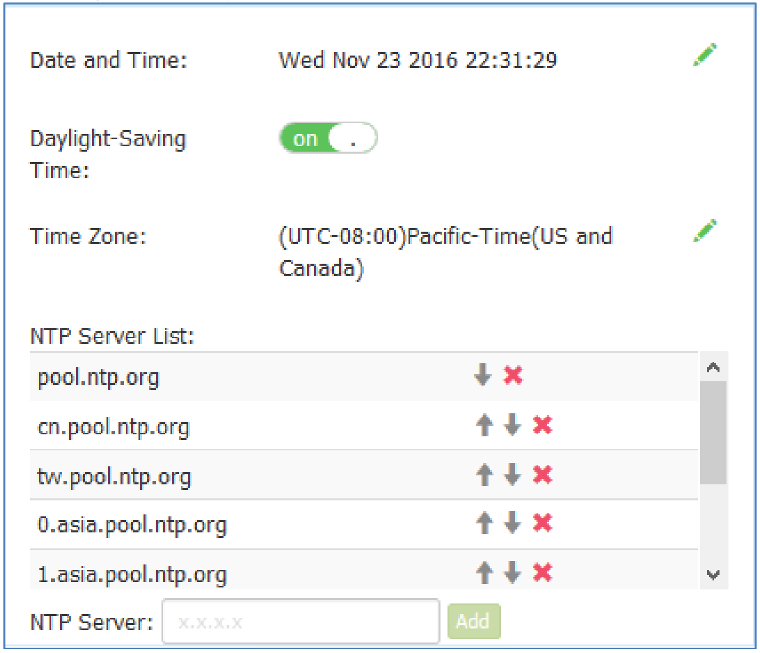
IPV6 Service: off

Figure 4-19 Service 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.

NTP (RFC 1305 - Network Time Protocol) 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 4-20 System Time.


Date and Time: Wed Nov 23 2016 22:31:29

Daylight-Saving Time: on

Time Zone: (UTC-08:00)Pacific-Time(US and Canada)

NTP Server List:

pool.ntp.org
cn.pool.ntp.org
tw.pool.ntp.org
0.asia.pool.ntp.org
1.asia.pool.ntp.org

NTP Server: x.x.x.x

Figure 4-20 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

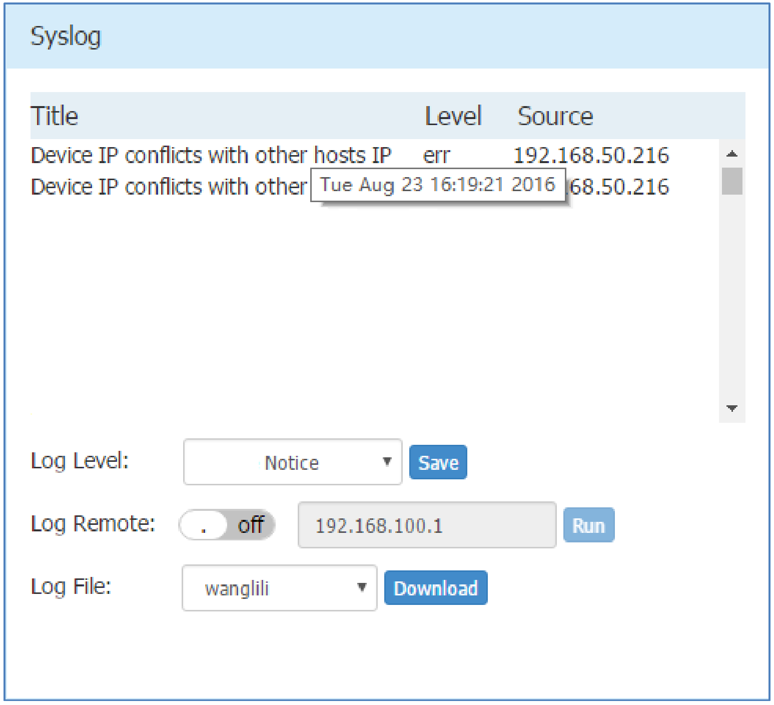
Note 4-5: In order to ensure time synchronization, it is recommended to check the reachability before adding an NTP server. If the NTP server is not configured or is unreachable, an AP reboot may lead to variation in time.

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 4-21 Syslog Window.



Syslog

Title	Level	Source
Device IP conflicts with other hosts IP	err	192.168.50.216
Device IP conflicts with other		68.50.216

Tue Aug 23 16:19:21 2016

Log Level: Notice

Log Remote: off 192.168.100.1

Log File: wanglili

Figure 4-21 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. User can specify separate log level for different facilities (System, Security, Wireless, Network, User):

- AP Debug - Detailed log about the AP device
- System - Log about AP configuration and system status
- Security – Log about network security
- Wireless – Log about wireless RF
- Network – Log about network change
- User - Log about client

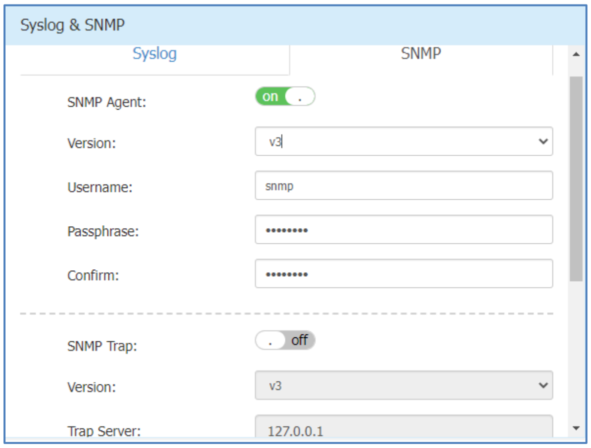
Log Remote: Setting of remote log server. If configured and enabled, besides storage in local file, Syslog messages of all APs in group can be sent to and stored in the server once generated. User can enable TLS to setup secure connection between AP and syslog server.

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



Syslog & SNMP

Syslog | SNMP

SNMP Agent: on

Version: v3

Username: snmp

Passphrase: ••••••••

Confirm: ••••••••

SNMP Trap: off

Version: v3

Trap Server: 127.0.0.1

Figure 4-22 SNMP Window

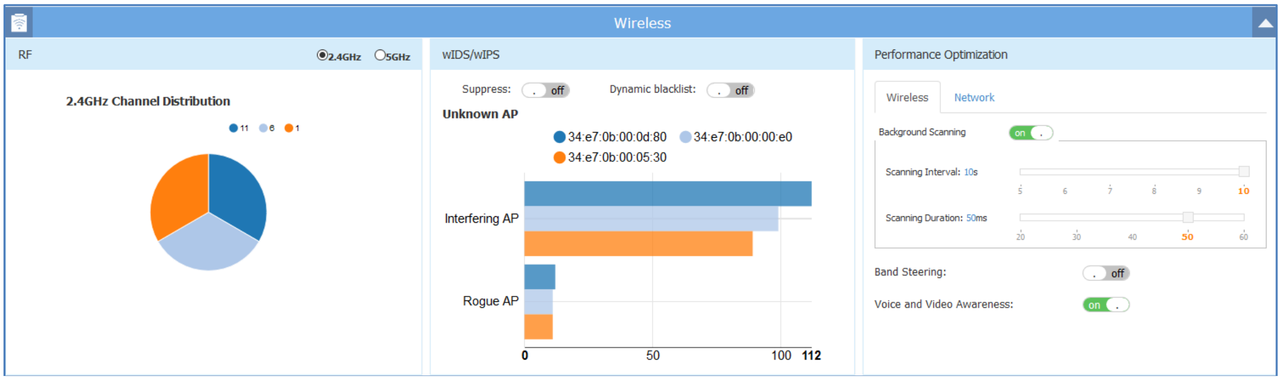
With SNMP user can monitor AP status in the group through traditional network management platform.

- SNMP Agent – Enable/Disable the SNMP agent on AP. Network management platform can fetch information from AP through SNMP protocol.

- SNMP Trap – Enable/Disable AP to send trap to network management platform.
- Version – SNMP version, SNMPv2c or SNMPv3. For SNMPv3, admin needs to specify the username and passphrase for communication between AP and management platform. For Stellar AP, the SNMPv3 authentication mechanism is fixed to sha algorithm, privacy mechanism is fixed to aes128.
- Community – Applicable for SNMPv2c, the credential used to communicate between AP and 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 4-23 Wireless Page.



Wireless

RF ● 2.4GHz ○ 5GHz

wIDS/wIPS

Suppress: off

Dynamic blacklist: off

Performance Optimization

Background Scanning: on

Scanning Interval: 10s

Scanning Duration: 50ms

Band Steering: off

Voice and Video Awareness: on

Figure 4-23 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 three modes for RF Window, Simplified Mode illustrated in Figure 4-24 RF-2.4GHz and Advanced Mode illustrated in Figure 4-26. 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 2.4GHz band or 5GHz band or 6GHz (if applicable). 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 2.4GHz band or 5GHz band or 6GHz (if applicable), illustrated in Figure 4-24 RF-2.4GHz and Figure 4-25 RF-5GHz.

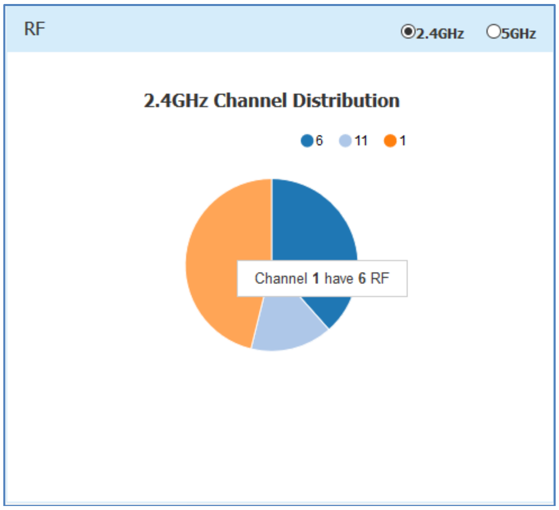


Figure 4-24 RF-2.4GHz

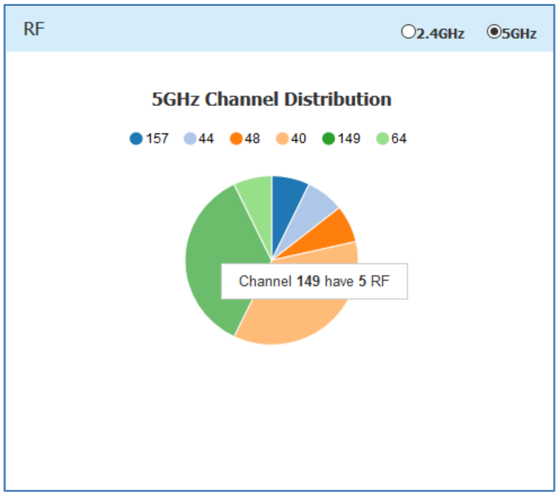
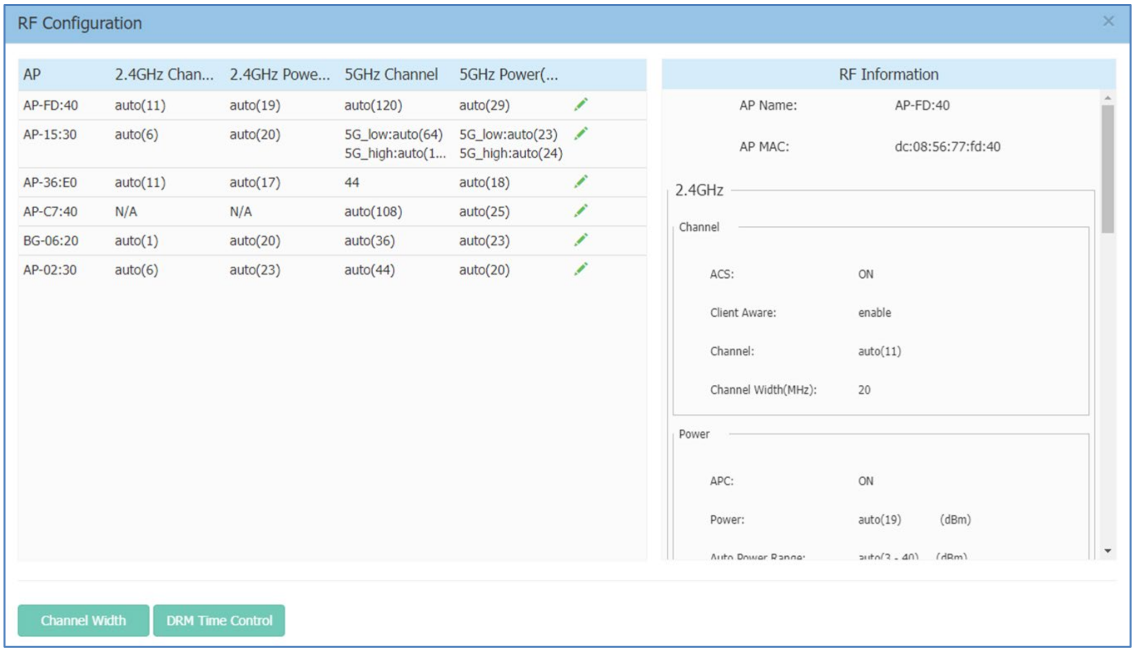


Figure 4-25 RF-5GHz



RF Configuration

AP	2.4GHz Chan...	2.4GHz Powe...	5GHz Channel	5GHz Power(...
AP-FD:40	auto(11)	auto(19)	auto(120)	auto(29)

AP-15:30	auto(6)	auto(20)	5G_low:auto(64)
			5G_high:auto(1...
				5G_low:auto(23)
				5G_high:auto(24)

AP-36:E0	auto(11)	auto(17)	44	auto(18)
AP-C7:40	N/A	N/A	auto(108)	auto(25)
BG-06:20	auto(1)	auto(20)	auto(36)	auto(23)
AP-02:30	auto(6)	auto(23)	auto(44)	auto(20)

RF Information

AP Name: AP-FD:40

AP MAC: dc:08:56:77:fd:40

2.4GHz

Channel

ACS: ON

Client Aware: enable

Channel: auto(11)

Channel Width(MHz): 20

Power

APC: ON

Power: auto(19) (dBm)

Auto Power Range: auto(3 - 40) (dBm)

Figure 4-26 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 4-26. The global configuration can be used to change channel width for all APs in the cluster for efficiency or you can change the channel width for specific AP by individually editing it. The latter configuration will take effect if both global setting and specific AP configuration both exist.

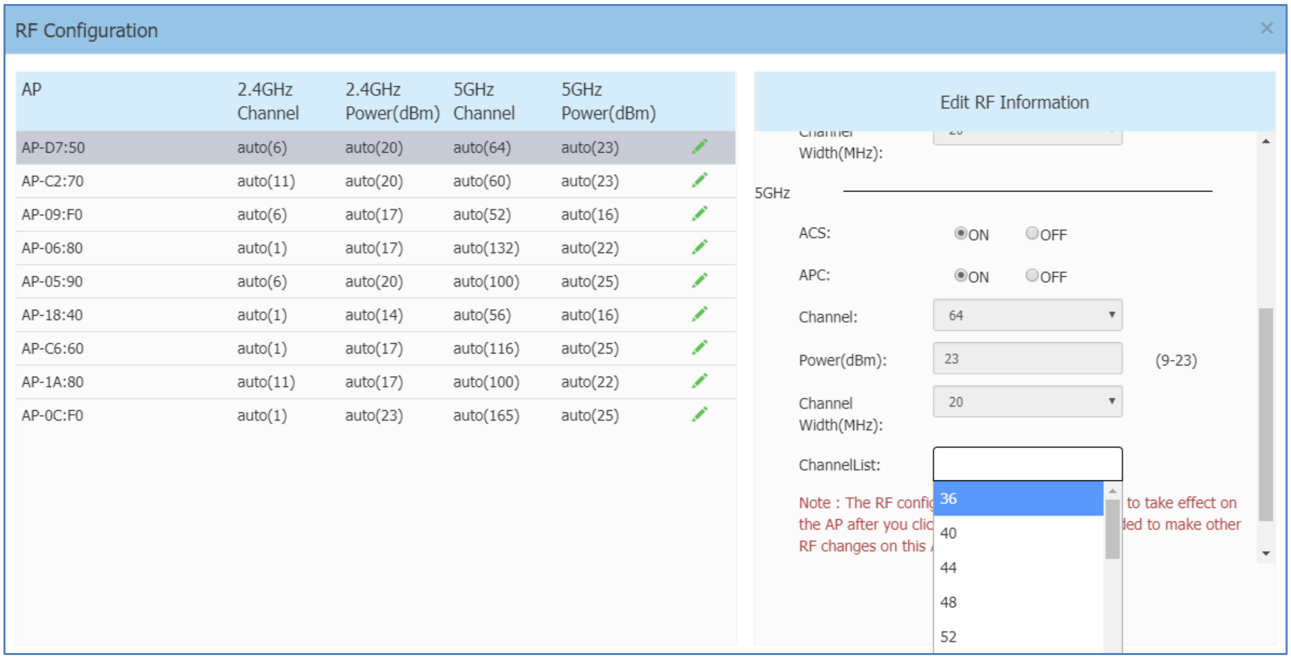
You can turn OFF specific wireless radios for APs in the cluster to reduce the radio emissions or for other purpose with Radio ON/OFF button.

For AP1222, AP1232, AP1322, AP1362 with external antenna deployment, you can specify the gain of the antenna which you want to use (Note: please subtract cable loss from the gain). AP will coordinate and comply with local law on signal transmitting.

For Wi-Fi 6E AP1411, it supports Dual-radio Tri-band 2.4GHz,5GHz and 6GHz (dual concurrent). AP1411 radios can be configured in three working modes and user can specify the according to deployment needs:

- 2.4GHz + 5GHz (default)
- 2.4GHz + 6GHz
- 5GHz + 6GHz

By default, the working channel and transmitting power are automatically managed by Radio Dynamic Adjustment™ (RDA) technology. You can specify the channels list/power range applicable for auto selection, which can reduce the risk of low power transmitting or DFS channel conflict. 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 4-27.



RF Configuration

AP	2.4GHz Channel	2.4GHz Power(dBm)	5GHz Channel	5GHz Power(dBm)
AP-D7:50	auto(6)	auto(20)	auto(64)	auto(23)
AP-C2:70	auto(11)	auto(20)	auto(60)	auto(23)
AP-09:F0	auto(6)	auto(17)	auto(52)	auto(16)
AP-06:80	auto(1)	auto(17)	auto(132)	auto(22)
AP-05:90	auto(6)	auto(20)	auto(100)	auto(25)
AP-18:40	auto(1)	auto(14)	auto(56)	auto(16)
AP-C6:60	auto(1)	auto(17)	auto(116)	auto(25)
AP-1A:80	auto(11)	auto(17)	auto(100)	auto(22)
AP-0C:F0	auto(1)	auto(23)	auto(165)	auto(25)

Edit RF Information

Channel Width(MHz): 20

5GHz

ACS: ● ON ○ OFF

APC: ● ON ○ OFF

Channel: 64

Power(dBm): 23 (9-23)

Channel Width(MHz): 20

ChannelList:

Note : The RF confi… to take effect on the AP after you clic… ded to make other RF changes on this …

Figure 4-27 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.

Auto Channel Selection and Auto Power Control will perform in a periodical time manner. You can change the period or time to trigger auto channel selection through DRM Time Control configuration, illustrating in Figure-26.

RDA relies on the background scanning feature. To ensure the RDA is effective, make sure the background scanning is ON, see "Performance optimization Window".

Table 4-12: Key word specification in RF Configuration Window

Parameter	Specification
Client Aware	When enabled, Auto Channel Selection does not change channels for Stellar APs with connected clients, except for high-priority events such as RADAR detected. If "Client Aware" is Disabled, the Stellar AP may change to a more optimal channel, which may temporarily disrupt current client traffic.
Channel Width	• Wi-Fi 6E Access Point AP1451/AP1431/AP1411 support 160MHz channels • Wi-Fi 6 Access Points AP132X, AP136X and AP1351 support 160MHz channels • Wi-Fi 6 Access Points AP1311/AP1301 do not support 160MHz channels. • 160MHz channel width is supported on 5G band or 6G band. • Only static 160MHz channel width is supported, Auto Channel Selection will not use 160MHz channels.

Short GI	Enable/Disable Short Guard Interval. In IEEE 802.11 OFDM-based communications, Guard Interval is used to ensure that distinct transmissions occur between the successive data symbols transmitted by a device. The standard symbol Guard Interval used in 802.11 OFDM is 800 nanoseconds in duration. To increase data rates, the 802.11 standard added optional support for a 400 nanoseconds guard interval (Short Guard Interval). This would provide approximately an 11% increase in data rates. However, using the Short Guard Interval will result in higher packet error rates when the delay spread of the RF channel exceeds the Short Guard Interval, or if timing synchronization between the transmitter and receiver is not precise. By Default, Short Guard Interval is enabled on the wireless radio. If the multipath effect is too serious (too many metals or other reflecting materials), disabling Short Guard Interval is recommended.
MU-MIMO	Enable/Disable MU-MIMO (multi-user, multiple-input, multiple-output) feature.
High Efficiency	Enable/Disable 802.11ax high efficiency wireless functionality. When disabled, the HE mode capable AP will downgrade to VHT (Very High Throughput) mode.
Beacon Interval	Specify the Beacon period for the AP in milliseconds. This indicates how often the 802.11 beacon management frames are transmitted by the access point. You can specify a value within the range of 60-500. The default value is 100 milliseconds.
CSA	Channel Switch Announcement. The CSA enables an AP to advertise that it is switching to a new channel before it begins transmitting on that channel. This allows the clients, which support CSA, to transition to the new channel with minimal downtime. By default, CSA is enabled. CSA utilizes beacon frames to notify clients, and the packet count range is 1~10.

wIDS/wIPS Window

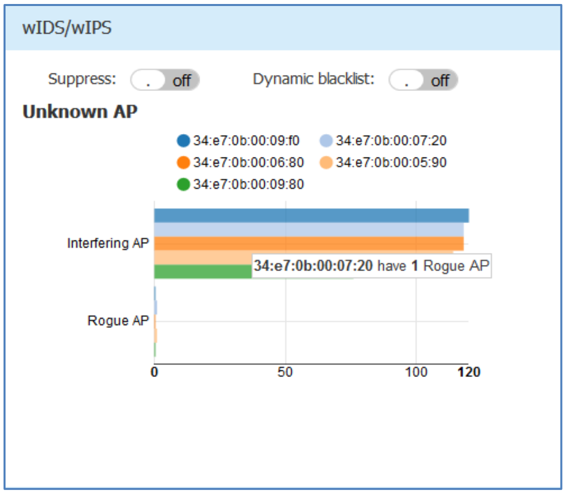
wIDS/wIPS window focus on the wireless security of the Stellar AP network.

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 4-28.



wIDS/wIPS

Suppress: off Dynamic blacklist: off

Unknown AP

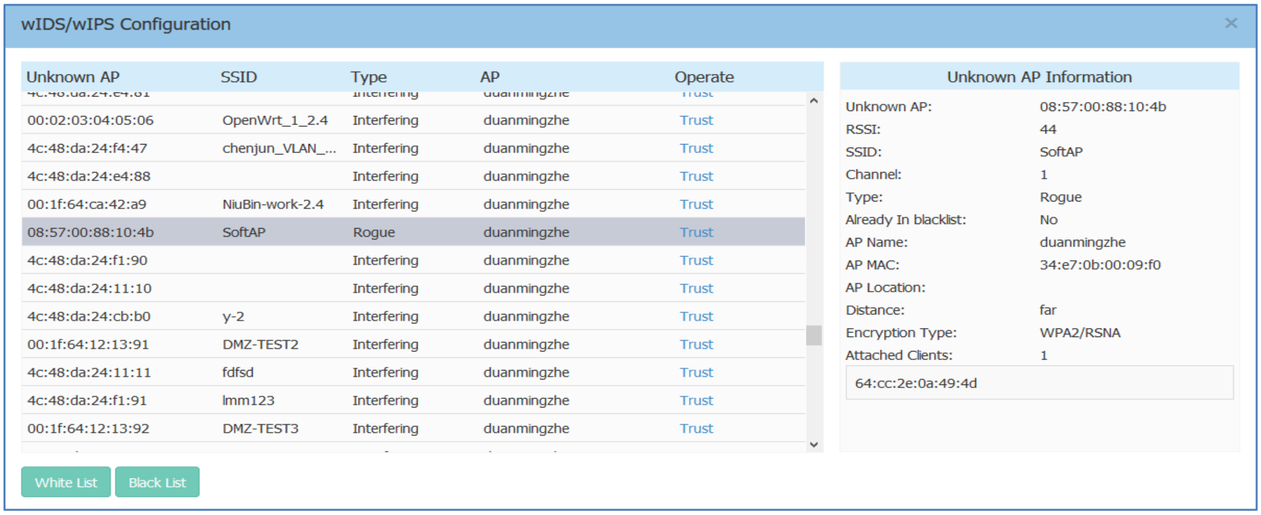
Figure 4-28 Top 5 AP interfered

AP allowlist: 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 4-29. 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 allowlist, illustrated in Figure 4-30. If a foreign AP MAC address is added to the allowlist, it will not be displayed in the unknown AP list.

AP blocklist: Only rogue APs can be added to the blocklist. If a rogue AP is added to the blocklist, it cannot change its role to act as a client and access to the Stellar AP wireless network, illustrated in Figure 4-31.

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 4-28.

Dynamic blocklist: If enabled, all the ad-hoc devices found will be added to the AP blocklist automatically, which prevents the ad-hoc device from changing its role to act as a client and access to Stellar AP wireless network. By default, the ad-hoc device is not added to the blocklist automatically.



wIDS/wIPS Configuration

Unknown AP	SSID	Type	AP	Operate
00:02:03:04:05:06	OpenWrt_1_2.4	Interfering	duanmingzhe	Trust
4c:48:da:24:f4:47	chenjun_VLAN_...	Interfering	duanmingzhe	Trust
4c:48:da:24:e4:88		Interfering	duanmingzhe	Trust
00:1f:64:ca:42:a9	NiuBin-work-2.4	Interfering	duanmingzhe	Trust
08:57:00:88:10:4b	SoftAP	Rogue	duanmingzhe	Trust
4c:48:da:24:f1:90		Interfering	duanmingzhe	Trust
4c:48:da:24:11:10		Interfering	duanmingzhe	Trust
4c:48:da:24:cb:b0	y-2	Interfering	duanmingzhe	Trust
00:1f:64:12:13:91	DMZ-TEST2	Interfering	duanmingzhe	Trust
4c:48:da:24:11:11	fdfsd	Interfering	duanmingzhe	Trust
4c:48:da:24:f1:91	lmm123	Interfering	duanmingzhe	Trust
00:1f:64:12:13:92	DMZ-TEST3	Interfering	duanmingzhe	Trust

Unknown AP Information

Unknown AP:	08:57:00:88:10:4b
RSSI:	44
SSID:	SoftAP
Channel:	1
Type:	Rogue
Already In blacklist:	No
AP Name:	duanmingzhe
AP MAC:	34:e7:0b:00:09:f0
AP Location:	
Distance:	far
Encryption Type:	WPA2/RSNA
Attached Clients:	1

64:cc:2e:0a:49:4d

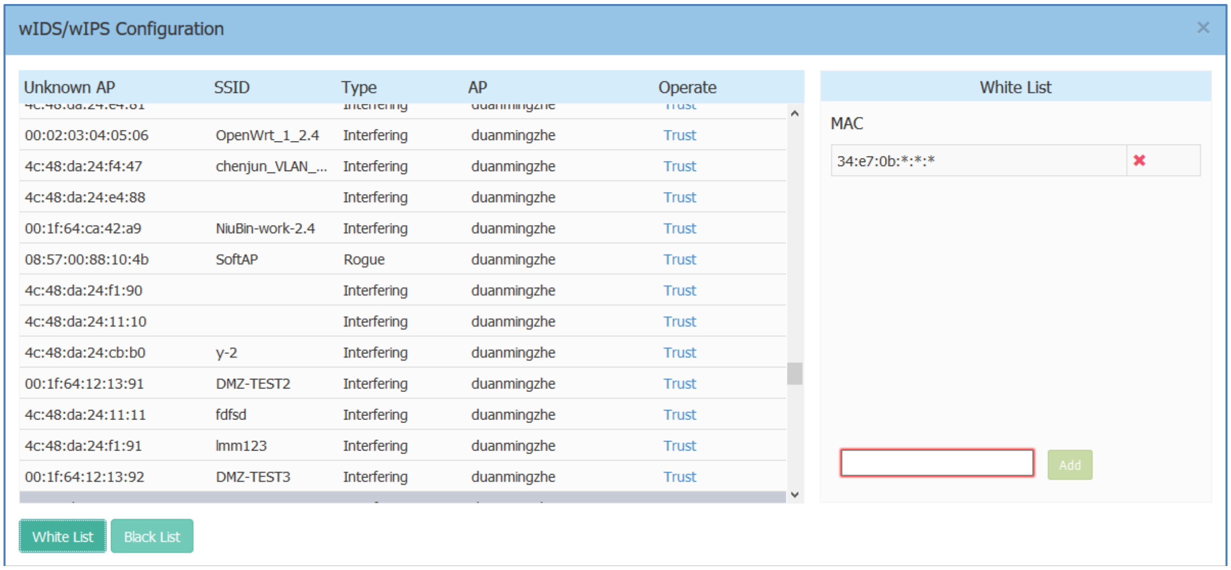
Figure 4-29 wIDS/wIPS Configuration Window

Table 4-13: Key word specification in wIDS/wIPS Configuration Window

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 Blocklist	Flag of ad-hoc device, depends on “the Dynamic blocklist” switch. If on, the ad-hoc devices will be automatically added to the blocklist and the flag is true (Yes); If off or the unknown AP in list is not an ad-hoc device, 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>(-20dBm);
	Near – (-45dBm)<RSSI< (-20dBm);
	Far - (-70dBm) <RSSI<(-45dBm);
	Farthest - RSSI<(-70dBm);

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 allowlist.
Allowlist	Allowlist of foreign APs. Those not considered as security threat to the Stellar AP network, you can add the trusted MAC address into allowlist manually, see more in Figure 4-30.
Blocklist	Blocklist of foreign APs. Those classified as rogue APs and pretending to act as a client to access the Stellar AP network. If enabled and there are detected ad-hoc devices, all of them will be added to the blocklist automatically. You can remove a foreign AP from the blocklist by the **Trust** operation, see more in Figure 4-31.



wIDS/wIPS Configuration

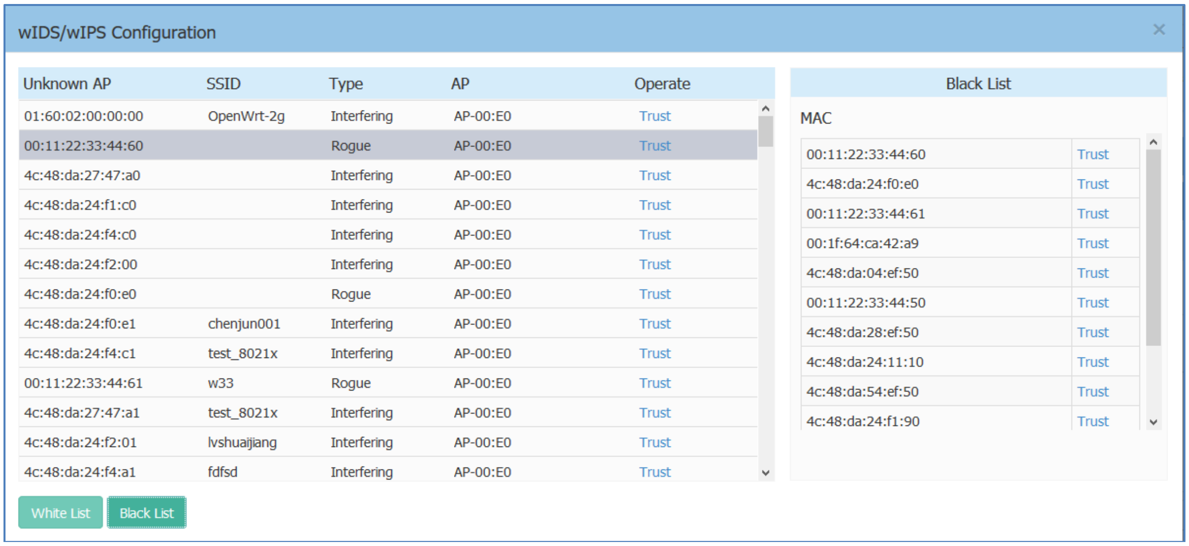
Unknown AP	SSID	Type	AP	Operate
4c:48:da:24:e4:81		Interfering	duanmingzhe	Trust
00:02:03:04:05:06	OpenWrt_1_2.4	Interfering	duanmingzhe	Trust
4c:48:da:24:f4:47	chenjun_VLAN_...	Interfering	duanmingzhe	Trust
4c:48:da:24:e4:88		Interfering	duanmingzhe	Trust
00:1f:64:ca:42:a9	NiuBin-work-2.4	Interfering	duanmingzhe	Trust
08:57:00:88:10:4b	SoftAP	Rogue	duanmingzhe	Trust
4c:48:da:24:f1:90		Interfering	duanmingzhe	Trust
4c:48:da:24:11:10		Interfering	duanmingzhe	Trust
4c:48:da:24:cb:b0	y-2	Interfering	duanmingzhe	Trust
00:1f:64:12:13:91	DMZ-TEST2	Interfering	duanmingzhe	Trust
4c:48:da:24:11:11	fdfsd	Interfering	duanmingzhe	Trust
4c:48:da:24:f1:91	lmm123	Interfering	duanmingzhe	Trust
00:1f:64:12:13:92	DMZ-TEST3	Interfering	duanmingzhe	Trust

White List

MAC

34:e7:0b:*:*:* ✖

Figure 4-30 Foreign AP Allowlist



Unknown AP	SSID	Type	AP	Operate
01:60:02:00:00:00	OpenWrt-2g	Interfering	AP-00:E0	Trust
00:11:22:33:44:60		Rogue	AP-00:E0	Trust
4c:48:da:27:47:a0		Interfering	AP-00:E0	Trust
4c:48:da:24:f1:c0		Interfering	AP-00:E0	Trust
4c:48:da:24:f4:c0		Interfering	AP-00:E0	Trust
4c:48:da:24:f2:00		Interfering	AP-00:E0	Trust
4c:48:da:24:f0:e0		Rogue	AP-00:E0	Trust
4c:48:da:24:f0:e1	chenjun001	Interfering	AP-00:E0	Trust
4c:48:da:24:f4:c1	test_8021x	Interfering	AP-00:E0	Trust
00:11:22:33:44:61	w33	Rogue	AP-00:E0	Trust
4c:48:da:27:47:a1	test_8021x	Interfering	AP-00:E0	Trust
4c:48:da:24:f2:01	lvshuaijiang	Interfering	AP-00:E0	Trust
4c:48:da:24:f4:a1	fdfsd	Interfering	AP-00:E0	Trust

Black List

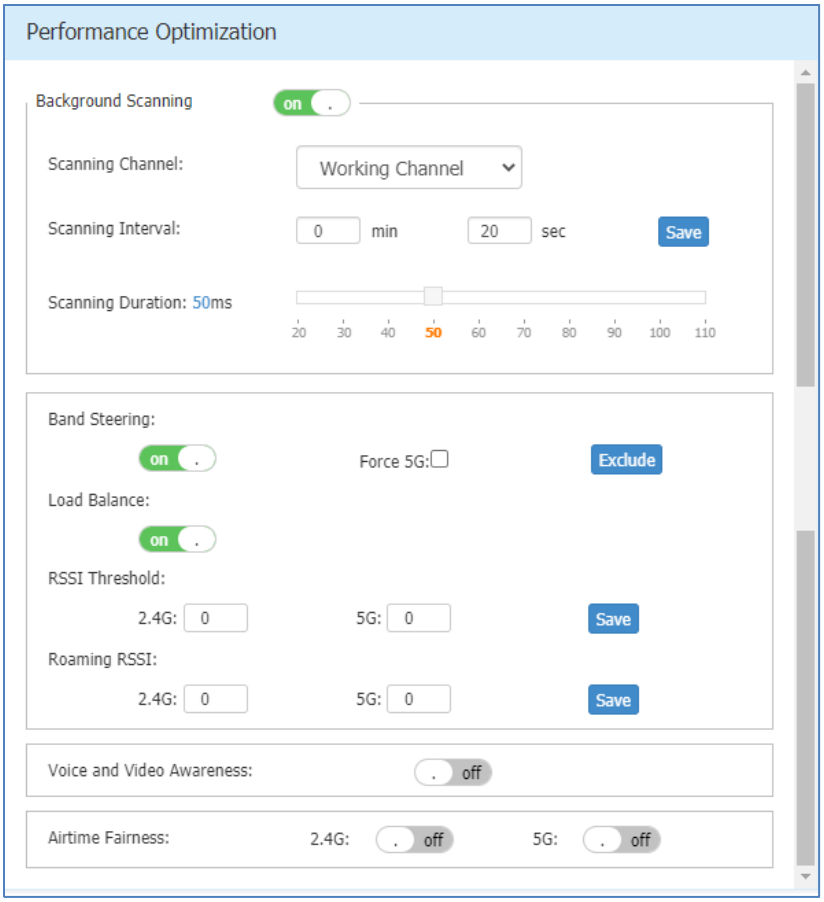
MAC	
00:11:22:33:44:60	Trust
4c:48:da:24:f0:e0	Trust
00:11:22:33:44:61	Trust
00:1f:64:ca:42:a9	Trust
4c:48:da:04:ef:50	Trust
00:11:22:33:44:50	Trust
4c:48:da:28:ef:50	Trust
4c:48:da:24:11:10	Trust
4c:48:da:54:ef:50	Trust
4c:48:da:24:f1:90	Trust

Figure 4-31 Foreign AP Blocklist

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

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 4-32.



Performance Optimization

Background Scanning on

Scanning Channel: Working Channel

Scanning Interval: 0 min 20 sec

Scanning Duration: 50ms

Band Steering: on

Force 5G: □

Load Balance: on

RSSI Threshold:

2.4G: 0 5G: 0

Roaming RSSI:

2.4G: 0 5G: 0

Voice and Video Awareness: off

Airtime Fairness: 2.4G: off 5G: off

Figure 4-32 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.

The scanning channel can be defined on demand: For highly sensitive packet delay use case, suggest enabling background scanning only for the working channel. The scanning interval of Background Scanning can be configured from 5 seconds to 3 hours (180 minutes) according to deployment requirement. For highly sensitive packet delay use case, it is recommended to prolong the interval from default 20-second setting. If the interval is longer than 1 minutes, RDA and wIPS feature accuracy will be impacted.

Band Steering: Band steering supports **Prefer 5GHz** and **Force 5G**.
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. The prefer-5GHz-band-steering is based on channel utilization and client density. When the 5G band is busy and connecting too many clients, a new client will be guided to connect to free 2.4G band.

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 or 6G band separately. Recommended 2.4G (5), 5G (10), 6G (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 or 6G 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), 6G (15).

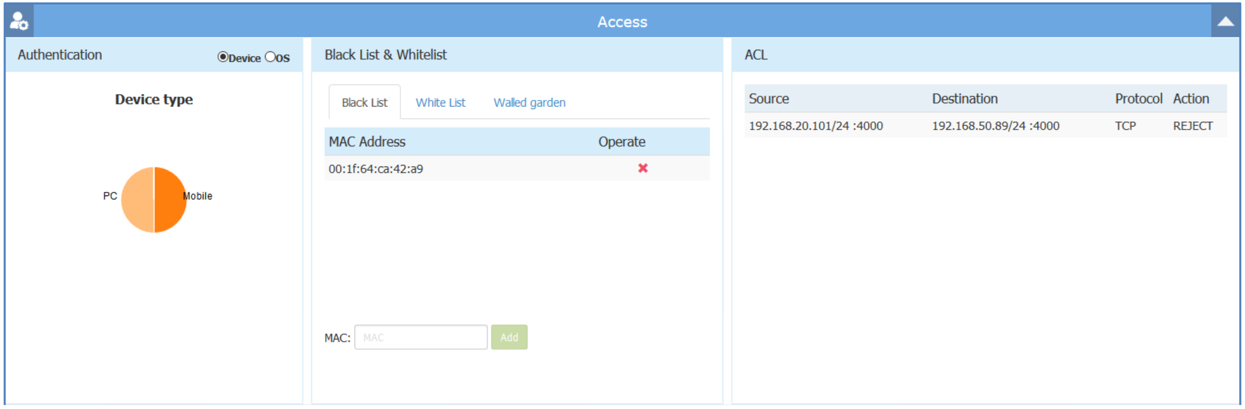
Voice and Video Awareness: Background scanning needs to be aware of existing traffic on the Stellar AP, if there is an ongoing voice/video service, scanning should not be done to ensure uninterrupted traffic; and allows to resume scanning when there is no active voice/video session. By default, Voice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

The Access page is divided into three windows: Authentication window, Blocklist & Allowlist window, ACL window, illustrated in Figure 4-33.



MAC Address	Operate
00:1f:64:ca:42:a9	✖

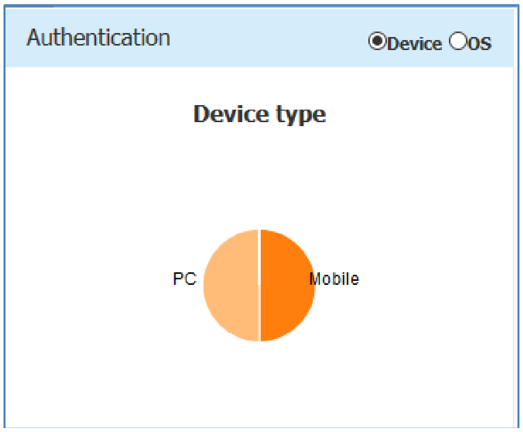
Source	Destination	Protocol	Action
192.168.20.101/24 :4000	192.168.50.89/24 :4000	TCP	REJECT

Figure 4-33 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 4-34 and Advanced Mode illustrated in Figure 4-35. You can launch the Advanced Mode from Simplified Mode by clicking the Authentication Window Frame.

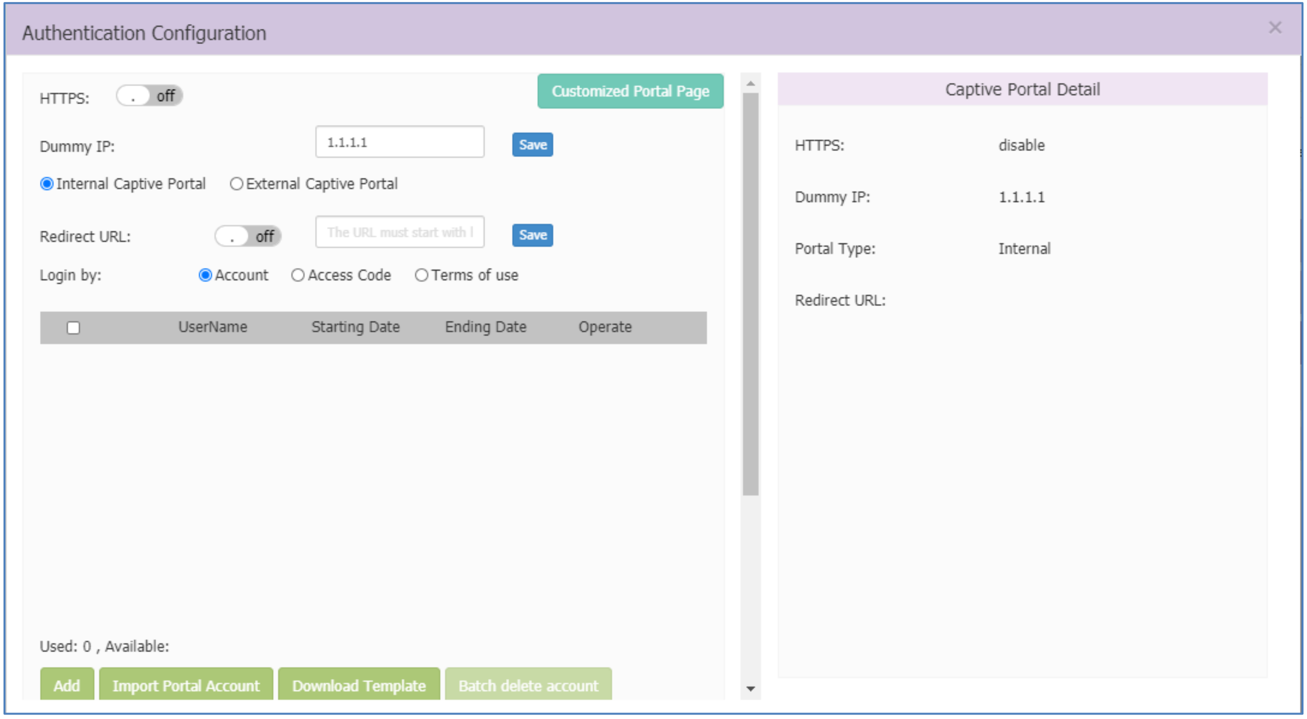


● Device ○ OS

Figure 4-34 Authentication Window - Simplified Mode

The simplified Authentication Window displays the statistics information of the users' device and operating system, illustrated in Figure 4-34.

The advanced Authentication Window is mainly used to configure the captive portal authentication, illustrated in Figure 4-35.



HTTPS: off

Dummy IP: 1.1.1.1

● Internal Captive Portal ○ External Captive Portal

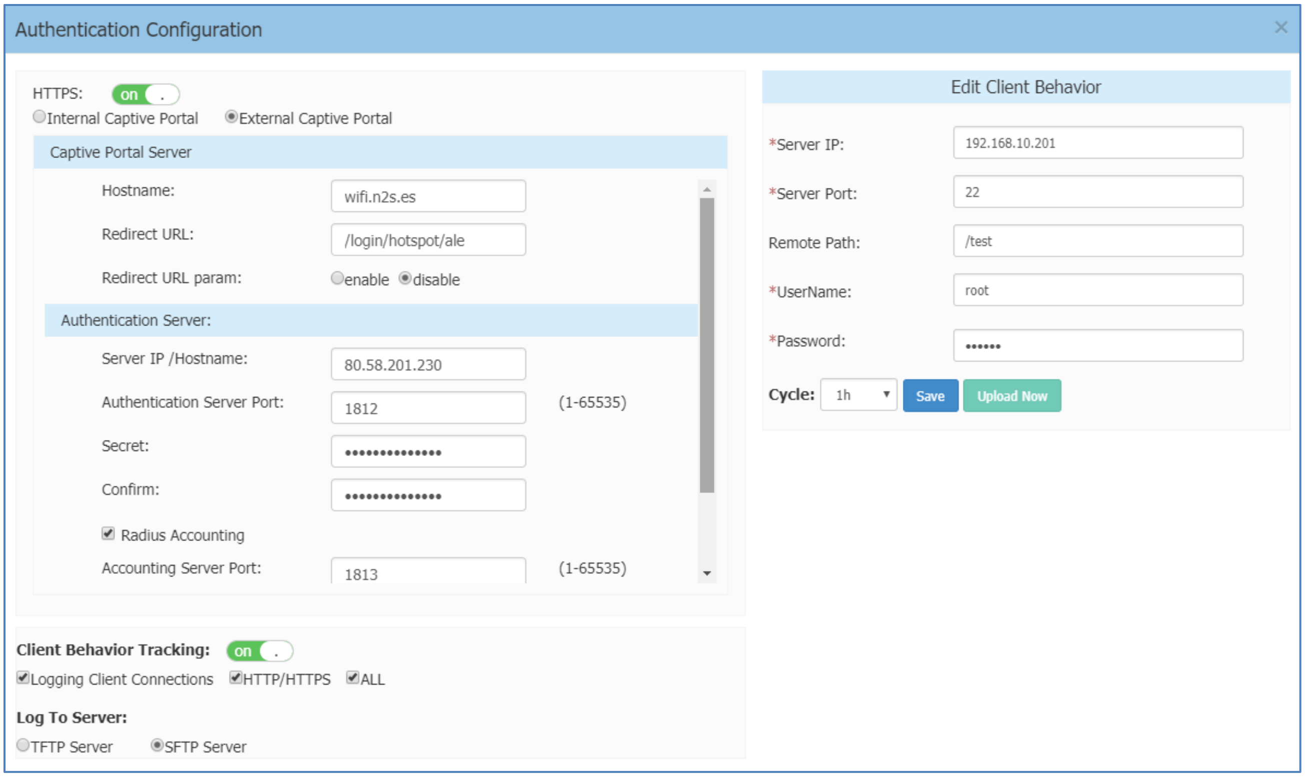
Redirect URL: off The URL must start with I

Login by: ● Account ○ Access Code ○ Terms of use

Used: 0 , Available:

HTTPS:	disable
Dummy IP:	1.1.1.1
Portal Type:	Internal
Redirect URL:	

Figure 4-35 Authentication Window - Internal Portal Server



Authentication Configuration

HTTPS: on

○ Internal Captive Portal ● External Captive Portal

Captive Portal Server

Hostname: wifi.n2s.es

Redirect URL: /login/hotspot/ale

Redirect URL param: ○ enable ● disable

Authentication Server:

Server IP /Hostname: 80.58.201.230

Authentication Server Port: 1812 (1-65535)

Secret: ••••••••••••••

Confirm: ••••••••••••••

☑ Radius Accounting

Accounting Server Port: 1813 (1-65535)

Client Behavior Tracking: on

☑ Logging Client Connections ☑ HTTP/HTTPS ☑ ALL

Log To Server:

○ TFTP Server ● SFTP Server

Edit Client Behavior

*Server IP: 192.168.10.201

*Server Port: 22

Remote Path: /test

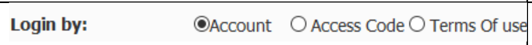
*UserName: root

*Password: ••••••

Cycle: 1h

Figure 4-36 Authentication Window - External Portal Server

Table 4-14: Key word specification in Authentication Window (Advanced Mode)

HTTPs	Specify the captive portal login protocol, https or http.
Dummy IP	• IP address of captive portal FQDN
Captive Portal Type	• Internal Captive Portal - Use AP internal captive portal server for authentication. • External Captive Portal - Use external captive portal server for authentication.
 Login by: ● Account ○ Access Code ○ Terms Of use	Login method used by the captive portal users, corresponding to different login page and credentials: • Account - Login by user account, you need to add accounts for portal users, see Create Users or Access Code. The users enter their usernames and passwords to pass the authentication and access the wireless network, see more in Customized Portal Page - Login by Account. • Access Code - Login by access code, you need to add access code for portal user, see Create Users or Access Code. The users enter the access code to pass the authentication, see more in Customized Portal Page - Login by access code. • Terms of use - Login by terms of use. The users accept the terms of use and pass the authentication, see more in Customized Portal Page - Login by Terms of use.
Redirect URL: on	Redirect user to a specific URL defined by administrator. By default, it is disabled.
UserName	Account of captive portal user.

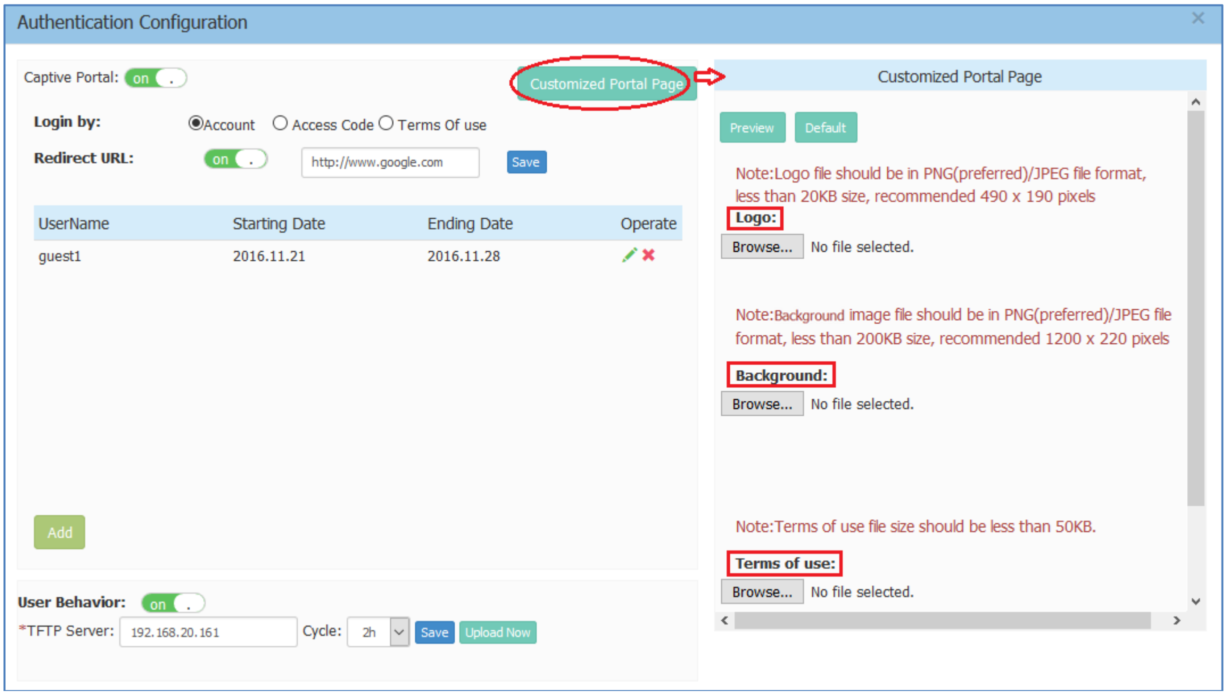
Starting Date	Account effective starting date.
Ending Date	Account effective ending date.
Operate	Edit or delete captive portal users.
Add	Add users for captive portal authentication when using login by account.
Import Portal Account	Import portal user account through excel file. Suggest downloading 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 FTP server or syslog server. Connection information of all users including online and offline will be recorded. More details can see in Note4-7.
Logging Client Connections	• HTTP/HTTPS – Record the HTTP/HTTPs web session of wireless clients • ALL – Record the all the session including HTTP(s)/TCP/UDP of wireless clients
Log To Server	• TFTP Server – Record the client connection information to a specific TFTP server by uploading log files • SFTP Server – Record the client connection information to a specific SFTP server by uploading log files • Syslog Server – Record the client connection information to a specific server by syslog message
Cycle: 1h	Specify the cycle for uploading user behavior logs to FTP server, can be set to 1 hour, 2 hours and 4 hours.
Save	Save the FTP setting for uploading user behavior logs.
Upload Now	Upload the user behavior logs to the FTP server manually.
RADIUS Setting	Setting RADIUS attributes which will be utilized by AP for authentication • Called-Station-ID: Specify the value for Called-Station-ID which will be used while AP sending RADIUS access request, max 64 bytes string.

Note

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

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 4-37.



Authentication Configuration

Captive Portal: on

Customized Portal Page

Login by: ● Account ○ Access Code ○ Terms Of use

Redirect URL: on http://www.google.com Save

UserName	Starting Date	Ending Date	Operate
guest1	2016.11.21	2016.11.28	✎ ✖

Add

User Behavior: on

*TFTP Server: 192.168.20.161 Cycle: 2h Save Upload Now

Customized Portal Page

Preview Default

Note:Logo file should be in PNG(preferred)/JPEG file format, less than 20KB size, recommended 490 x 190 pixels

Logo:

Browse... No file selected.

Note:Background image file should be in PNG(preferred)/JPEG file format, less than 200KB size, recommended 1200 x 220 pixels

Background:

Browse... No file selected.

Note:Terms of use file size should be less than 50KB.

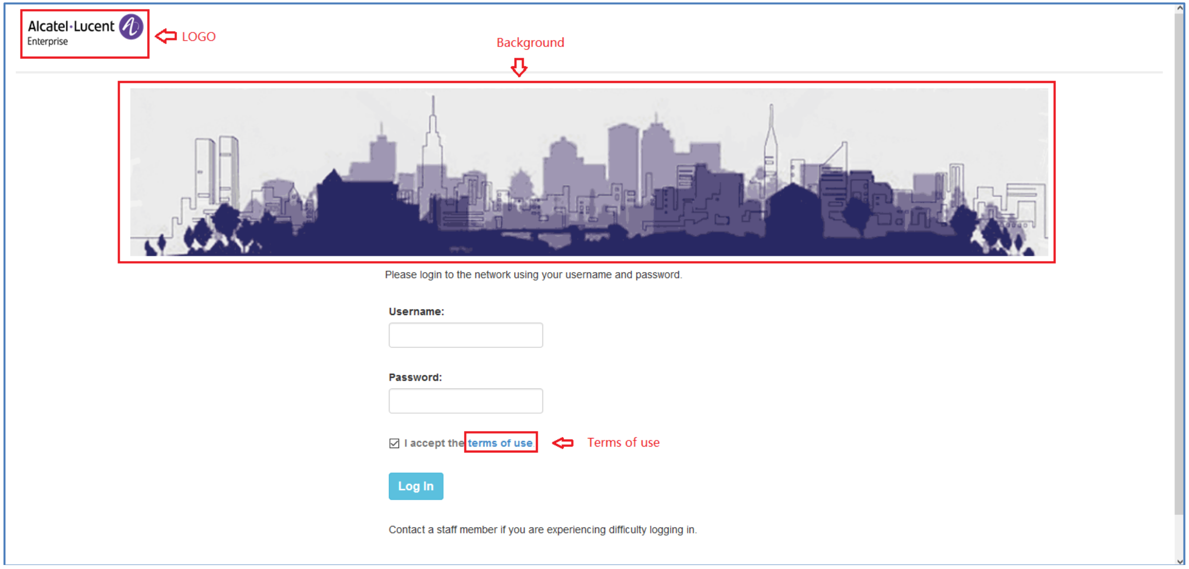
Terms of use:

Browse... No file selected.

Figure 4-37 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



Please login to the network using your username and password.

Username:

Password:

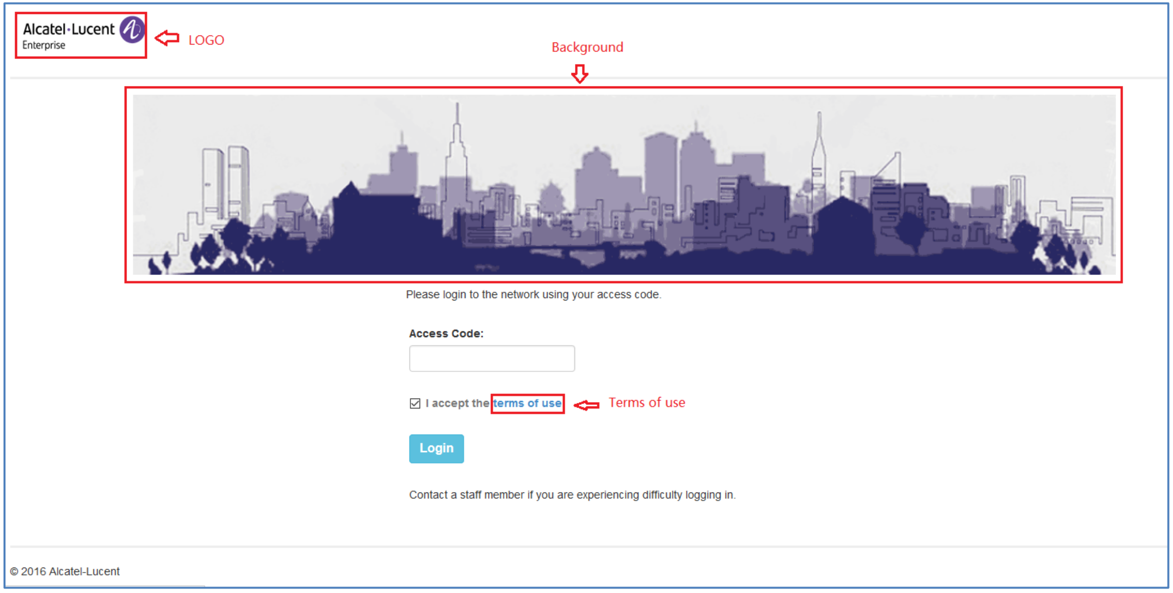
☑ I accept the terms of use

Log In

Contact a staff member if you are experiencing difficulty logging in.

Figure 4-38 Customized Portal Page - Login by account

Customized Portal Page – Login by Access Code



Please login to the network using your access code.

Access Code:

☑ I accept the terms of use

Login

Contact a staff member if you are experiencing difficulty logging in.

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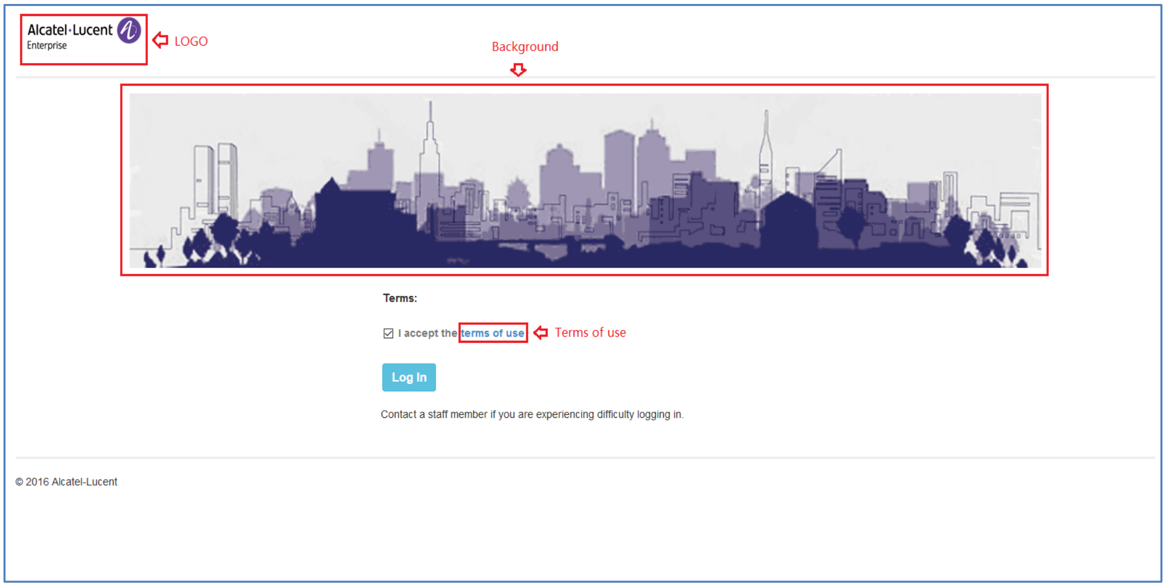
Figure 4-39 Customized Portal Page - Login by access code

Customized Portal Page – Login by Terms of Use



Terms:

☑ I accept the terms of use

Log In

Contact a staff member if you are experiencing difficulty logging in.

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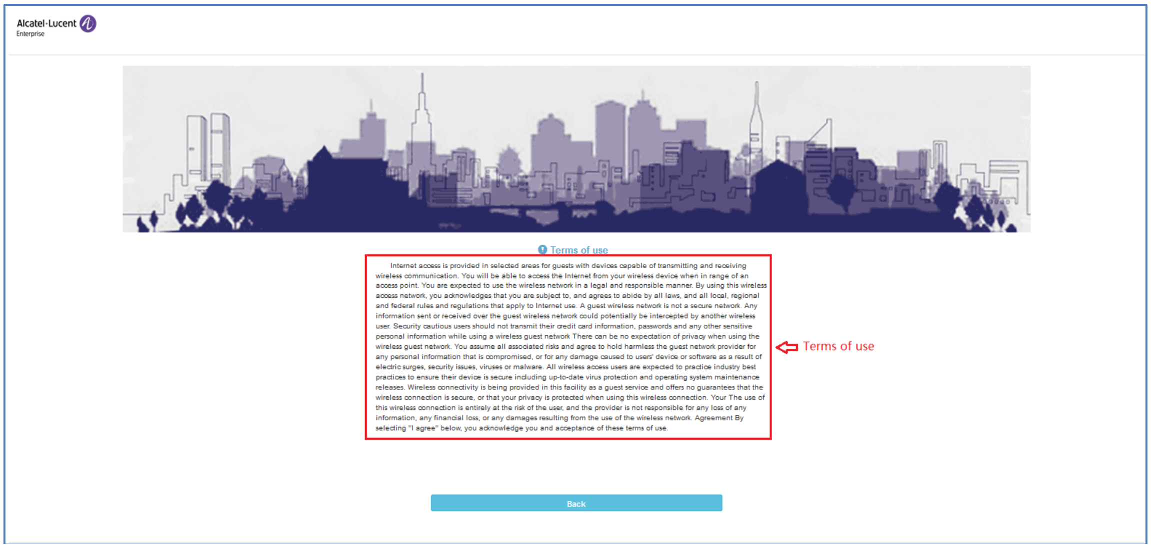
Figure 4-40 Customized Portal Page - Login by Terms of use



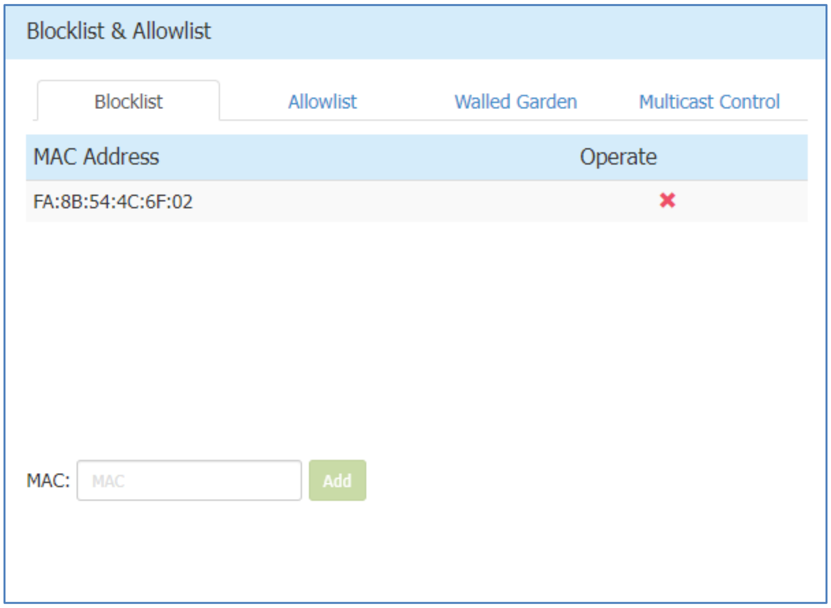
Internet access is provided in selected areas for guests with devices capable of transmitting and receiving wireless communication. You will be able to access the Internet from your wireless device when in range of an access point. You are expected to use the wireless network in a legal and responsible manner. By using this wireless access network, you acknowledges that you are subject to, and agrees to abide by all laws, and all local, regional and federal rules and regulations that apply to Internet use. A guest wireless network is not a secure network. Any information sent or received over the guest wireless network could potentially be intercepted by another wireless user. Security cautious users should not transmit their credit card information, passwords and any other sensitive personal information while using a wireless guest network There can be no expectation of privacy when using the wireless guest network. You assume all associated risks and agree to hold harmless the guest network provider for any personal information that is compromised, or for any damage caused to users' device or software as a result of electric surges, security issues, viruses or malware. All wireless access users are expected to practice industry best practices to ensure their device is secure including up-to-date virus protection and operating system maintenance releases. Wireless connectivity is being provided in this facility as a guest service and offers no guarantees that the wireless connection is secure, or that your privacy is protected when using this wireless connection. Your The use of this wireless connection is entirely at the risk of the user, and the provider is not responsible for any loss of any information, any financial loss, or any damages resulting from the use of the wireless network. Agreement By selecting "I agree" below, you acknowledge you and acceptance of these terms of use.

Figure 4-41 Customized Portal Page - Terms of use

Blocklist & Allowlist Window

Blocklist & Allowlist Window focuses on the basic access control mechanism for users connecting to the Stellar WLAN network based on the client level. It includes following tabs: Blocklist Tab, Allowlist Tab, Wall Garden Tab and Multicast Control Tab.

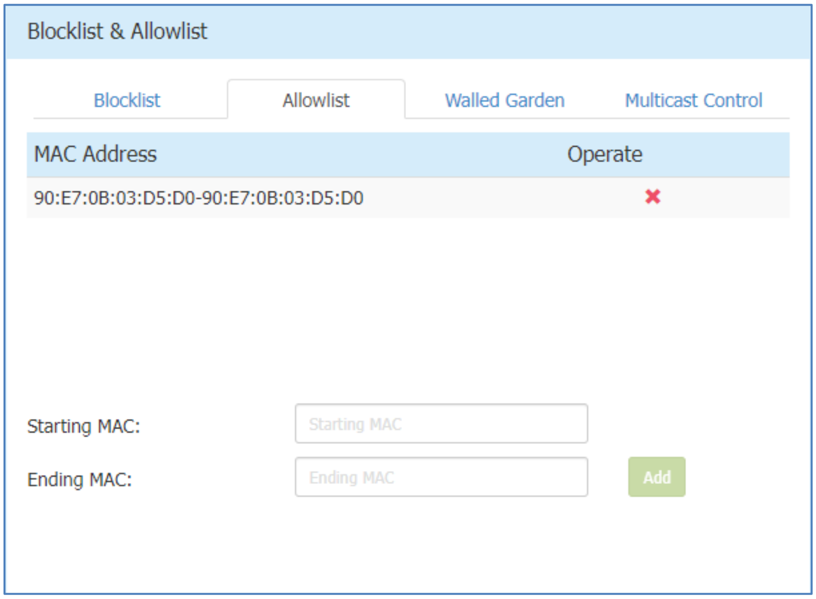
Those clients on the blocklist are denied associating to the Stellar AP wireless network. Once a client is in the blocklist , it cannot connect to any WLAN of any security level (Enterprise/Personal/Open). You can add/delete the blocklist based on client’s MAC address, illustrated in Figure 4-42.



MAC Address	Operate
FA:8B:54:4C:6F:02	✖

Figure 4-42 Blocklist Tab

The allowlist is applied to captive portal authentication ONLY. Those clients on the allowlist are permitted to access the network resource without passing the captive portal authentication. You can manually add/remove client(s) to/from the allowlist for captive portal authentication by MAC address, illustrated in Figure 4-43. The allowlist does not support Enterprise/Personal WLANs. This means that the clients in the allowlist are not allowed to access Enterprise/Personal WLANs without using correct credentials.



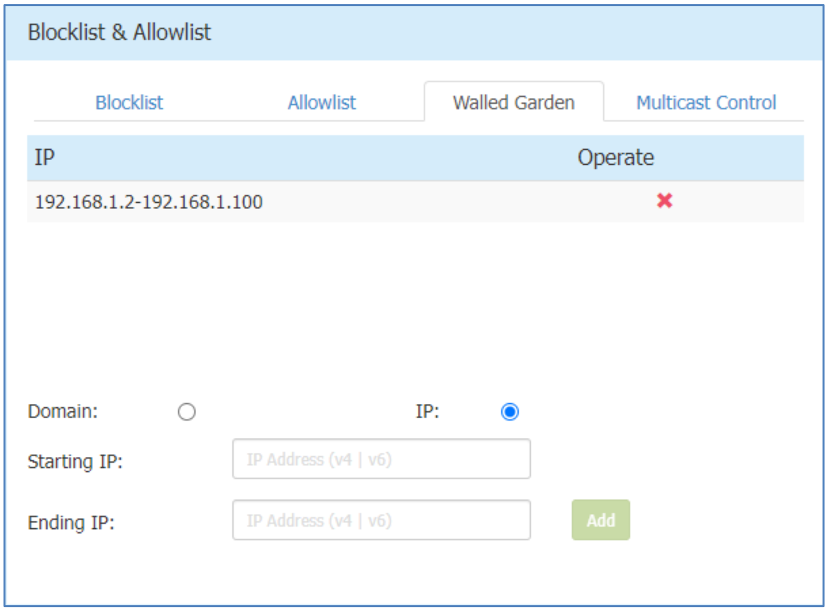
MAC Address	Operate
90:E7:0B:03:D5:D0-90:E7:0B:03:D5:D0	✖

Starting MAC: Starting MAC

Ending MAC: Ending MAC

Figure 4-43 Allowlist 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 can access the network resource (For example: website of the hotel) before passing the captive portal authentication. You can add/remove allowed domain(s) or IP(s) to/from the walled garden, illustrated in Figure 4-44.



IP	Operate
192.168.1.2-192.168.1.100	✖

Domain: ○ IP: ●

Starting IP: IP Address (v4 | v6)

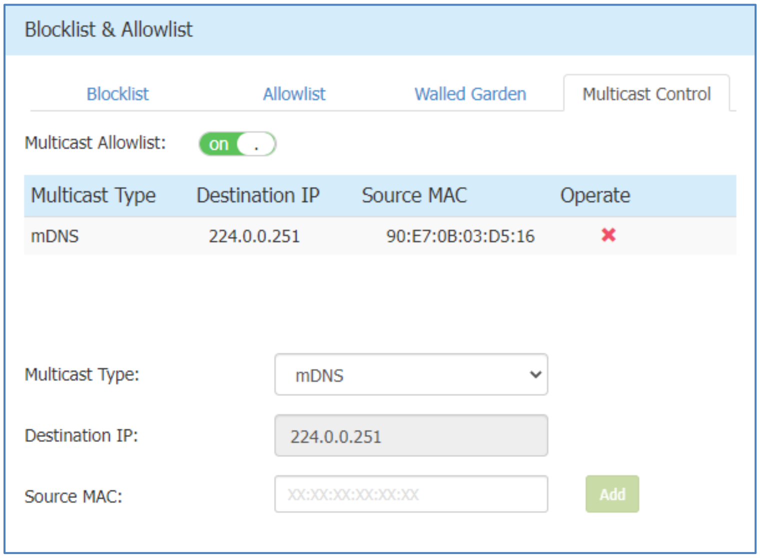
Ending IP: IP Address (v4 | v6)

Figure 4-44 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 must know the IP address or domain name of the network resource and add it into the walled garden.

The Multicast Control targets on the mDNS multicast traffic forwarding from wired network (switch ports) towards AP. When enabled, only traffic from the configured multicast source in the allowlist can be forwarded by AP to the clients connecting to it. Maximum 8 items of multicast allowlist are supported. When Multicast Allowlist is disabled, the mDNS multicast traffic is forwarding without conditions.



Blocklist & Allowlist

Multicast Allowlist: on

Multicast Type	Destination IP	Source MAC	Operate
mDNS	224.0.0.251	90:E7:0B:03:D5:16	✖

Multicast Type: mDNS

Destination IP: 224.0.0.251

Source MAC: XX:XX:XX:XX:XX:XX

Figure 4-45 Multicast Control Tab

Access Control List Window

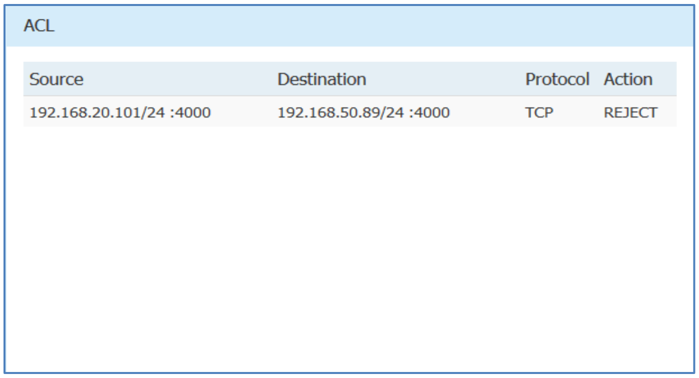
There are two modes for ACL Window, Simplified Mode illustrated in Figure 4-46 and Advanced Mode illustrated in Figure 4-47.

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 4-46.

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 4-47.

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

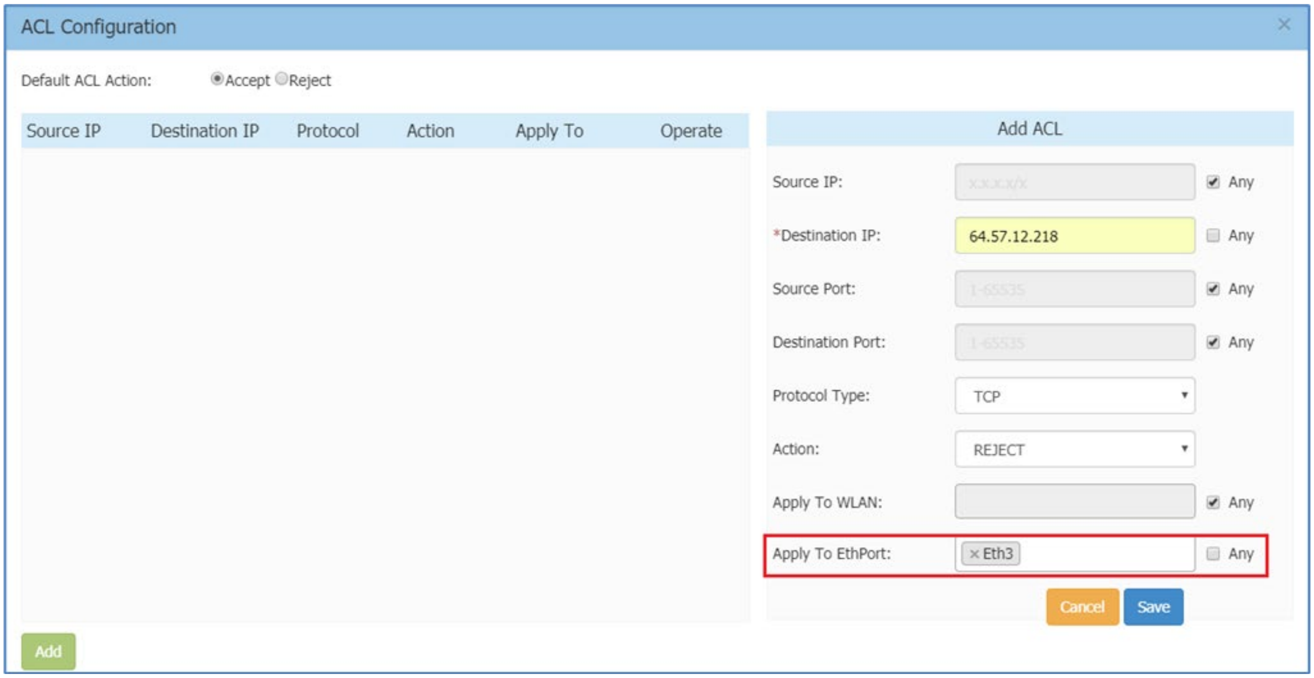
By default, traffic is allowed to pass if no ACL rules are matched (Default ACL action is ‘Accept’).



ACL

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

Figure 4-46 ACL Window - Simplified Mode



ACL Configuration

Default ACL Action: ● Accept ○ Reject

Source IP	Destination IP	Protocol	Action	Apply To	Operate

Add ACL

Source IP: x.x.x.x/x ☑ Any

*Destination IP: 64.57.12.218 □ Any

Source Port: 1-65535 ☑ Any

Destination Port: 1-65535 ☑ Any

Protocol Type: TCP

Action: REJECT

Apply To WLAN: ☑ Any

Apply To EthPort: × Eth3 □ Any

Figure 4-47 ACL Window - Advanced Mode

Table 4-15 ACL Parameter Specification

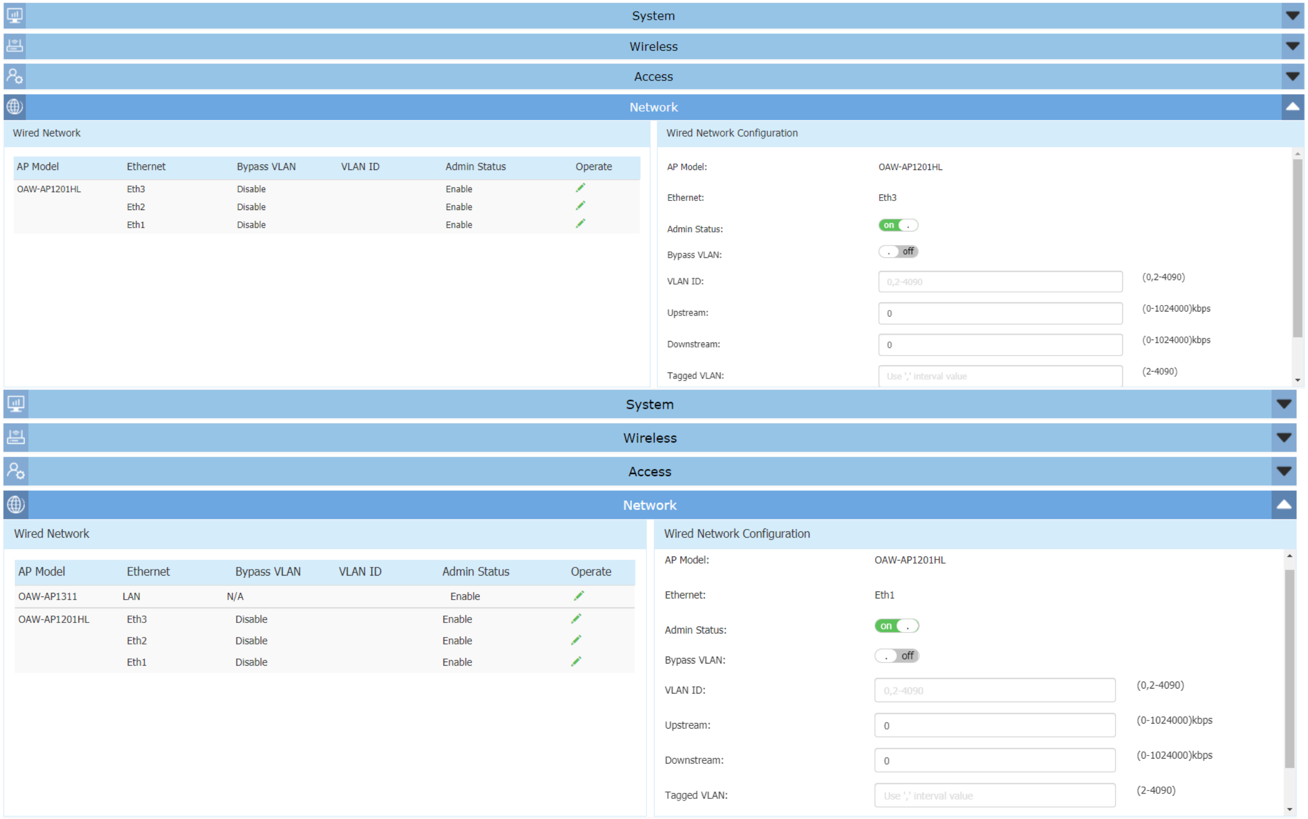
Parameter	Specifications
Source IP	The source IP address.
Destination IP	The destination IP address.
Source Port	Source UDP or TCP port.
Destination Port	Destination UDP or TCP port.
IP Protocol	There are three options for IP Protocol, TCP, UDP or ICMP.
Action	Accept or Reject
Apply To WLAN	Indicate 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/AP1201HL/AP1311/AP1301H.

Note

Note 4-8: Stellar AP supports L2 ACLs, you can block/allow certain MACs or a range of MAC addresses, see Blocklist & Allowlist 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 downlink port configuration. For example, user can view and configure AP1201H/AP1201HL/AP1311/AP1301H downlink ports in network page.



Wired Network

AP Model	Ethernet	Bypass VLAN	VLAN ID	Admin Status	Operate
OAW-AP1201HL	Eth3	Disable		Enable	
	Eth2	Disable		Enable	
	Eth1	Disable		Enable	

Wired Network Configuration

AP Model:	OAW-AP1201HL	
Ethernet:	Eth3	
Admin Status:	on	
Bypass VLAN:	off	
VLAN ID:	0,2-4090	(0,2-4090)
Upstream:	0	(0-1024000)kbps
Downstream:	0	(0-1024000)kbps
Tagged VLAN:	Use ',' interval value	(2-4090)

Wired Network

AP Model	Ethernet	Bypass VLAN	VLAN ID	Admin Status	Operate
OAW-AP1311	LAN	N/A		Enable	
OAW-AP1201HL	Eth3	Disable		Enable	
	Eth2	Disable		Enable	
	Eth1	Disable		Enable	

Wired Network Configuration

AP Model:	OAW-AP1201HL	
Ethernet:	Eth1	
Admin Status:	on	
Bypass VLAN:	off	
VLAN ID:	0,2-4090	(0,2-4090)
Upstream:	0	(0-1024000)kbps
Downstream:	0	(0-1024000)kbps
Tagged VLAN:	Use ',' interval value	(2-4090)

Figure 4-48 Network Page

If there is not any online AP1201H/AP1201HL/AP1311/AP1301H in the cluster, Network page is hidden and cannot be operated until an AP with downlink port is online and joins into the cluster.

Table 4-16 Wired Network

Parameter	Specifications
AP Model	AP model needs to configure ethernet downlink port
Ethernet	Ethernet downlink port of AP
Admin Status	Enable/Disable the ethernet downlink port
Bypass VLAN	To specify the default VLAN traffic forwarding behavior. When enabled, the traffic in the default VLAN will skip the CPU process and forward directly in/out the AP. Bypass VLAN can improve the traffic forwarding efficiency greatly.
VLAN ID	VLAN ID assigned to the ethernet downlink port as default VLAN
Upstream	Maximum upstream bandwidth for the down Link port

Downstream	Maximum downstream bandwidth for the down Link port
Tagged VLAN	Traffic with VLAN tagged through the ethernet port will skip the CPU process and still keeps the VLAN tag

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.

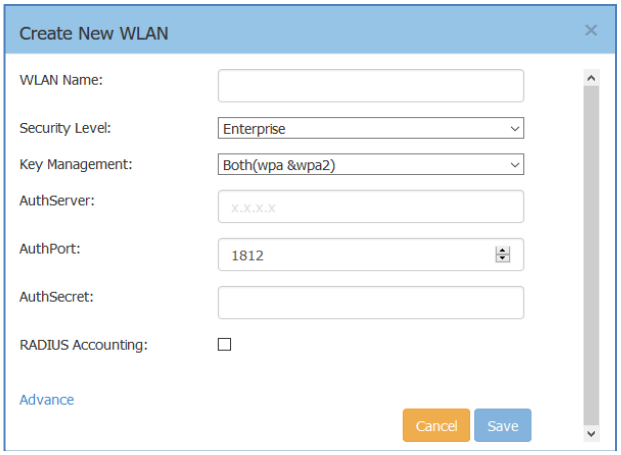
Personal: Also referred to as PSK (pre-shared key) mode, this is designed for home and small office networks and doesn't require an authentication server. Each wireless network device encrypts the network traffic using a 256 bit key. This key may be entered either as a string of 64 hexadecimal digits, 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 5-1and 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.



Create New WLAN

WLAN Name:

Security Level: Enterprise

Key Management: Both(wpa &wpa2)

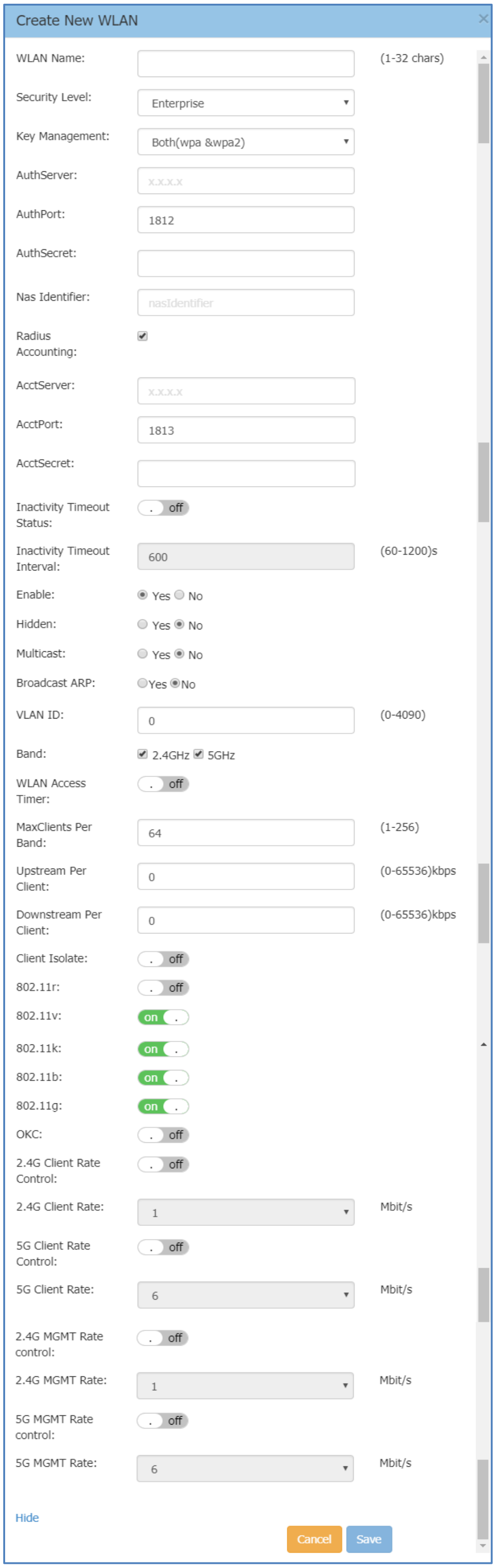
AuthServer: x.x.x.x

AuthPort: 1812

AuthSecret:

RADIUS Accounting: □

Figure 5-1 Create Enterprise WLAN - Simplified Mode



Create New WLAN

WLAN Name:		(1-32 chars)
Security Level:	Enterprise ▾	
Key Management:	Both(wpa &wpa2) ▾	
AuthServer:	x.x.x.x	
AuthPort:	1812	
AuthSecret:		
Nas Identifier:	nasIdentifier	
Radius Accounting:	☑	
AcctServer:	x.x.x.x	
AcctPort:	1813	
AcctSecret:		
Inactivity Timeout Status:	off	
Inactivity Timeout Interval:	600	(60-1200)s
Enable:	● Yes ○ No	
Hidden:	○ Yes ● No	
Multicast:	○ Yes ● No	
Broadcast ARP:	○Yes ●No	
VLAN ID:	0	(0-4090)
Band:	☑ 2.4GHz ☑ 5GHz	
WLAN Access Timer:	off	
MaxClients Per Band:	64	(1-256)
Upstream Per Client:	0	(0-65536)kbps
Downstream Per Client:	0	(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:	1 ▾	Mbit/s
5G Client Rate Control:	off	
5G Client Rate:	6 ▾	Mbit/s
2.4G MGMT Rate control:	off	
2.4G MGMT Rate:	1 ▾	Mbit/s
5G MGMT Rate control:	off	
5G MGMT Rate:	6 ▾	Mbit/s

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	WPA3/WPA2/WPA encryption method. It is applicable to Enterprise/Personal WLANs only. • Both(wpa&wpa2): Allowing WPA or WPA2 capable wireless client to connect to the WLAN • wpa2-enterprise: Allowing WPA2 capable or WPA3 capable wireless client to connect to the WLAN • wpa3-enterprise: Allowing WPA3 capable wireless client to connect to the WLAN. CSNA: Allowing client supporting WPA3 with CNSA (Suite B) to connect when checked. *Note: AP1101 full band does not support WPA3 CNSA encryption, AP1201H and AP1201L 2.4Ghz band does not support WPA3 CSNA encryption. All other APs and radio bands support CSNA encryption. When CSNA encryption is applied to an AP that does not support it, the encryption will automatically fall back to non-CSNA mode (WPA2).*
PMF	Stellar supports the IEEE802.11w standard, also known as Protected Management Frames (PMF). The PMF function increases the security by providing data confidentiality of management frames. PMF is applicable for WPA2 and WPA3 encryption method. • Disabled: Disables 802.11w PMF protection for the WLAN. • Optional: Both 802.11w PMF capable clients and 802.11w PMF non-capable clients can connect the WLAN. • Required: Only 802.11w PMF capable clients can associate to the WLAN. • For WPA3 Enterprise authentication, if the CNSA is selected, PMF is set to 'required' which means only PMF capable client can connect.
AuthServer	IPv4/IPv6 address of the authentication server (RADIUS). With Dynamic VLAN feature, Stellar supports VLAN assignment for the clients connecting to the Enterprise WLAN. Below RADIUS attributes are supported in Stellar Express mode (RFC-2868): • Tunnel-Type (IEFT #64) = VLAN • Tunnel-Medium-Type (IEFT #65) = 802 (6) • Tunnel-Private-Group-ID (IEFT #81) = [tag, string]
AuthPort	Communication port of the authentication server. The default value is 1812. If RadSec is enabled, the AuthPort should be configured 2083 or the value mapping RadSec server.
AuthSecret	Shared secret key used by the authentication server, in ASCII format.
Nas Identifier	Nas Identifier is used to notify the source of a RADIUS access request, which enables the RADIUS server to choose a policy for that request. The Nas Identifier is sent to the RADIUS server by the AP through an authentication request to classify users to different groups. This enables the RADIUS server to send a customized authentication response.
TLS	Enable to make Stellar AP use TLS tunnel and to enable secure communication between the RADIUS server and Stellar AP. Enabling RADIUS communication over TLS increases the level of security for authentication that is carried out across the cloud network. When configured, this feature ensures that the RadSec protocol is used for safely transmitting the authentication and accounting data between the Stellar AP and the RadSec server. When configured, the AuthPort value should be also adjusted to map the RadSec server. The RadSec feature is applicable for wireless client only.
RADIUS Accounting	Select the checkbox if accounting service is needed. By default, it is not selected.

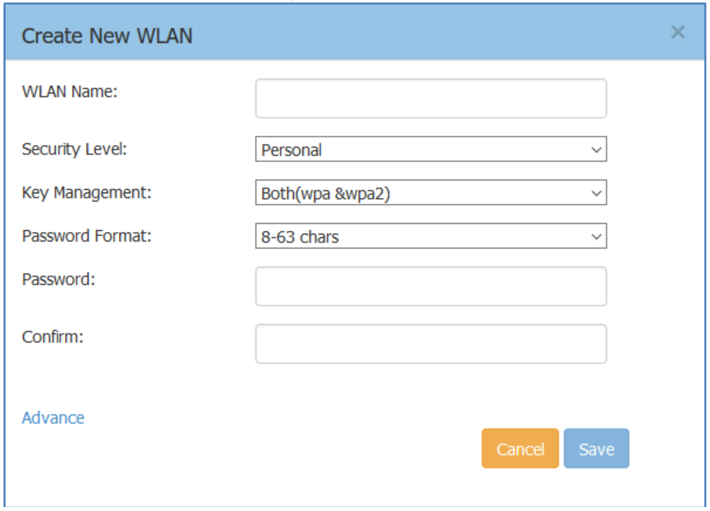
AcctServer	IPv4 address of the accounting server.
AcctPort	Communication port of the accounting server. The default value is 1813.
AcctSecret	Shared secret key used by the accounting server, in ASCII format.
Inactivity Timeout Status	Specify the inactivity timeout interval configuration status. The clients will be disconnected from the wireless network for a specific duration that not transmitting any packets. If Inactivity Timeout Status is disabled, the inactivity timeout interval is set to fixed 600 seconds. If Inactivity Timeout Status is enabled, the configured Inactivity Timeout Interval will be used to disconnect inactivity client.
Inactivity Timeout Interval	Specify the inactivity timeout internal.
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 2.4GHz, 5GHz, or 6GHz (if applicable for the region). Note: 6GHz wireless networks only support WPA 3 and Enhanced Open encryption methods.
Scope Type	Specify the scope of APs in the cluster which will create the WLAN. • All – All APs in the cluster will create the WLAN. • Group – Select the APs which will create the WLAN. The AP which MAC address is in the group will be valid for the WLAN.
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. • Access Days – Specify the days for broadcasting SSID per week. • Operational Hours – Specify the time of the day in which broadcasting SSID.
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.
FDB update on Association	Enable/Disable FDB update on Association. If enabled, when a client roams to a new AP, the AP will send ARP packets to the uplink switch to notify the switch to change the downstream forwarding port for the wireless client's traffic.
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
2.4G Client Rate Control	Enables/Disables 2.4G band access control based on client data rate
2.4G Client Rate	2.4G band client with lower data speed will not be allowed to access, recommended value 12
5G Client Rate Control	Enables/Disables 5G band access control based on client data rate
5G Client Rate	5G band client with lower data speed will not be allowed to access, recommended value 24
6G Client Rate Control	(If applicable) Enables/Disables 6G band access control based on client data rate
6G Client Rate	(If applicable) 6G band client with lower data speed will not be allowed to access, recommended value 24
2.4G MGMT Rate Control	Enables/Disables 2.4G band wireless management frame rate control
2.4G MGMT Rate	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage. 2.4G Beacon frame does not support 9 Mbps or 18 Mbps speed. When 9/18 Mbps is configured for 2.4G MGMT Rate, beacon frame will broadcast on 11/24 Mbps rate and other management frames (such as probe frame) will broadcast on 9/18 Mbps.
5G MGMT Rate Control	Enables/Disables 5G band wireless management frame rate control
5G MGMT Rate	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage. 5G Beacon frame does not support 9 Mbps speed. When 9 Mbps is configured for 5G MGMT Rate, beacon frame will broadcast on 12 Mbps rate and other management frames (such as probe frame) will broadcast on 9 Mbps.
6G MGMT Rate Control	(If applicable) Enables/Disables 6G band wireless management frame rate control
6G MGMT Rate	(If applicable) 6G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage.
Advertise AP Name	Advertise AP name in the beacon frame, disabled by default.
OKC	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.
UAPSD	Unscheduled Automatic Power Save Delivery (UAPSD) is a part of 802.11e and helps in increasing the battery life of Wi-Fi terminals. By default, UASPD is enabled.
DTIM Interval	The DTIM interval indicates the DTIM period in beacons, which determines how often the AP should deliver the buffered broadcast and multicast frames to associated clients in the power save mode. The default value is 1, which means the client checks for buffered data on the AP at every beacon. User can also configure a higher DTIM value for power saving.
Cancel	The WLAN Creation Window is closed if you click 'Cancel' button.
Save	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.



Create New WLAN

WLAN Name:

Security Level: Personal

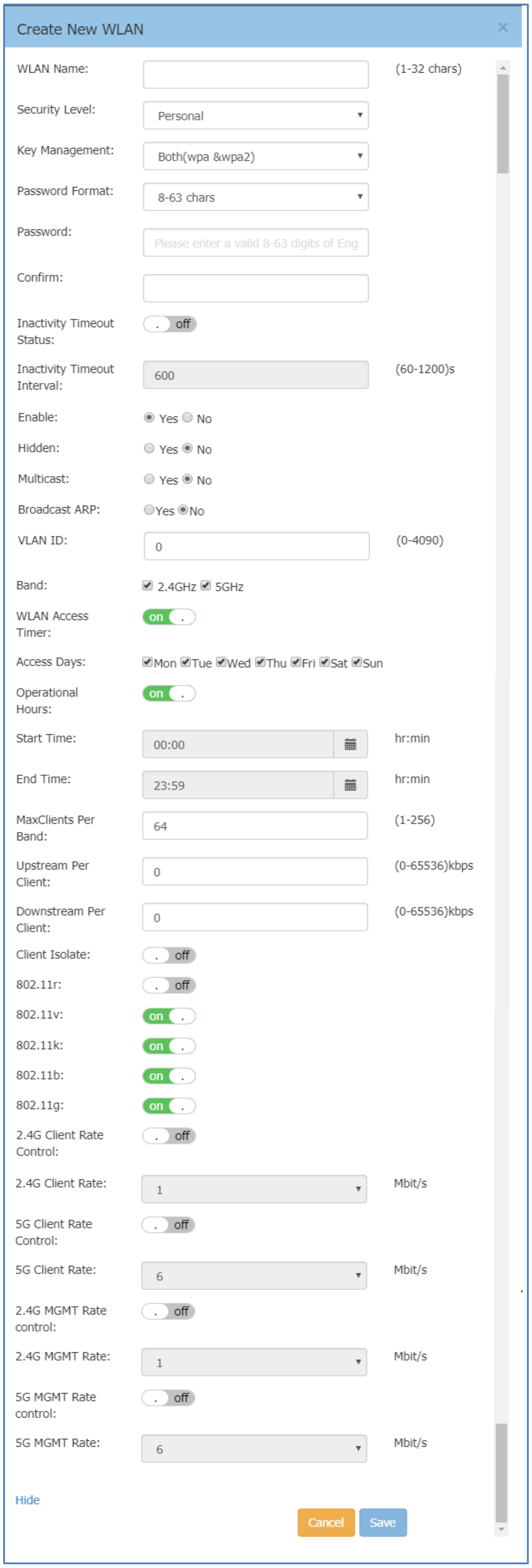
Key Management: Both(wpa &wpa2)

Password Format: 8-63 chars

Password:

Confirm:

Figure 5-3 Create Personal WLAN - Simplified Mode



Create New WLAN ×

WLAN Name:		(1-32 chars)
Security Level:	Personal ▾	
Key Management:	Both(wpa &wpa2) ▾	
Password Format:	8-63 chars ▾	
Password:	Please enter a valid 8-63 digits of Eng	
Confirm:		
Inactivity Timeout Status:	off	
Inactivity Timeout Interval:	600	(60-1200)s
Enable:	● Yes ○ No	
Hidden:	○ Yes ● No	
Multicast:	○ Yes ● No	
Broadcast ARP:	○ Yes ● No	
VLAN ID:	0	(0-4090)
Band:	☑ 2.4GHz ☑ 5GHz	
WLAN Access Timer:	on	
Access Days:	☑Mon ☑Tue ☑Wed ☑Thu ☑Fri ☑Sat ☑Sun	
Operational Hours:	on	
Start Time:	00:00	hr:min
End Time:	23:59	hr:min
MaxClients Per Band:	64	(1-256)
Upstream Per Client:	0	(0-65536)kbps
Downstream Per Client:	0	(0-65536)kbps
Client Isolate:	off	
802.11r:	off	
802.11v:	on	
802.11k:	on	
802.11b:	on	
802.11g:	on	
2.4G Client Rate Control:	off	
2.4G Client Rate:	1 ▾	Mbit/s
5G Client Rate Control:	off	
5G Client Rate:	6 ▾	Mbit/s
2.4G MGMT Rate control:	off	
2.4G MGMT Rate:	1 ▾	Mbit/s
5G MGMT Rate control:	off	
5G MGMT Rate:	6 ▾	Mbit/s

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	WPA3/WPA2/WPA encryption method. It is applicable to Enterprise/Personal WLANs only. • Both(wpa&wpa2): Allowing WPA or WPA2 capable wireless client to connect to the WLAN • wpa2-personal: Only Allowing WPA2 capable wireless client to connect to the WLAN • Both(wpa2&wpa3): Allowing WPA2 or WPA3 capable wireless client to connect to the WLAN • wpa3-personal: Only Allowing WPA3 capable wireless client to connect to the WLAN • Static-wep: Wireless client is authenticated with Static Wired Equivalent Privacy security algorithm, which is specified in 802.11b and is designed to provide a WLAN with a level of security and privacy comparable to what is usually expected of a wired LAN. You can specify up to 4 WEP keys and make one of them effective for authentication. Each WEP key can be 10 or 26 hexadecimal characters. Recommendation is that a static-wep WLAN is ONLY applicable for those 802.11b clients.
PMF	Stellar supports the IEEE802.11w standard, also known as Protected Management Frames (PMF). The PMF function increases the security by providing data confidentiality of management frames. PMF is applicable for WPA2 and WPA3 encryption method. • Disabled: Disables 802.11w PMF protection for the WLAN. • Optional: Both 802.11w PMF capable clients and 802.11w PMF non-capable clients can connect the WLAN. • Required: Only 802.11w PMF capable clients can associate to the WLAN.
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	Specify the inactivity timeout interval configuration status. The clients will be disconnected from the wireless network for a specific duration that not transmitting any packets. If Inactivity Timeout Status is disabled, the inactivity timeout interval is set to fixed 600 seconds. If Inactivity Timeout Status is enabled, the configured Inactivity Timeout Interval will be used to disconnect inactivity client.
Inactivity Timeout Interval	Specify the inactivity timeout internal.
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.

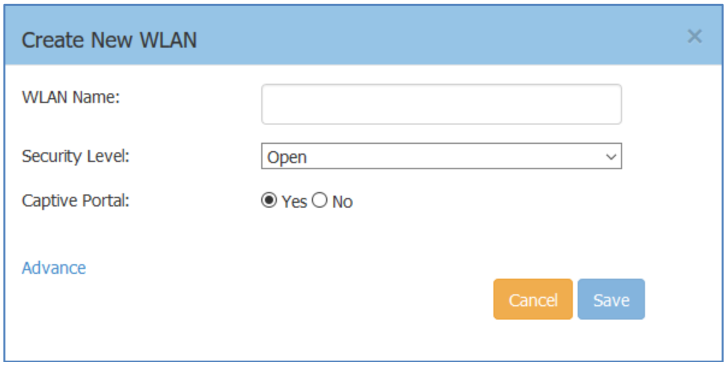
VLAN ID	Identifier of the VLAN to which the WLAN mapping, it is a user VLAN.
Band	Select a value to specify the band at which the network transmits radio signals. You can set the band to 2.4GHz, 5GHz, or 6GHz (if applicable for the region). Note: 6GHz wireless networks only support WPA 3 and Enhanced Open encryption methods.
Scope Type	Specify the scope of APs in the cluster which will create the WLAN. • All – All APs in the cluster will create the WLAN. Group – Select the APs which will create the WLAN. The AP which MAC address is in the group will be valid for the WLAN.
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. • Access Days – Specify the days for broadcasting SSID per week. • Operational Hours – Specify the time of the day in which broadcasting SSID.
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.
FDB update on Association	Enable/Disable FDB update on Association. If enabled, when a client roams to a new AP, the AP will send ARP packets to the uplink switch to notify the switch to change the downstream forwarding port for the wireless client's traffic.
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
2.4G Client Rate Control	Enables/Disables 2.4G band accessing control based on client data rate
2.4G Client Rate	2.4G band client with lower data speed will not be allowed to access, recommended value 12
5G Client Rate Control	Enables/Disables 5G band accessing control based on client data rate
5G Client Rate	5G band client with lower data speed will not be allowed to access, recommended value 24
6G Client Rate Control	Enables/Disables 6G band accessing control based on client data rate
6G Client Rate	6G band client with lower data speed will not be allowed to access, recommended value 24
2.4G MGMT Rate Control	Enables/Disables 2.4G band wireless management frame rate control

2.4G MGMT Rate	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
5G MGMT Rate Control	Enables/Disables 5G band wireless management frame rate control
5G MGMT Rate	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
6G MGMT Rate Control	Enables/Disables 6G band wireless management frame rate control
6G MGMT Rate	6G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
Advertise AP Name	Advertise AP name in the beacon frame, disabled by default.
DTIM Interval	The DTIM interval indicates the DTIM period in beacons, which determines how often the AP should deliver the buffered broadcast and multicast frames to associated clients in the power save mode. The default value is 1, which means the client checks for buffered data on the AP at every beacon. User can also configure a higher DTIM value for power saving.
Cancel	The WLAN Creation Window is closed if you click 'Cancel' button.
Save	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.



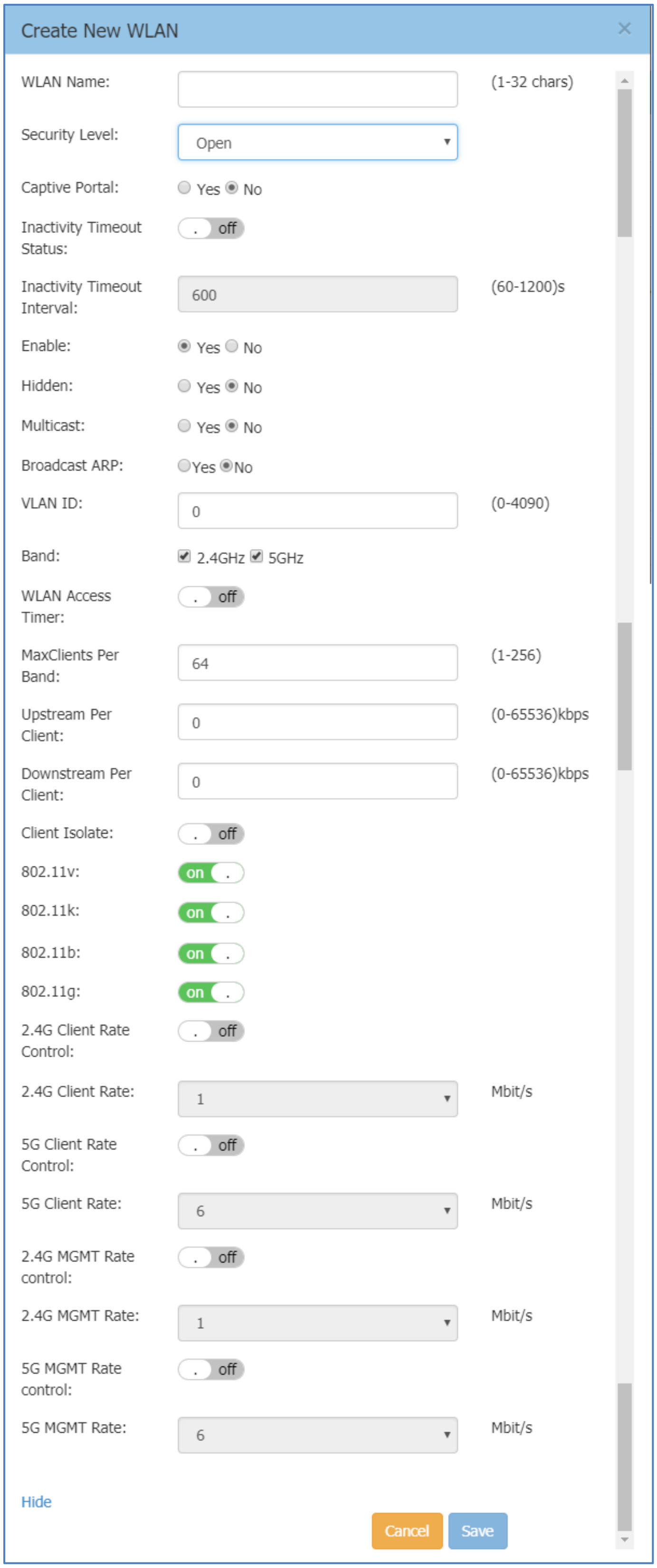
Create New WLAN

WLAN Name:

Security Level: Open

Captive Portal: ● Yes ○ No

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:	off	
Inactivity Timeout Interval:	600	(60-1200)s
Enable:	● Yes ○ No	
Hidden:	○ Yes ● No	
Multicast:	○ Yes ● No	
Broadcast ARP:	○Yes ●No	
VLAN ID:	0	(0-4090)
Band:	☑ 2.4GHz ☑ 5GHz	
WLAN Access Timer:	off	
MaxClients Per Band:	64	(1-256)
Upstream Per Client:	0	(0-65536)kbps
Downstream Per Client:	0	(0-65536)kbps
Client Isolate:	off	
802.11v:	on	
802.11k:	on	
802.11b:	on	
802.11g:	on	
2.4G Client Rate Control:	off	
2.4G Client Rate:	1	Mbit/s
5G Client Rate Control:	off	
5G Client Rate:	6	Mbit/s
2.4G MGMT Rate control:	off	
2.4G MGMT Rate:	1	Mbit/s
5G MGMT Rate control:	off	
5G MGMT Rate:	6	Mbit/s

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.
Enhance Open	Enhanced open provides improved data encryption in open Wi-Fi networks and protects data from sniffing. With enhanced open, the client and WLAN perform Diffie-Hellman key exchange during the access procedure and use the resulting pairwise key with a 4-way handshake. Stellar AP supports the following Enhanced Open authentication types: • OWE (Opportunistic Wireless Encryption) • Transition mode - The enhanced open transition mode enables a seamless transition from open unencrypted WLAN connections without adversely impacting the end user experience. It provides the ability for enhanced open and non-enhanced open clients to connect to the same open system virtual AP. In this mode the AP broadcasts two different types of BSSID. One legacy Open SSID on 2.4/5GHz band, and one Enhanced Open SSID on 2.4/5/6GHz band.
Inactivity Timeout Status	Specify the inactivity timeout interval configuration status. The clients will be disconnected from the wireless network for a specific duration that not transmitting any packets. If Inactivity Timeout Status is disabled, the inactivity timeout interval is set to fixed 600 seconds. If Inactivity Timeout Status is enabled, the configured Inactivity Timeout Interval will be used to disconnect inactivity client.
Inactivity Timeout Interval	Specify the inactivity timeout internal.
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 2.4GHz, 5GHz, or 6GHz (if applicable for the region). Note: 6GHz wireless networks only support WPA 3 and Enhanced Open encryption methods.
Scope Type	Specify the scope of APs in the cluster which will create the WLAN. • All – All APs in the cluster will create the WLAN. Group – Select the APs which will create the WLAN. The AP which MAC address is in the group will be valid for the WLAN.
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. • Access Days - Specify the days for broadcasting SSID per week. • Operational Hours – Specify the time of the day in which broadcasting SSID.

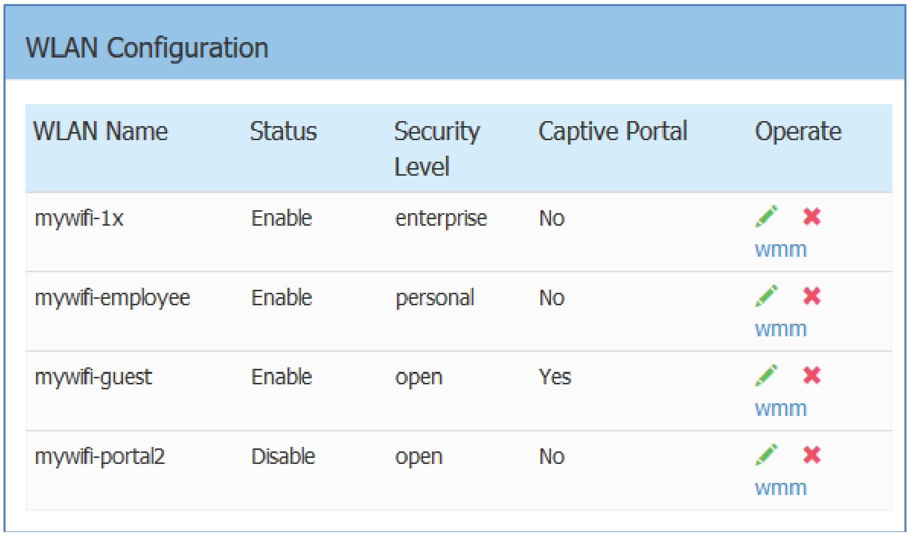
Max Clients per band	Specify the maximum number of clients that can be configured for each BSSID on a WLAN. You can specify a value within the range of 1 to 256. The default value is 64.
Upstream Per Client	Specify the maximum upstream bandwidth limitation for each user.
Downstream Per Client	Specify the maximum downstream bandwidth limitation for each user.
FDB update on Association	Enable/Disable FDB update on Association. If enabled, when a client roams to a new AP, the AP will send ARP packets to the uplink switch to notify the switch to change the downstream forwarding port for the wireless client's traffic.
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
2.4G Client Rate Control	Enables/Disables 2.4G band accessing control based on client data rate
2.4G Client Rate	2.4G band client with lower data speed will not be allowed to access, recommended value 12
5G Client Rate Control	Enables/Disables 5G band accessing control based on client data rate
5G Client Rate	5G band client with lower data speed will not be allowed to access, recommended value 24
6G Client Rate Control	Enables/Disables 6G band accessing control based on client data rate
6G Client Rate	6G band client with lower data speed will not be allowed to access, recommended value 24
2.4G MGMT Rate Control	Enables/Disables 2.4G band wireless management frame rate control
2.4G MGMT Rate	2.4G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
5G MGMT Rate Control	Enables/Disables 5G band wireless management frame rate control
5G MGMT Rate	5G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
6G MGMT Rate Control	Enables/Disables 6G band wireless management frame rate control
6G MGMT Rate	6G band wireless management frame transmit rate, higher value means less coverage, lower value means larger coverage
Advertise AP Name	Advertise AP name in the beacon frame, disabled by default.
DTIM Interval	The DTIM interval indicates the DTIM period in beacons, which determines how often the AP should deliver the buffered broadcast and multicast frames to associated clients in the power save mode. The default value is 1, which means

	the client checks for buffered data on the AP at every beacon. User can also configure a higher DTIM value for power saving.
Cancel	The WLAN Creation Window is closed if you click 'Cancel' button.
Save	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 compete 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.



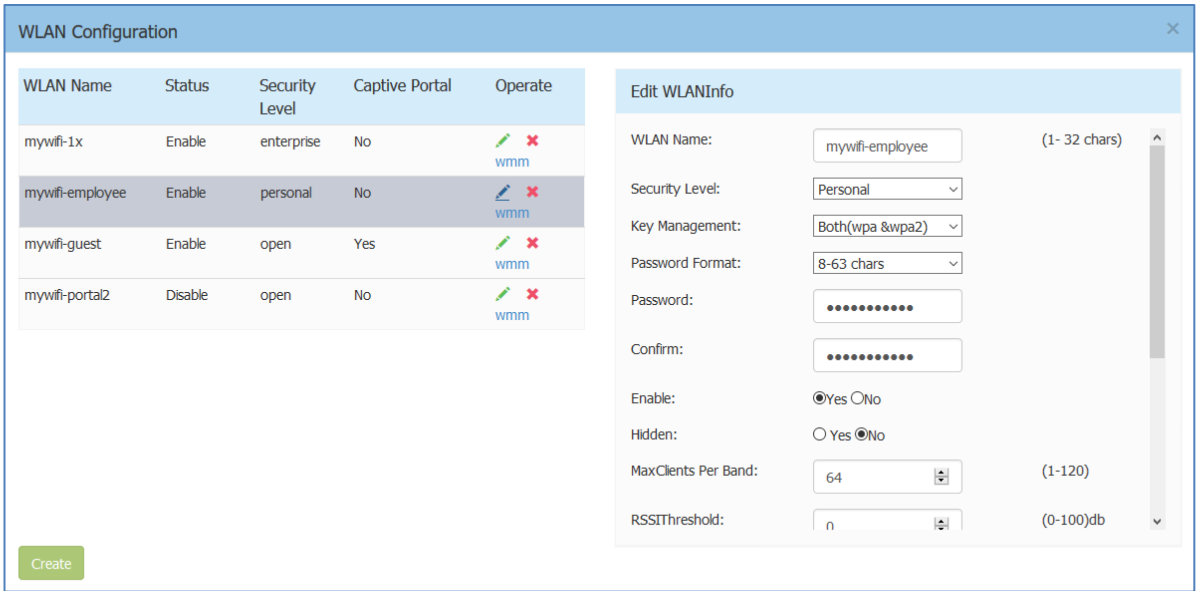
WLAN Configuration

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



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

Create

Edit WLANInfo

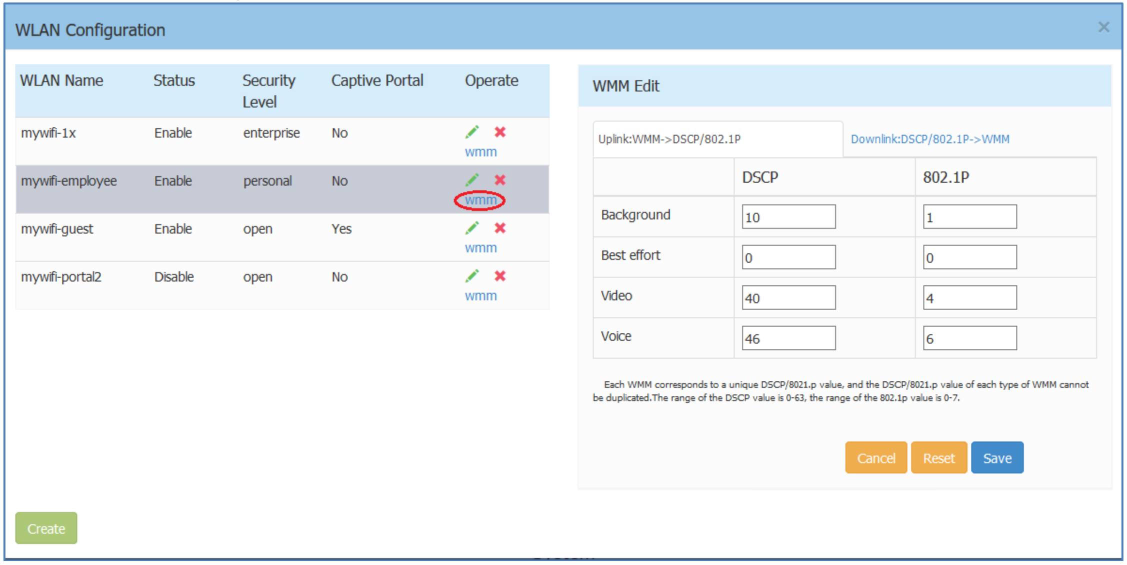
WLAN Name:	mywifi-employee	(1- 32 chars)
Security Level:	Personal	
Key Management:	Both(wpa &wpa2)	
Password Format:	8-63 chars	
Password:	●●●●●●●●●●●	
Confirm:	●●●●●●●●●●●	
Enable:	● Yes ○ No	
Hidden:	○ Yes ● No	
MaxClients Per Band:	64	(1-120)
RSSIThreshold:	0	(0-100)db

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.



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

Create

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/8021.p value, and the DSCP/8021.p 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

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 Manager (PVM), Secondary Virtual Manager (SVM) 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

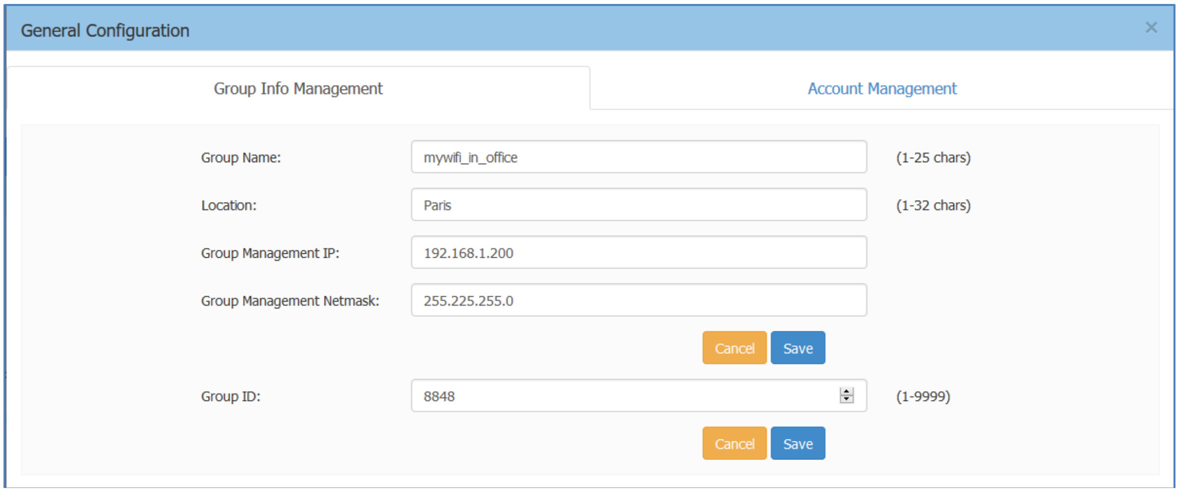
AP Group Management

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 PVM and the AP which has the second highest MAC address as the SVM. Each group has a management IP address that is a virtual IP and will be assigned to the PVM. When the PVM fails to respond due to an unexpected error or issue, the SVM will automatically upgrade to act as the PVM. 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.

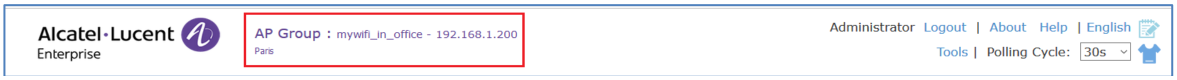
Table 6-1: AP Group Attribution Parameters Specification

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 PVM. It is used for the group management and can be configured manually.
Group Management Netmask	Netmask of Group Management IP.



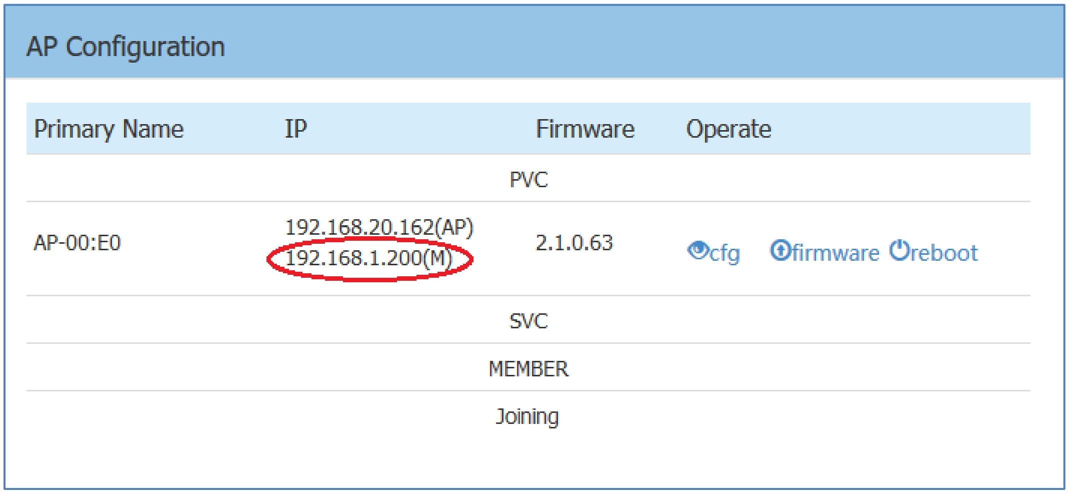
Group Name:	mywifi_in_office	(1-25 chars)
Location:	Paris	(1-32 chars)
Group Management IP:	192.168.1.200	
Group Management Netmask:	255.225.255.0	
Group ID:	8848	(1-9999)

Figure 6-1 AP Group Configuration Window


Alcatel·Lucent
Enterprise
Administrator Logout | About Help | English
Tools | Polling Cycle: 30s

AP Group : mywifi_in_office - 192.168.1.200
Paris

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

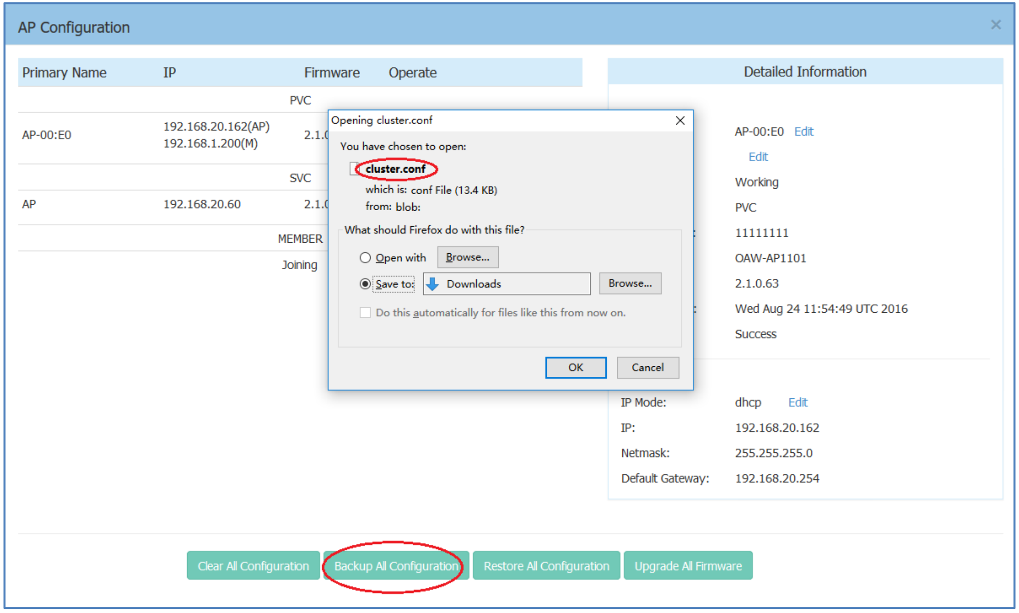
There are two IP addresses on the PVM of the group, illustrated in Figure 6-3 (Navigate:**Dashboard** – **AP Window** – **AP Configuration Window**).

1. AP IP address [e.g.: 192.168.20.162(AP)] – The IP of the PVM 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.



AP Configuration

Primary Name	IP	Firmware	Operate
		PVC	

AP-00:E0	192.168.20.162(AP)
	192.168.1.200(M)
		2.1.(	

		SVC	
AP	192.168.20.60	2.1.(	
		MEMBER	
		Joining	

Opening cluster.conf

You have chosen to open:

cluster.conf

which is: conf File (13.4 KB)

from: blob:

What should Firefox do with this file?

○ Open with [Browse...]

● Save to: Downloads [Browse...]

□ Do this automatically for files like this from now on.

[OK] [Cancel]

Detailed Information

AP-00:E0 Edit

Edit

Working

PVC

11111111

OAW-AP1101

2.1.0.63

Wed Aug 24 11:54:49 UTC 2016

Success

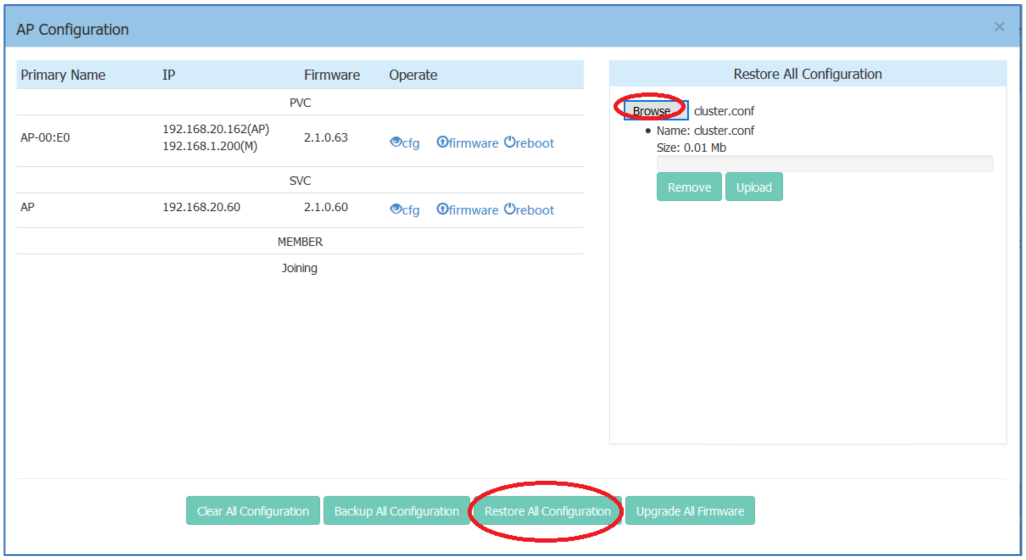
IP Mode: dhcp Edit

IP: 192.168.20.162

Netmask: 255.255.255.0

Default Gateway: 192.168.20.254

Figure 6-4 Export AP Group Configuration



AP Configuration

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	
AP	192.168.20.60	2.1.0.60	cfg firmware reboot
		MEMBER	
		Joining	

Restore All Configuration

[Browse] cluster.conf

- Name: cluster.conf
  Size: 0.01 Mb

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

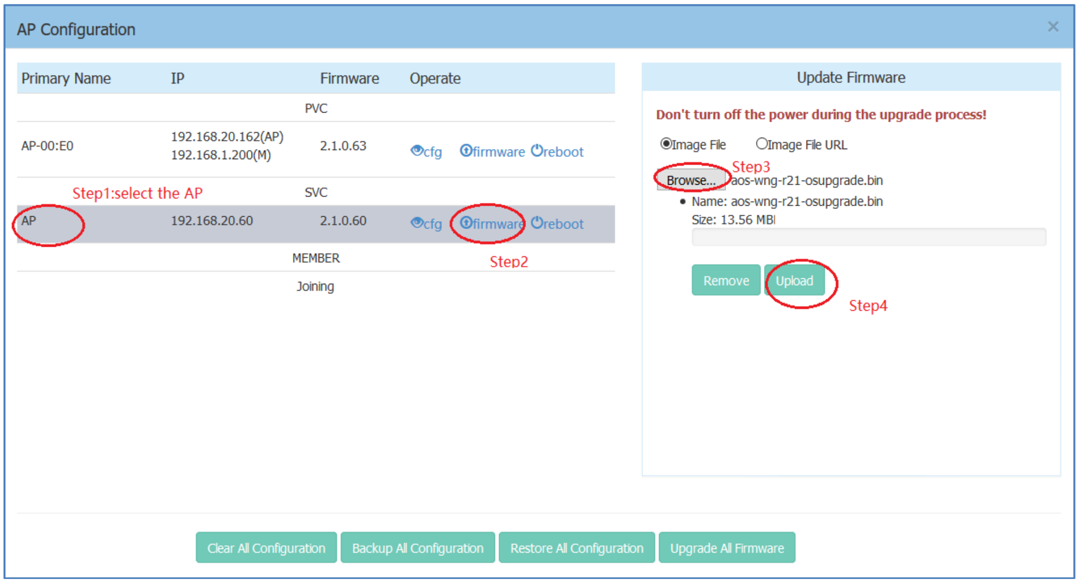
Note6-1: All configuration settings (clear, backup or restore) will be applied to the entire group. There is no need to select specific APs to apply configuration settings. The entire group of APs have one configuration file.

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:

1. **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.
2. **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.



AP Configuration

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		
AP	192.168.20.60	2.1.0.60	cfg firmware reboot
	MEMBER		
	Joining		

Step1:select the AP

Step2

Update Firmware

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

● Image File ○ Image File URL

Step3

Browse... aos-wng-r21-osupgrade.bin

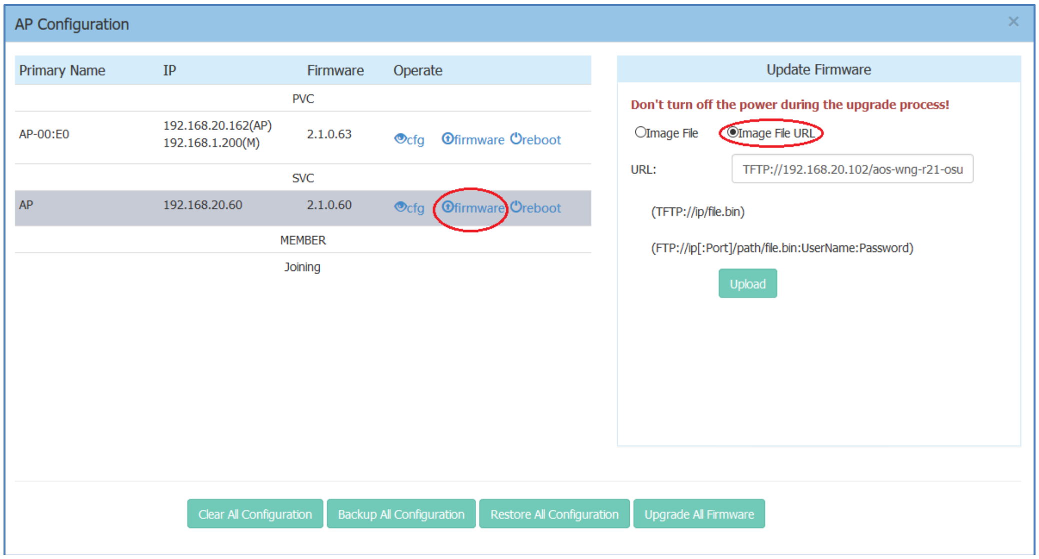
- Name: aos-wng-r21-osupgrade.bin

Size: 13.56 MB

Step4

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.



AP Configuration

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			
AP	192.168.20.60	2.1.0.60	cfg firmware reboot
MEMBER			
Joining			

Update Firmware

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

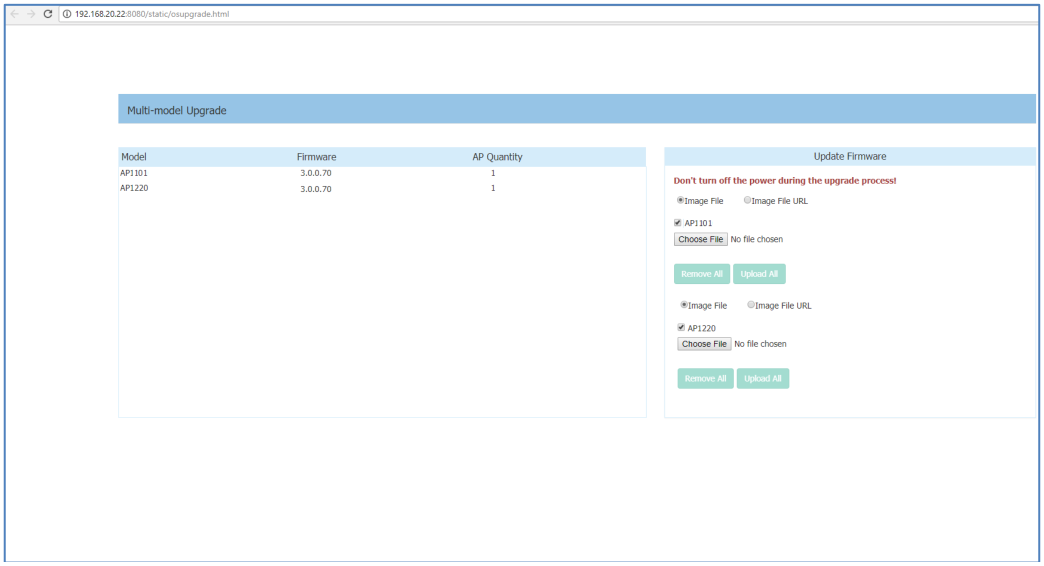
○ Image File ● Image File URL

URL: TFTP://192.168.20.102/aos-wng-r21-osu

(TFTP://ip/file.bin)

(FTP://ip[:Port]/path/file.bin:UserName:Password)

Figure 6-7 Update Single AP from Remote TFTP Server



192.168.20.22:8080/static/osupgrade.html

Multi-model Upgrade

Model	Firmware	AP Quantity
AP1101	3.0.0.70	1
AP1220	3.0.0.70	1

Update Firmware

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

● Image File ○ Image File URL

☑ AP1101

Choose File No file chosen

● Image File ○ Image File URL

☑ AP1220

Choose File No file chosen

Figure 6-8 Update all APs' Firmware

CAUTION

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:

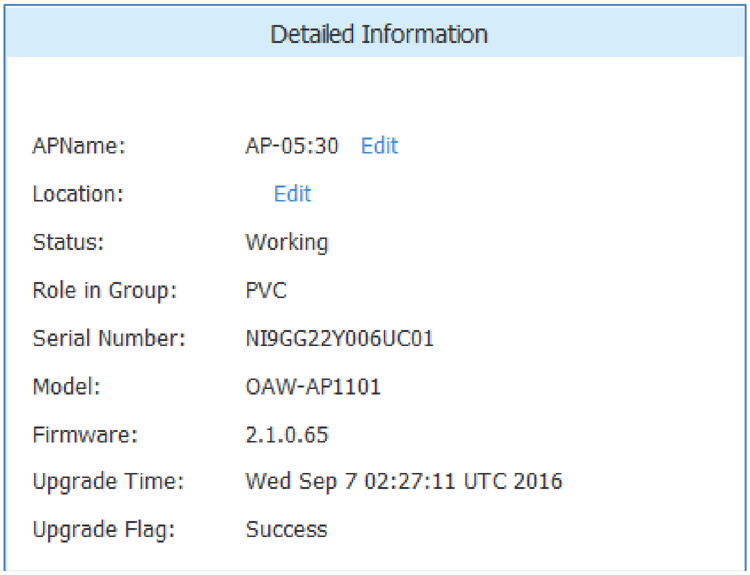
- Cookies

- 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

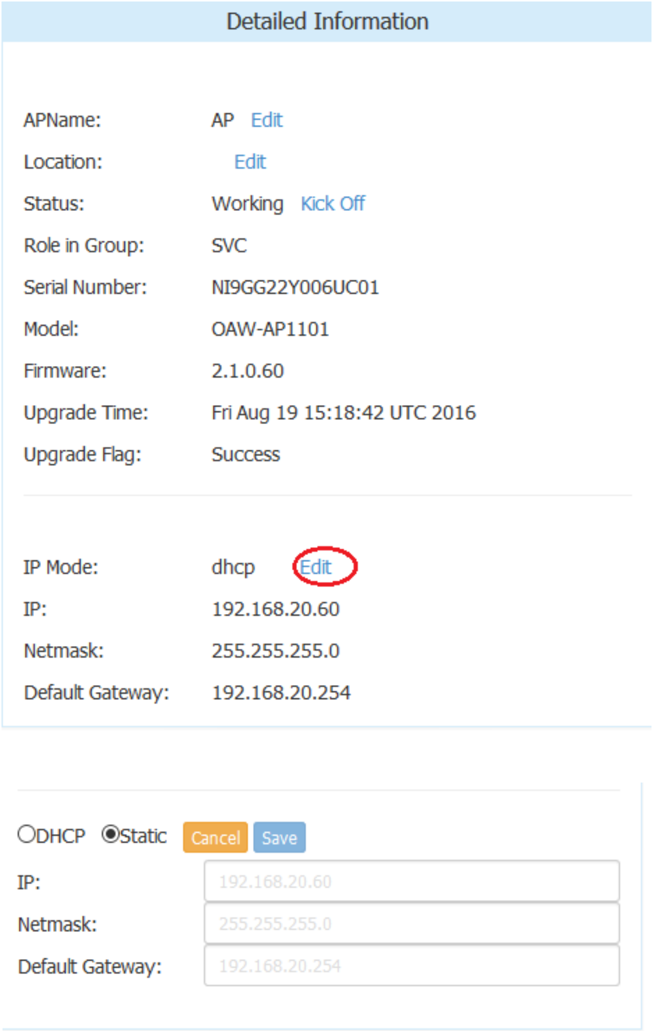
APName:	AP-05:30 Edit
Location:	Edit
Status:	Working
Role in Group:	PVC
Serial Number:	NI9GG22Y006UC01
Model:	OAW-AP1101
Firmware:	2.1.0.65
Upgrade Time:	Wed Sep 7 02:27:11 UTC 2016
Upgrade Flag:	Success

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 Edit

Location: Edit

Status: Working Kick Off

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

IP Mode: dhcp Edit

IP: 192.168.20.60

Netmask: 255.255.255.0

Default Gateway: 192.168.20.254

○DHCP ●Static Cancel Save

IP: 192.168.20.60

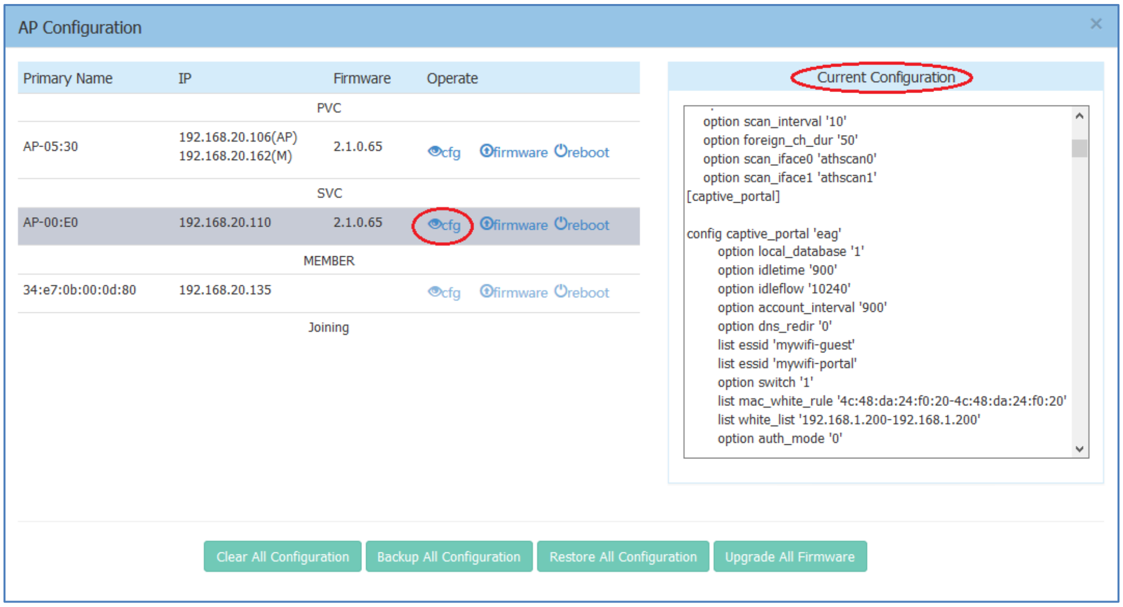
Netmask: 255.255.255.0

Default Gateway: 192.168.20.254

Figure 6-10 Modify AP IP Address

Check AP Configuration Detail

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



AP Configuration

Primary Name	IP	Firmware	Operate
	PVC		

AP-05:30	192.168.20.106(AP)
	192.168.20.162(M)
		2.1.0.65	cfg firmware reboot

	SVC		
AP-00:E0	192.168.20.110	2.1.0.65	cfg firmware reboot
	MEMBER		
34:e7:0b:00:0d:80	192.168.20.135		cfg firmware reboot
	Joining		

Current Configuration

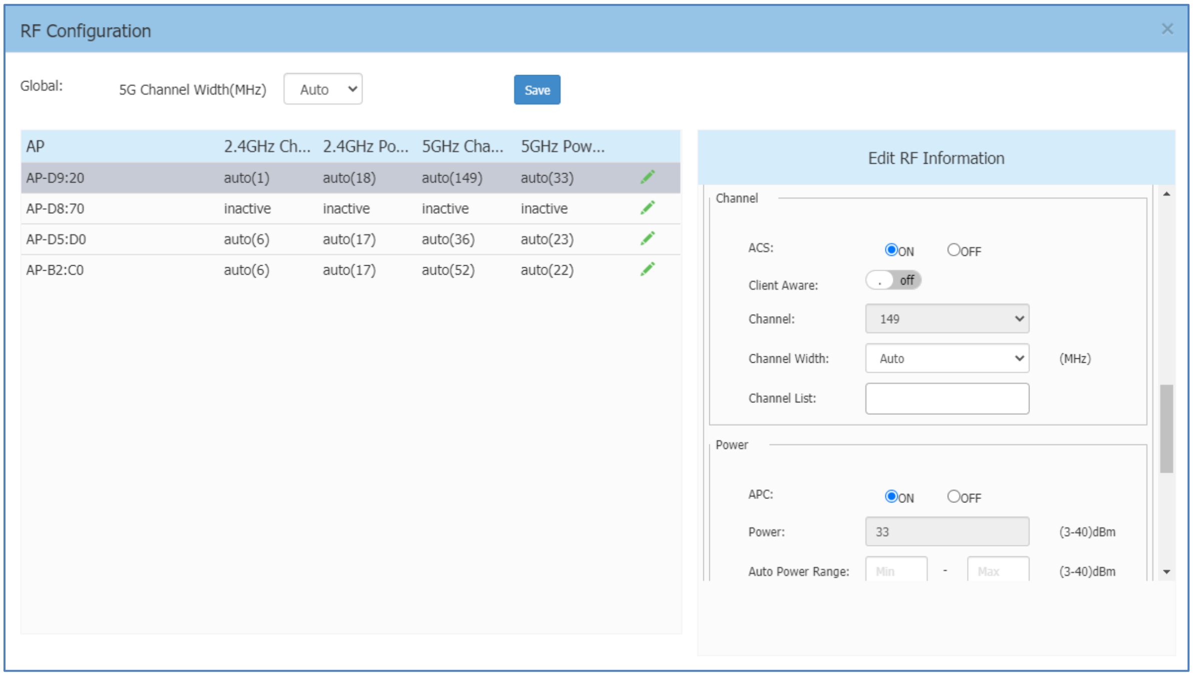
```
    option scan_interval '10'
    option foreign_ch_dur '50'
    option scan_iface0 'athscan0'
    option scan_iface1 'athscan1'
[captive_portal]

config captive_portal 'eag'
        option local_database '1'
        option idletime '900'
        option idleflow '10240'
        option account_interval '900'
        option dns_redir '0'
        list essid 'mywifi-guest'
        list essid 'mywifi-portal'
        option switch '1'
        list mac_white_rule '4c:48:da:24:f0:20-4c:48:da:24:f0:20'
        list white_list '192.168.1.200-192.168.1.200'
        option auth_mode '0'
```

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**)



RF Configuration

Global: 5G Channel Width(MHz) Auto

AP	2.4GHz Ch...	2.4GHz Po...	5GHz Cha...	5GHz Pow...
AP-D9:20	auto(1)	auto(18)	auto(149)	auto(33)
AP-D8:70	inactive	inactive	inactive	inactive
AP-D5:D0	auto(6)	auto(17)	auto(36)	auto(23)
AP-B2:C0	auto(6)	auto(17)	auto(52)	auto(22)

Edit RF Information

Channel

ACS: ●ON ○OFF

Client Aware: off

Channel: 149

Channel Width: Auto (MHz)

Channel List:

Power

APC: ●ON ○OFF

Power: 33 (3-40)dBm

Auto Power Range: Min - Max (3-40)dBm

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.

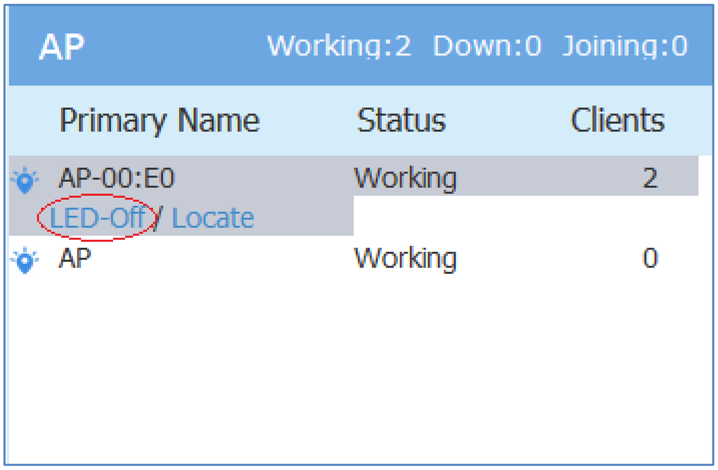
AP LED Specification

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.

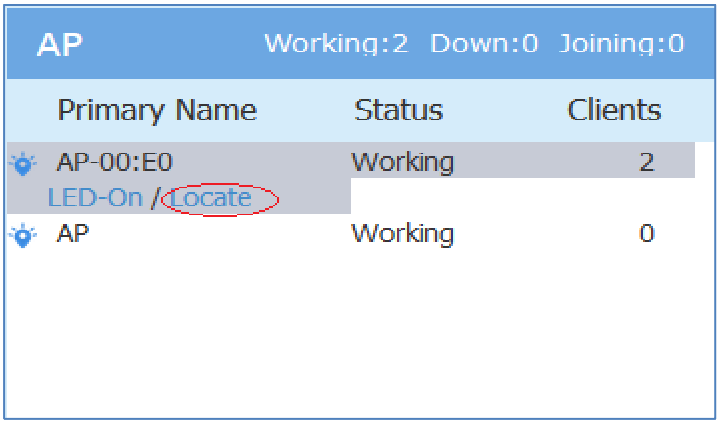


AP Working:2 Down:0 Joining:0

Primary Name	Status	Clients
AP-00:E0	Working	2
LED-Off / Locate		
AP	Working	0

Figure 6-13 Turn LED off

Step3: Click "Locate" to locate AP.

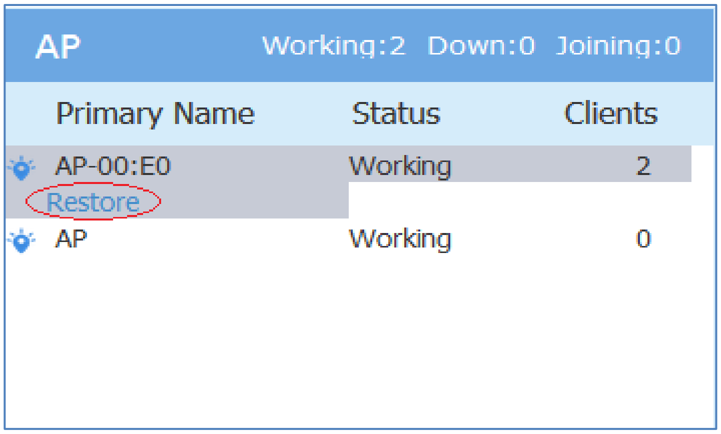


Primary Name	Status	Clients
AP-00:E0 LED-On / Locate	Working	2
AP	Working	0

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.

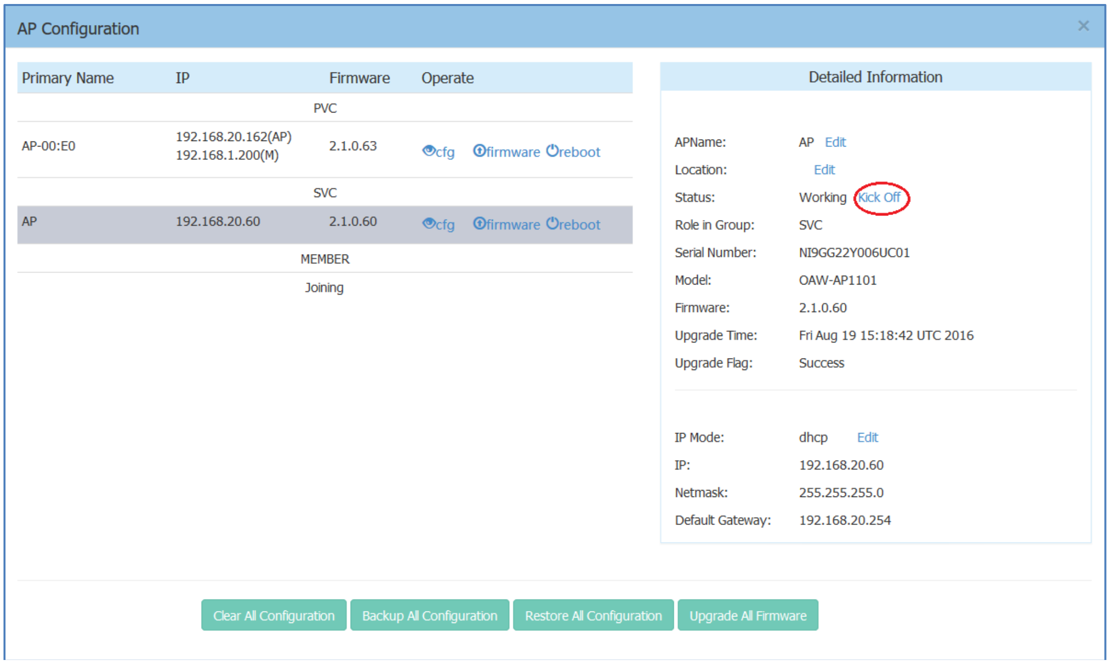


Primary Name	Status	Clients
AP-00:E0 Restore	Working	2
AP	Working	0

Figure 6-15 Restore AP state

Remove an AP from the Group

An AP is removed from the AP group list (PVM/SVM/Member) by selecting “kick off”. Then the AP enters a group blocklist, 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.



AP Configuration

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

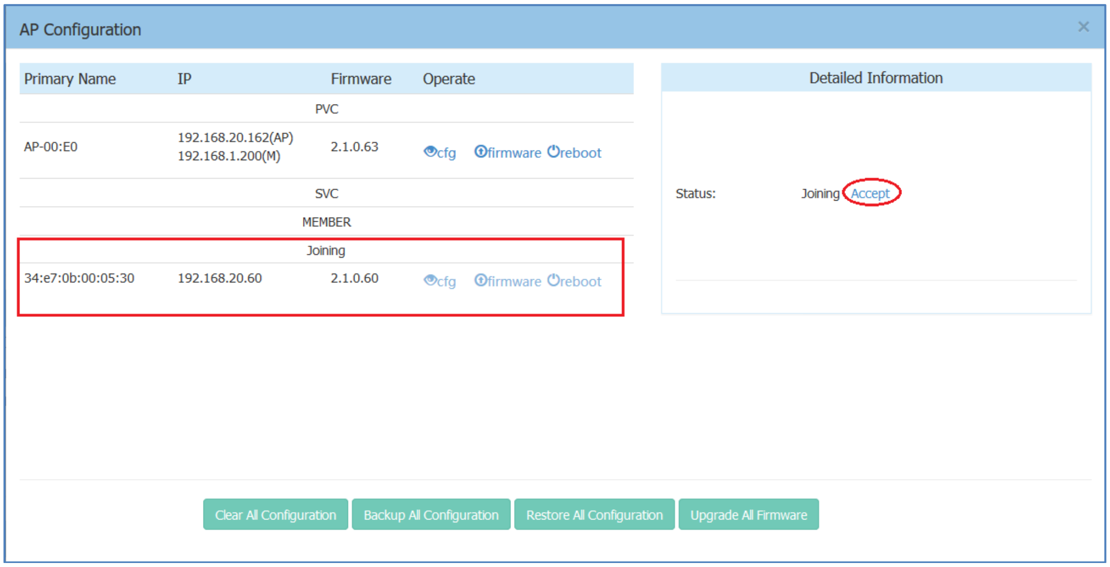
	SVC		
AP	192.168.20.60	2.1.0.60	cfg firmware reboot
	MEMBER		
	Joining		

Detailed Information

APName:	AP Edit
Location:	Edit
Status:	Working Kick Off
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
IP Mode:	dhcp Edit
IP:	192.168.20.60
Netmask:	255.255.255.0
Default Gateway:	192.168.20.254

Figure 6-16 Remove an AP from Group

Allow an AP to Join the Group



AP Configuration

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		
34:e7:0b:00:05:30	192.168.20.60	2.1.0.60	cfg firmware reboot

Detailed Information

Status: Joining Accept

Figure 6-17 Allow AP to join group

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

How to Add a New AP to Group

To add a new AP to the group, ensure that the PVM is not in the ‘Down’ state. If the PVM is down, upgrade the SVM to be the PVM before plugging in the new AP.

How to Replace a Current AP in Group

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

How to Setup Wireless Networks With large scale of Stellar APs

If you have more Stellar APs than a group specification, 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 OmniVista and scale up to 4000 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 PVM 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 configuring 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 Static-WEP, and several WPA, WPA2, WPA3 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.

Enterprise Authentication is developed for medium and large businesses and requires a RADIUS authentication server that provides automatic key generation and authentication throughout the entire enterprise.

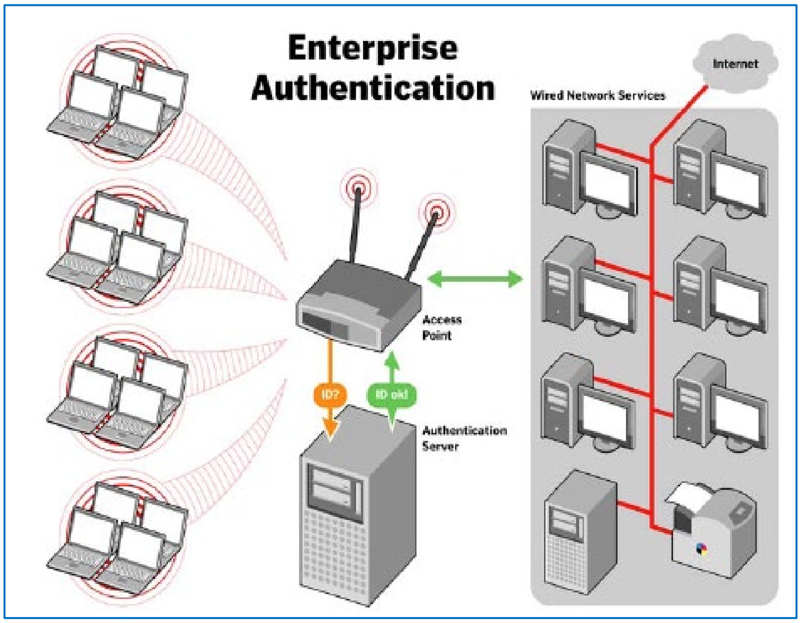


Figure 7-1 Enterprise Authentication

Users in small office and home office (SOHO) wireless LAN environments lack the budget and IT staff to install and maintain RADIUS authentication servers. There are alternatives for this type of wireless LAN authentication and validation: Static-WEP and WPA-Personal. Both protocols use a pre-shared key, but the encryption on WEP is weaker than the encryption on WPA-Personal systems. It’s recommended to use WPA-Personal instead of WEP protocol for encryption and authentication.

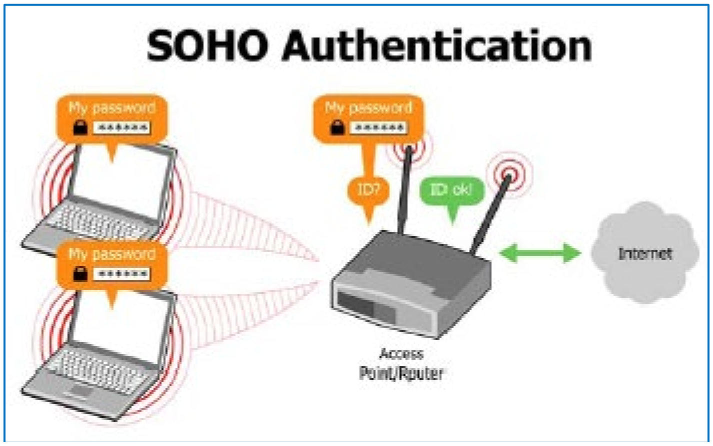
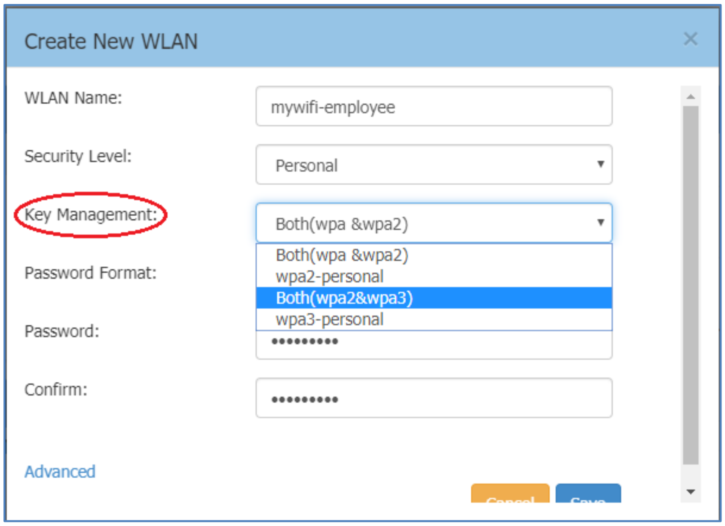


Figure 7-2 SOHO Authentication



Create New WLAN

WLAN Name: mywifi-employee

Security Level: Personal

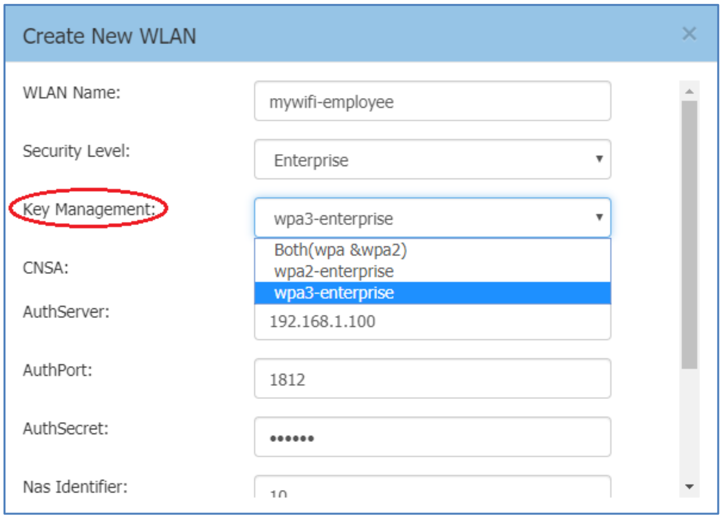
Key Management: Both(wpa &wpa2)

Password Format:

Password: •••••••••

Confirm: •••••••••

Figure 7-3 Authentication Security Type-Personal



Create New WLAN

WLAN Name: mywifi-employee

Security Level: Enterprise

Key Management: wpa3-enterprise

CNSA:

AuthServer: 192.168.1.100

AuthPort: 1812

AuthSecret: ••••••

Nas Identifier: 10

Figure 7-4 Authentication Security Type-Enterprise

There are multiple Wi-Fi security protocols for personal and enterprise networks:

- Wired Equivalent Privacy (WEP), introduced as part of the original 802.11 standard ratified in 1997. It uses the RC4 cipher to ensure confidentiality and a CRC-32 Checksum to ensure integrity of the data transmitted.

- Wi-Fi Protected Access (WPA) became available in 2003. It was the replacement to the increasingly apparent vulnerabilities of the WEP encryption standard. The keys used by WPA are 256-bit, a significant increase over the 64-bit and 128-bit keys used in the WEP system. WPA includes message integrity checks and the Temporal Key Integrity Protocol (TKIP). TKIP employs a per-packet key system that was radically more secure than the fixed key system used by WEP. RC4 cipher is still used to ensure confidentiality in WPA.

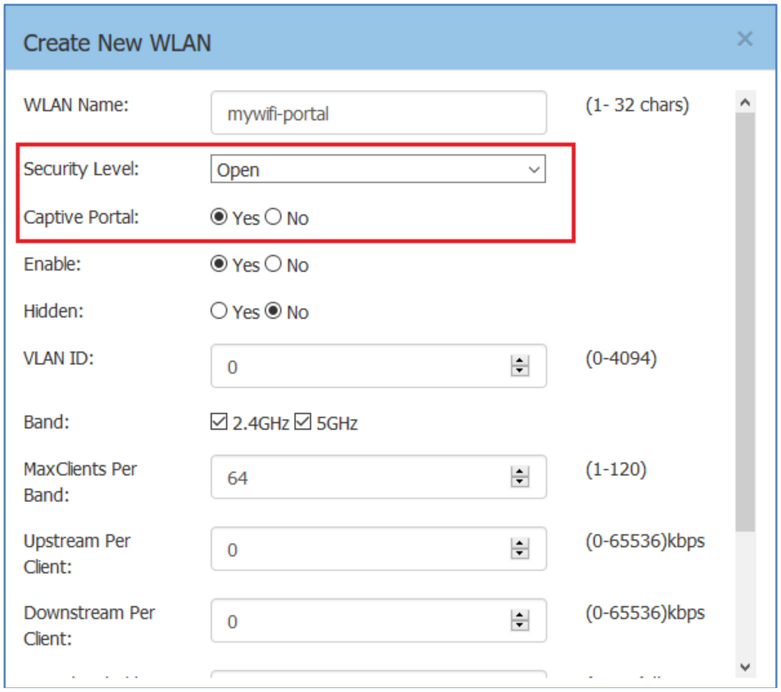
- WPA2 replaced WPA began in 2004. Most important upgrade is mandatory use of AES algorithms (instead of previous RC4) and the introduction of CCMP (AES CCMP, Counter Cipher Mode with Block Chaining Message Authentication Code Protocol, 128 Bit) as a replacement for TKIP (which is still present in WPA2, as a fallback system and WPA interoperability).

- WPA3 began as a replacement to WPA2 in 2018. It introduces new features to simplify Wi-Fi security, including enabling better authentication, increased cryptographic strength, and requiring the use of Protected Management Frames (PMF) to increase network security. WPA3-Personal uses Simultaneous Authentication of Equals (SAE) which replaces Pre-Shared Key (PSK) in WPA2-Personal. SAE improves security of the initial key exchange and offers better protection against offline dictionary-based attacks. WPA3-Enterprise utilizes 192-bit security while still using the 802.1x standard to provide a secure wireless network for enterprise use. This provides a superior encryption method to better protect any kind of data. The security suite is aligned with the recommendations from the Commercial National Security Algorithm (CNSA) suite and commonly placed in high-security Wi-Fi networks such as in government, defense, finance, and other industries.

How to Configure Captive Portal Authentication

Create a Captive Portal WLAN

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



Create New WLAN

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

Security Level: Open

Captive Portal: ● Yes ○ No

Enable: ● Yes ○ No

Hidden: ○ Yes ● No

VLAN ID: 0 (0-4094)

Band: ☑ 2.4GHz ☑ 5GHz

MaxClients Per Band: 64 (1-120)

Upstream Per Client: 0 (0-65536)kbps

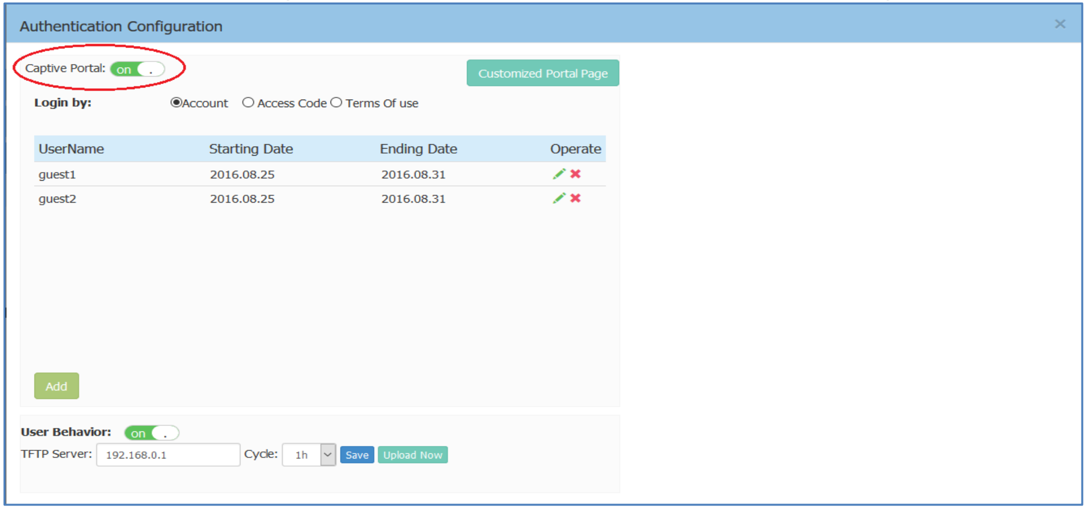
Downstream Per Client: 0 (0-65536)kbps

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.



Authentication Configuration

Captive Portal: on

Login by: ◉Account ○ Access Code ○ Terms Of use

UserName	Starting Date	Ending Date	Operate
guest1	2016.08.25	2016.08.31	
guest2	2016.08.25	2016.08.31	

User Behavior: on

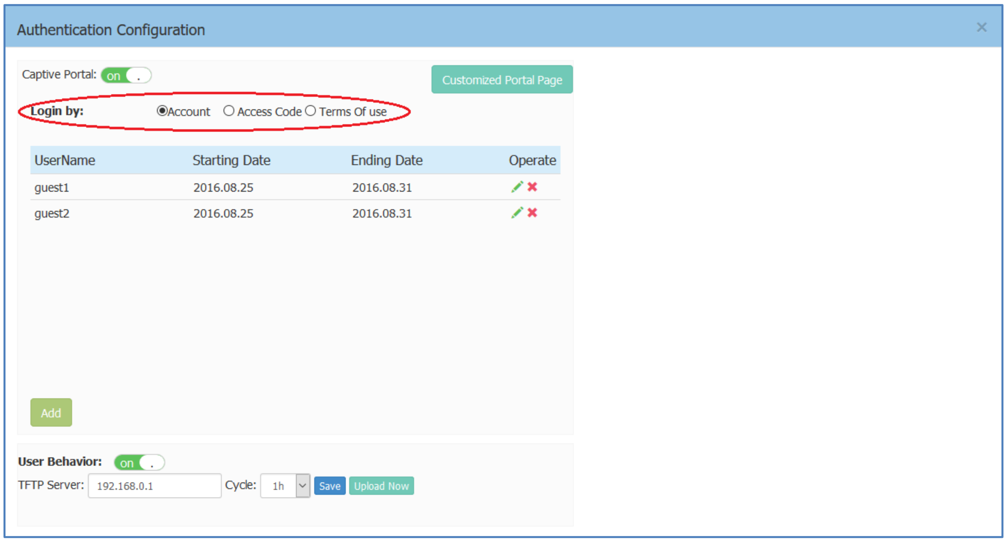
TFTP Server: 192.168.0.1 Cycle: 1h

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.



Authentication Configuration

Captive Portal: on

Login by: ◉Account ○ Access Code ○ Terms Of use

UserName	Starting Date	Ending Date	Operate
guest1	2016.08.25	2016.08.31	
guest2	2016.08.25	2016.08.31	

User Behavior: on

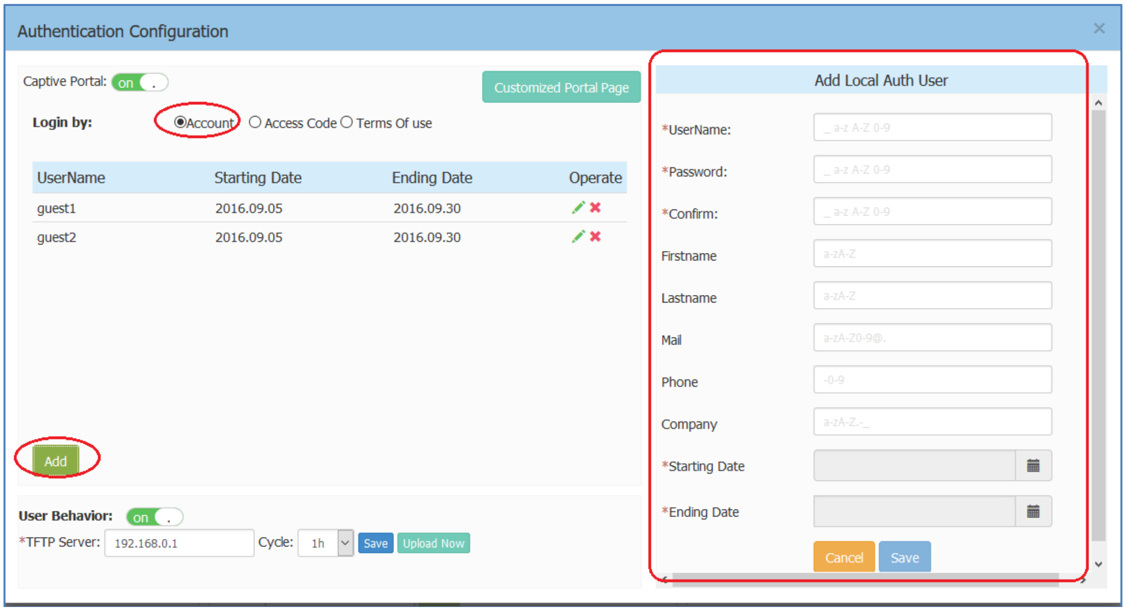
TFTP Server: 192.168.0.1 Cycle: 1h

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.



Authentication Configuration

Captive Portal: on

Customized Portal Page

Login by: ● Account ○ Access Code ○ Terms Of use

UserName	Starting Date	Ending Date	Operate
guest1	2016.09.05	2016.09.30	✎ ✖
guest2	2016.09.05	2016.09.30	✎ ✖

Add

User Behavior: on

*TFTP Server: 192.168.0.1 Cycle: 1h Save Upload Now

Add Local Auth User

*UserName: _ a-z A-Z 0-9

*Password: _ a-z A-Z 0-9

*Confirm: _ a-z A-Z 0-9

Firstname a-zA-Z

Lastname a-zA-Z

Mail a-zA-Z0-9@.

Phone -0-9

Company a-zA-Z.-_

*Starting Date

*Ending Date

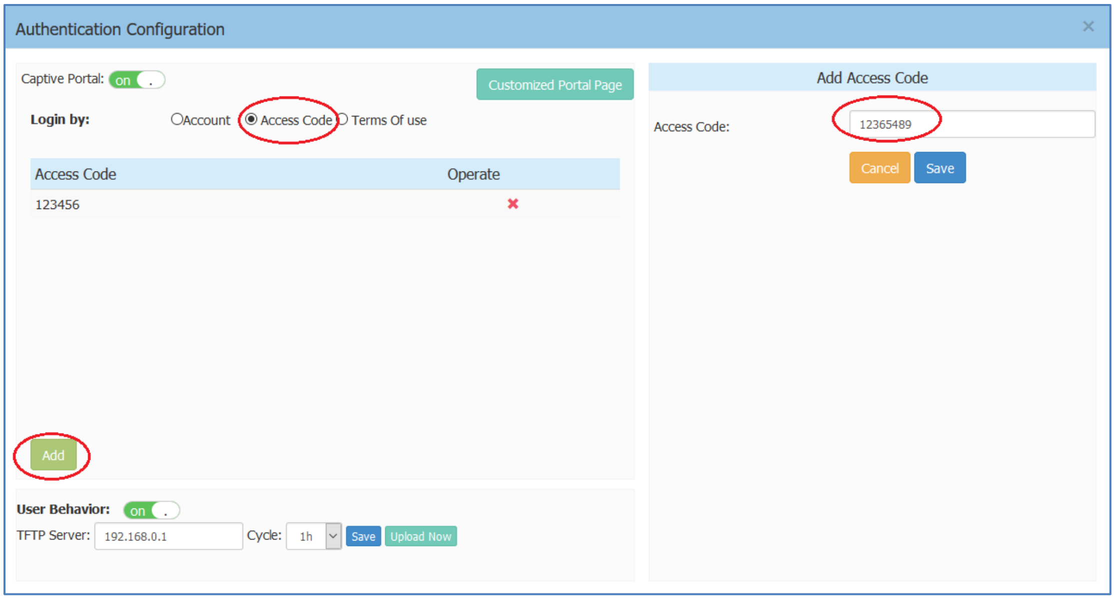
Cancel Save

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.



Authentication Configuration

Captive Portal: on

Login by: ○Account ● Access Code ○ Terms Of use

Access Code	Operate
123456	✖

User Behavior: on

TFTP Server: 192.168.0.1 Cycle: 1h

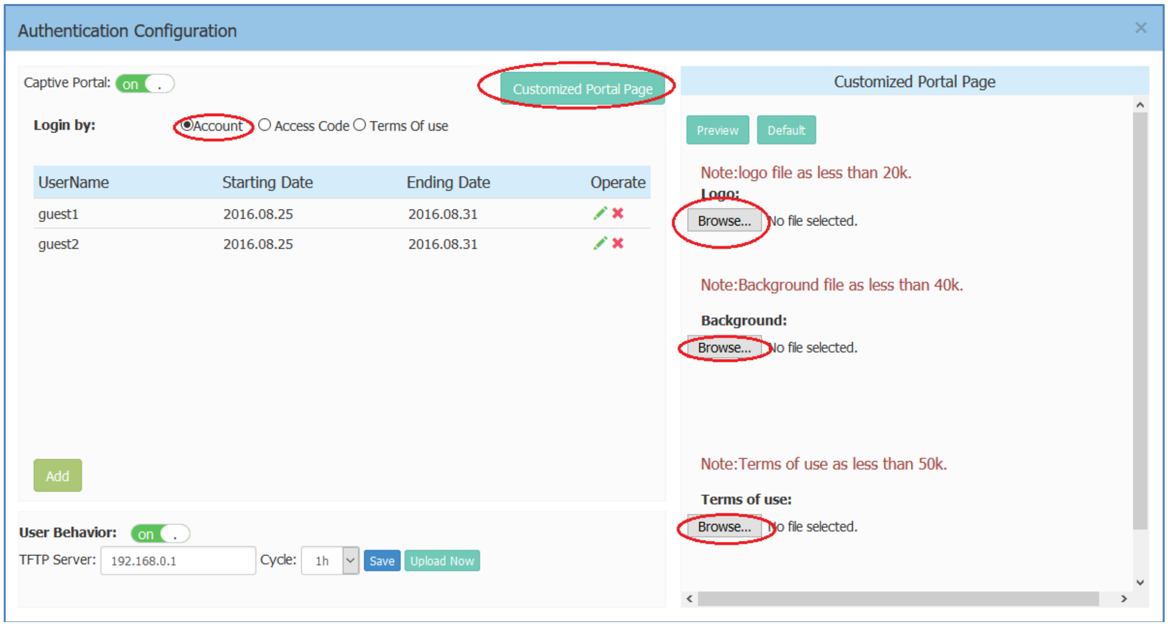
Add Access Code

Access Code: 12365489

Figure 7-9 Create Access Code

Customize Your Splash Page (Optional)

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



Authentication Configuration

Captive Portal: on

Login by: ●Account ○ Access Code ○ Terms of use

UserName	Starting Date	Ending Date	Operate
guest1	2016.08.25	2016.08.31	✎ ✖
guest2	2016.08.25	2016.08.31	✎ ✖

User Behavior: on

TFTP Server: 192.168.0.1 Cycle: 1h

Customized Portal Page

Note:logo file as less than 20k.

Logo: Browse... No file selected.

Note:Background file as less than 40k.

Background: Browse... No file selected.

Note:Terms of use as less than 50k.

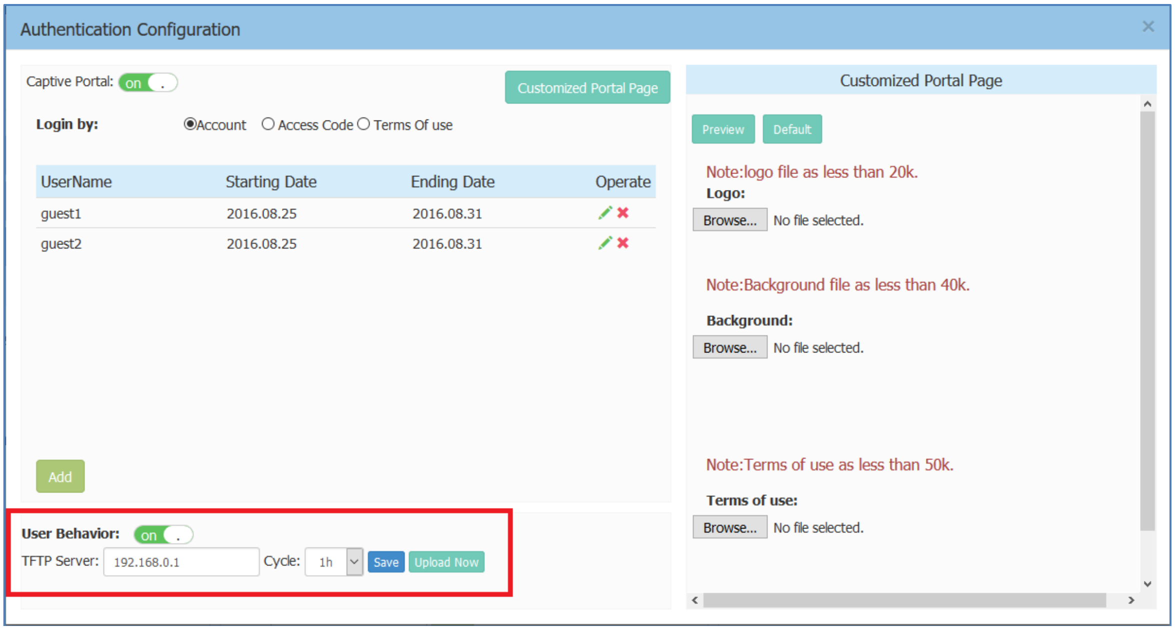
Terms of use: Browse... No file selected.

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.



Captive Portal: on

Login by: ● Account ○ Access Code ○ Terms Of use

UserName	Starting Date	Ending Date	Operate
guest1	2016.08.25	2016.08.31	✎ ✖
guest2	2016.08.25	2016.08.31	✎ ✖

User Behavior: on

TFTP Server: 192.168.0.1 Cycle: 1h

Note:logo file as less than 20k.

Logo: No file selected.

Note:Background file as less than 40k.

Background: No file selected.

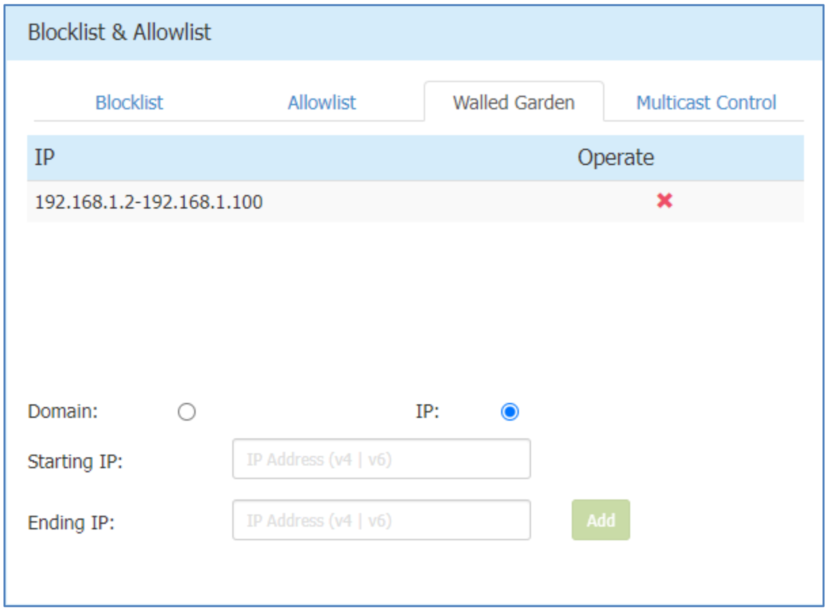
Note:Terms of use as less than 50k.

Terms of use: No file selected.

Figure 7-11 Log User Behavior

Specify Your Walled Garden (Optional)

Navigate: Dashboard-Access Page-Blocklist & Allowlist Window-Walled Garden Tab.



IP	Operate
192.168.1.2-192.168.1.100	✖

Domain: ○ IP: ●

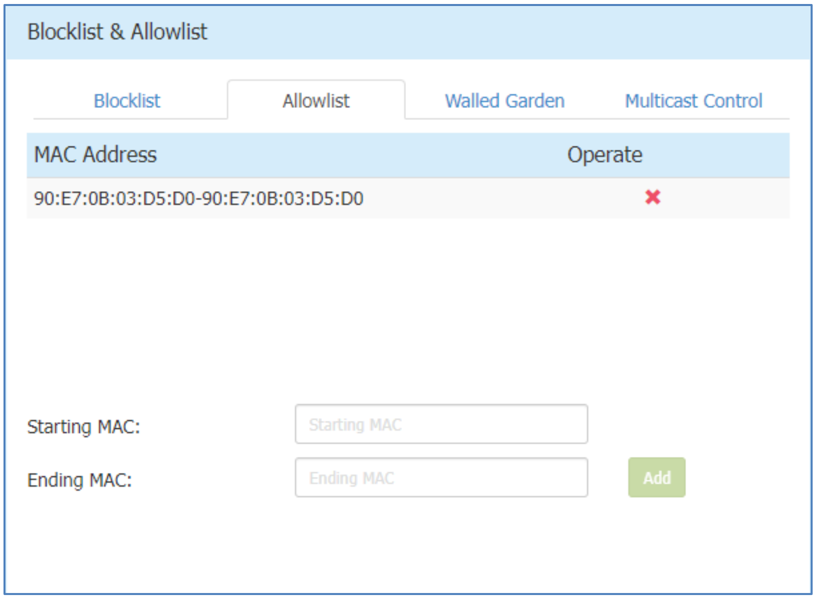
Starting IP: IP Address (v4 | v6)

Ending IP: IP Address (v4 | v6)

Figure 7-12 Wall Garden

Specify Your Captive Portal Allowlist (Optional)

Navigate: Dashboard-Access Page-Blocklist & Allowlist Window-Allowlist Tab.

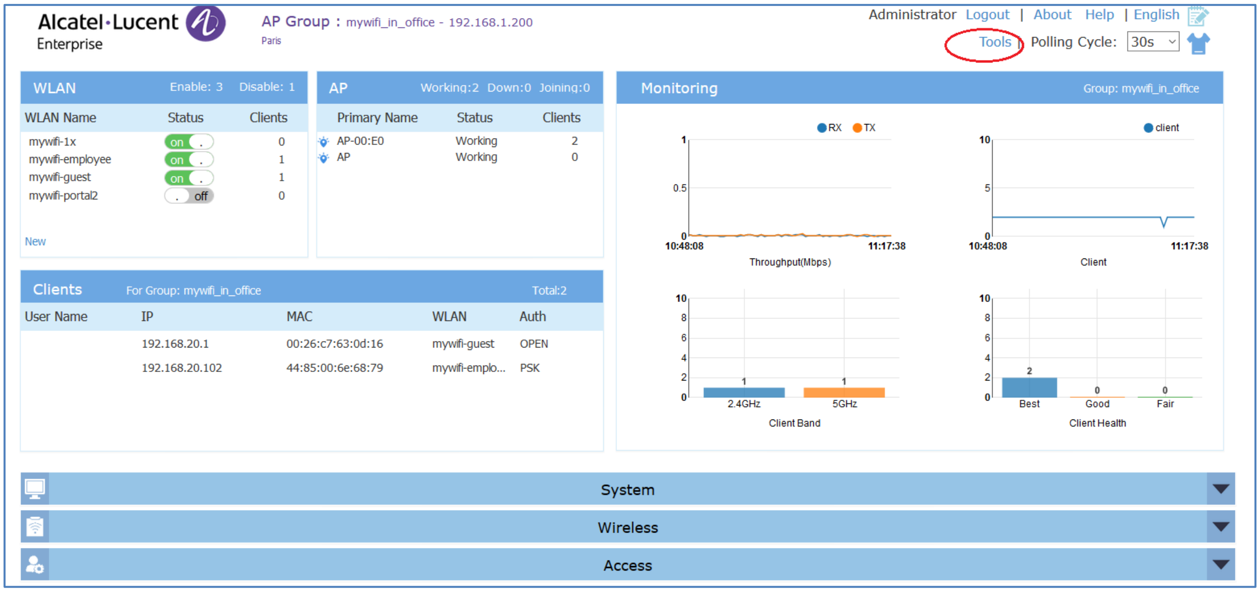


MAC Address	Operate
90:E7:0B:03:D5:D0-90:E7:0B:03:D5:D0	✖

Figure 7-13 Portal Allowlist

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.



WLAN Enable: 3 Disable: 1

WLAN Name	Status	Clients
mywifi-1x	on	0
mywifi-employee	on	1
mywifi-guest	on	1
mywifi-portal2	off	0

New

AP Working:2 Down:0 Joining:0

Primary Name	Status	Clients
AP-00:E0	Working	2
AP	Working	0

Clients For Group: mywifi_in_office Total:2

User Name	IP	MAC	WLAN	Auth
	192.168.20.1	00:26:c7:63:0d:16	mywifi-guest	OPEN
	192.168.20.102	44:85:00:6e:68:79	mywifi-emplo...	PSK

Figure 8-1 Tools in Dashboard

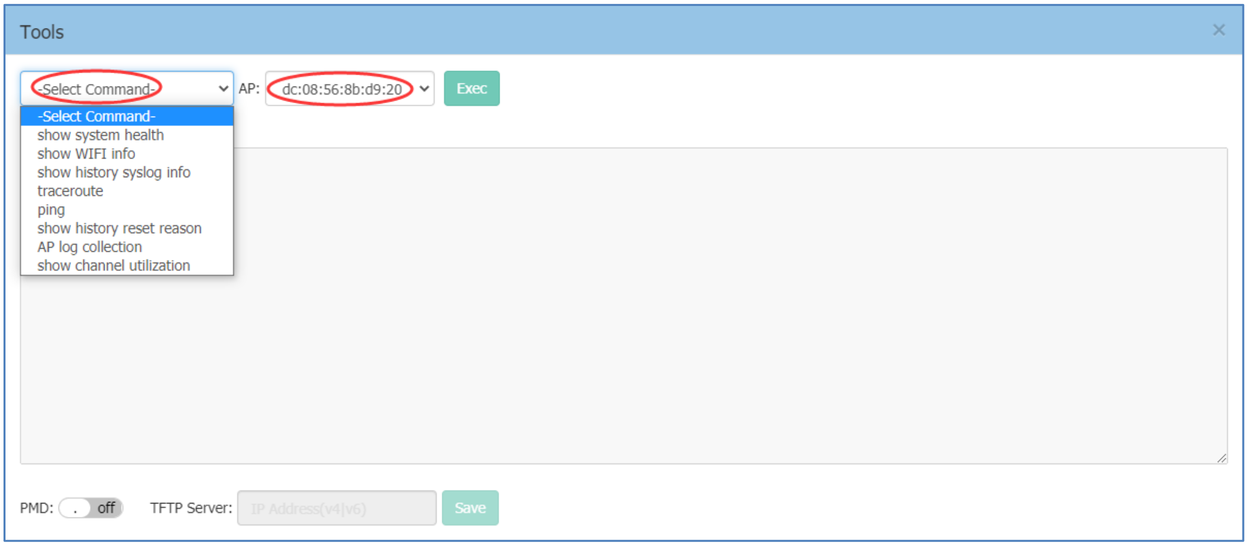


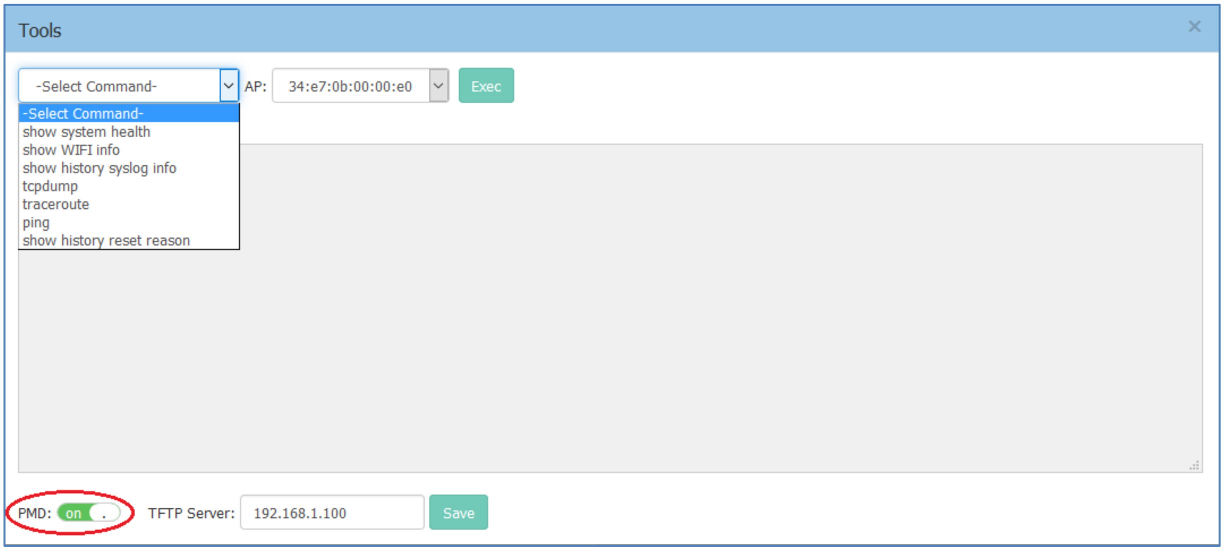
Figure 8-2 Troubleshooting Command

Table8-1 describes the commands for troubleshooting.

Command	Purpose
show system heath	Show system CPU and memory usage information of specified AP
show WIFI info	Show wireless interface information of specified AP

show history syslog info	Show historic Syslog messages generated in last time system running (Before this time system up) of specified AP
traceroute	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
AP log collection	Collect AP log files for troubleshooting and download by TFTP/HTTP
show channel utilization	Display current 2.4G/5G band channel utilization detected by the AP

PMD



AP: 34:e7:0b:00:00:e0

TFTP Server: 192.168.1.100

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.

SSH Secure shell

Stellar Access Points support secure access via SSHv2

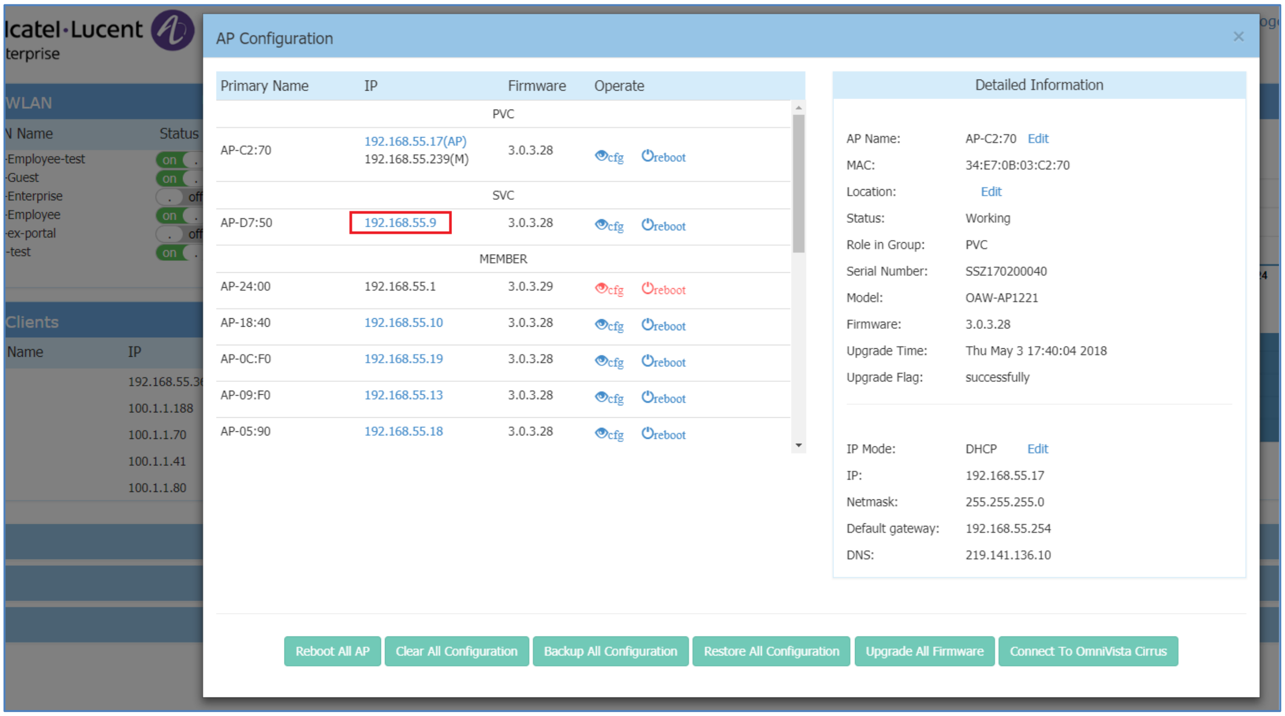
9 AP UI

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	cfg reboot

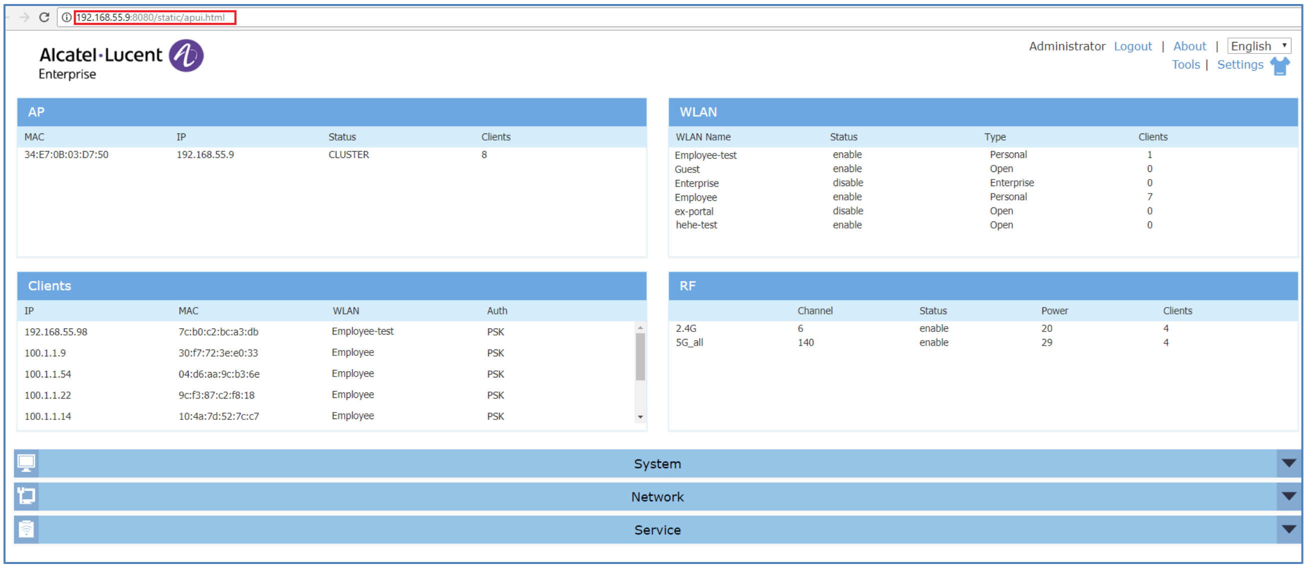
SVC			
AP-D7:50	192.168.55.9	3.0.3.28	cfg reboot
MEMBER			
AP-24:00	192.168.55.1	3.0.3.29	cfg reboot
AP-18:40	192.168.55.10	3.0.3.28	cfg reboot
AP-0C:F0	192.168.55.19	3.0.3.28	cfg reboot
AP-09:F0	192.168.55.13	3.0.3.28	cfg reboot
AP-05:90	192.168.55.18	3.0.3.28	cfg reboot

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:	SSZ170200040
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

Figure 9-1 AP List - link to AP UI

AP UI



192.168.55.9:8080/static/apui.html

AP

MAC	IP	Status	Clients
34:E7:0B:03:D7:50	192.168.55.9	CLUSTER	8

WLAN

WLAN Name	Status	Type	Clients
Employee-test	enable	Personal	1
Guest	enable	Open	0
Enterprise	disable	Enterprise	0
Employee	enable	Personal	7
ex-portal	disable	Open	0
hehe-test	enable	Open	0

Clients

IP	MAC	WLAN	Auth
192.168.55.98	7c:b0:c2:bc:a3:db	Employee-test	PSK
100.1.1.9	30:f7:72:3e:e0:33	Employee	PSK
100.1.1.54	04:d6:aa:9c:b3:6e	Employee	PSK
100.1.1.22	9c:f3:87:c2:f8:18	Employee	PSK
100.1.1.14	10:4a:7d:52:7c:c7	Employee	PSK

RF

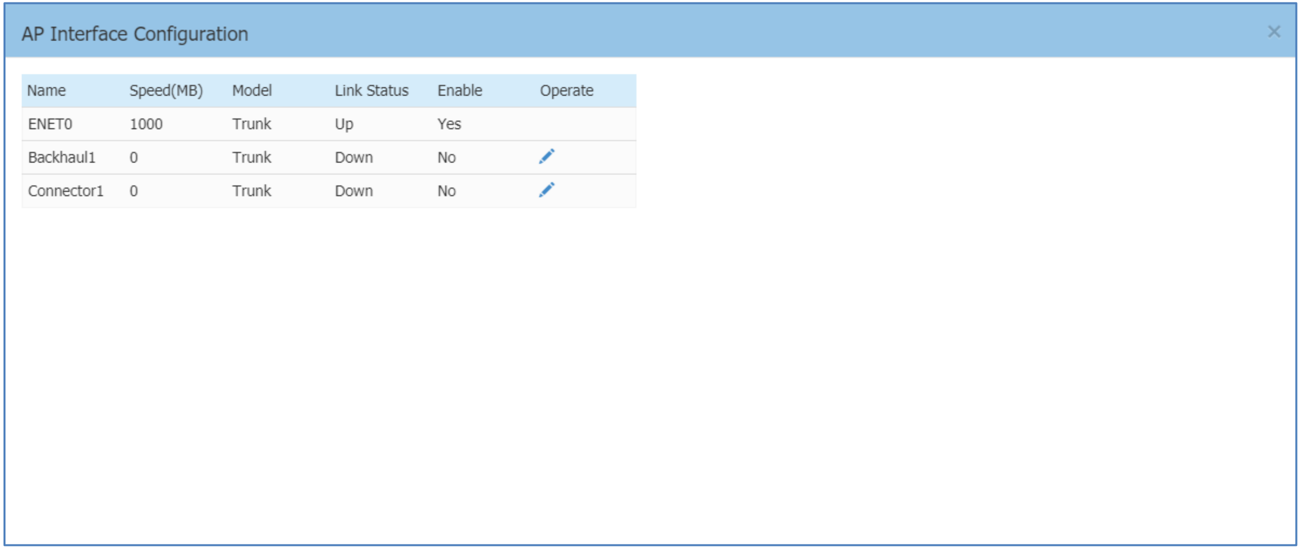
	Channel	Status	Power	Clients
2.4G	6	enable	20	4
5G_all	140	enable	29	4

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.



AP Interface Configuration

Name	Speed(MB)	Model	Link Status	Enable	Operate
ENET0	1000	Trunk	Up	Yes	
Backhaul1	0	Trunk	Down	No	✎
Connector1	0	Trunk	Down	No	✎

Figure 9-3 AP Interface

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

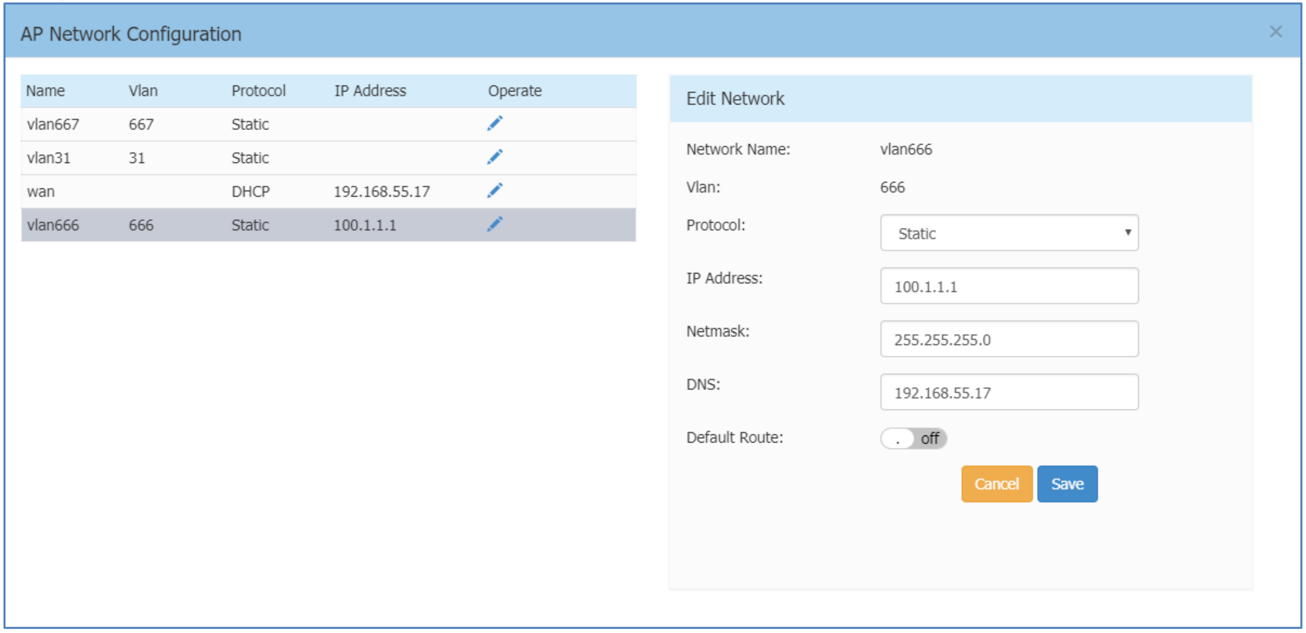
For each AP interface

- 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.



AP Network Configuration

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:	Static
IP Address:	100.1.1.1
Netmask:	255.255.255.0
DNS:	192.168.55.17
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

The Alcatel-Lucent mesh solution is an effective way to expand network coverage for outdoor and indoor enterprise environments without any wires. Using mesh, you can bridge multiple Ethernets LANs or you can extend your wireless coverage (Wireless backhauling). As traffic traverses across mesh APs, the mesh network automatically reconfigures around broken or blocked paths. This self-healing feature provides increased reliability and redundancy: the network continues to operate if an AP stops functioning or a connection fails.

To expand your wireless coverage without bridging Ethernet LAN segments, you can use Mesh services configured as wireless backhaul. In this deployment scenario, the AP provides network access for wireless clients and establishes a mesh path to the mesh root, which uses its wired interface to connect to the switch.

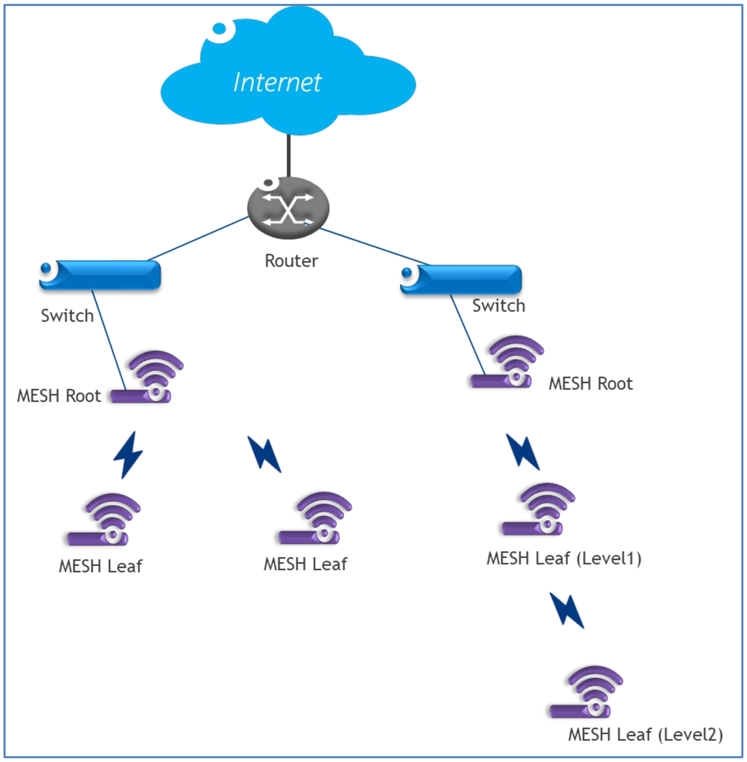
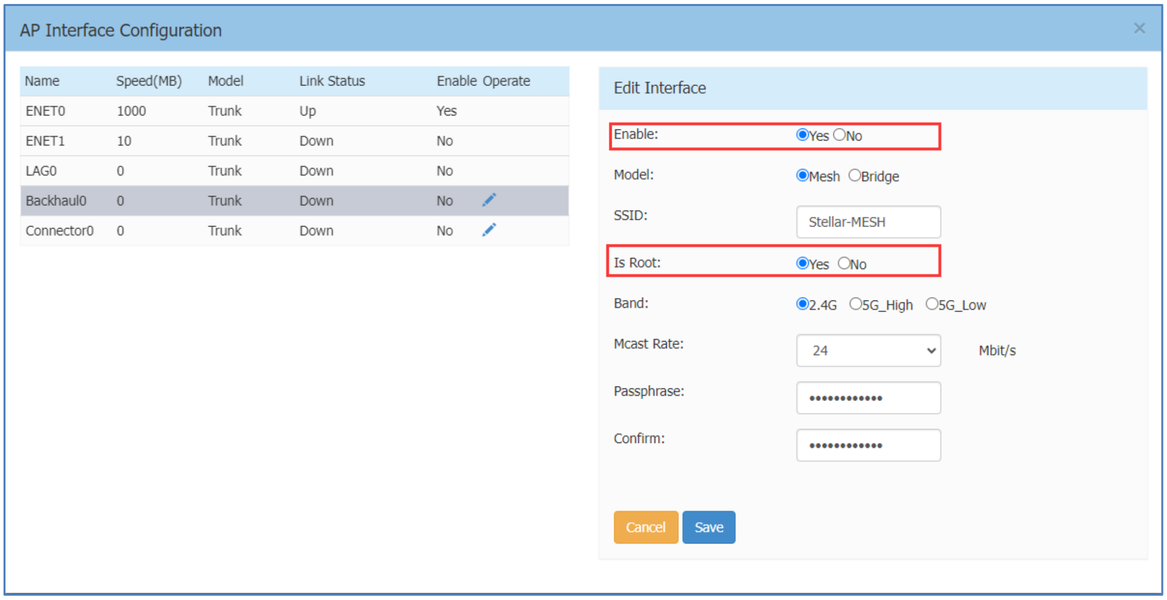


Figure 9-5 MESH Topology

MESH Configuration:

Out-of-box MESH: Out-of-box MESH is mainly used to improve the MESH deployment efficiency and administrator only needs to specify the root MESH point, other leaf MESH point can automatically join the MESH network without manual configuration. By default, Stellar AP with factory configuration powered up without wired uplink will try to establish MESH link automatically with build-in configuration (MESH SSID [Stellar-MESH] and password on 2.4G band).The out-of-box will be permanently disabled once the AP ever connected to wired uplink and only reset to factory operation can bring the out-of-box function back. The out-of-box MESH can be manually modified on band (Change from 2.4G to 5G) as well as passphrase (**Navigate: AP-UI -> Network -> AP Interface -> AP Interface Configuration**), and it will return to factory setting after reset operation.

Regular MESH: The MESH is configured on Stellar AP one after one by administrator manually. To configure MESH for the Stellar AP working in EXPRESS mode, administrator needs to login separate AP-UI of APs planned to enable MESH in the network and then perform the MESH configuration:
Navigate: AP-UI -> Network -> AP Interface -> AP Interface Configuration.



AP Interface Configuration ×

Name	Speed(MB)	Model	Link Status	Enable	Operate
ENET0	1000	Trunk	Up	Yes	
ENET1	10	Trunk	Down	No	
LAG0	0	Trunk	Down	No	
Backhaul0	0	Trunk	Down	No	✎
Connector0	0	Trunk	Down	No	✎

Edit Interface

Enable: ● Yes ○ No

Model: ● Mesh ○ Bridge

SSID: Stellar-MESH

Is Root: ● Yes ○ No

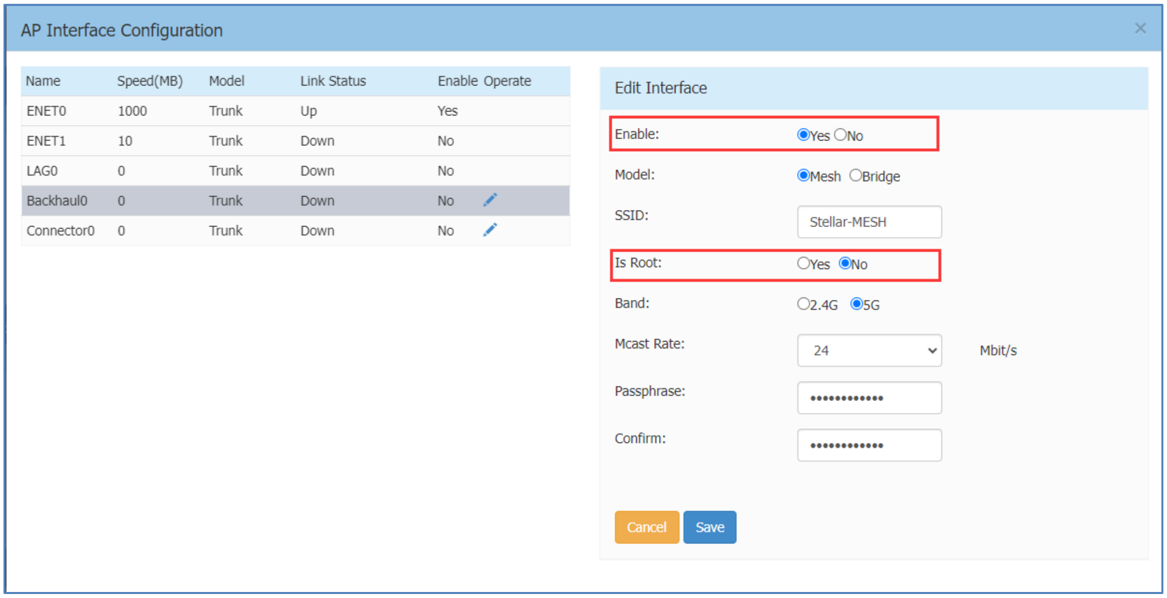
Band: ● 2.4G ○ 5G_High ○ 5G_Low

Mcast Rate: 24 Mbit/s

Passphrase: ••••••••••••

Confirm: ••••••••••••

Figure 9-6 Configure Mesh Root



AP Interface Configuration ×

Name	Speed(MB)	Model	Link Status	Enable	Operate
ENET0	1000	Trunk	Up	Yes	
ENET1	10	Trunk	Down	No	
LAG0	0	Trunk	Down	No	
Backhaul0	0	Trunk	Down	No	✎
Connector0	0	Trunk	Down	No	✎

Edit Interface

Enable: ● Yes ○ No

Model: ● Mesh ○ Bridge

SSID: Stellar-MESH

Is Root: ○ Yes ● No

Band: ○ 2.4G ● 5G

Mcast Rate: 24 Mbit/s

Passphrase: ••••••••••••

Confirm: ••••••••••••

Figure 9-7 Configure Mesh Leaf

Edit the Backhaul/Connector interface to complete the MESH configuration. Either Backhaul configuration or Connector configuration is sufficient. The last saved configuration will be effective if Backhaul1 and Connector1 are both configured:

- Enable - Enable/disable the wireless mesh on the AP.
- Mode - AP working mode, mesh mode or bridge mode.
- SSID - WLAN used to setup wireless mesh connection (SSID 'Stellar-MESH' is built-in for Out-of-box MESH, it can be modified to become a regular MESH SSID).
- Band - Mesh 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.

- Mcast Rate - Specify the multicast traffic maximum forwarding rate on the mesh link. By default, it is 24Mbps. Recommend changing the value under the guidance of ALE support team if neccessary.
- Passphrase – Password of the WLAN used to setup wireless mesh connection.
- Confirm – Re-enter the password to confirm.

Wireless Bridge Configuration:
A point-to-point wireless bridge is used to connect LAN(s), which are often in different buildings, through the wireless interface. The wireless bridges eliminate the need for expensive leased lines and fiber-optic cables.
Navigate: AP-UI -> Network -> AP Interface -> AP Interface Configuration.
Edit the Backhaul1/Connector1 interface to complete the wireless bridge configuration. Either Backhaul1 configuration or Connector1 configuration is sufficient. The last saved configuration will be effective if Backhaul1 and Connector1 are configured with different attributes:

- Enable – Enable/disable the wireless bridge on the AP.
- Mode – AP working mode, mesh mode or bridge mode.
- SSID – WLAN used to setup wireless bridge connection.
- Band – Wireless bridge working frequency.
- Is Root – Specify the root node of the wireless bridge.
- Passphrase – Password of the WLAN used to setup wireless bridge connection.
- Confirm – Re-enter the password to confirm.

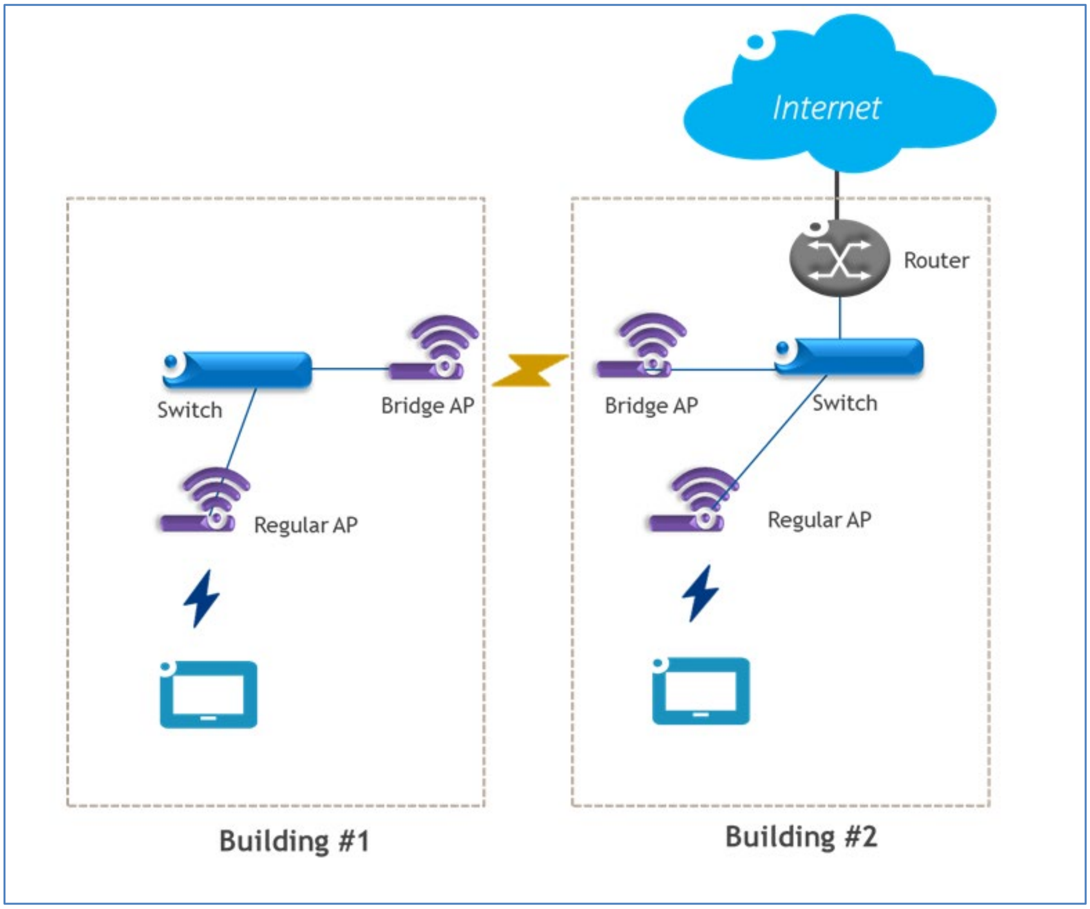


Figure 9-8 Configure Wireless Bridge

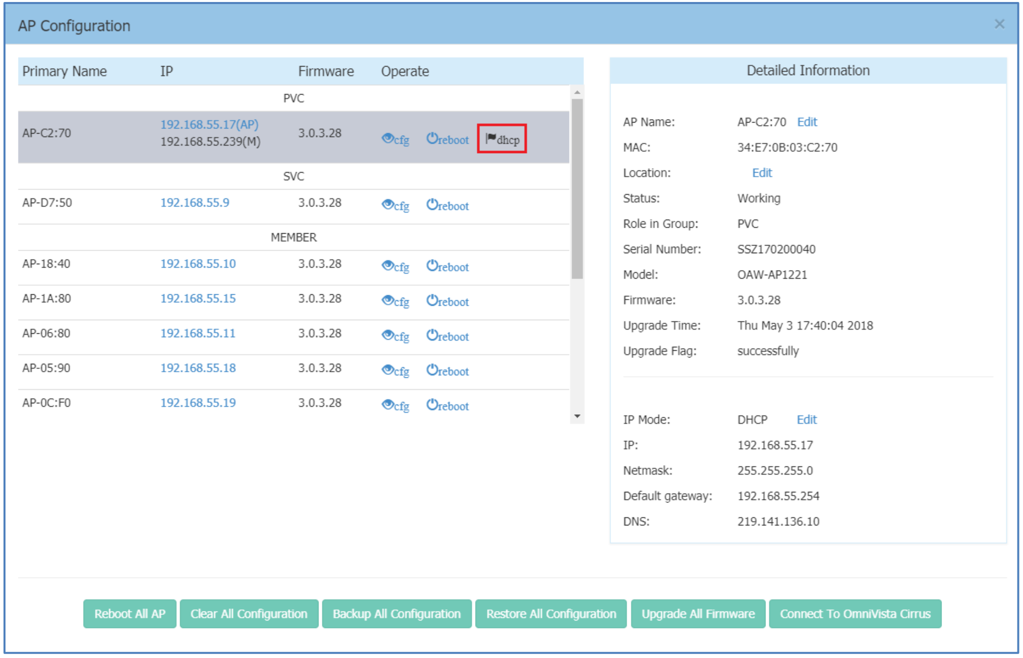
Note:

1. *AP1201, AP1201L, AP1201H, AP1201HL is low performance than other mid-end/high-end APs, and those APs do not support bridging the packets with VLAN tags, so not recommend deploying wireless bridge with above AP models. If really needs to deploy wireless bride with AP1201, AP1201L, AP1201H, AP1201HL, please contact ALE support for help. AP1201, AP1201L, AP1201H, AP1201HL is working correctly in MESH deployment.*
2. *MESH AP can provide service to wireless client accompanied with MESH link. While Wireless Bridge AP can only provide bridge link, not able to connect wireless clients.*

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.



AP Configuration

Primary Name	IP	Firmware	Operate
PVC			

AP-C2:70	192.168.55.17(AP)
	192.168.55.239(M)
		3.0.3.28	cfg reboot dhcp

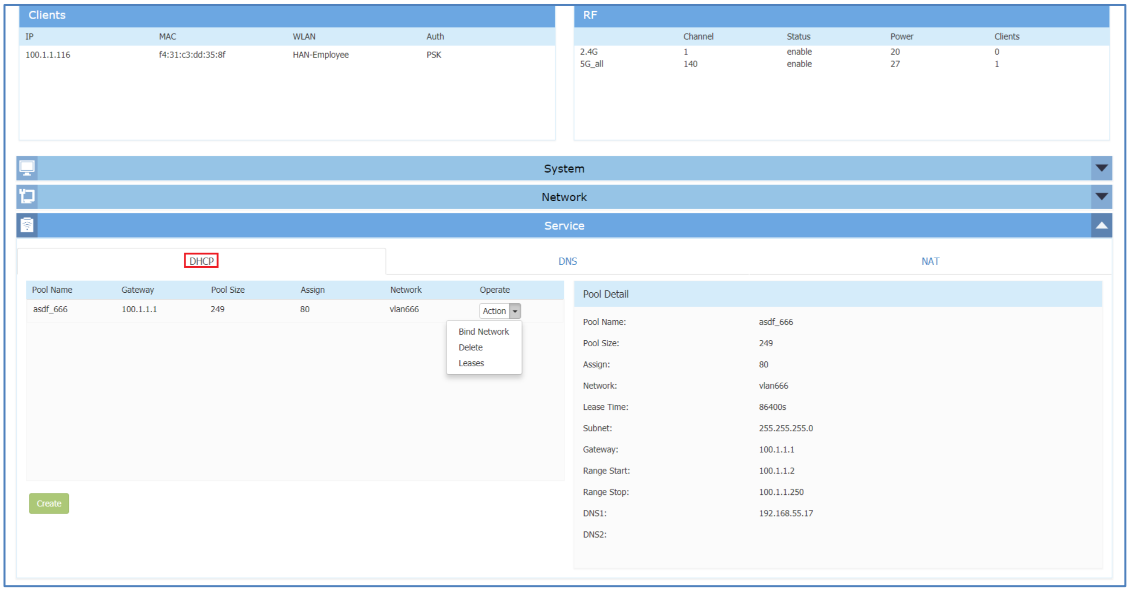
SVC			
AP-D7:50	192.168.55.9	3.0.3.28	cfg reboot
MEMBER			
AP-18:40	192.168.55.10	3.0.3.28	cfg reboot
AP-1A:80	192.168.55.15	3.0.3.28	cfg reboot
AP-06:80	192.168.55.11	3.0.3.28	cfg reboot
AP-05:90	192.168.55.18	3.0.3.28	cfg reboot
AP-0C:F0	192.168.55.19	3.0.3.28	cfg reboot

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: SSZ170200040
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

Figure 9-9 DHCP Server in AP group



Clients

IP	MAC	WLAN	Auth
100.1.1.116	f4:31:c3:dd:35:8f	HAN-Employee	PSK

RF

	Channel	Status	Power	Clients
2.4G	1	enable	20	0
5G_all	140	enable	27	1

Pool Name	Gateway	Pool Size	Assign	Network	Operate
asdf_666	100.1.1.1	249	80	vlan666	Action

Pool Detail

Pool Name: asdf_666
Pool Size: 249
Assign: 80
Network: vlan666
Lease Time: 86400s
Subnet: 255.255.255.0
Gateway: 100.1.1.1
Range Start: 100.1.1.2
Range Stop: 100.1.1.250
DNS1: 192.168.55.17
DNS2:

Figure 9-10 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

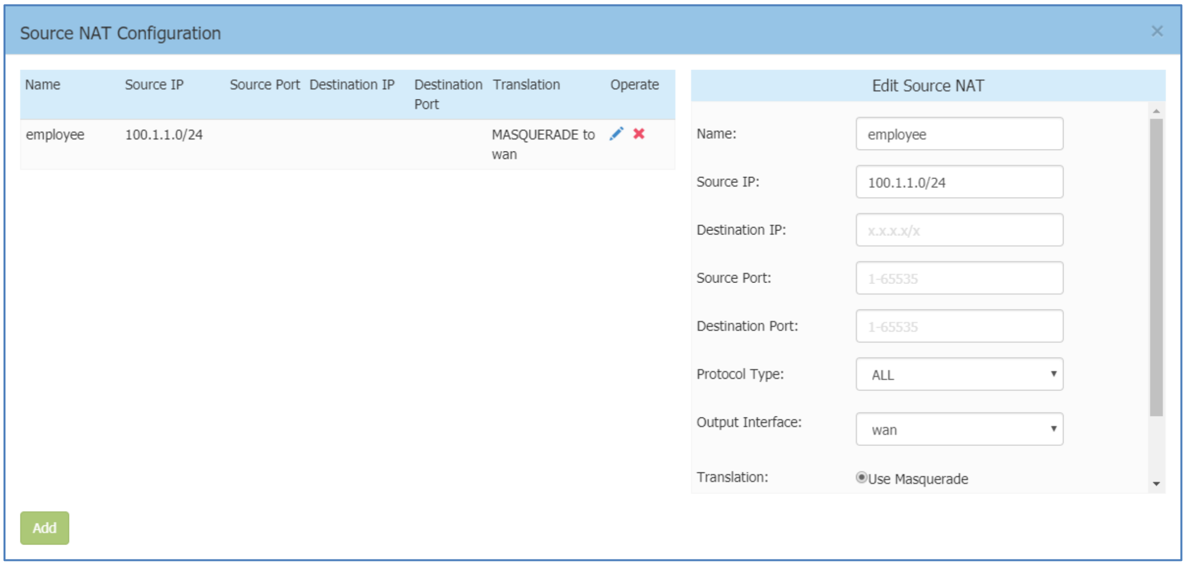
Navigate: AP-UI -> Service -> DNS.

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

Configure NAT through AP UI

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

Source NAT



Source NAT Configuration

Name	Source IP	Source Port	Destination IP	Destination Port	Translation	Operate
employee	100.1.1.0/24				MASQUERADE to wan	

Edit Source NAT

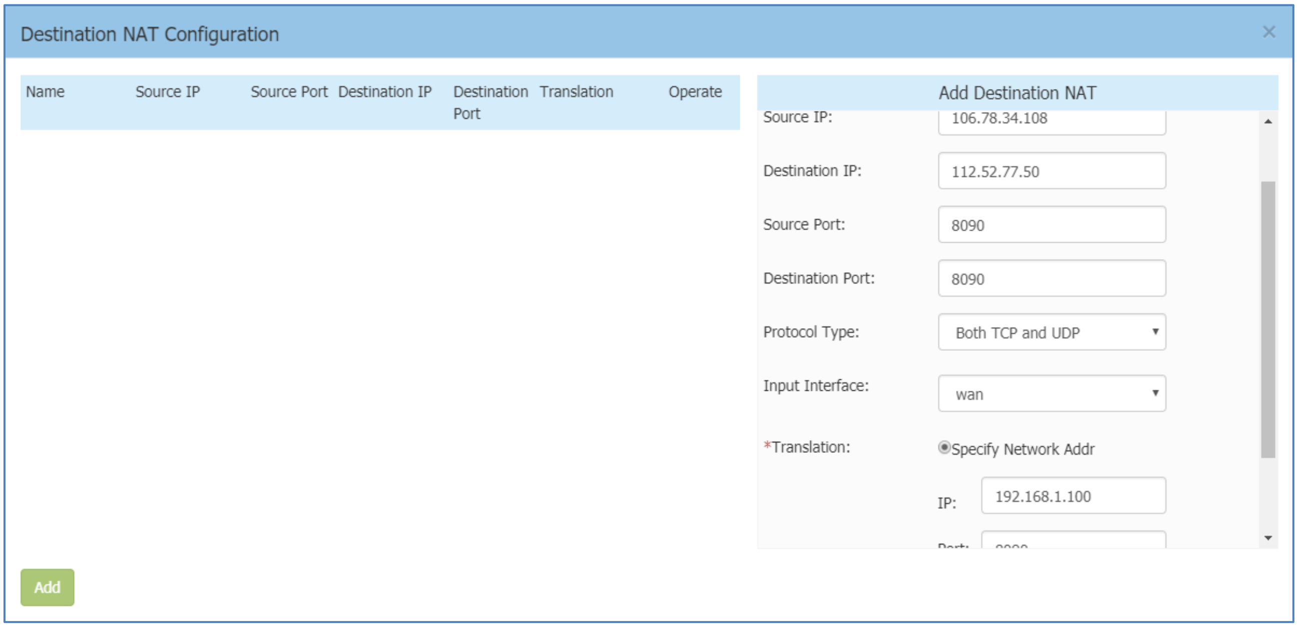
Name:	employee
Source IP:	100.1.1.0/24
Destination IP:	x.x.x.x/x
Source Port:	1-65535
Destination Port:	1-65535
Protocol Type:	ALL
Output Interface:	wan
Translation:	● Use Masquerade

Figure 9-11 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



Destination NAT Configuration

Name	Source IP	Source Port	Destination IP	Destination Port	Translation	Operate

Add Destination NAT

Source IP: 106.78.34.108

Destination IP: 112.52.77.50

Source Port: 8090

Destination Port: 8090

Protocol Type: Both TCP and UDP

Input Interface: wan

*Translation: ● Specify Network Addr

IP: 192.168.1.100

Figure 9-12 Destination NAT

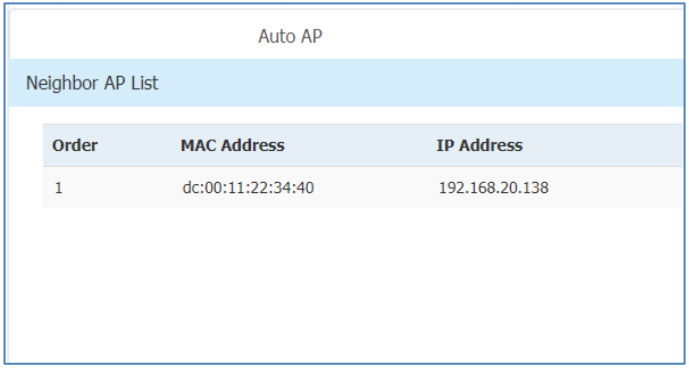
Destination NAT can be utilized to realize visiting specific server in the internal network from internet.

- 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.

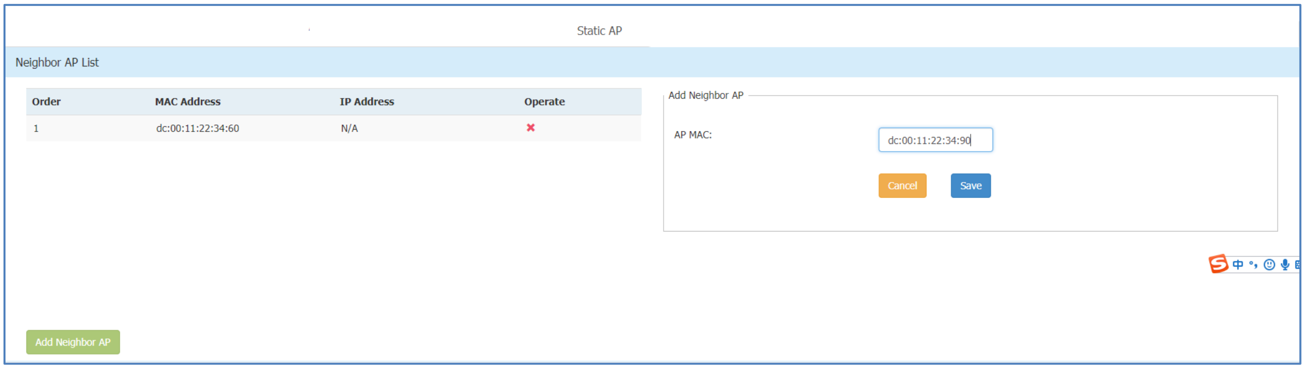


Auto AP

Neighbor AP List

Order	MAC Address	IP Address
1	dc:00:11:22:34:40	192.168.20.138

Figure 9-13 Auto Neighbor AP



Static AP

Neighbor AP List

Order	MAC Address	IP Address	Operate
1	dc:00:11:22:34:60	N/A	✖

Add Neighbor AP

AP MAC: dc:00:11:22:34:90

Figure 9-14 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

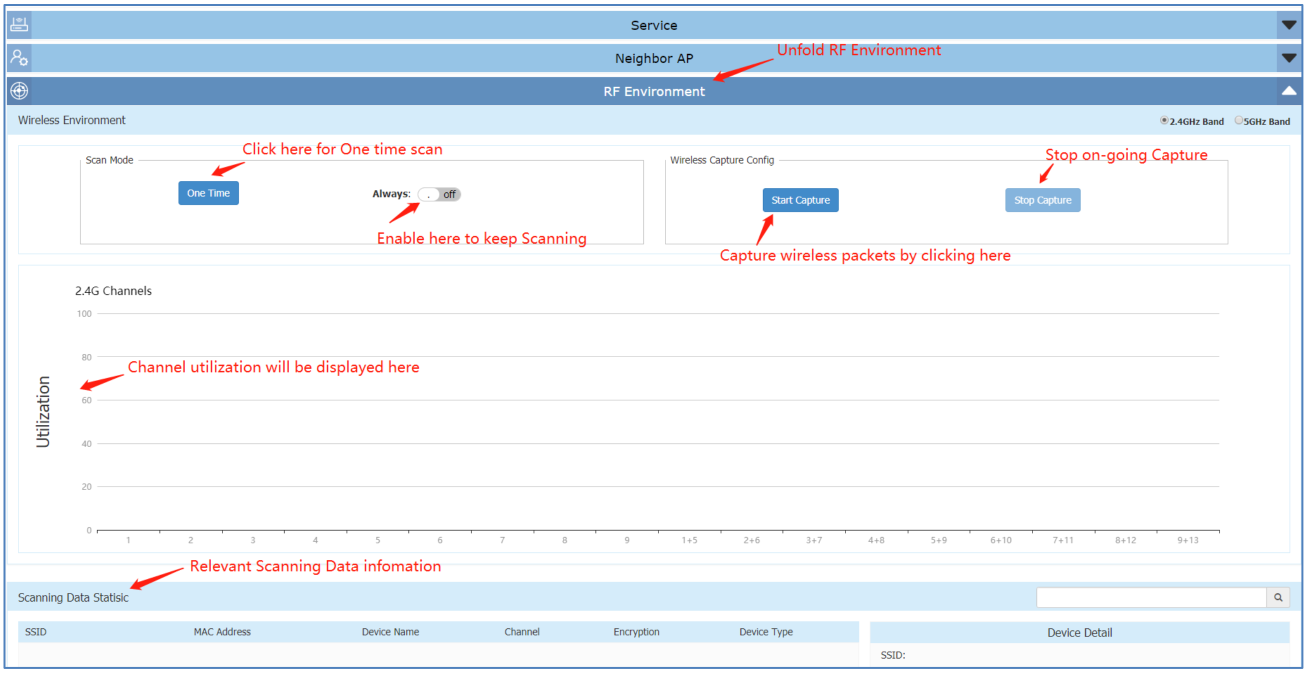
The RF Environment is used to view Scanning Mode data for APs. Wireless networks operate in environments with electrical and radio frequency devices that can interfere with network communications. APs can examine the radio frequency environment in which the Wi-Fi network is operating, identify interference, 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.



Unfold RF Environment

Click here for One time scan

Enable here to keep Scanning

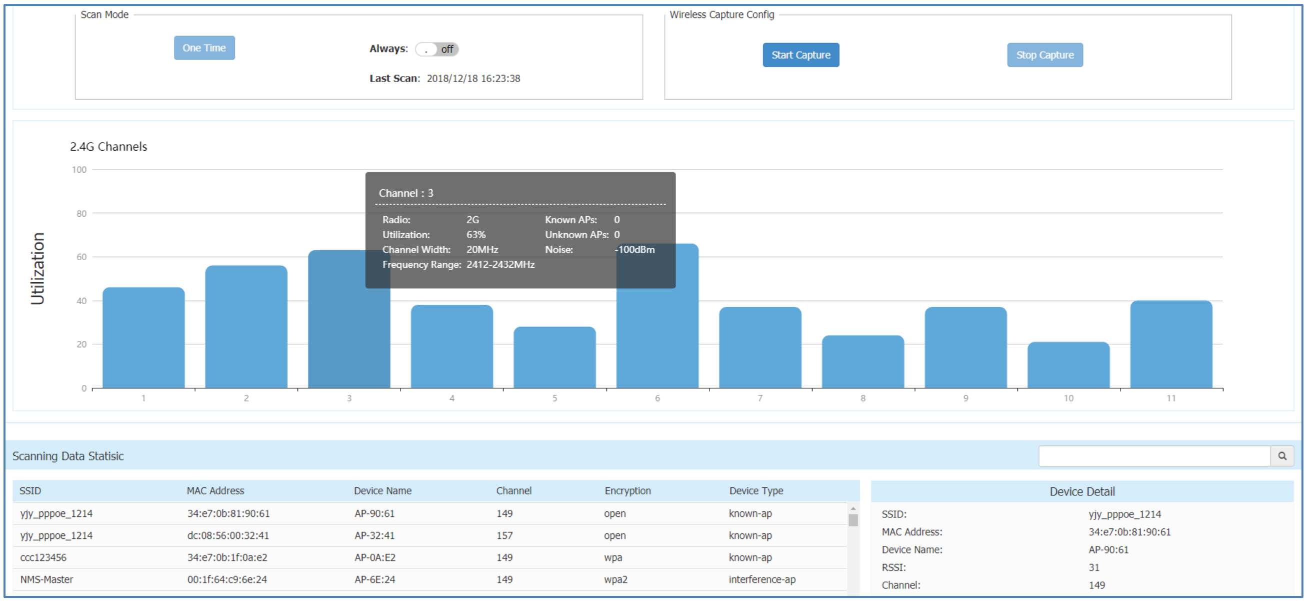
Stop on-going Capture

Capture wireless packets by clicking here

Channel utilization will be displayed here

Relevant Scanning Data infomation

Figure 9-15 RF Environment



Last Scan: 2018/12/18 16:23:38

Channel : 3

Radio: 2G
Utilization: 63%
Channel Width: 20MHz
Frequency Range: 2412-2432MHz
Known APs: 0
Unknown APs: 0
Noise: -100dBm

SSID	MAC Address	Device Name	Channel	Encryption	Device Type
yjy_pppoe_1214	34:e7:0b:81:90:61	AP-90:61	149	open	known-ap
yjy_pppoe_1214	dc:08:56:00:32:41	AP-32:41	157	open	known-ap
ccc123456	34:e7:0b:1f:0a:e2	AP-0A:E2	149	wpa	known-ap
NMS-Master	00:1f:64:c9:6e:24	AP-6E:24	149	wpa2	interference-ap

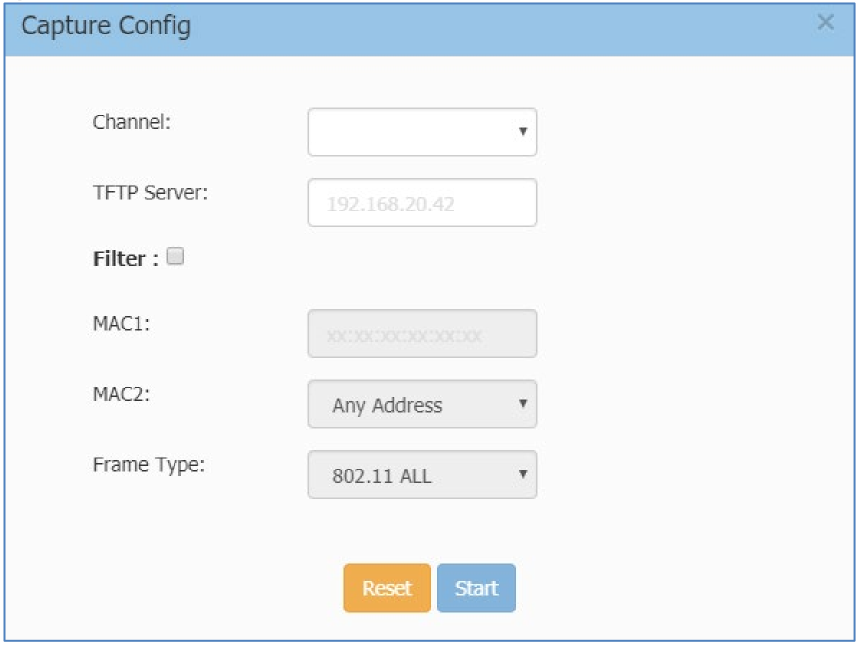
Device Detail	
SSID:	yjy_pppoe_1214
MAC Address:	34:e7:0b:81:90:61
Device Name:	AP-90:61
RSSI:	31
Channel:	149

Figure 9-16 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



Capture Config

Channel:

TFTP Server: 192.168.20.42

Filter : □

MAC1: xx:xx:xx:xx:xx:xx

MAC2: Any Address

Frame Type: 802.11 ALL

Figure 9-17 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://AP-IP:8080* (*For example*: *http://172.16.101.34:8080*) or *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://AP-IP* (*For example*: *https://172.16.101.34*) or *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.

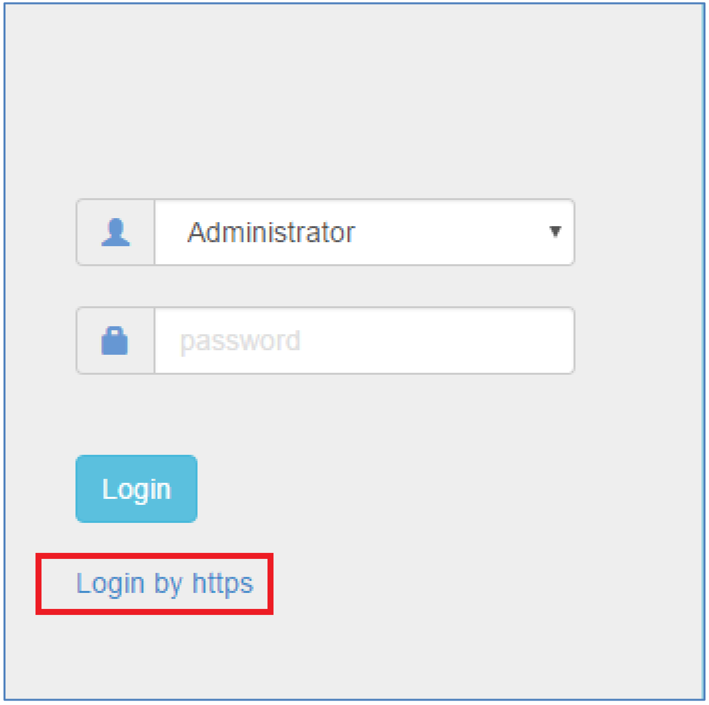
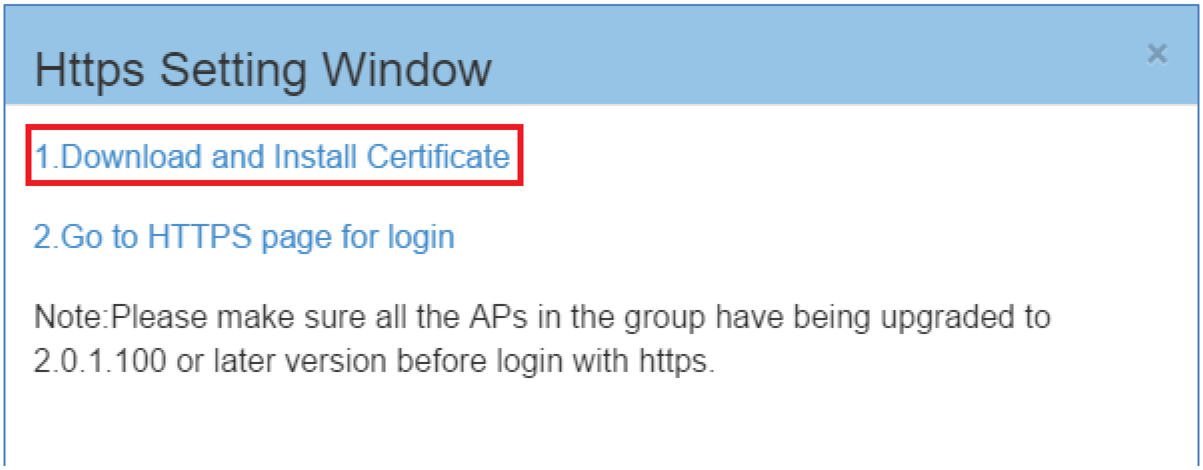


Figure 10-1 HTTP Login Page



Https Setting Window

1.Download and Install Certificate

2.Go to HTTPS page for login

Note:Please make sure all the APs in the group have being upgraded to 2.0.1.100 or later version before login with https.

Figure 10-2 Download Certificate from AP

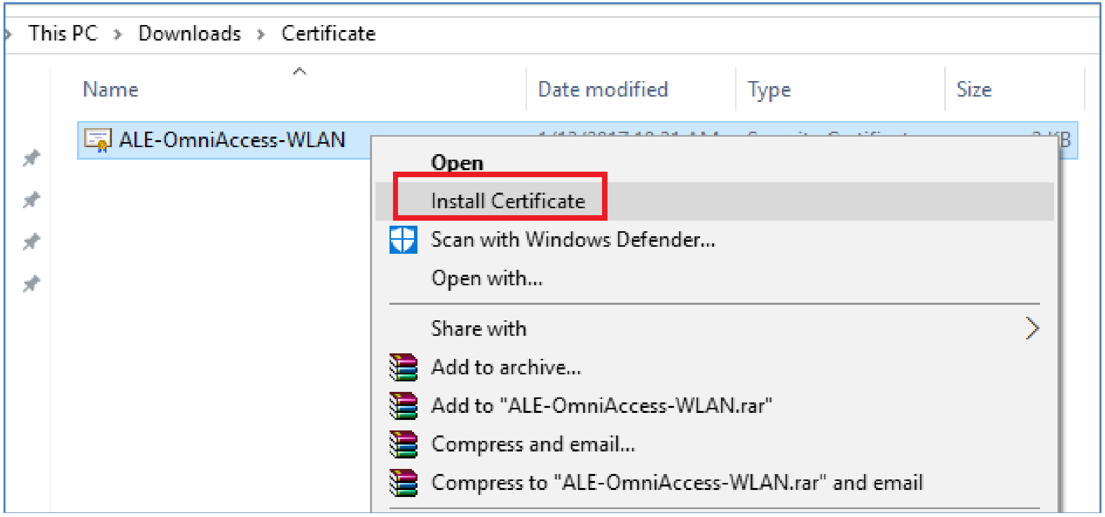
Install the Certificate on Different Platform accordingly

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://PVM-IP* *(For example:* *https://172.16.101.34*) or *https://mywifi.al-enterprise.com* to manage the AP group.

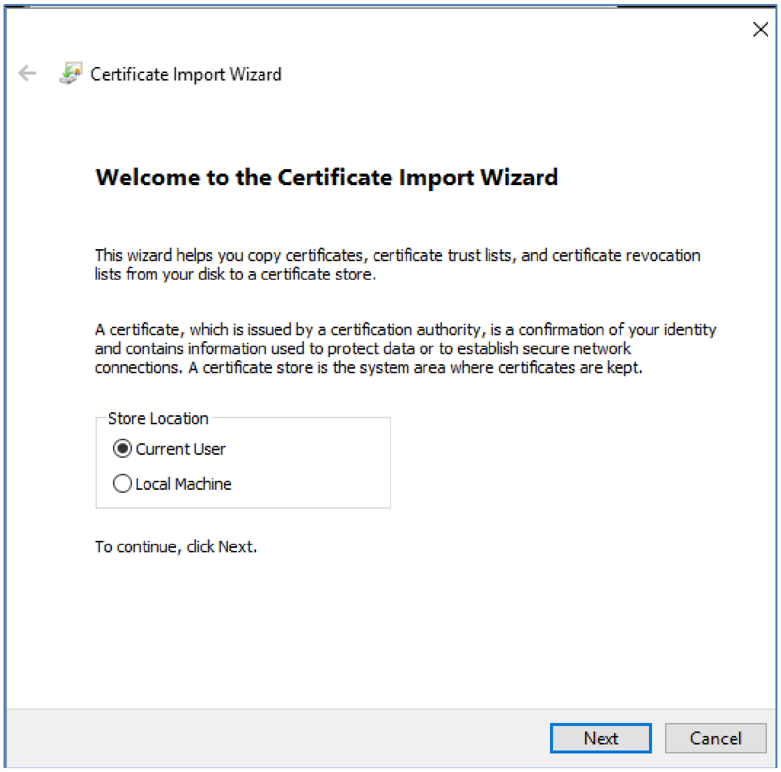
Case A: Microsoft Windows + Microsoft IE/Google Chrome

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.



This PC › Downloads › Certificate
Name
Date modified
Type
Size
ALE-OmniAccess-WLAN
Open
Install Certificate
Scan with Windows Defender...
Open with...
Share with
Add to archive...
Add to "ALE-OmniAccess-WLAN.rar"
Compress and email...
Compress to "ALE-OmniAccess-WLAN.rar" and email

Figure 10-3 Case A - Step 1



Welcome to the Certificate Import Wizard

This wizard helps you copy certificates, certificate trust lists, and certificate revocation lists from your disk to a certificate store.

A certificate, which is issued by a certification authority, is a confirmation of your identity and contains information used to protect data or to establish secure network connections. A certificate store is the system area where certificates are kept.

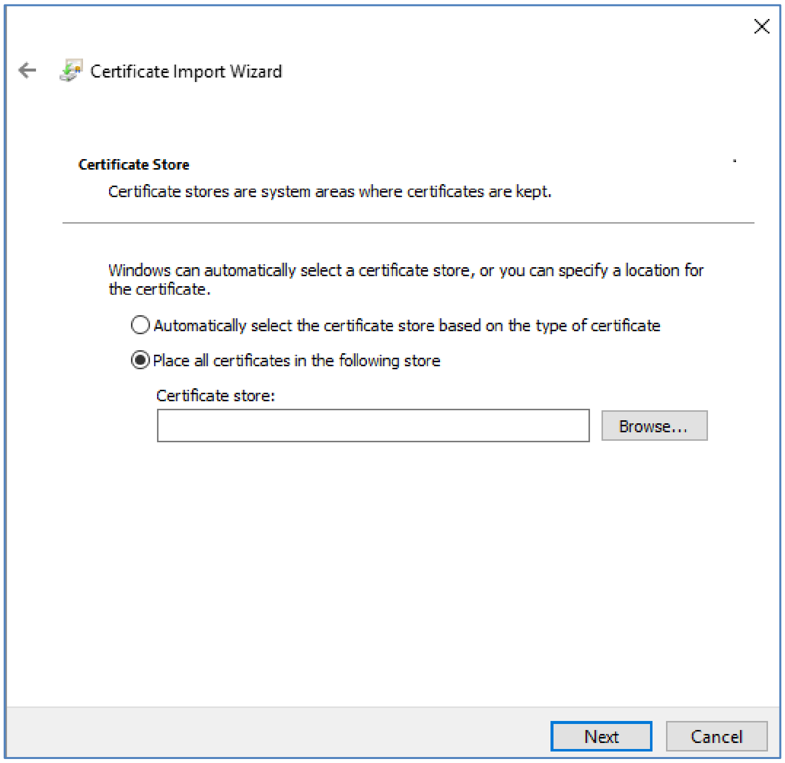
Store Location

● Current User

○ Local Machine

To continue, click Next.

Figure 10-4 Case A - Step 2



Certificate Store

Certificate stores are system areas where certificates are kept.

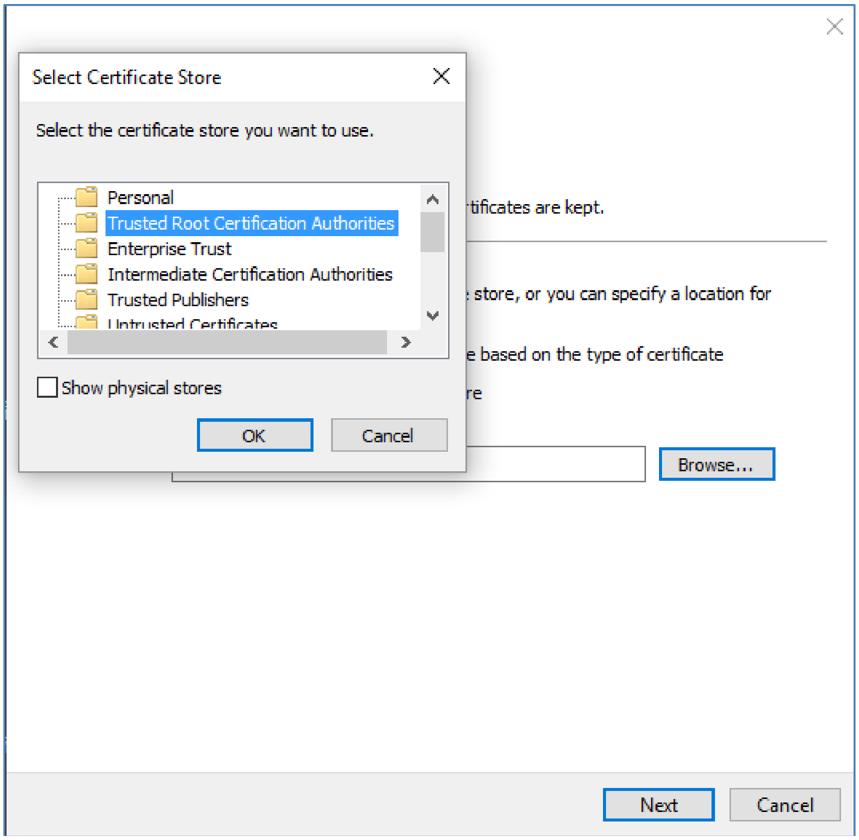
Windows can automatically select a certificate store, or you can specify a location for the certificate.

○ Automatically select the certificate store based on the type of certificate

● Place all certificates in the following store

Certificate store:

Figure 10-5 Case A - Step 3



Select Certificate Store

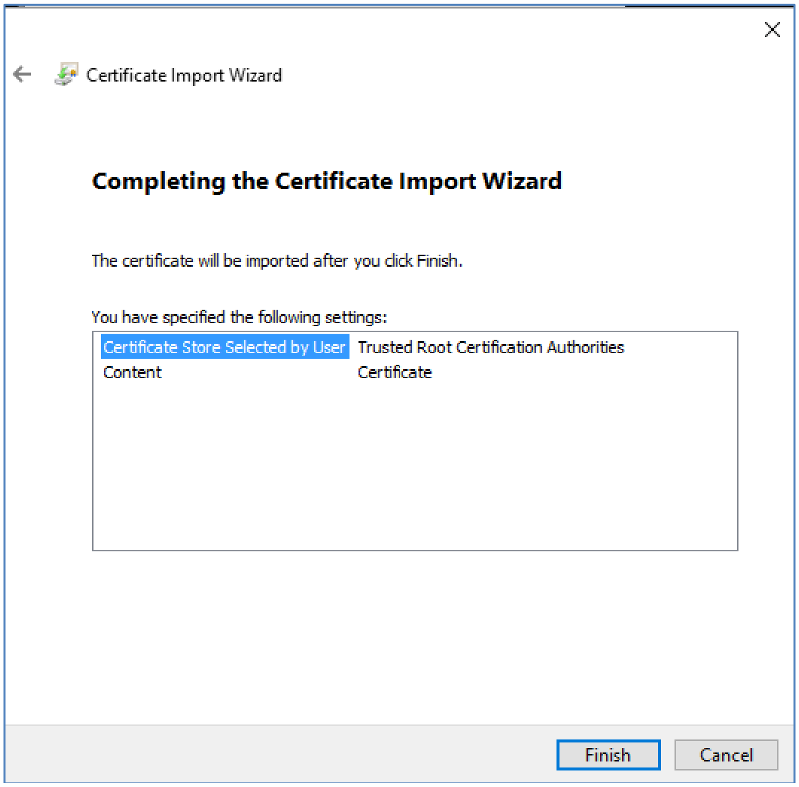
Select the certificate store you want to use.

- Personal
- Trusted Root Certification Authorities
- Enterprise Trust
- Intermediate Certification Authorities
- Trusted Publishers
- Untrusted Certificates

□ Show physical stores

OK
Cancel
tificates are kept.
store, or you can specify a location for
e based on the type of certificate
re
Browse...
Next
Cancel

Figure 10-6 Case A - Step 4



Certificate Import Wizard

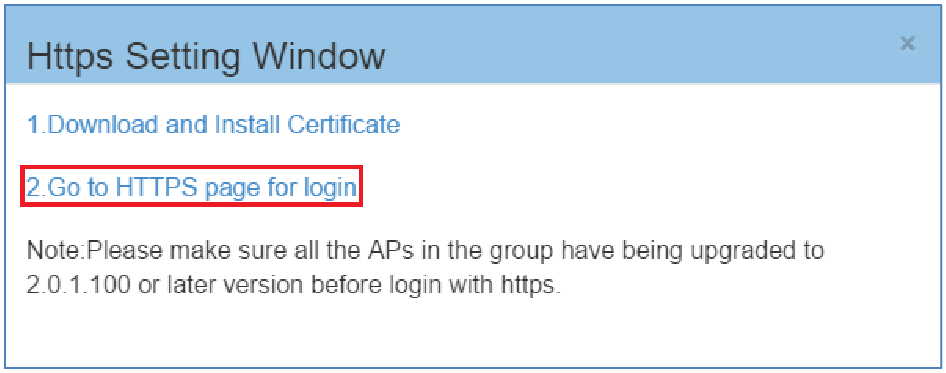
Completing the Certificate Import Wizard

The certificate will be imported after you click Finish.

You have specified the following settings:

Certificate Store Selected by User	Trusted Root Certification Authorities
Content	Certificate

Figure 10-7 Case A - Step 5



Https Setting Window

1.Download and Install Certificate

2.Go to HTTPS page for login

Note:Please make sure all the APs in the group have being upgraded to 2.0.1.100 or later version before login with https.

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.

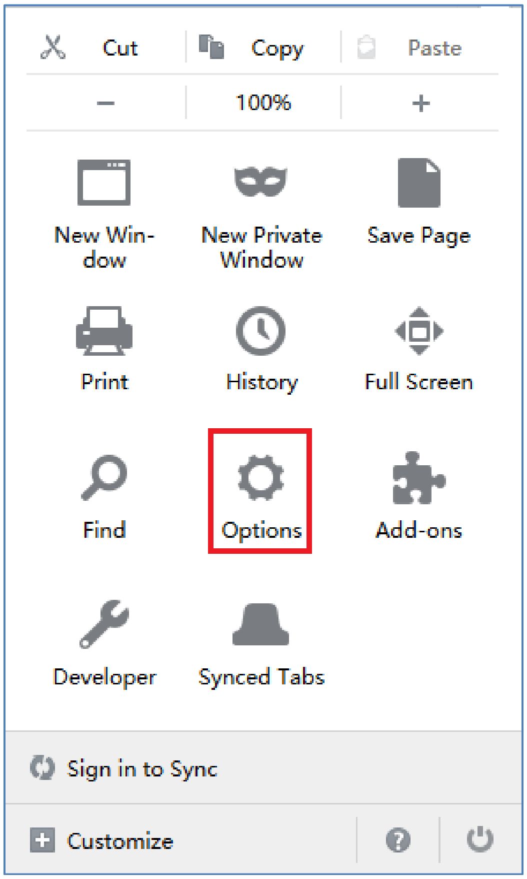
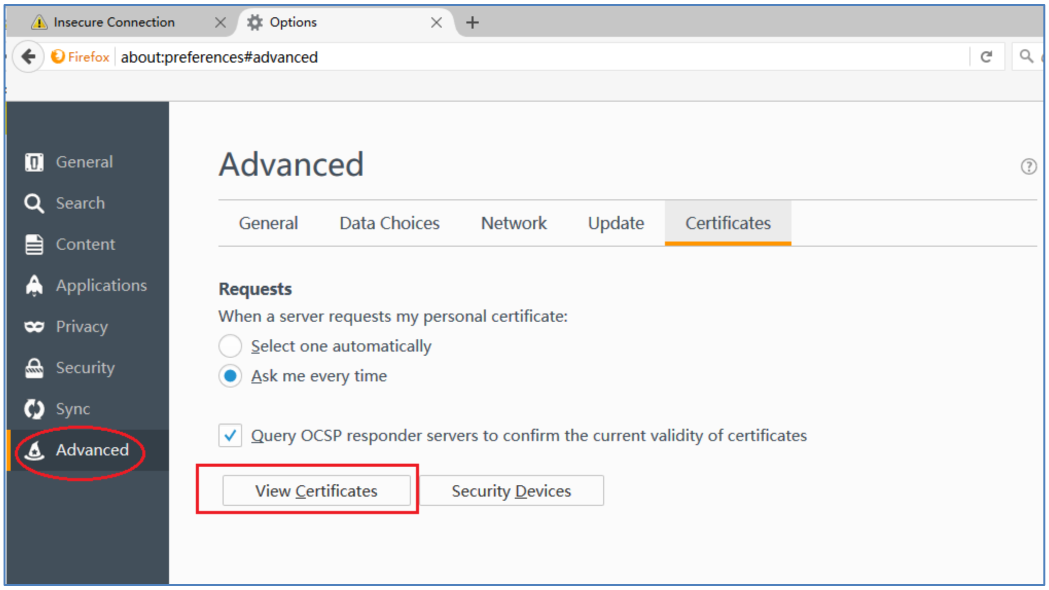


Figure 10-9 Case B - Step 1



Advanced

Requests

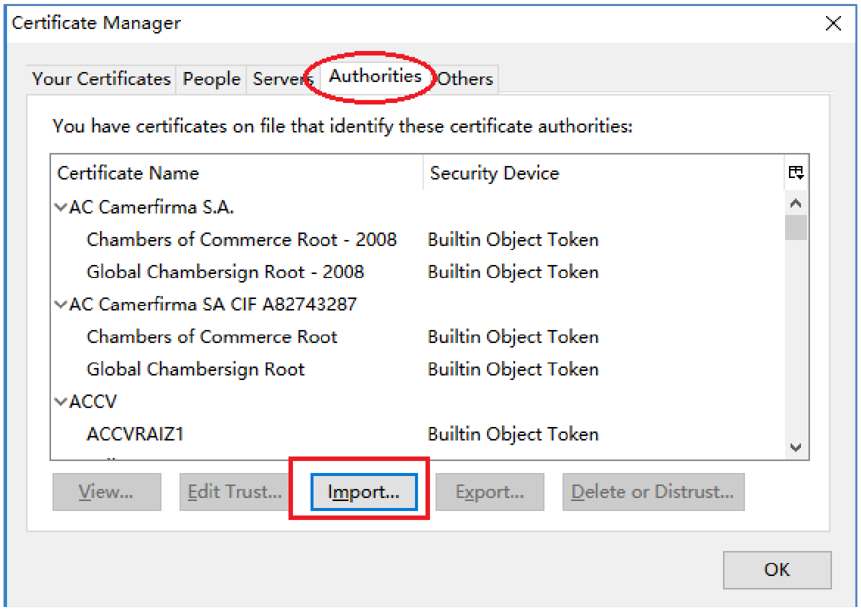
When a server requests my personal certificate:

○ Select one automatically

● Ask me every time

☑ Query OCSP responder servers to confirm the current validity of certificates

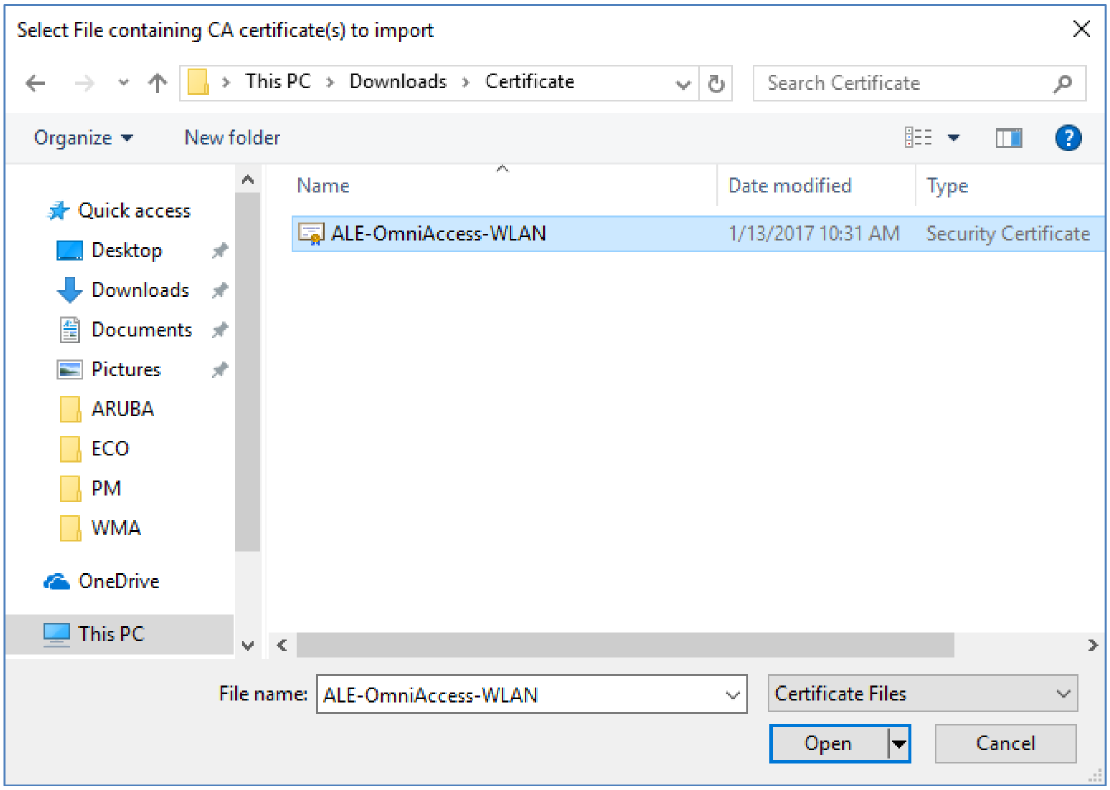
Figure 10-10 Case B - Step 2



You have certificates on file that identify these certificate authorities:

Certificate Name	Security Device
AC Camerfirma S.A.	
Chambers of Commerce Root - 2008	Builtin Object Token
Global Chambersign Root - 2008	Builtin Object Token
AC Camerfirma SA CIF A82743287	
Chambers of Commerce Root	Builtin Object Token
Global Chambersign Root	Builtin Object Token
ACCV	
ACCVRAIZ1	Builtin Object Token

Figure 10-11 Case B - Step 3

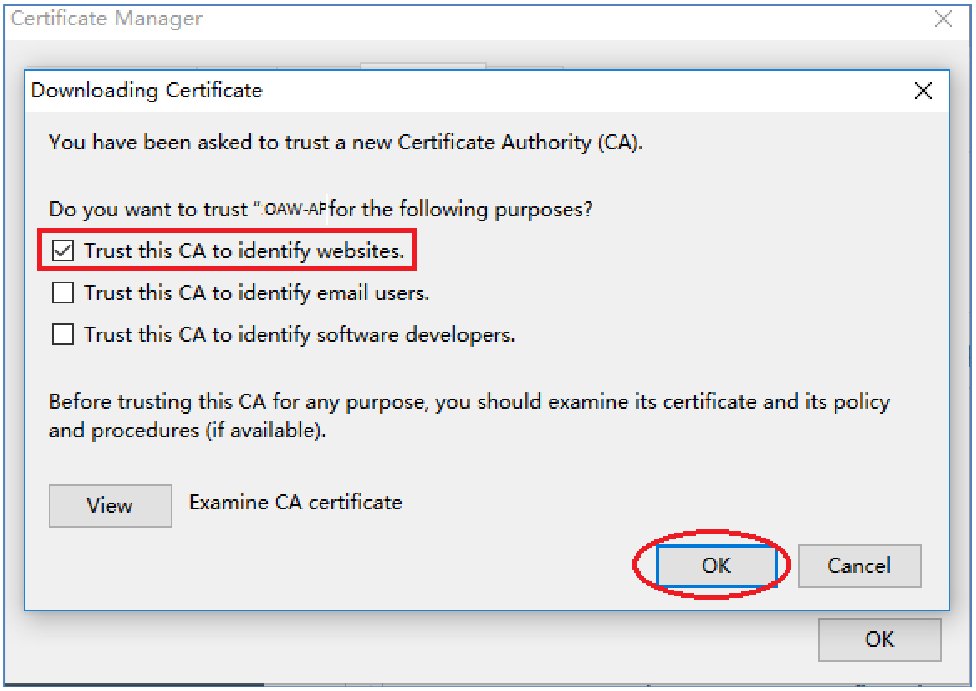


Name	Date modified	Type
ALE-OmniAccess-WLAN	1/13/2017 10:31 AM	Security Certificate

File name: ALE-OmniAccess-WLAN

Certificate Files

Figure 10-12 Case B - Step 4



You have been asked to trust a new Certificate Authority (CA).

Do you want to trust "OAW-AP for the following purposes?

☑ Trust this CA to identify websites.

□ Trust this CA to identify email users.

□ Trust this CA to identify software developers.

Before trusting this CA for any purpose, you should examine its certificate and its policy and procedures (if available).

Examine CA certificate

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.

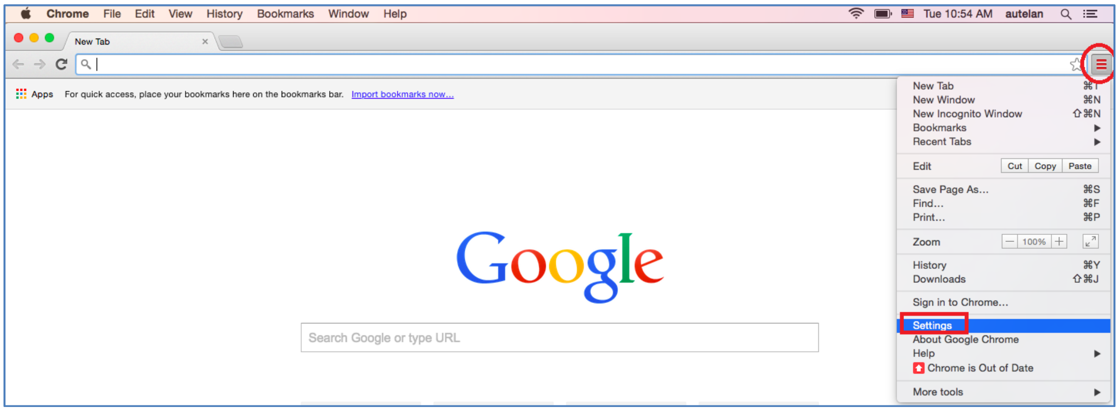
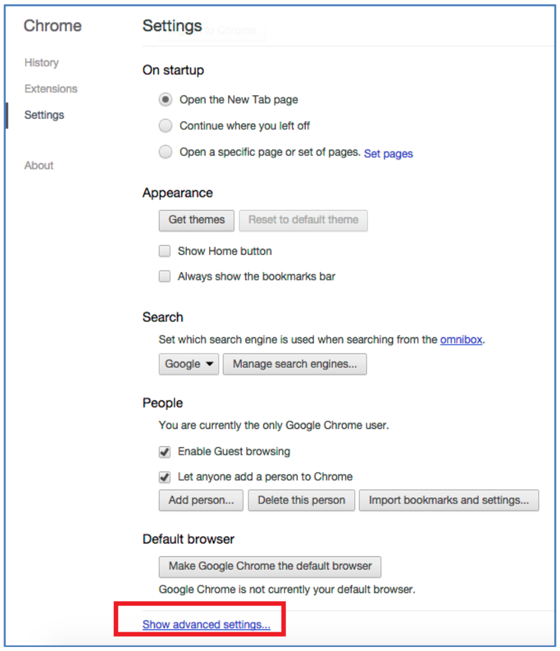


Figure 10-14 Case C - Step 1



On startup

● Open the New Tab page

○ Continue where you left off

○ Open a specific page or set of pages. Set pages

Appearance

Get themes | Reset to default theme

□ Show Home button

□ Always show the bookmarks bar

Search

Set which search engine is used when searching from the omnibox.

Google ▾ | Manage search engines...

People

You are currently the only Google Chrome user.

☑ Enable Guest browsing

☑ Let anyone add a person to Chrome

Add person... | Delete this person | Import bookmarks and settings...

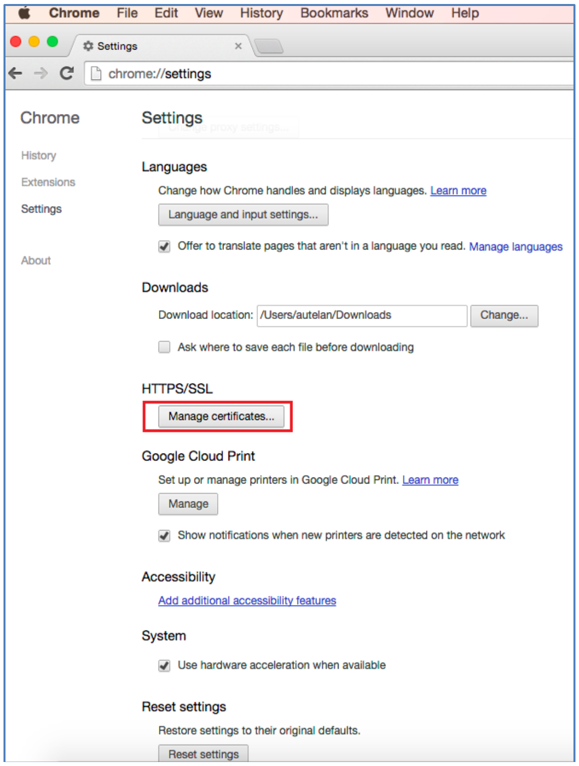
Default browser

Make Google Chrome the default browser

Google Chrome is not currently your default browser.

Show advanced settings...

Figure 10-15 Case C - Step 2



Languages

Change how Chrome handles and displays languages. Learn more

☑ Offer to translate pages that aren't in a language you read. Manage languages

Downloads

Download location: /Users/autelan/Downloads

□ Ask where to save each file before downloading

HTTPS/SSL

Google Cloud Print

Set up or manage printers in Google Cloud Print. Learn more

☑ Show notifications when new printers are detected on the network

Accessibility

Add additional accessibility features

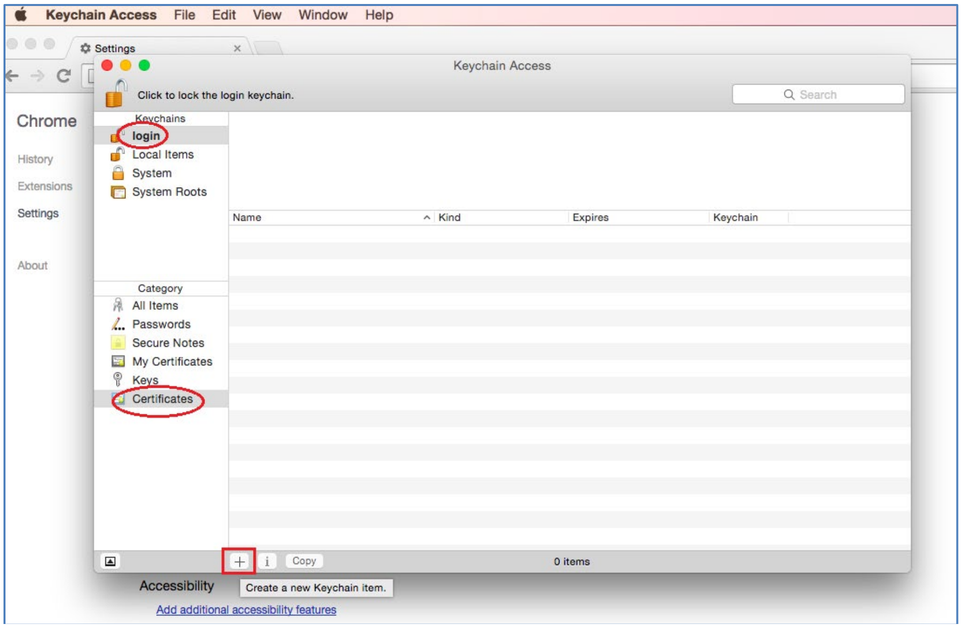
System

☑ Use hardware acceleration when available

Reset settings

Restore settings to their original defaults.

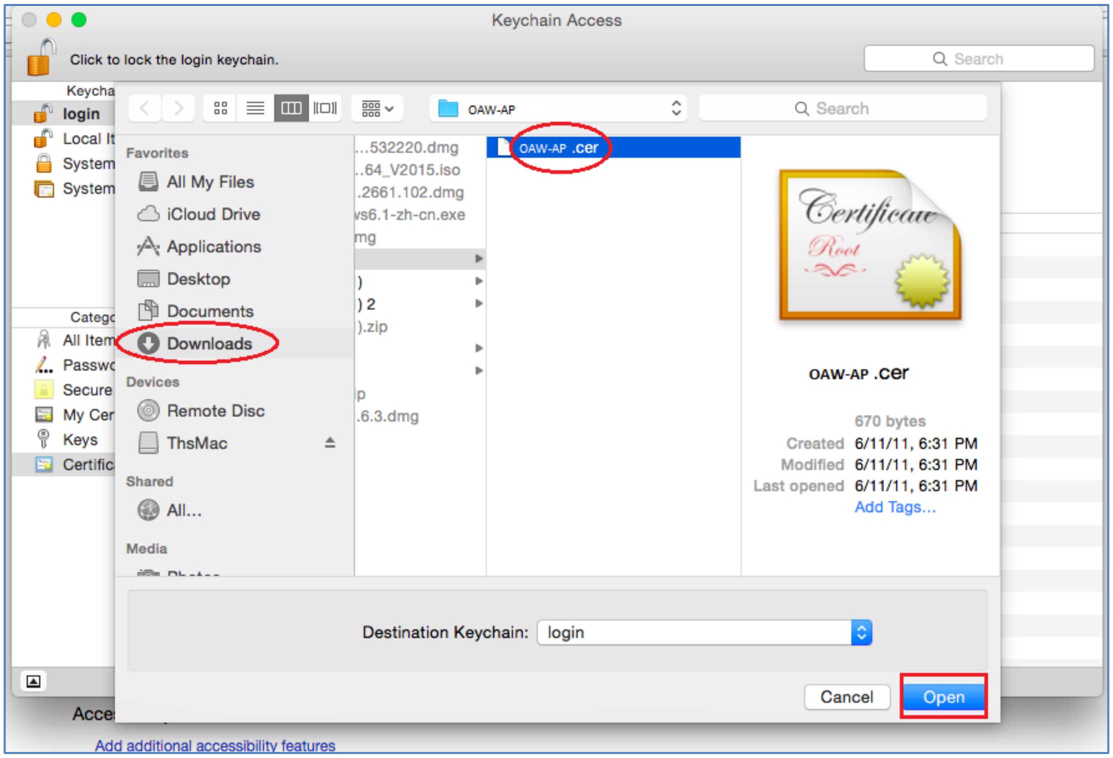
Figure 10-16 Case C - Step 3



Click to lock the login keychain.

Create a new Keychain item.

Figure 10-17 Case C - Step 4

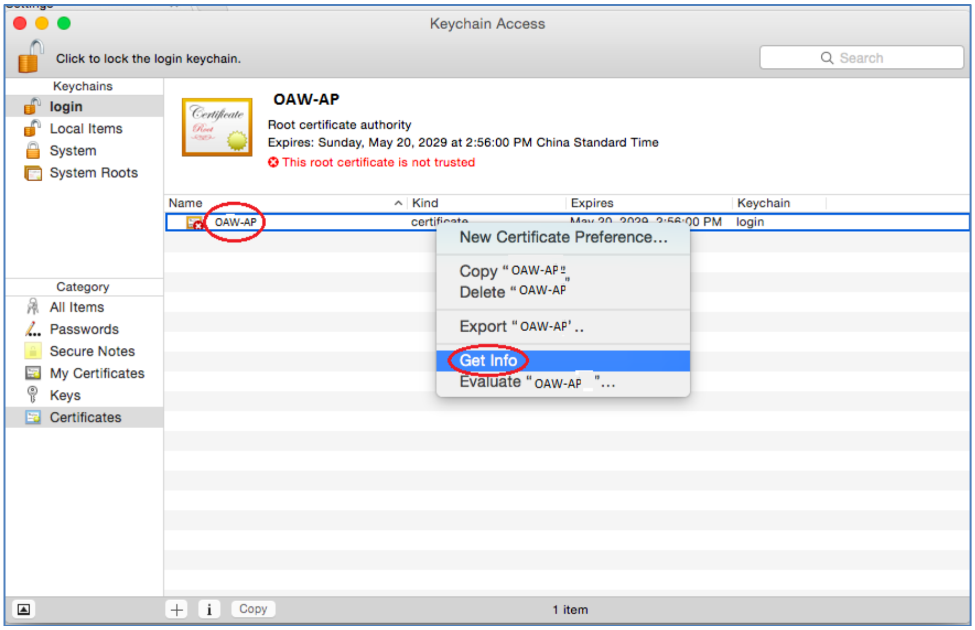


OAW-AP .cer

670 bytes
Created 6/11/11, 6:31 PM
Modified 6/11/11, 6:31 PM
Last opened 6/11/11, 6:31 PM

Destination Keychain: login

Figure 10-18 Case C - Step 5



OAW-AP

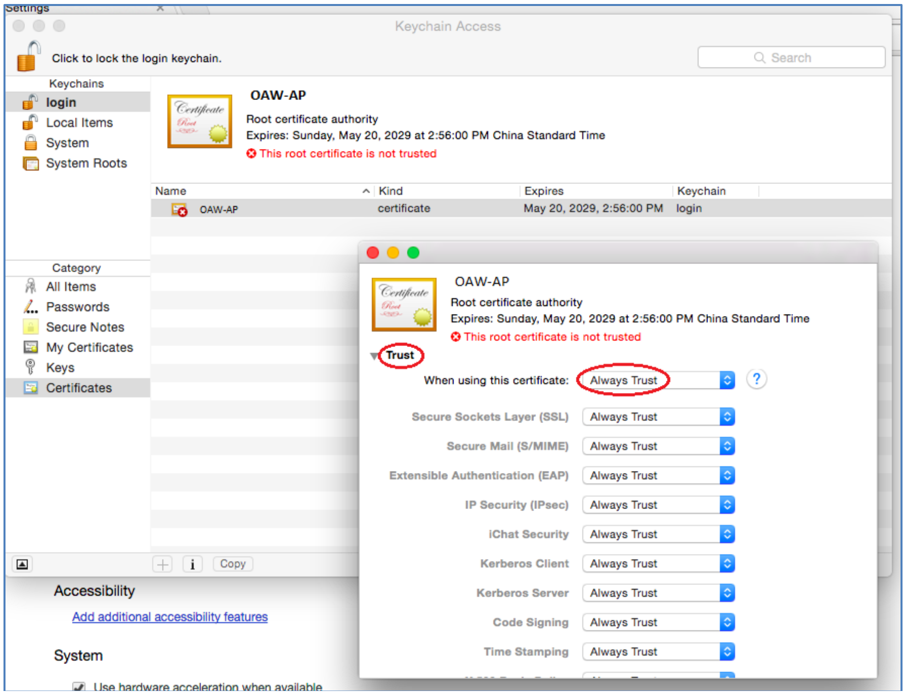
Root certificate authority

Expires: Sunday, May 20, 2029 at 2:56:00 PM China Standard Time

This root certificate is not trusted

Name	Kind	Expires	Keychain
OAW-AP	certificate	May 20, 2029, 2:56:00 PM	login

Figure 10-19 Case C - Step 6



Click to lock the login keychain.

OAW-AP
Root certificate authority
Expires: Sunday, May 20, 2029 at 2:56:00 PM China Standard Time
✖ This root certificate is not trusted

Name	Kind	Expires	Keychain
OAW-AP	certificate	May 20, 2029, 2:56:00 PM	login

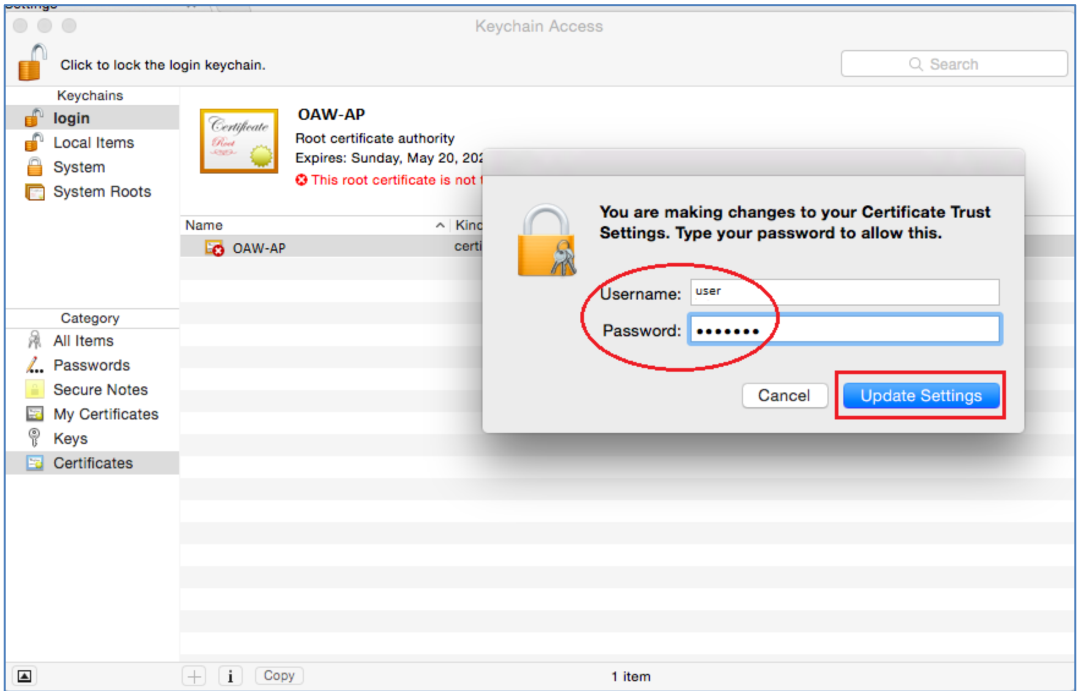
OAW-AP
Root certificate authority
Expires: Sunday, May 20, 2029 at 2:56:00 PM China Standard Time
✖ This root certificate is not trusted

▼ Trust

When using this certificate:	Always Trust
Secure Sockets Layer (SSL)	Always Trust
Secure Mail (S/MIME)	Always Trust
Extensible Authentication (EAP)	Always Trust
IP Security (IPsec)	Always Trust
iChat Security	Always Trust
Kerberos Client	Always Trust
Kerberos Server	Always Trust
Code Signing	Always Trust
Time Stamping	Always Trust

☑ Use hardware acceleration when available

Figure 10-20 Case C - Step 7



Click to lock the login keychain.

OAW-AP
Root certificate authority
Expires: Sunday, May 20, 202
✖ This root certificate is not

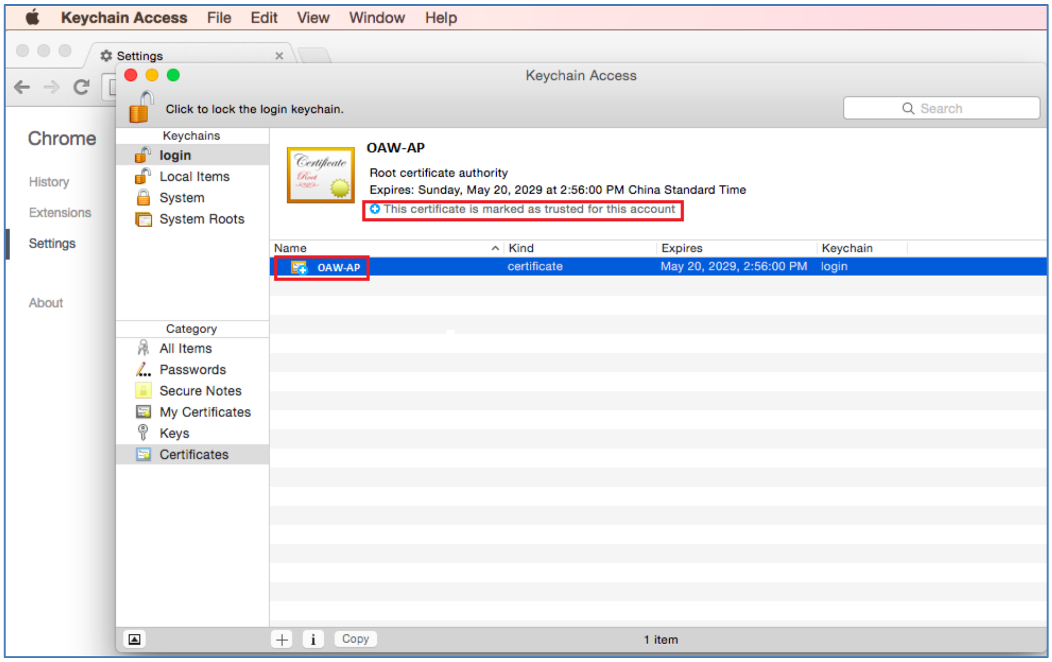
Name	Kind
OAW-AP	certi

You are making changes to your Certificate Trust Settings. Type your password to allow this.

Username: user
Password: •••••••

1 item

Figure 10-21 Case C - Step 8



Click to lock the login keychain.

OAW-AP

Root certificate authority

Expires: Sunday, May 20, 2029 at 2:56:00 PM China Standard Time

This certificate is marked as trusted for this account

Name	Kind	Expires	Keychain
OAW-AP	certificate	May 20, 2029, 2:56:00 PM	login

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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