



Grandstream Networks, Inc.

GWN7000 Controller - GWN76xx Wireless AP
Management & Provisioning



Table of Contents

INTRODUCTION	4
CONNECTING AND ACCESSING THE GWN7XXX.....	5
Connecting the GWN7000 and GWN76xx	5
Access WEB GUI.....	5
MANAGING WIFI NETWORK USING GWN76XX.....	7
Power and Connect GWN76xx Access Point	7
Discover and Pair GWN76xx Access Points.....	7
GWN76xx Access Point Configuration	9
MANAGING GROUPS AND SSIDS.....	12
Network Groups.....	12
SSIDs.....	18
<i>Create an SSID under a Network Group</i>	<i>18</i>
<i>Additional SSID under Same Network Group.....</i>	<i>18</i>
CLIENTS MANAGEMENT	20
Status.....	20
Edit IP and Name.....	21
Block a client.....	22
DEPLOYMENT EXAMPLES	23
Deployment with Single GWN76xx Access Point.....	23
Deployment with Multiple GWN76xx Access Points	23



Table of Tables

Table 1: GWN76XX Device Configuration	10
Table 2: Network Group -> Basic.....	13
Table 3: Network Group -> Wi-Fi	15

Table of Figures

Figure 1: System Installation & Deployment.....	5
Figure 2: GWN7000 Web GUI Login Page.....	6
Figure 3: GWN7000 Discovering Access Points	8
Figure 4: Pair the Discovered GWN76XX	8
Figure 5: Pair the Discovered GWN76XX Provisioning Status	8
Figure 6: GWN76XX Online Status	8
Figure 7: GWN7600 Offline Status	9
Figure 8: Edit Button on GWN76xx	9
Figure 9: GWN76xx Device Configuration.....	10
Figure 10: Network Group	12
Figure 11: Add a New Network Group -> Basic Settings.....	13
Figure 12: Add a New Network Group -> Wi-Fi Settings.....	15
Figure 13: Add a New Network Group -> Device Membership	17
Figure 14: Add AP to Network Group from Access Points Page	17
Figure 15: Select the Network Group for The Access Point	17
Figure 16: Create an SSID	18
Figure 17: Additional SSID.....	19
Figure 18: Additional SSID Created.....	19
Figure 19: Clients.....	20
Figure 20: Client's Status.....	21
Figure 21: Client's Configuration	21
Figure 22: Block a Client.....	22
Figure 23: Unban Client.....	22
Figure 24: Deployment with Single GWN76xx Access Point.....	23
Figure 25: Deployment with Multiple GWN76xx Access Points	23



INTRODUCTION

The GWN7000 is a powerful enterprise-grade router and manager for wireless access points. Ideal for enterprises, office buildings, retail stores, shopping centers, hotels, hospitals, convention centers and more, the GWN7000 allows businesses to build comprehensive Wi-Fi or VPN Networks via many wireless access points that can be shared across many different physical locations.

The GWN7000 can act as controller and manage 300+ GWN76xx Wireless Access Points offering simultaneous dual-band Wi-Fi (2.4GHz and 5GHz) using the latest MIMO 802.11ac technology to maximize bandwidth, increase signal strength and expand Wi-Fi coverage.

This guide contains necessary steps to connect and configure GWN7000 as controller for GWN76xx including discovery, pairing and managing Wi-Fi network groups and SSIDs.



CONNECTING AND ACCESSING THE GWN7XXX

Connecting the GWN7000 and GWN76xx

To set up the GWN7000 and the GWN76xx, follow the steps below:

1. Connect one end of an RJ-45 Ethernet cable into the WAN1 or/and WAN2 port(s) of the GWN7000.
2. Connect the other end of the Ethernet cable(s) into a DSL modem or router(s).
3. Connect the 12V DC power adapter into the power jack on the back of the GWN7000. Insert the main plug of the power adapter into a surge-protected power outlet.
4. Wait for the GWN7000 to boot up and connect to internet/network. In the front of the GWN7000 the Power LED will be in solid green, and the WAN LED will flash in green.
5. Connect one of the LAN ports to your computer, the associated LED ports will flash in green.
6. Connect LAN ports to your GWN76xx access points or/and other devices, the associated LED ports will flash in green as displayed on the following diagram.



Figure 1: System Installation & Deployment

Access WEB GUI

The GWN7000 embedded Web server responds to HTTPS GET/POST requests. Embedded HTML pages allow users to configure the device through a Web browser such as Microsoft IE, Mozilla Firefox, Google Chrome and etc.



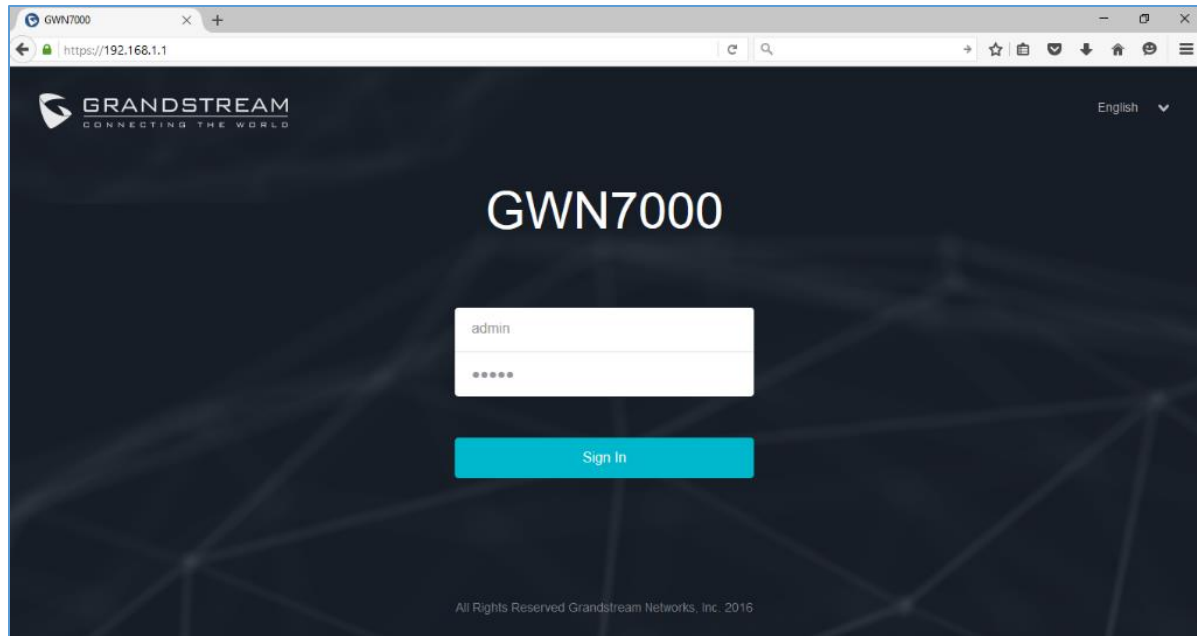


Figure 2: GWN7000 Web GUI Login Page

To access the GWN7000 Web GUI, please refer following steps:

1. Connect a computer to a LAN Port of the GWN7000.
2. Ensure the device is properly powered up, and the Power, LAN port LEDs light up in green.
3. Open a Web browser on the computer and enter the web GUI URL in the following format:
<https://192.168.1.1>
4. Enter the administrator's login and password to access the Web Configuration Menu. The default administrator's username and password are "admin" and "admin".

Note: At first boot or after factory reset, users will be asked to change the default administrator password before accessing GWN7000 web interface. The new password field is case sensitive with a maximum length of 32 characters. Using strong password including letters, digits and special characters is recommended for better security.



MANAGING WIFI NETWORK USING GWN76XX

The GWN7000 Enterprise Router provides users capability to create a wireless network by adding multiple GWN7600 series access points using the most common wireless standards (802.11b/g/n) operating in both 2.4GHz and 5GHz range. GWN7000 can manage up to 300 GWN76xx Access Points.

On this chapter, we will describe in depth how to discover and add the GWN76xx Access Point to GWN7000 Router and how create / manage Wi-Fi zones.

Power and Connect GWN76xx Access Point

1. Connect one end of a RJ-45 Ethernet cable into the NET or PoE/NET port of the GWN76xx.
2. Connect the other end of the Ethernet cable(s) into a LAN port of the GWN7000 Router (or to a switch connected into LAN port of the GWN7000 router so that the access point becomes the LAN client of the GWN7000 router).
3. Connect the 24V DC power adapter into the power jack on the back of the GWN76xx and insert the main plug of the power adapter into a surge-protected power outlet.


Notes:

- GWN76xx can be powered using PoE/PoE+ switch via PoE/NET port. In this scenario, GWN76xx should be connected to GWN7000 using NET port.
 - PoE+ is required to transmit at the highest power, while PoE will at reduced power.
 - GWN76xx has a PoE detection daemon that will monitor the status and update maximum allowable power for radio and USB in real time.
4. Wait for the GWN76xx to boot up and acquire an IP address from the GWN7000.

Discover and Pair GWN76xx Access Points

The GWN76xx is a powerful access point which is fully compatible with the GWN7000 and can be added, provisioned and managed in an easy and intuitive way using the web GUI of the GWN7000 router. Once the GWN76xx is successfully connected and has an IP from the GWN7000 router, users can then pair it to the GWN7000 and associate it with a Wireless Zone.

To pair the GWN76xx access point, please refer to following steps:

1. Access the GWN7000 Web GUI using the administrator username and password. (Default username / password are: admin/admin)
2. Navigate to **Access Points** page which list and display available GWN76xx access points.
3. Clicks on **Discover AP** button  to display discovered access points within GWN7000's Network as displayed on following screenshot.

Note: When the GWN76xx access point is connected to GWN7000 via LAN port and not paired, it will start blinking with a purple color.



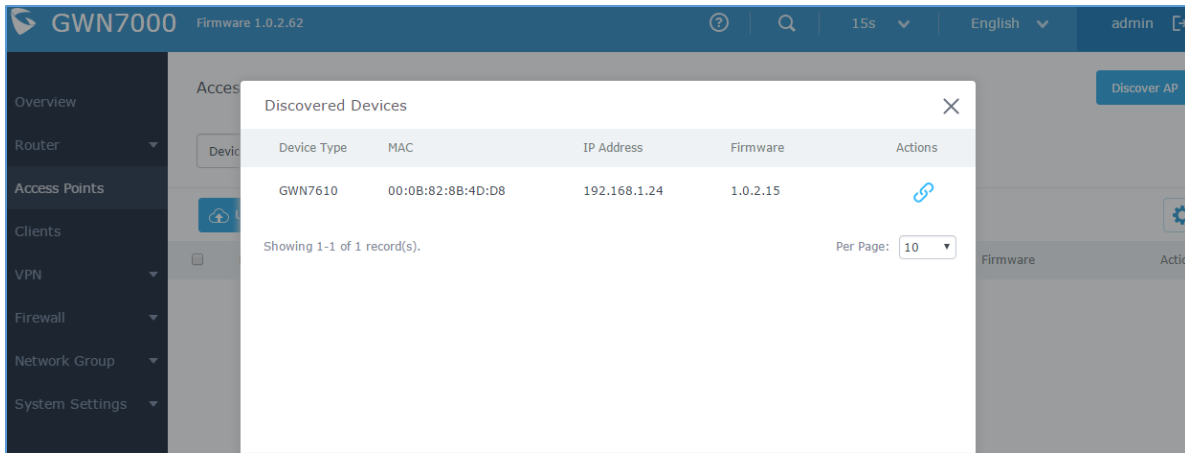


Figure 3: GWN7000 Discovering Access Points

- Click  for the selected device to pair it with GWN7000 Router.

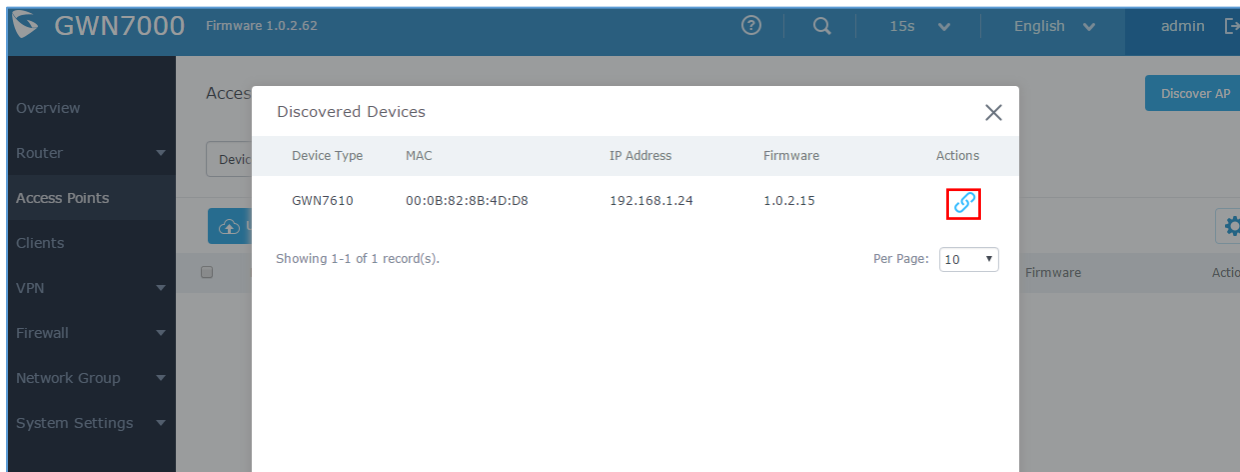


Figure 4: Pair the Discovered GWN76XX

Notes:

- During provisioning, device status shows **Provisioning** as displayed on following screenshot.



<input type="checkbox"/>	Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
<input type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8	192.168.1.24	Provisioning		1.0.2.15	 

Figure 5: Pair the Discovered GWN76XX Provisioning Status

- Once the access point is paired and connected successfully, it will appear as **Online**. Afterwards, it will also display its relevant information such as its name, MAC address, IP address, uptime and firmware version loaded.



<input type="checkbox"/>	Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
<input type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8	192.168.1.24	Online	1h 19m 9s	1.0.2.15	 

Figure 6: GWN76XX Online Status



- When the access point is not reaching the GWN7000, it will appear as **Offline**.




<input type="checkbox"/>	Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
<input type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8		Offline	1h 34m 31s	1.0.2.15	 

Figure 7: GWN7600 Offline Status

- To unpair an access point, click on unpair button  .


Note:

If the GWN76xx is not being paired, or the pair icon is grey color, make sure that it's not being paired with another GWN7000 Router or GWN76xx Access Point acting as Master Controller, if yes users will need to unpair it first, or reset it to factory default settings to make it available for pairing.

GWN76xx Access Point Configuration

The GWN76xx access point can be easily managed and configured from the GWN7000 Web GUI. The GWN7000 acts as controller for all paired GWN76xx access points.

To configure the paired GWN76xx access point, please refer to following steps:

1. Access the GWN7000 Web GUI using the administrator username and password. (Default username / password are: admin/admin)
2. Navigate to **Access Points** page which list and display available / paired GWN76xx access points.
3. Select the desired access point and click on **Edit**  button under **Actions** to access GWN76xx Device Configuration which combine the status, users and configuration settings of the GWN76xx access point.



<input type="checkbox"/>	Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
<input type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8	192.168.1.24	Online	5m 51s	1.0.2.15	 

Figure 8: Edit Button on GWN76xx



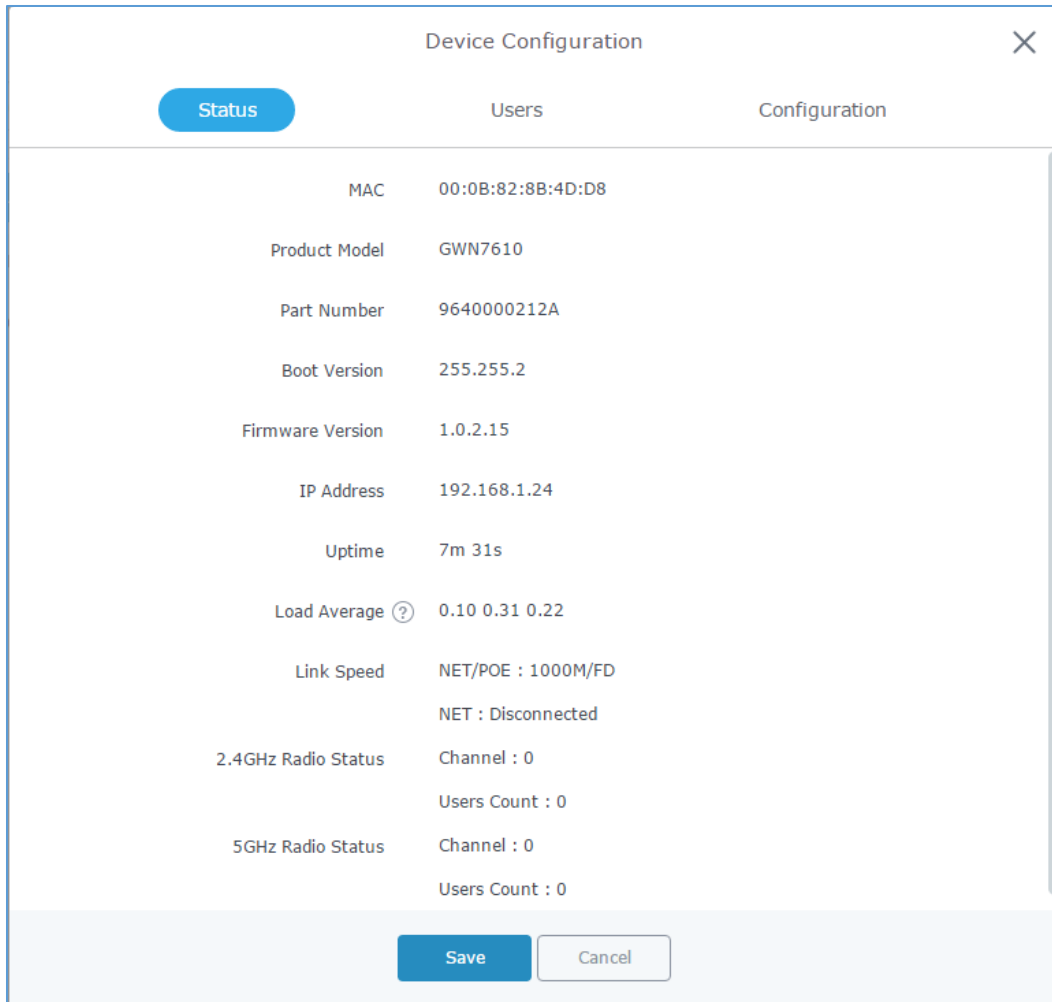


Figure 9: GWN76xx Device Configuration

The following table describes GWN76xx Access Point configuration settings:

Table 1: GWN76XX Device Configuration

Status	Shows the device's status information such as Firmware version, IP Address, Link Speed, Uptime, and Users count via different Radio channels.
Users	Shows the users connected to the GWN76xx access point.
Configuration	<ul style="list-style-type: none"> • Device Name Set GWN76xx's name to identify it along with its MAC address. • Fixed IP Used to set a static IP for the GWN76xx, if checked users will need to set the following: <ul style="list-style-type: none"> ▪ IPv4 Address Enter the IPv4 address to be set as static for the device ▪ IPv4 Subnet Mask Enter the Subnet Mask. ▪ IPv4 Gateway Enter the Network Gateway's IPv4 Address.



- **Preferred IPv4 DNS**
Enter the Primary IPv4 DNS.
- **Alternate IPv4 DNS**
Enter the Alternate IPv4 DNS.

- **Frequency**

Set the GWN76xx's frequency, it can be either 2.4GHz, 5GHz or Dual-band.

- **Enable Band Steering**

When Frequency is set to Dual-Band, users can check this option to enable Band Steering on the Access Point.

This will help redirecting clients to a radio band accordingly for efficient use and to benefit from the maximum throughput supported by the client.

- **Mode**

Choose the mode for the frequency band, 802.11n/g/b for 2.4Ghz and 802.11ac for 5Ghz.

- **Channel Width**

Choose the Channel Width, note that wide channel will give better speed/throughput, and narrow channel will have less interference. 20Mhz is suggested in very high density environment.

- **40MHz Channel Location**

Configure the 40MHz channel location when using 20MHz/40MHz in Channel Width, users can set it to be "Secondary Below Primary", "Primary Below Secondary" or "Auto".

- **Channel**

Select "Auto" or a specific channel. Default is "Auto". Note that the proposed channels depend on **Country** Settings under System Settings→Maintenance.

- **Enable Short Guard Interval**

Check to activate this option to increase throughput.

- **Active Spatial Streams**

Choose active spatial stream. Available options: "Auto", "1 stream", "2 streams" and "3 streams" (For GWN7610).

- **Radio Power**

Set the Radio Power depending on desired cell size to be broadcasted, three options are available: "Low", "Medium" or "High". Default is "High".



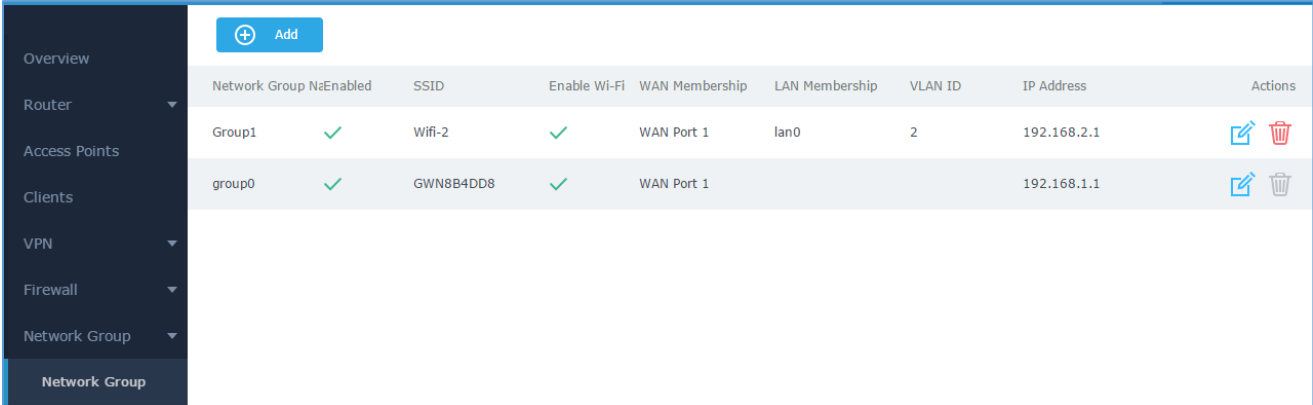
MANAGING GROUPS AND SSIDS

Network Groups

Users can create different Network groups separated by VLANs and adding paired GWN76xx Access Points.

Following steps describe in depth how to add / manage existing network groups



1. Access the GWN7000 Web GUI using the administrator username and password. (Default username / password are: admin/admin)
2. Access to **Network Group-> Network Group**.



Network Group Name	Enabled	SSID	Enable Wi-Fi	WAN Membership	LAN Membership	VLAN ID	IP Address	Actions
Group1	✓	Wifi-2	✓	WAN Port 1	lan0	2	192.168.2.1	[Edit] [Delete]
group0	✓	GWN8B4DD8	✓	WAN Port 1			192.168.1.1	[Edit] [Delete]

Figure 10: Network Group

Note:

The GWN7000 will have a default network group named “group0”, click  to edit it, or click  to add a new network group.



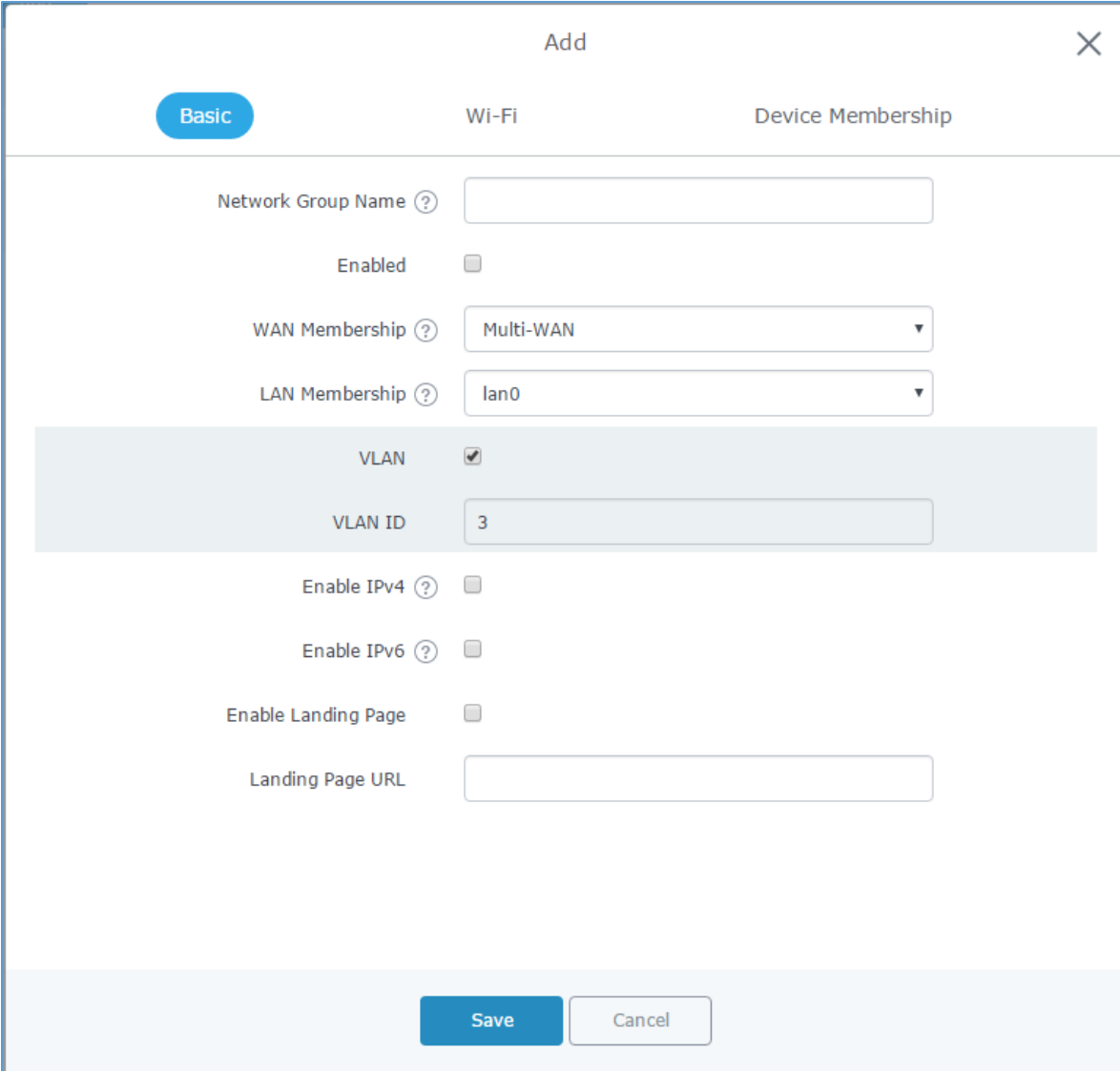


Figure 11: Add a New Network Group -> Basic Settings





When editing or adding a new network group, users will have three tabs for configuration:

- **Basic:** Used to name the network group, and set a VLAN ID if adding a new network group, and addressing plans, refer to below table for each field:

Table 2: Network Group -> Basic

Network Group Name	Specifies the name for the network group.
WAN Membership	Select the WAN port membership. Users can benefit from Multi-WAN option if enabled under Router->Port->Global Settings
LAN Membership	Select the LAN port membership.
VLAN	Check to enable VLAN. This field is appearing only when having more than a network group.



VLAN ID	Set a VLAN ID. Valid range is between 2 and 4093.
Enable IPv4	Check to enable IPv4 addressing for this network group
IPv4 Static Address	Set a static IPv4 address for the network group when enabling IPv4.
IPv4 Subnet Mask	Set the Subnet Mask.
DHCP Enabled for IPv4	Check to enable DHCP using IPv4. This will allow clients connected to this network group to get IPv4 addresses automatically from GWN7000 acting as DHCP server.
DHCP Start Address	Set the starting IPv4 address for this network group's clients.
DHCP End Address	Set the ending IPv4 address for this network group's clients
DHCP Lease Time	Set the lease time for DHCP clients users can set the value in hours, minutes, or as "infinite". Default lease time is "12h".
DHCPv4 Options	Set the DHCP options. Click on  to add another option, and  to delete an option. Example: 44,192.168.2.50 for DHCP option 44 and 192.168.2.50 is the WINS server's address. Please refer to the following link for DHCP options syntax: https://wiki.openwrt.org/doc/howto/dhcp.dnsmasq
DHCPv4 Relay Enabled	Enable this option, if you want the GWN7000 relays the DHCP requests from clients to another DHCP server(s). Once checked Click on  to add another DHCPv4 Relay Target, and  to delete a DHCPv4 Relay Target.
Enable IPv6	Check to enable IPv6 addressing for this network group.
IPv6 Relay from WAN	Check to allow GWN7000 to relay IPv6 DHCP request from network group's clients to WAN port.
DHCP Enabled for IPv6	Check weather to enable IPv6 DHCP server for this network group.
IPv6 Prefix for Assignment	Set the prefix value to be assigned to the network group. Valid range is between 1 to 64. Example: 64 will assign /64 prefixes.
IPv6 Subnet Hint	Set the subnet mask value.
IPv6 Uplink	Select the WAN port.
Enable Landing Page	Check to enable landing page when connecting to this network group's Wi-Fi.
Landing Page URL	Set the landing page URL to which clients will be redirected once connected to the network group's Wi-Fi.



- **Wi-Fi:** Please refer to the below table for Wi-Fi tab options:

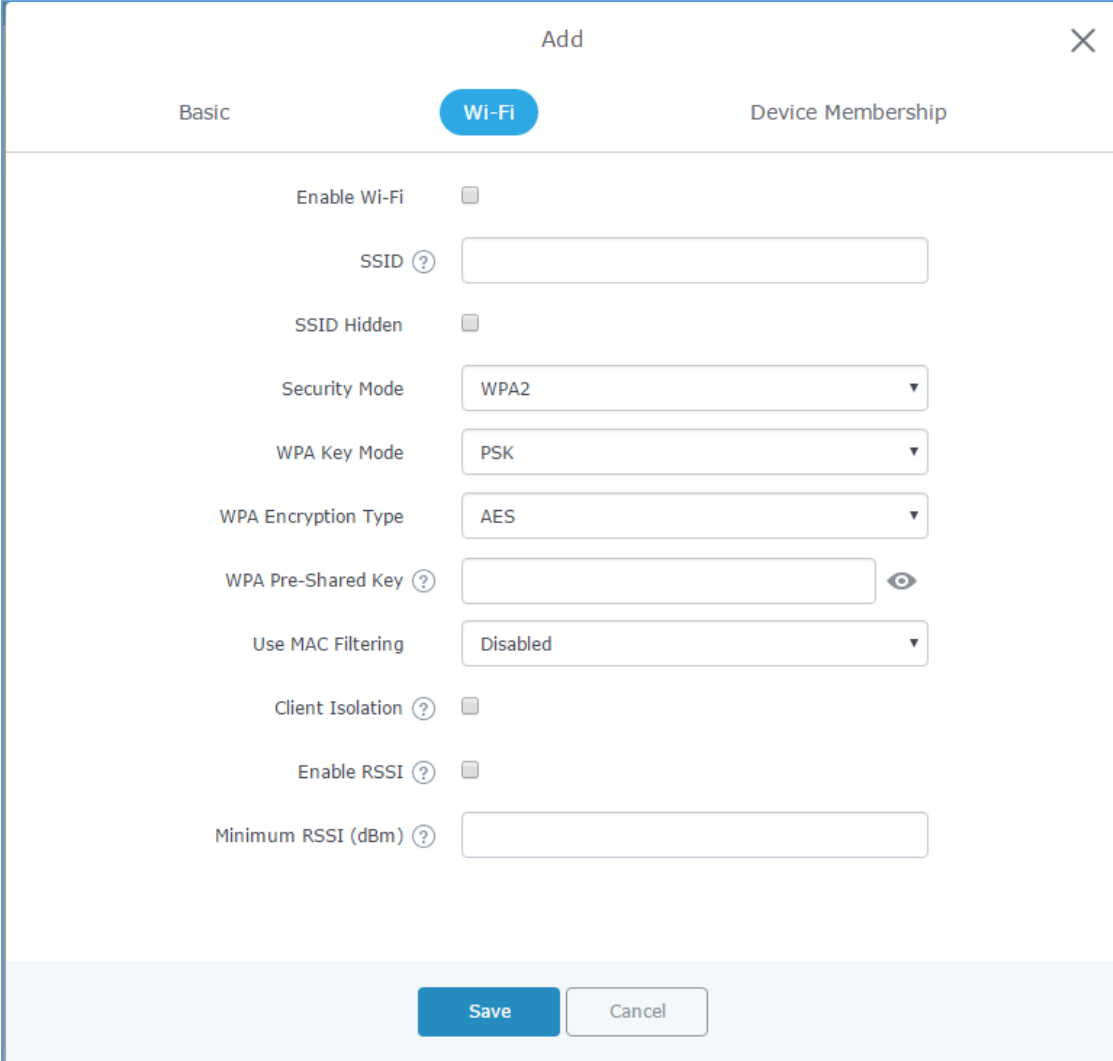


Figure 12: Add a New Network Group -> Wi-Fi Settings

Table 3: Network Group -> Wi-Fi

Enable Wi-Fi	Check to enable Wi-Fi for the network group.
SSID	Set or modify the SSID name.
SSID Hidden	Select to hide SSID. SSID will not be visible when scanning for Wi-Fi, to connect a device to hidden SSID, users need to specify SSID name and authentication password manually.
Security Mode	Set the security mode for encryption, 5 options are available: <ul style="list-style-type: none"> • WEP 64-bit: Using a static WEP key. The characters can only be 0-9 or A-F with a length of 10, or printable ASCII characters with a length of 5. • WEP 128-bit: Using static WEP key. Characters can only be 0-9 or A-F



	<p>with a length of 26, or printable ASCII characters with a length of 13.</p> <ul style="list-style-type: none"> • WPA/WPA2: Using “PSK” or “802.1x” as WPA Key Mode, with “AES” or “AES/TKIP” Encryption Type. • WPA2: Using “PSK” or “802.1x” as WPA Key Mode, with “AES” or “AES/TKIP” Encryption Type. Recommended configuration for authentication. • Open: No password is required. Users will be connected without authentication. Not recommended for security reasons.
Use MAC Filtering	Choose Blacklist/Whitelist to specify MAC addresses to be excluded/included from connecting to the zone’s Wi-Fi. Default is Disabled.
Client Isolation	Choose if client isolation will be enabled in order to forbid wireless clients connected to the zone’s Wi-Fi from seeing each other. If enabled users will need to specify the Gateway’s MAC address so users, will not lose access to the Network.
Gateway MAC Address	Type in the Gateway’s MAC address if using Client Isolation.
RSSI Enabled	Check to enable RSSI function, this will lead the AP to disconnect users below the configured threshold in Minimum RSSI (dBm) .
Minimum RSSI (dBm)	Enter the minimum RSSI value in dBm. If the signal value is lower than the configured minimum value, the client will be disconnected. The input range is from “-94” or “-1”.

- **Device Membership:** Used to add or remove paired access points to the network group.



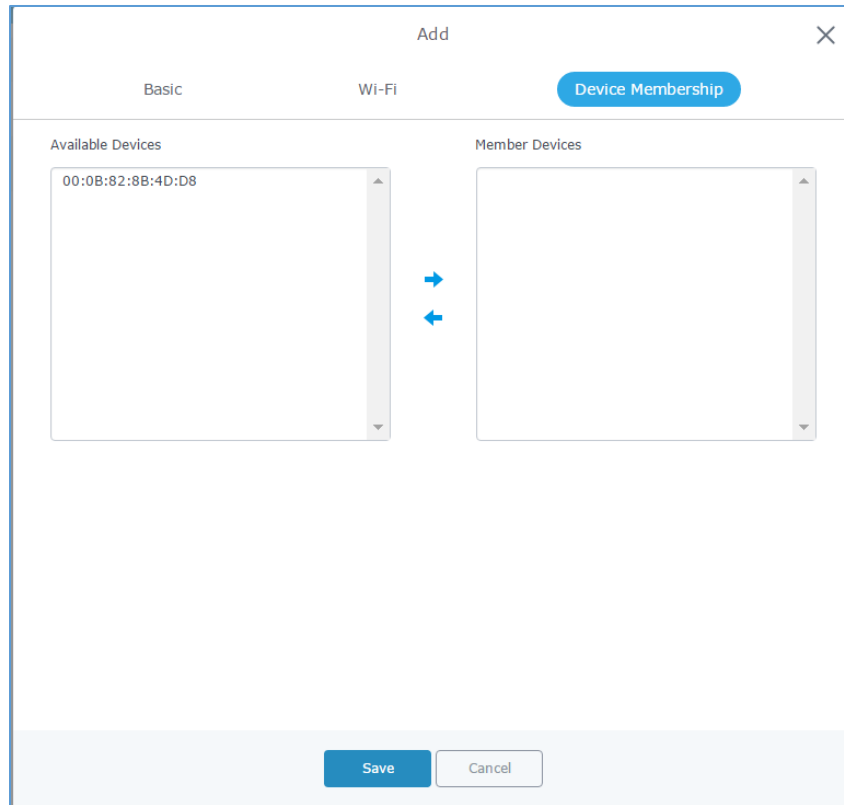




Figure 13: Add a New Network Group -> Device Membership

Click on  to add the GWN76xx to the network group, or click on  to remove it.

Note: Users can also add a device to a Network Group from **Access Points** Page:

- Select the desired AP to add to a Network Group and click on  button.



<input checked="" type="checkbox"/>	Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
<input checked="" type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8	192.168.1.24	Online	3h 9m 36s	1.0.2.15	 

Figure 14: Add AP to Network Group from Access Points Page

- Check to select the desired Network, on which the selected APs will be added, as shown in the following figure.

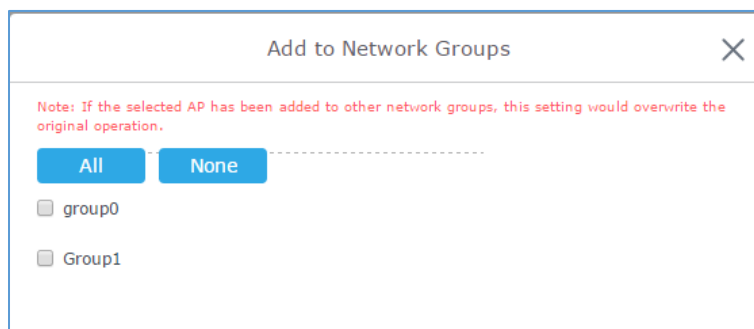


Figure 15: Select the Network Group for The Access Point



SSIDs

Create an SSID under a Network Group

To create an SSID under a network group, please refer to following steps:

1. Under **Network Group** Page, click to edit a network group or create a new network group.
2. Navigate to **Wi-Fi** tab.

(Please refer to **Table 3: Network Group** -> **Wi-Fi** for more details about the Wi-Fi configuration settings.)

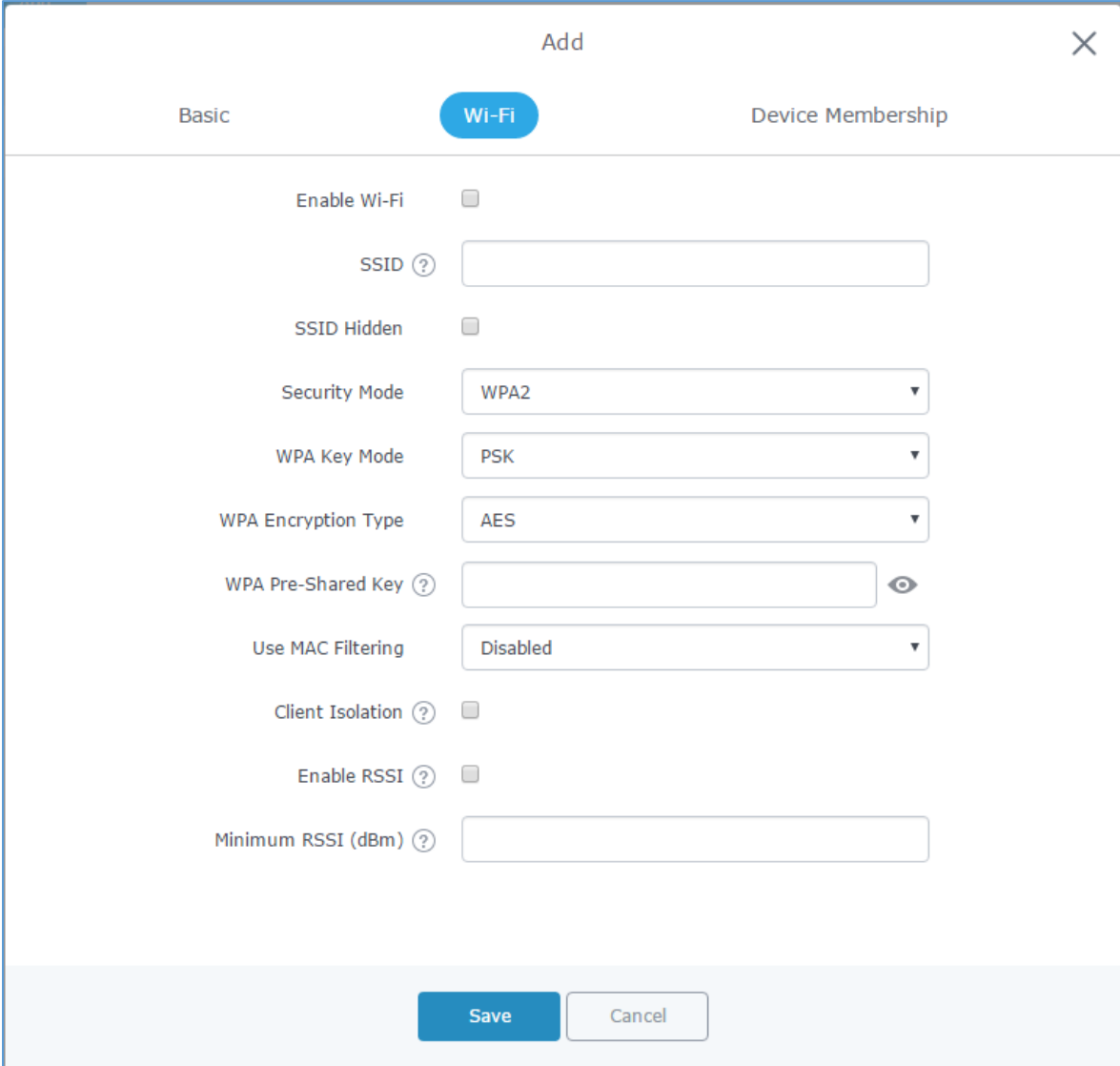


Figure 16: Create an SSID

Additional SSID under Same Network Group

Users can also create an additional SSID under the same group. To create an additional SSID:

1. Access to **Network Group**->**Additional SSID**.



Add ✕

Enable Additional SSID

SSID ?

Network Group Membership

SSID Hidden

Security Mode

WPA Key Mode

WPA Encryption Type

WPA Pre-Shared Key ? 👁

Use MAC Filtering

Client Isolation

Enable RSSI ?



Minimum RSSI (dBm) ?

Enable Landing Page

Landing Page URL

Figure 17: Additional SSID

2. Select one of the available network groups from **Network Group Membership** dropdown menu, this will create an additional SSID with the same Device Membership configured when creating the main network group.

Note: Users can click on  to delete the additional SSID, or  to edit it.



SSID	Enabled	Network Group	Hidden	Security Mode	MAC Filtering	Client Isolation	RSSI	Actions
Additional	✓	group0	✗	WPA2	Disabled	✗	✗	 





















Figure 18: Additional SSID Created



CLIENTS MANAGEMENT


Connected clients to different network groups can be shown and managed from a single interface. Users can access clients list from GWN7000's **Web GUI -> Clients** to perform different actions to wired and wireless clients.

GWN7000 Enterprise Router with its DHCP server enabled on LAN ports level, will assign automatically an IP address to the devices connected to its LAN ports like a computer or GWN76xx access points and to wireless clients connected to paired GWN76xx access points.

MAC	Hostname	Type	IP Address	Radio/Channel	Status	AP	Throughput	Aggregate	Actions
00:0B:82:76:F4:29		Wired	192.168.6.213		Offline	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
00:0B:82:75:21:20		Wired	192.168.6.141		Online	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
B0:83:FE:6D:3C:C6		Wired	192.168.6.237		Online	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
00:0B:82:6B:10:52		Wired	192.168.6.145		Offline	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
00:0B:82:5E:66:D9		Wired	192.168.6.229		Offline	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
24:77:03:C8:72:90	DESKTOP-1A7...	Wireless	192.168.6.150	5GHz 36	Offline	00:0B:82:8B:4E:28	TX:515B/s RX:0b/s	TX:5.61MB RX:6.78MB	 
24:77:03:F3:E4:14	DESKTOP-UDU...	Wireless	192.168.6.93	2.4GHz 1	Offline	00:0B:82:8B:4D:D4	TX:17.47KB/s RX:24.09KB/s	TX:34.95KB RX:48.18KB	 
A4:1F:72:6B:FD:09	EMEA-PC.lan	Wired	192.168.6.74		Offline	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
88:51:FB:57:7D:B0	Surveillance-PC	Wired	192.168.6.75		Online	Wired	TX:0b/s RX:0b/s	TX:0b RX:0b	 
F0:9A:51:0B:82:33	android-c887b...	Wireless	192.168.6.29	2.4GHz 1	Offline	00:0B:82:8B:4D:D4	TX:0b/s RX:0b/s	TX:652.51KB RX:113.40KB	 

Showing 61-70 of 123 record(s). ◀ 1 2 3 4 5 6 7 8 ... 12 13 ▶ Jump to: Go Per Page: 10 ▼

Figure 19: Clients

Click on  under Actions to check the client's status and modify its configuration.

Status

This page allows to check user's basic information such as MAC address, IP address, which Network group does it belong to, and to which access point if it's a wireless client, as well as Throughput and Aggregate usage.



User Configuration ✕

Status
Configuration

MAC	24:77:03:C8:72:90
Hostname	DESKTOP-1A70NOV.lan
Network Group	group0
Connection Type	Wireless
IP Address	192.168.6.150
Connected Time	00:21:15
Connected AP	00:0B:82:8B:4E:28
Channel	36
Aggregate	TX:5.61MB, RX:6.78MB
Throughput	TX:515B/s, RX:0b/s

Save
Cancel

Figure 20: Client's Status

Edit IP and Name

Users can set name for a client and set a static IP

User Configuration ✕

Status
Configuration

Name (?)


Fixed IP (?)



IP Address

Figure 21: Client's Configuration



Block a client

To block a client, click on  under actions.

MAC	Hostname	Type	IP Address	Radio/Channel	Status	AP	Throughput	Aggregate	Actions
C8:38:70:3C:11:A6	android-ce522...	Wireless	192.168.1.32	2.4GHz 11	Online 00:06:38	00:0B:82:8B:4E:24	TX:844B/s RX:1.14KB/s	TX:93.06KB RX:73.33KB	 

Showing 1-1 of 1 record(s). Per Page: 10 Block


Figure 22: Block a Client

To unban a client, go to **Router -> Port -> Global Settings**. Click on  to remove it from the banned list.

WAN Port Settings

WAN Port 1
WAN Port 2
Tunnel
LAN Port
Global Settings
Port Mirroring

Multi-WAN ? Disabled

Banned Client MAC ? c8:38:70:3c:11:a6 


Add new item 

Figure 23: Unban Client



DEPLOYMENT EXAMPLES

Deployment with Single GWN76xx Access Point

In this scenario, only one GWN76xx Access point is connected to GWN7000 network providing WiFi connection to users. GWN7000 is connected to Internet via its WAN port.

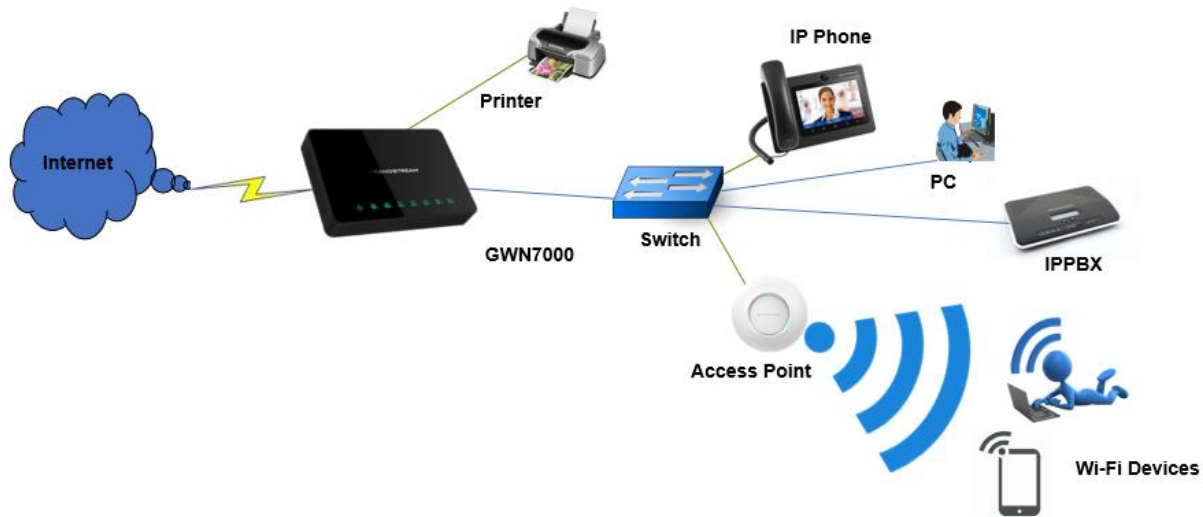


Figure 24: Deployment with Single GWN76xx Access Point

Deployment with Multiple GWN76xx Access Points

In this scenario, multiple GWN76xx Access points are connected to GWN7000 network (either directly or via a switch) providing WiFi connection to users. GWN7000 is connected to Internet via its WAN port. GWN7000 can manage up to 300 GWN76xx Access Points.

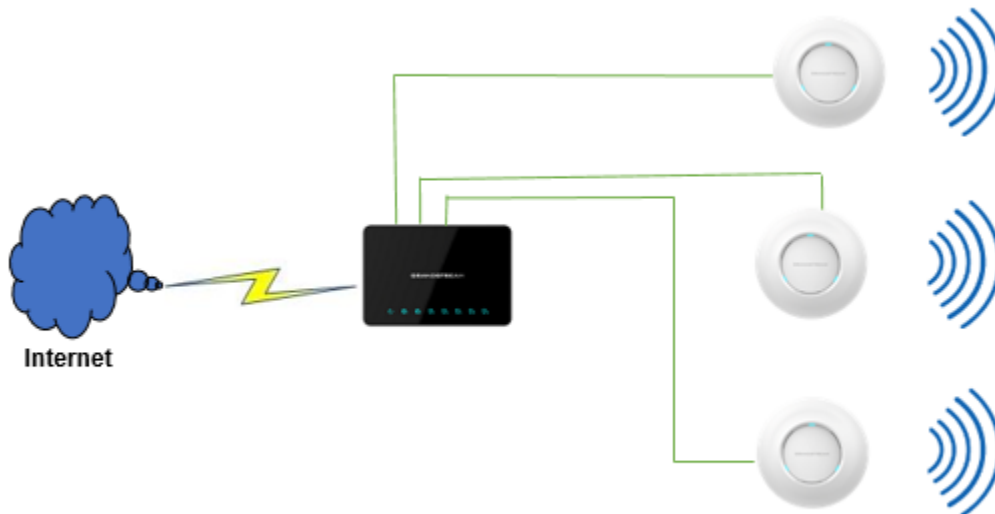


Figure 25: Deployment with Multiple GWN76xx Access Points

