Grandstream Networks, Inc.

GWN7600LR

Enterprise 802.11ac Wave-2

Outdoor Long Range WiFi Access Point

User Manual

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CAUTION

Changes or modifications to this product not expressly approved by Grandstream, or operation of this product in any way other than as detailed by this guide, could void your manufacturer warranty.

FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

GNU GPL INFORMATION

GWN7600LR firmware contains third-party software licensed under the GNU General Public License (GPL). Grandstream uses software under the specific terms of the GPL. Please see the GNU General Public License (GPL) for the exact terms and conditions of the license.

Grandstream GNU GPL related source code can be downloaded from Grandstream web site:
http://www.grandstream.com/support/faq/gnu-general-public-license

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DOCUMENT PURPOSE

This document describes how to configure the GWN7600LR via Web GUI in standalone mode, with other GWN7600LR as Master/Slave architecture and more. The intended audiences of this document are network administrators. Please visit http://www.grandstream.com/support to download the latest "GWN7600LR User Manual".

This guide covers following topics:

CHANGE LOG

This section documents significant changes from previous versions of the GWN7600LR user manuals. Only major new features or major document updates are listed here. Minor updates for corrections or editing are not documented here.

Firmware Version 1.0.3.19

- Added support for Captive portal
- Added support for 802.11k/r/v (enable voice enterprise.)
- Added support for Failover
- Added support for VLAN assignment via RADIUS
- Added support for Select SSID Band
- Added support for Exact Radio Power Configuration in dBm
- Added support for AP locating
- Added support for Per-Client/Per-SSID Bandwidth Rules.
- Added support for Wireless Client Limit per SSID
- Added support for Wireless Schedule
- Added support for DHCP options 66 and 63 to override

Firmware Version 1.0.2.52

- This is the initial version.

WELCOME

Thank you for purchasing Grandstream GWN7600LR Enterprise 802.11ac Wave-2 Outdoor Long Range WiFi Access Pointt. The GWN7600LR, which supports outdoor Wi-Fi supplying, waterproofing and heat resisting, is a mid-tier 802.11ac Wave-2 Wi-Fi access point for small to medium sized businesses, multiple floor offices, commercial locations and branch offices. It offers dual-band 2x2:2 MU-MIMO with beam-forming technology and a sophisticated antenna design for maximum network throughput and expanded Wi-Fi coverage range to 275 meters. To ensure easy installation and management, the GWN7600LR uses a controller-less distributed network management design in which the controller is embedded within the product's web user interface. This allows each access point to manage a network of up to 30 GWN76xx series APs independently without needing separate controller hardware/software and without a single point of-failure. This wireless access point can be paired with any third-party routers as well as Grandstream GWN series routers. With support for advanced QoS, low-latency real-time applications, 450+ concurrent client devices per AP and dual Gigabit network ports with PoE, the GWN7600LR is an ideal Wi-Fi access point for medium wireless network deployments with medium-to-high user density.

⚠ **Caution:**

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PRODUCT OVERVIEW

Technical Specifications

Table 1: GWN7600LR Technical Specifications

Wi-Fi Standards	IEEE 802.11 a/b/g/n/ac (Wave-2)
Antennas	2x 2.4 GHz, gain 4 dBi, internal antenna 2x 5 GHz, gain 5 dBi, internal antenna
Wi-Fi Data Rates	IEEE 802.11ac: 6.5 Mbps to 867 Mbps IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n: 6.5 Mbps to 300 Mbps; 400Mbps with 256-QAM on 2.4GHz IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps *Actual throughput may vary depending on many factors including environmental conditions, distance between devices, radio interference in the operating environment and mix of devices in the network
Frequency Bands	2.4GHz radio: 2.400 - 2.4835 GHz 5GHz radio: 5.150 - 5.250 GHz, 5.725 - 5.850 GHz
Channel Bandwidth	2.4G: 20 and 40 MHz 5G: 20,40 and 80 MHz
Wi-Fi and System Security	WEP, WPA/WPA2-PSK, WPA/WPA2 Enterprise (TKIP/AES), anti-hacking secure boot and critical data/control lockdown via digital signatures, unique security certificate and random default password per device
MIMO	2x2:2 2.4GHz (MIMO), 2x2:2 5GHz (MU-MIMO)
Coverage Range	Up to 902 ft. (275 meters) *Coverage range can vary based on environment
Maximum TX Power	2.4G: 26dBm (FCC) / 16dBm (CE) 5G: 26dBm (FCC) / 18dBm (CE) *Maximum power varies by country, frequency band and MCS rate
Receiver Sensitivity	**2.4G** 802.11b:-100dBm @1Mbps,-93dBm@11Mbps;802.11g:-95dBm @6Mbps,-76dBm @54Mbps; 802.11n 20MHz:-72dBm @MCS7;802.11n 40MHz:-70dBm @MCS7

	5G 802.11a:-93dBm@6Mbps,-76dBm@54Mbps;802.11ac20MHz:-68dBm@MCS8;802.11ac HT40:-65dBm @MCS9;802.11ac 80MHz:-60dBm @MCS9
SSIDs	16 SSIDs per AP
Concurrent Clients	450+
Network Interfaces	2x autosensing 10/100/1000 Base-T Ethernet Ports
Auxiliary Ports	1x Reset Pinhole
Mounting	Outdoor base bracket and cover bracket included
LEDs	1 tri-color LED for device tracking and status indication
Network Protocols	IPv4, 802.1Q, 802.1p, 802.1x, 802.11e/WMM
QoS	802.11e/WMM, VLAN, TOS
Network Management	Embedded controller in GWN7600LR allows it to auto-discover, auto-provision and manage up to 30 GWN76xxs in a network
Power and Green Energy Efficiency	Power over Ethernet 802.3af and 802.3at compliant Maximum Power Consumption:12.9 W (PoE supply) 23.0 W (PoE+ supply)
Temperature & Humidity	Operation: -30°C to 60°C Storage: -30°C to 70°C Humidity: 5% to 95% Non-condensing
Physical	Unit Dimension: 290×150×35mm; Unit Weight:708g Unit + Mounting Kits Dimension : 290×150×56mm; Unit + Mounting Kits Weight: 1528.2g Entire Package Dimension: 423×187×97mm; Entire Package Weight: 1844g
Package Content	Enterprise 802.11ac Wave-2 Outdoor Long Range WiFi Access Point, Mounting Kits, Quick Installation Guide
Compliance	FCC, CE, RCM, IC
Waterproof grade	IP66 level weatherproof capability when installed vertically

INSTALLATION

Before deploying and configuring the GWN7600LR, the device needs to be properly powered up and connected to the network. This section describes detailed information on installation, connection and warranty policy of the GWN7600LR.

Equipment Packaging

Table 2: GWN7600LR Equipment Packaging

Main Case	Yes (1)
Cover Interface	Yes (1)
Base Bracket	Yes (1)
Cover Bracket	Yes (1)
Assembled Screw	Yes (4)
Locknut	Yes (4)
Anchors + Screws	Yes (4)
Screw (PM8 x 115)	Yes (4)
Quick Installation Guide	Yes (1)
GPL License	Yes (1)

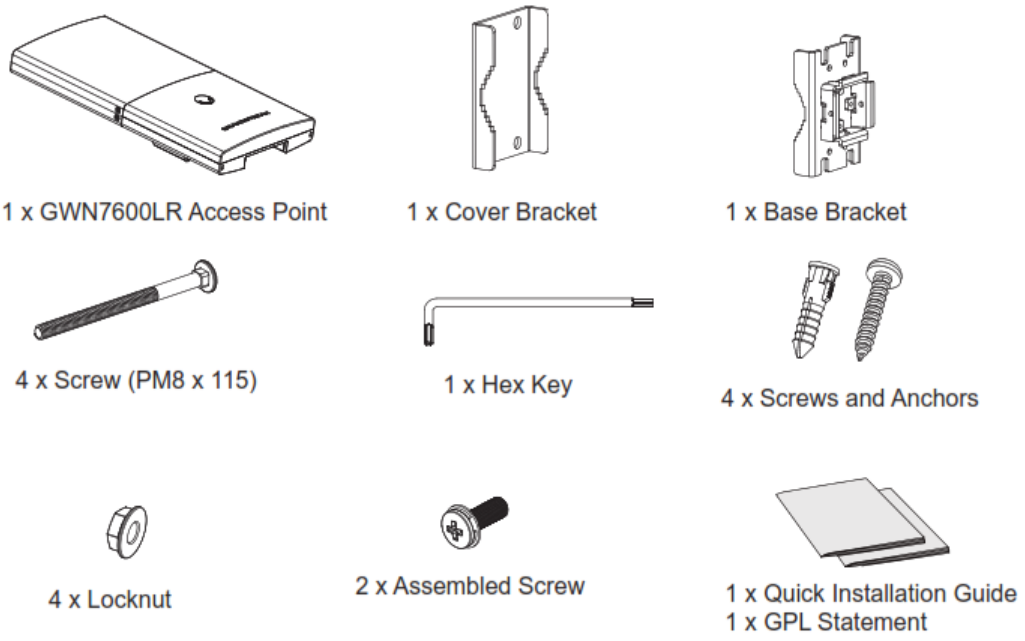


Figure 1: GWN7600LR Equipment Package

GWN7600LR Access Point Ports

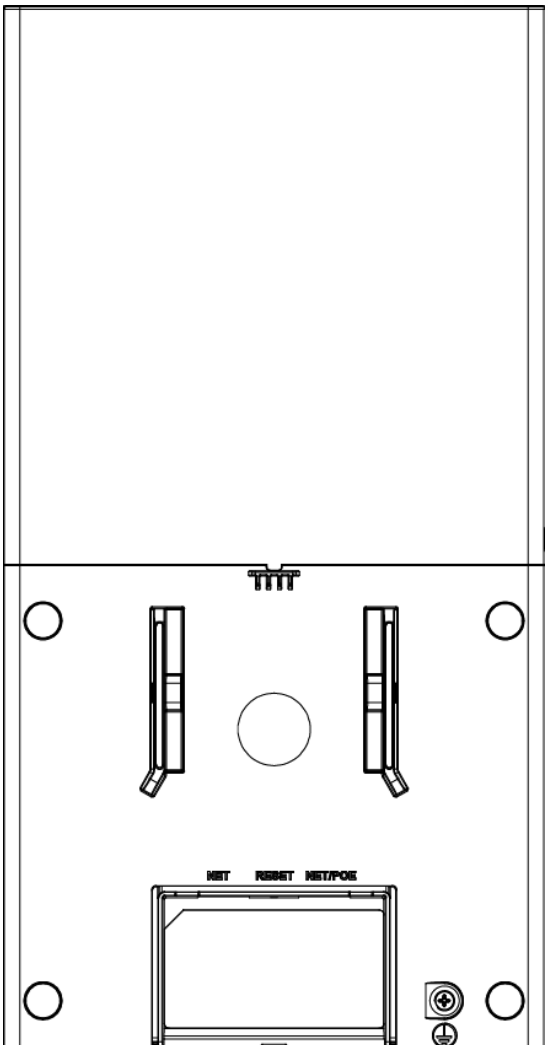


Figure 2: GWN7600LR Ports

Table 3: GWN7600LR Ports Description

Port	Description
NET/PoE	Ethernet RJ45 port (10/100/1000Mbps) supporting PoE.
NET	Ethernet RJ45 port (10/100/1000Mbps) to your router or another GWN76xx series
RESET	Factory reset button. Press for 7 seconds to reset factory default settings.

Power and Connect GWN7600LR Access Point

1. Connect one end of a RJ-45 Ethernet cable into the PoE/NET port of the GWN7600LR.
2. Connect the other end of the Ethernet cable(s) to a PoE switch connected to your LAN network.
3. Wait for the GWN7600LR to boot up and acquire an IP address from the DHCP Server.

Mounting Instructions

Please refer to the following steps for the mounting your GWN7600LR correctly.

1. Prepare the Cover Bracket by inserting the 4 screws (PM8) into corresponding holes.
2. Attach the Cover Bracket with screws on the vertical/horizontal Mounting Bolt were GWN7600LR will be installed.
3. Assemble the Base Bracket with the Cover Bracket using provided locknuts and screws (PM8).
4. Align the GWN7600LR with the Base Bracket and pull it down to the right position.
5. Install the 2x Assembled screws to fix GWN7600LR on the Mounting Bolt.
6. Connect the Ethernet cable (RJ45) to the correct ports of your GWN7600LR.

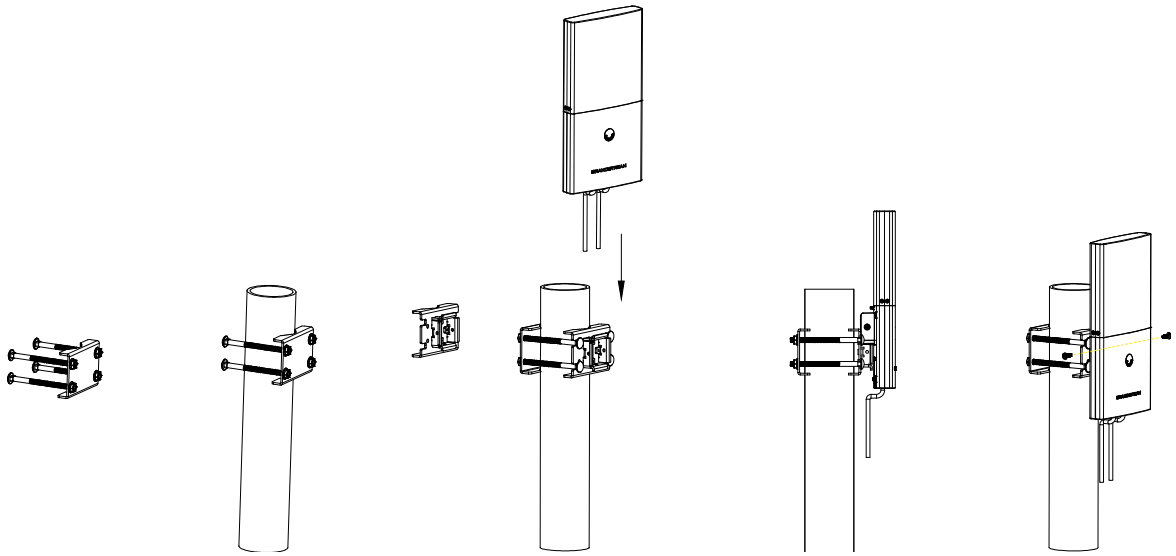


Figure 3: GWN7600LR Vertical Mounting

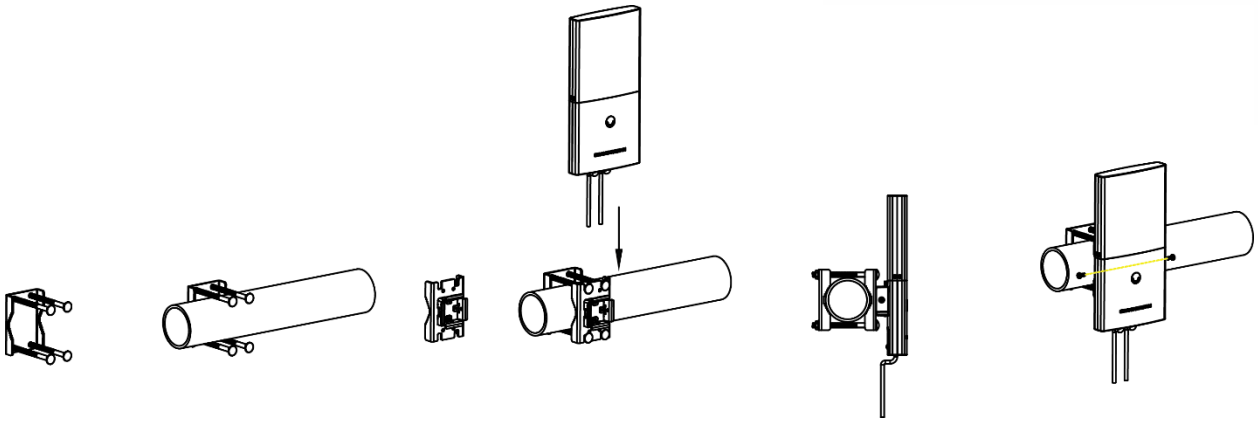


Figure 4: GWN7600LR Horizontal Mounting

Warranty

If the GWN7600LR Wireless Access Point was purchased from a reseller, please contact the company where the device was purchased for replacement, repair or refund. If the device was purchased directly from Grandstream, contact our Technical Support Team for a RMA (Return Materials Authorization) number before the product is returned. Grandstream reserves the right to remedy warranty policy without prior notification.

GETTING STARTED

The GWN7600LR Wireless Access Point provides an intuitive web GUI configuration interface for easy management to give users access to all the configurations and options for the GWN7600LR's setup.

This section provides step-by-step instructions on how to read LED patterns, discover the GWN7600LR and use its Web GUI interface.

LED Patterns

The panel of the GWN7600LR has different LED patterns for different activities, to help users read the status of the GWN7600LR whether it's powered up correctly, provisioned, in upgrading process and more.

The table below describes LED patterns available on GWN7600LR.

Table 4: LED Patterns

LED Status	Indication
OFF	Unit is powered off or abnormal power supply.
Blinking green	Firmware update in progress.
Solid green	Firmware update successful.
Blanking red	Delete slave paring
Solid red	Firmware update failed.
Blinking pink	Unit not provisioned.
Solid pink	Unit not paired
Blinking blue	Unit provisioning in progress.
Solid blue	Unit is provisioned successfully.

Discover the GWN7600LR

Once the GWN7600LR is powered up and connected to the Network correctly, users can discover the GWN7600LR using one of the below methods:

Method1: Discover GWN7600LR using its MAC address

1. Locate the MAC address of the GWN7600LR from the package box.
2. From a computer connected to same Network as the GWN7600LR, type in the following address using the GWN7600LR's MAC address on your browser https://gwn_<mac>.local

For example, if a GWN7600LR has the MAC address **00:B8:8B:7E:7E:7E**, this unit can be accessed by typing https://gwn_00b88b7e7e7e.local/ on the browser.

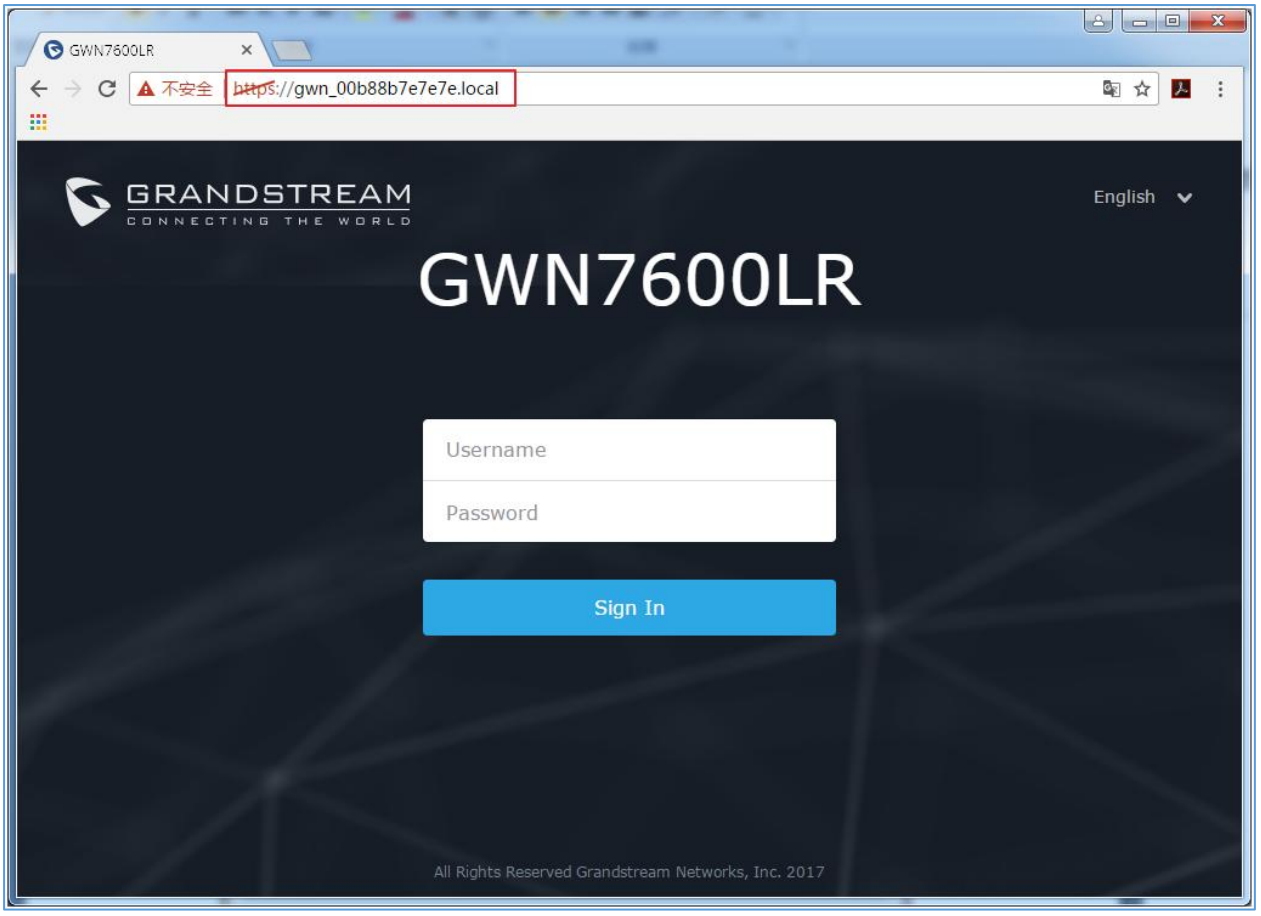


Figure 5: Discover the GWN7600LR using its MAC Address

Method 2: Discover GWN7600LR using GWN Discovery Tool

1. Download and install **GWN Discovery Tool** from the following link: http://www.grandstream.com/support/tools
2. Open the GWNDiscoveryTool, and click on **Scan**.
3. The tool will discover all GWN76xx Access Points, including GWN7600LR, connected to the network showing their MAC and IP addresses.

4. Click on **Manage Device** to be redirected directly to the GWN7600LR's configuration interface, or type in manually the displayed IP address on your browser.

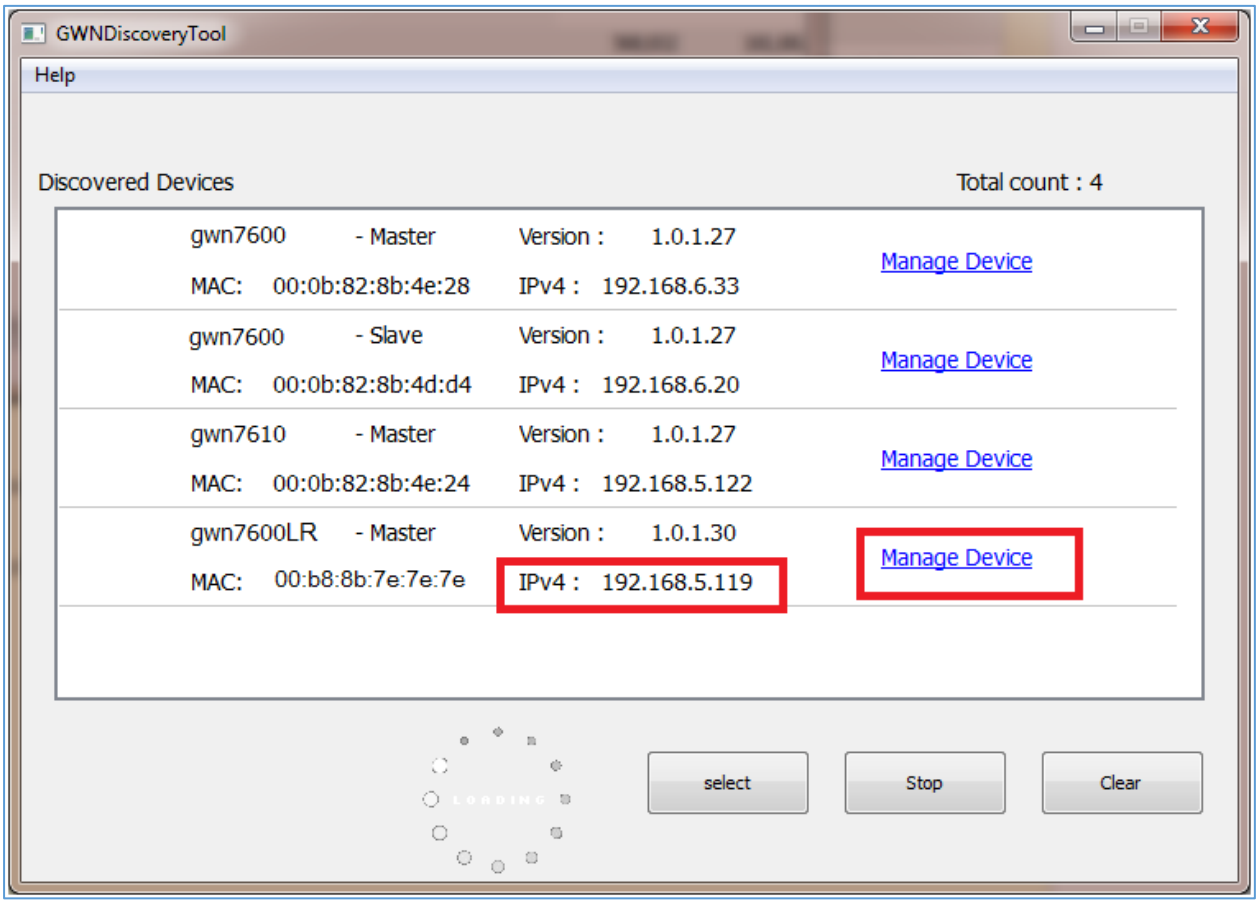


Figure 6: GWN Discovery Tool

Users can access then the GWN7600LR using its Web GUI, the following sections will explain how to access and use the Web Interface.

Use the Web GUI

Access Web GUI

The GWN7600LR 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 etc.

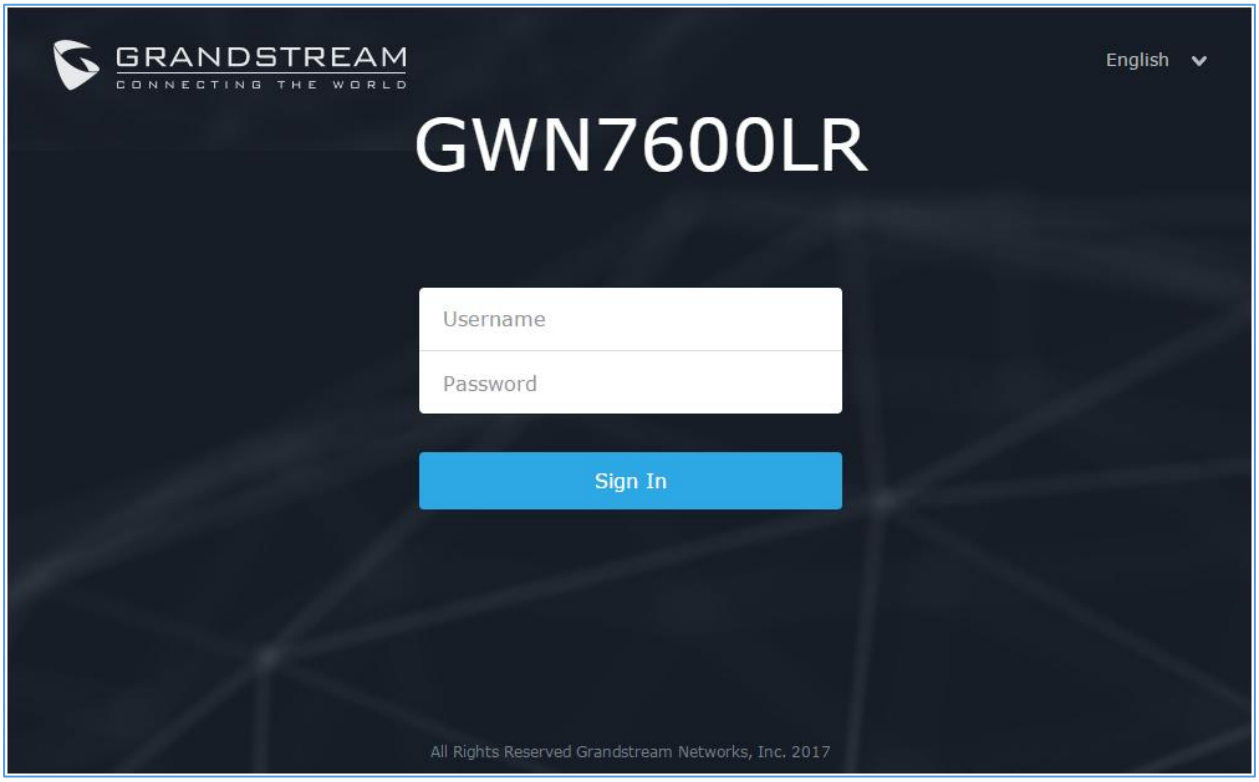


Figure 7: GWN7600LR Web GUI Login Page

To access the Web GUI:

1. Make sure to use a computer connected to the same local Network as the GWN7600LR.
2. Ensure the device is properly powered up.
3. Open a Web browser on the computer and type in the URL using the MAC address as shown in Discover the GWN7600LR or the IP address using the following format:

   https://IP_Address
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".

WEB GUI Languages

Currently the GWN7600LR series web GUI supports ***English*** and ***Simplified Chinese.***
Users can select the displayed language at the upper right of the web GUI either before or after logging in.

Figure 8: GWN7600LR Web GUI Language

Figure 9: GWN7600LR Web GUI Language

Overview Page

Overview is the first page shown after successful login to the GWN7600LR's Web Interface. Overview page provides an overall view of the GWN7600LR's information presented in a Dashboard style for easy monitoring.

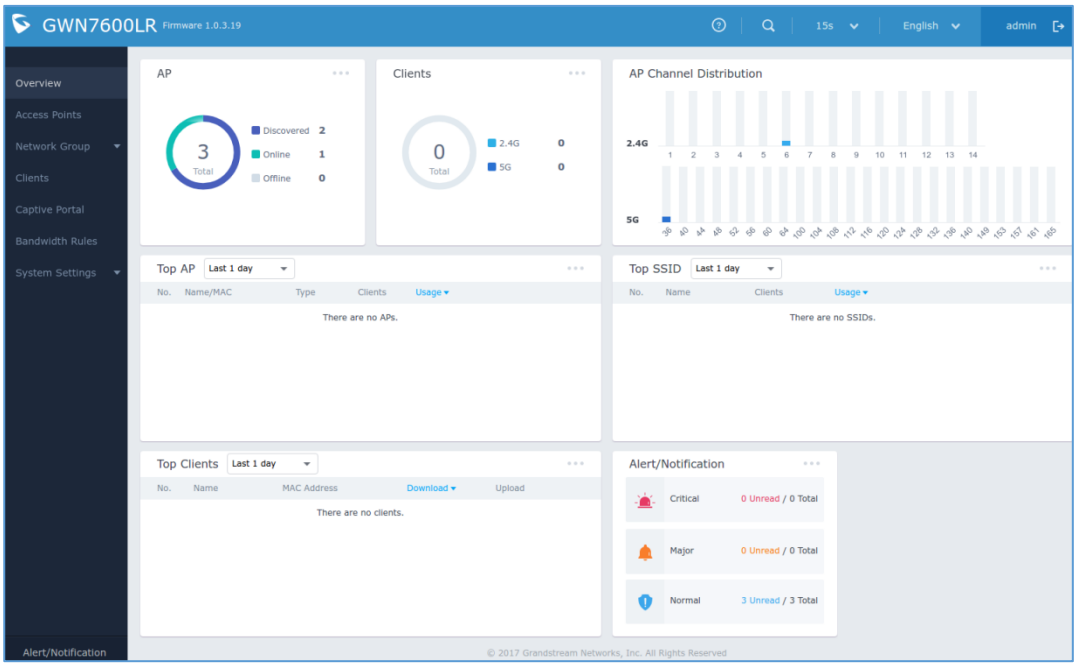


Figure 10: Overview Page

Users can quickly see the status of the GWN7600LR for different items, please refer to the following table for each item:

Table 5: Overview

AP	Shows the number of Access Points that are Discovered, Paired(Online) and Offline. Users may click on ••• to go to Access Points page for basic and advanced configuration options for the APs
Clients	Shows the total number of connected clients, and a count for clients connected to each Channel. Users may click on ••• to go to Clients page for more options.
AP Channel Distribution	Shows the Channel used for all APs that are paired with this Access Point.
Top AP	Shows the Top APs list, users may assort the list by number of clients connected to each AP or data usage combining upload and download. Users may click on ••• to go to Access Points page for basic and advanced configuration options for the APs.
Top SSID	Shows the Top SSIDs list, users may assort the list by number of clients connected to each SSID or data usage combining upload and download. Users may click on ••• to go to Network Group page for more options.
Top Clients	Shows the Top Clients list, users may assort the list of clients by their upload or download. Users may click on ••• to go to Clients page for more options.
Alert/Notification	Shows 3 types of Alert/Notifications: Critical, Major and Normal. Users can click ••• to pop up the list of Alert and Notifications.

Note that status icons can be updated each 15s, 1min, 2min, 5min or Never by clicking  in the upper bar menu (Default is 15s).

Save And Apply Changes

When clicking on "Save" button after configuring or changing any option on the web GUI pages. A message mentioning the number of changes will appear on the upper menu (See Figure 10).

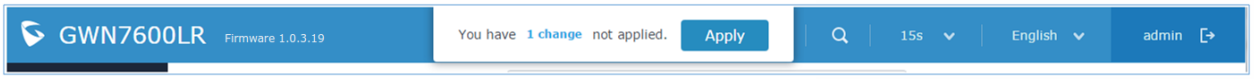


Figure 11: Apply Changes

Click on Apply button to apply changes, or Revert to undo the changes.

Figure 12: Apply Successful

USING GWN7600LR AS STANDALONE ACCESS POINT

The GWN7600LR can be used in Standalone mode, where it can act as Master Access Point Controller or in Slave mode and managed by another GWN7600LR Master.

This section will describe how to use and configure the GWN7600LR in standalone mode.

Connect to GWN7600LR Default Wi-Fi Network

GWN7600LR can be used as standalone access point out of box, or after factory reset with Wi-Fi enabled by default.

After powering the GWN7600LR and connecting it to the network, GWN7600LR will broadcast a default SSID based on its MAC address **GWN[MAC's last 6 digits]** and a random password.

Note that GWN7600LR's default SSID and password information are printed on the MAC tag of the unit as shown on the below figure.

Figure 13: MAC Tag Label

USING GWN7600LR AS MASTER ACCESS POINT CONTROLLER

Master Mode allows a GWN7600LR to act as an Access Point Controller managing other GWN7600LR access points. This will allow users adding other access points under one controller and managing them in an easy and a centralized way.

Master/Slave mode is helpful with large installations that needs more coverage area zones with the same controller.

Figure 14: Login Page

At factory reset, "**Login as Master**" will be checked by default, click on "**Sign In**" after typing the admin's username and password.

⚠ **Warning:**

"**Login as Master**" option will forbid the GWN7600LR Access Point from being paired by other Master GWN76xx, and can only act as a Master Access point controller.

Users will need to perform a factory reset to the GWN7600LR, or unpair it from the initial GWN76xx to make it open to Master Access Point mode again.

Login Page

After login, users can use the Setup Wizard tool to go through the configuration setup, or exit and configure it manually. Setup Wizard can be accessed anytime by clicking on  while on the web interface.

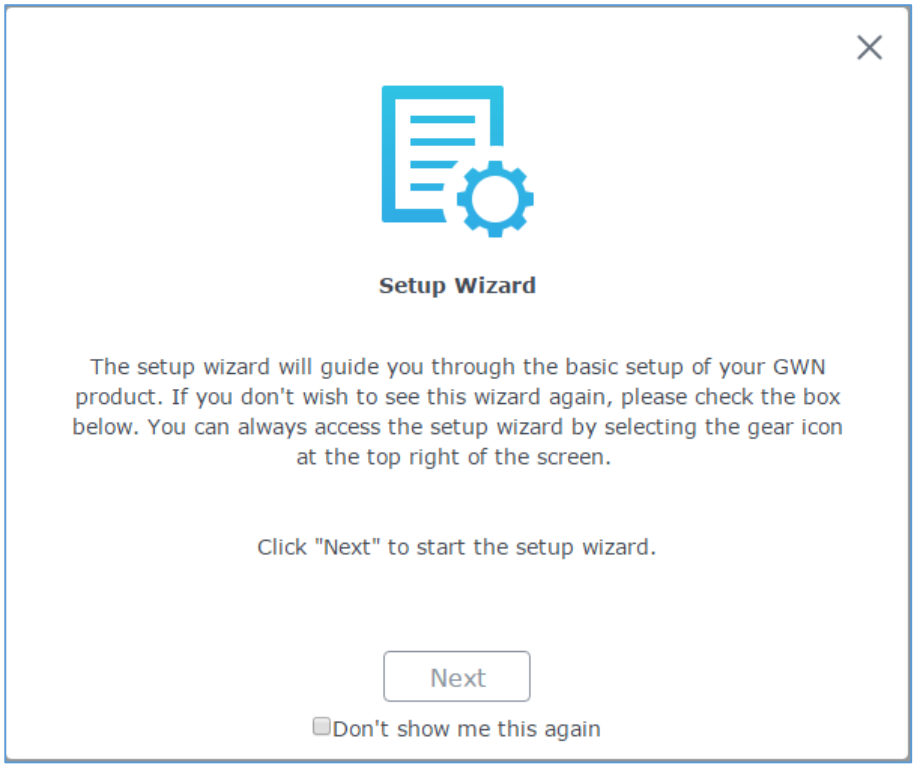


Figure 15: Setup Wizard

Discover and Pair Other GWN7600LR Access Point

To Pair a GWN7600LR access point connected to the same Network as the GWN7600LR follow the below steps:

1. Connect to the GWN7600LR Web GUI as Master and go to **Access Points.**

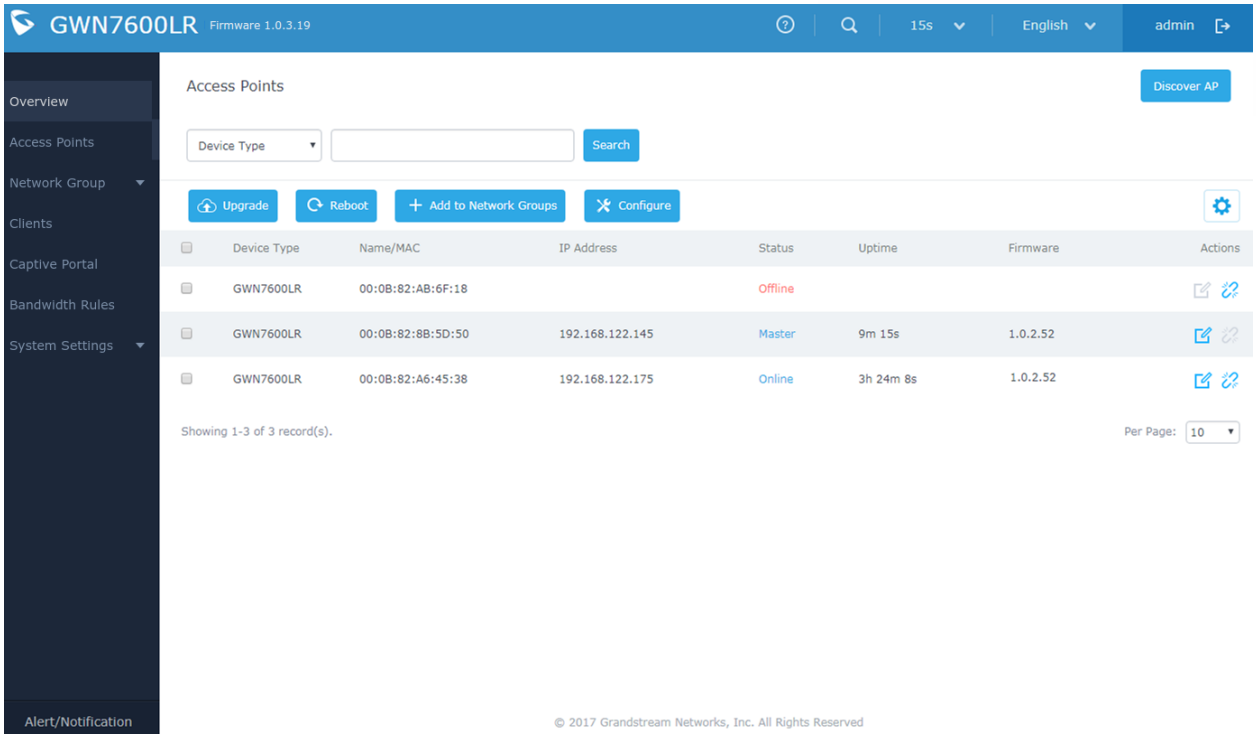


Figure 16: Discover and Pair GWN7600LR

2. Click on Discover AP to discover access points within GWN7600LR's Network, the following page will appear.

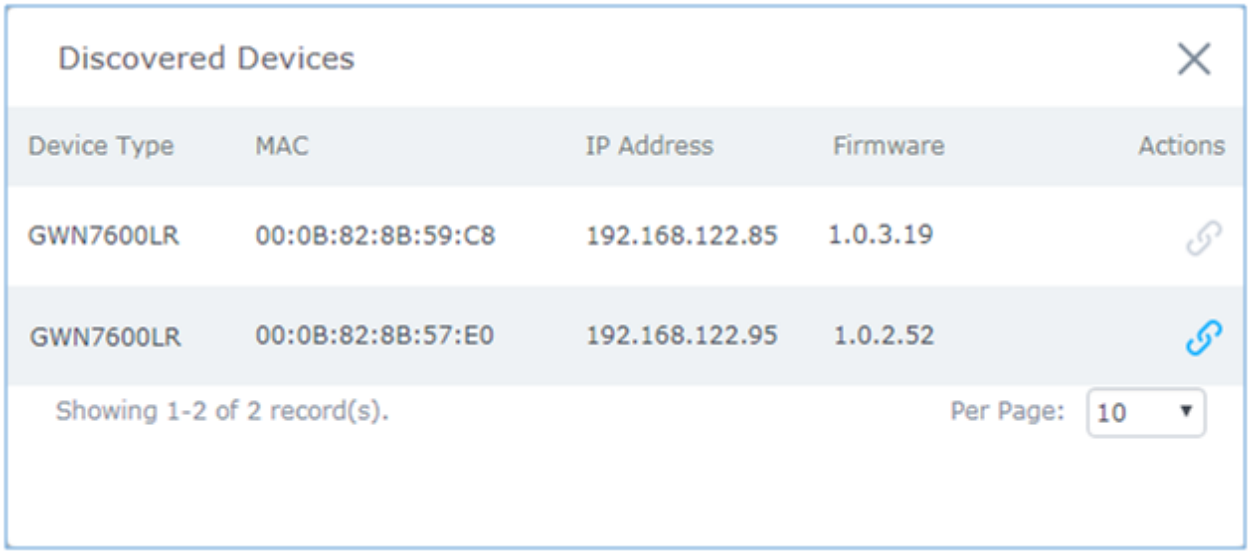


Figure 17: Discovered Devices

3. Click on Pair under Actions to pair the discovered access point as slave with the GWN7600LR acting as Master.

4. The paired GWN7600LR will appear Online, users can click on to unpair it.

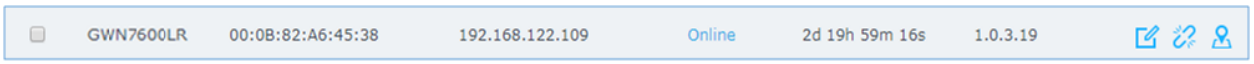


Figure 18: GWN7600LR online

5. Users can click on next to Master or paired access point to check device configuration for its status, users connected to it and configuration. Refer to below table for Device Configuration tabs.

Table 6: 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.
Clients	Shows the connected Users to the GWN7600LR access point.

Configuration	• **Device Name:** Set GWN7600LR's name to be shown next to MAC address.
	• **Fixed IP:** Used to set a static IP for the GWN7600LR, if checked users will need to set the following:
	  ○ 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 GWN7600LR's frequency, it can be either 2.4GHz, 5GHz or Dual-band.
	• **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 if Auto, 1 or 2 streams. • **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". • **Allow Legacy Devices(802.11b):** Check to support 802.11b devices to connect the AP in 802.11n/g mode. • **Custom 2.4GHz/5GHz Wireless Power(dBm):** Support users to set the wireless power.

Note

If a GWN7600LR is not being paired or the pair icon is grey color, make sure that it is not being paired with another GWN76xx acting as Master Access Point Controller, if yes users will need to unpair it first, or reset it to factory default settings to make it available for pairing by other GWN76xx Access Point Controller

AP Locating

Click on  , the LED of the correlated AP will blinking for 10 times, which may help to locate where the AP is.

Failover

Click on Failover to enter the configure page. Select the failover AP which will query for all APs on its "Failover AP" web page or even switch to "Master AP" when the master AP is unable to control its slave APs.

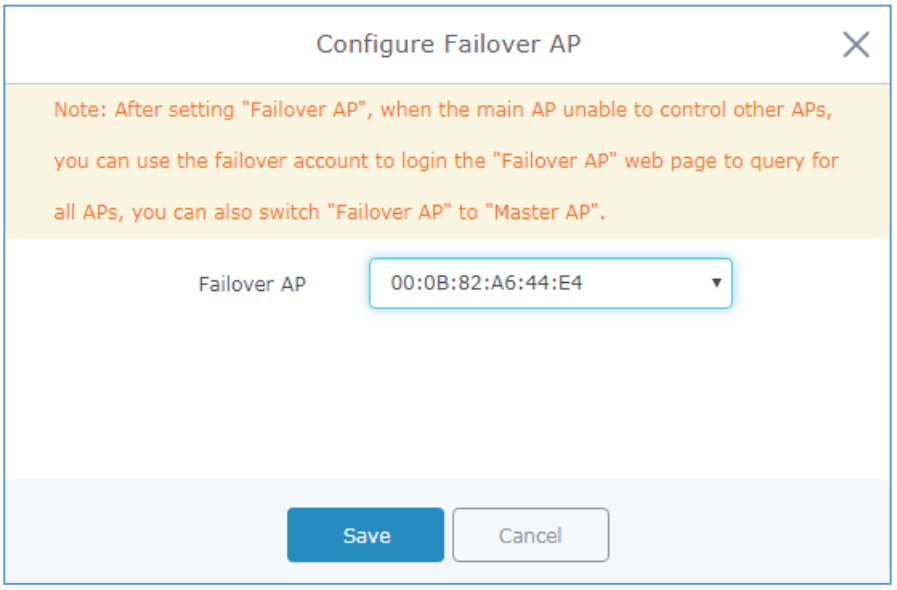


Figure 19: Failover AP configuration

NETWORK GROUPS

When using GWN7600LR as Master Access Point, users can create different Network groups and adding GWN7600LR Slave Access Points.

Log in as Master to the GWN7600LR WebGUI and go to **Network Group->Network Group.**

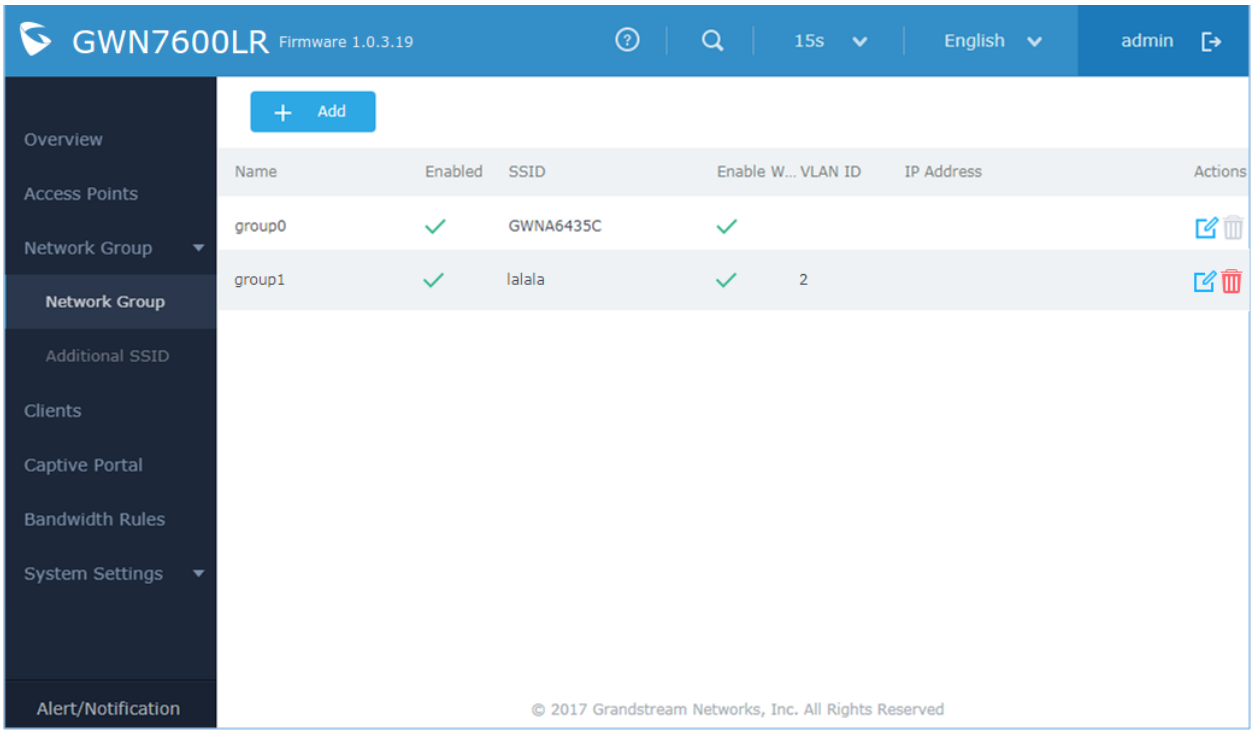


Figure 20: Network Group

The GWN7600LR will have a default network group named group0, click on to edit it, or click on Add to add a new network group.

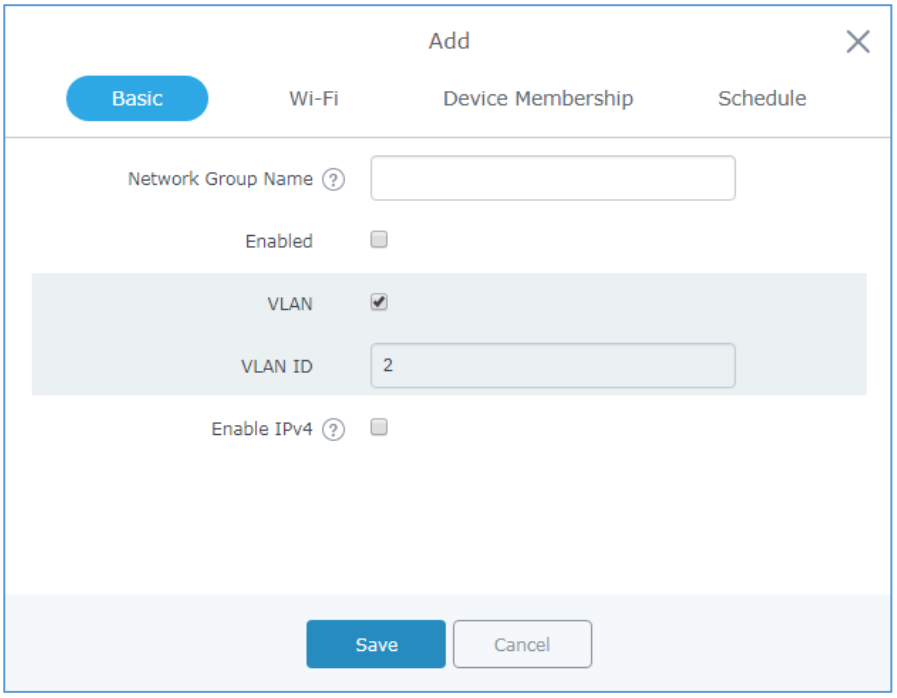


Figure 21: Add a New Network Group

When editing or adding a new network group, users will have three tabs to configure:

- **Basic:** Used to name the network group, and set a VLAN ID if adding a new network group

Table 7: Basic configuration of Network

Network Group Name	Set the name of the new group.
Enabled	Enable the new group.
VLAN	Check to enable/disable VLAN.
VLAN ID	Set a VLAN ID.
Enable IPv4	Check to enable/disable IPv4
IPv4 Static Address	Configure the static address of IPv4
IPv4 Subnet Mask	Configure the corresponding subnet mask of IPv4
DHCP Enabled for IPv4	Check to enable DHCP for IPv4
DHCP Start Address	Set the start address for DHCP
DHCP End Address	Set the end address for DHCP
DHCP Leases Time	Set the DHCP lease time for the clients
DHCP Options	Add the Option items for DHCP, detailed option contents can be found via: https://wiki.openwrt.org/doc/howto/dhcp.dnsmasq

DHCP Gateway	Set the gateway for DHCP, and it is better to set the gateway address out of the DHCP pool.
DHCP Preferred DNS	Set the preferred DNS for DHCP
DHCP Alternated DNS	Set the alternated DNS for DHCP

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

Table 8: Wi-Fi

Field	Description
Enable Wi-Fi	Check to enable Wi-Fi for the network group.
SSID	Set or modify the SSID name.
SSID Band	Select dual band/2.4GHz/5GHz for SSID
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.
Wireless Client Limit	Set the maximum client for the SSID.
Enable Captive Portal	Check to enable/disable captive portal
Captive Portal Policy	Select the policy which is configured in Captive Portal menu
Security Mode	Set the security mode for encryption, 5 options are available: • **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 a static WEP key. The characters can only be 0-9 or A-F with a length of 26, or printable ASCII characters with a length of 13. • **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
WPA Key Mode	Set the WPA Key Mode: PSK or 802.1x
WPA Encryption Type	Select the encryption type for WPA, 2 options are available: AES and

	AES/TKIP
WPA Pre-Shared Key	Set the access key for the clients, and the input range should be: 8-63 ASCII characters or 8-64 hex characters.
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	Client isolation feature blocks any TCP/IP connection between connected clients to GWN7600LR's Wi-Fi access point. Client isolation can be helpful to increase security for Guest networks/Public Wi-Fi. Three modes are available: • **Internet Mode**: Wireless clients will be allowed to access only the internet services and they cannot access any of the management services, either on the router nor the access points GWN7600LR. • **Gateway MAC Mode**: Wireless clients can only communicate with the gateway, the communication between clients is blocked and they cannot access any of the management services on the GWN7600LR access points. • **Radio Mode**: Wireless clients can access to the internet services, GWN7xxx router and the access points GWN7600LR but they cannot communicate with each other. The default value is "Disabled".
Gateway MAC Address	This field is required when using **Client Isolation,** so users will not lose access to the Network (usually Internet). Type in the default LAN Gateway's MAC address (router's MAC address for instance) in hexadecimal separated by ":". Example: 00:0B:82:8B:4D:D8
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 smaller than the configured minimum value, the client will be disconnected. The input range is from "-94" or "-1".
Enable Voice Enterprise	Check to enable/disable Voice Enterprise. The roaming time will be reduced once enable voice enterprise.
Enable 11R	Check to enable 802.11r

Enable 11K	Check to enable 802.11k
Enable 11V	Check to enable 802.11v
Upstream Rate	Set the maximum upstream rate
Downstream Rate	Set the maximum downstream rate

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

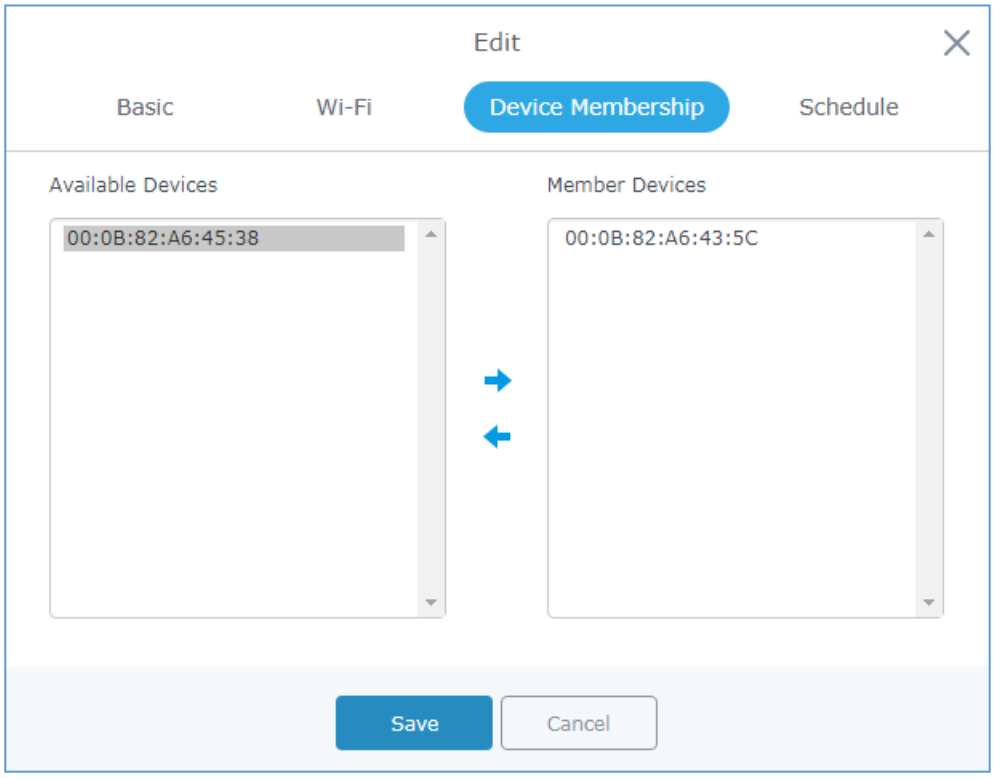


Figure 22: Device Membership

Click on → to add the GWN7600LR to the network group, or click on ← to remove it.

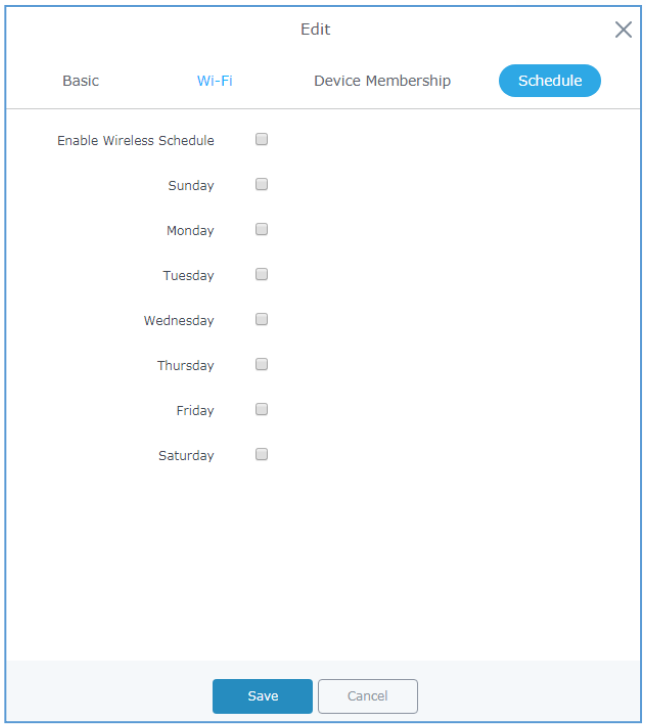


Figure 23: WiFi Schedule

If users want to schedule the AP operation time, “Enable Wireless Schedule” should be selected first, and then, choose the days the AP needs to work, at last, click on “Save” to save configuration.

- 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 

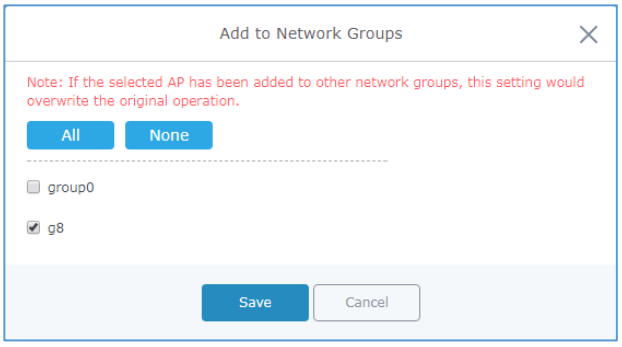


Figure 24: Add AP to Network Group

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

1. To create an additional SSID go to **Network Group->Additional SSID.**

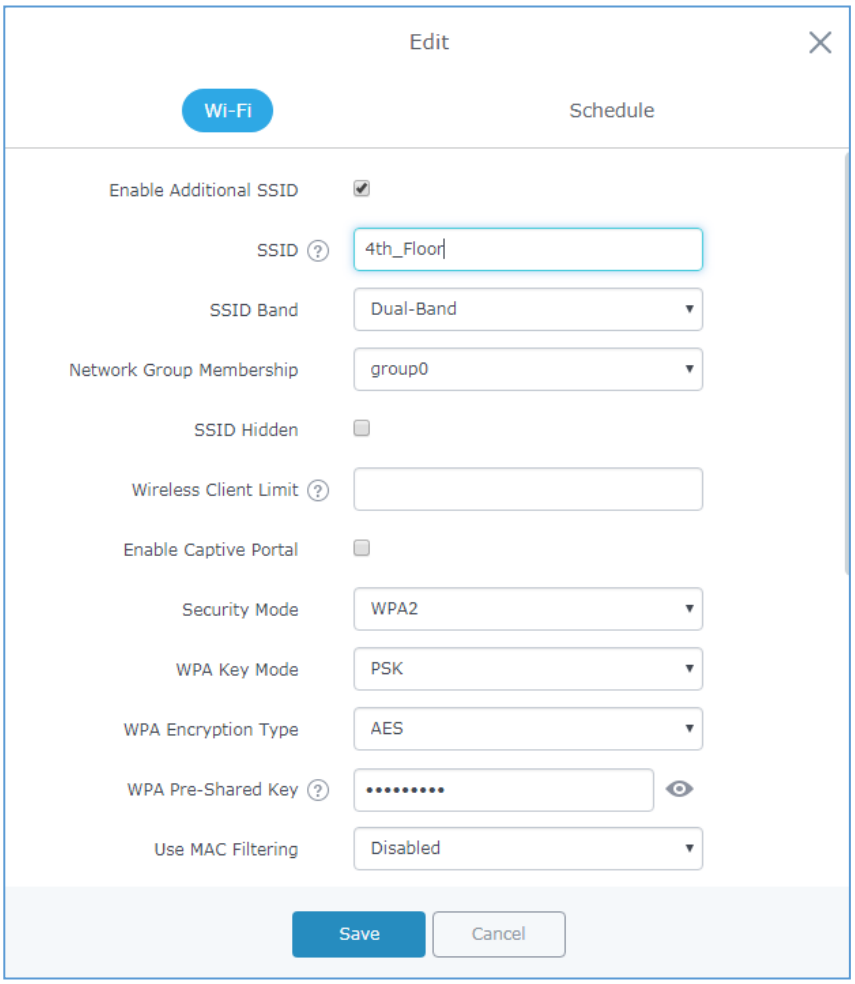


Figure 25: Additional SSID

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.

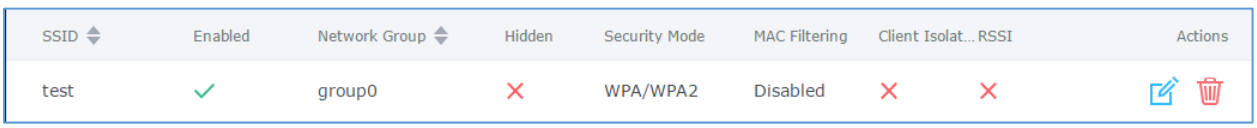


Figure 26: Additional SSID Created

3. Click on to delete the additional SSID, or to edit it.

CLIENTS CONFIGURATION

Users can access clients list connected to GWN7600LR Group from GWN7600LR **Web GUI** -> **Clients** to perform different actions to wireless clients.

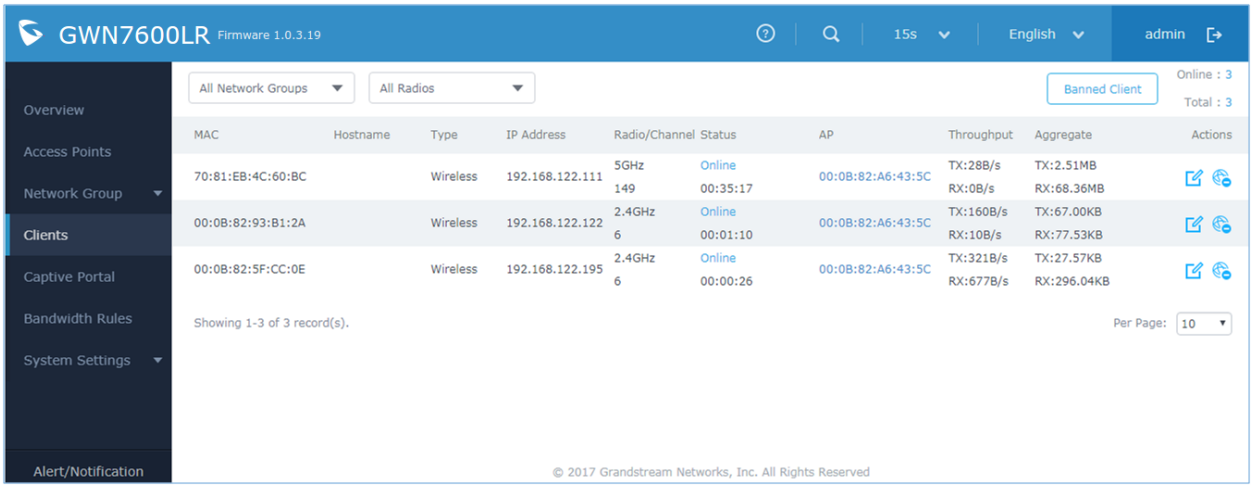


Figure 27: Clients

- Click on  under Actions to check a client's status and modify basic settings such as Device's Name.
- Click on  to block a client's MAC address from connecting to the zone's network group.
- Click on  to add or remove a client from banned client list.

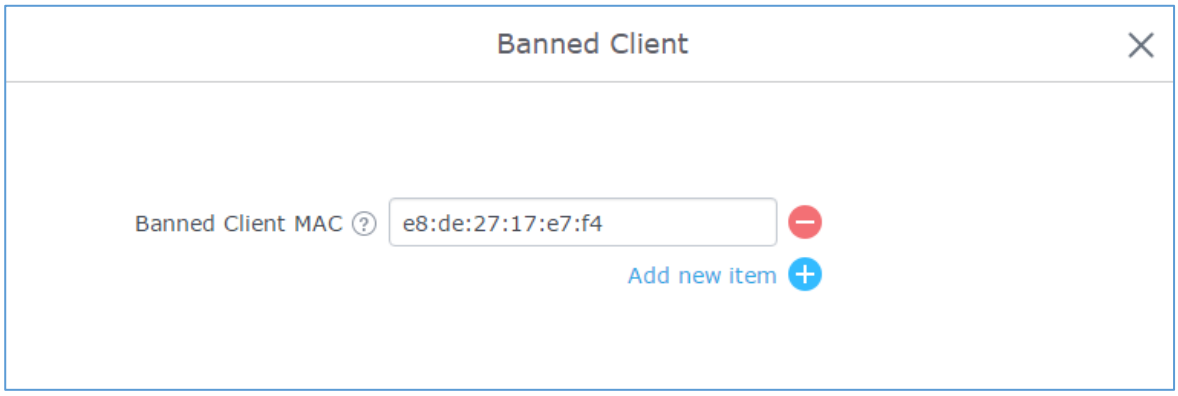


Figure 28: Ban/Unban Client

- Users can scroll down to the down of the client's page to paginate between clients list.

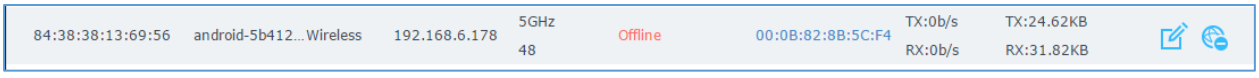


Figure 29: Paginate between client's list

- Users can filter the clients by selecting network group category or radio category.

CAPTIVE PORTAL

Captive portal provides an authentication method via web, which checks and authenticates the name and key of the client via HTTP page.

Policy

Users can customize a portal policy in this page.

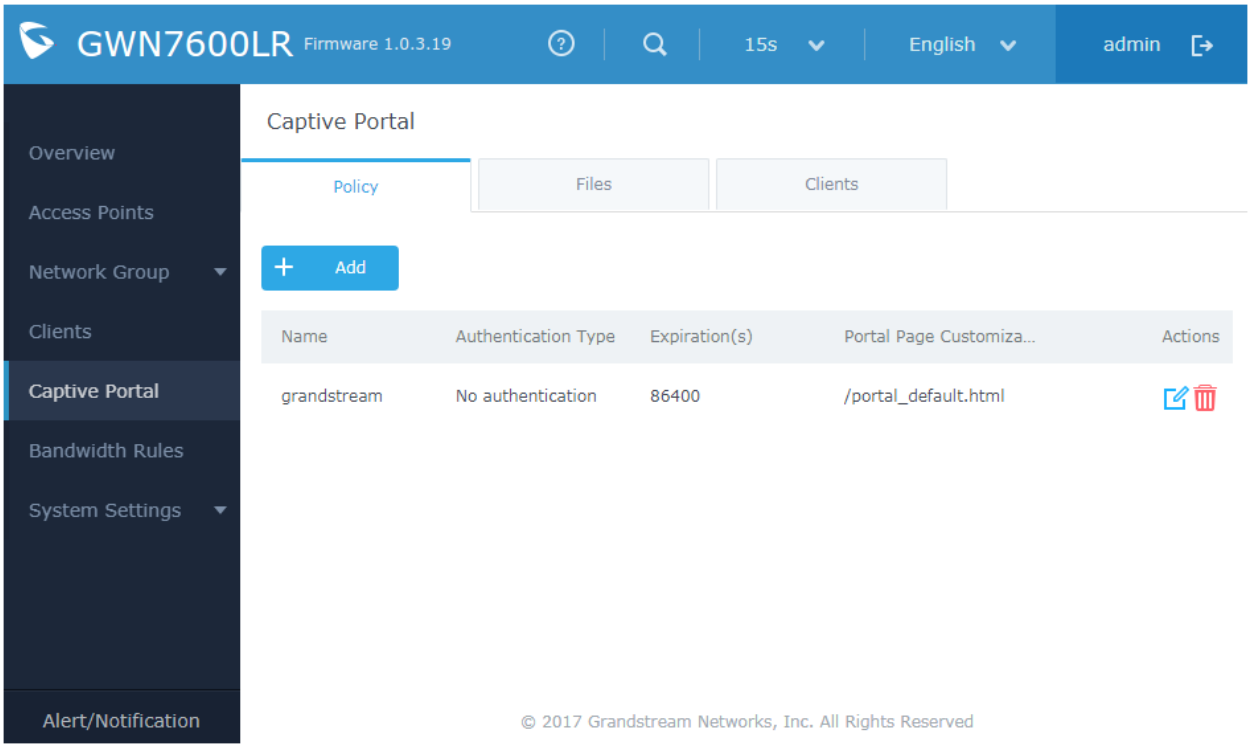


Figure 30: Captive Portal policy

Click on to edit the policy.

Click on to delete the policy.

Click on Add to add a policy.

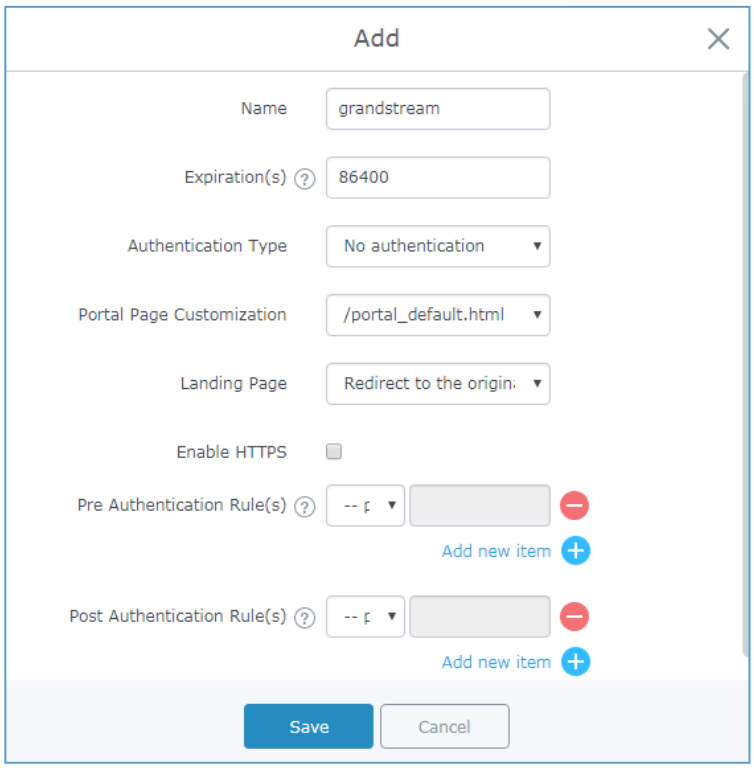


Figure 31: Add a new policy

Below table lists the items policy add page configures.

Table 9: policy add

Name	Enter the name of the Captive Portal policy
Expiration	Configures the period of validity, after the valid period, the client will be re-authenticated again.
Authentication Type	Select an authentication type for the portal, 3 types are available: No authentication, Radius Server and Third party authentication.
Radius Server Address	Fill in the IP address of the radius server.
Radius Server Port	Set the radius server port, and the default value is 1812.
Radius Server Key	Fill in the key of the radius server.
Radius Authentication Method	Select the radius authentication method, 3 methods are available: PAP, CHAP and MS-CHAP.
WeChat Authentication	Check to enable/disable WeChat Authentication
Shop ID	Fill in the Shop ID that offers WeChat Authentication.
APP ID	Fill in the APP ID provided by the WeChat in its web registration page
SecretKey	Set the key for the portal, once clients want to connect to the WiFi, they should enter this key.

Facebook Authentication	Check to enable/disable Facebook Authentication
Facebook App ID	Fill in the Facebook App ID.
Facebook APP Key	Set the key for the portal, once clients want to connect to the WiFi, they should enter this key.
Portal Page Customization	Select the customized portal page.
Landing Page	Choose the landing page, 2 options are available: redirect to the origin and redirect to external page
Redirect External Page URL Address	Once the landing page redirects to external page, user should set the URL address for redirecting.
Enable HTTPS	Check to enable/disable HTTPS service.
Pre Authentication Rule(s)	Set the Pre Authentication Rules for temporarily release the IP or ports of the devices (e.g.: subnet:192.168.10.1/12, tcp: tcp src 80 dst 80, udp: udp src 80 dst 80, ssh, telnet)
Post Authentication Rule(s)	Set the Post Authentication Rules (e.g.: subnet:192.168.10.1/12, tcp: tcp src 80 dst 80, udp: udp src 80 dst 80, ssh, telnet, http, https)

Files

In this section, users could upload and down load the customized files for the portal. All the related files are listed on this page.

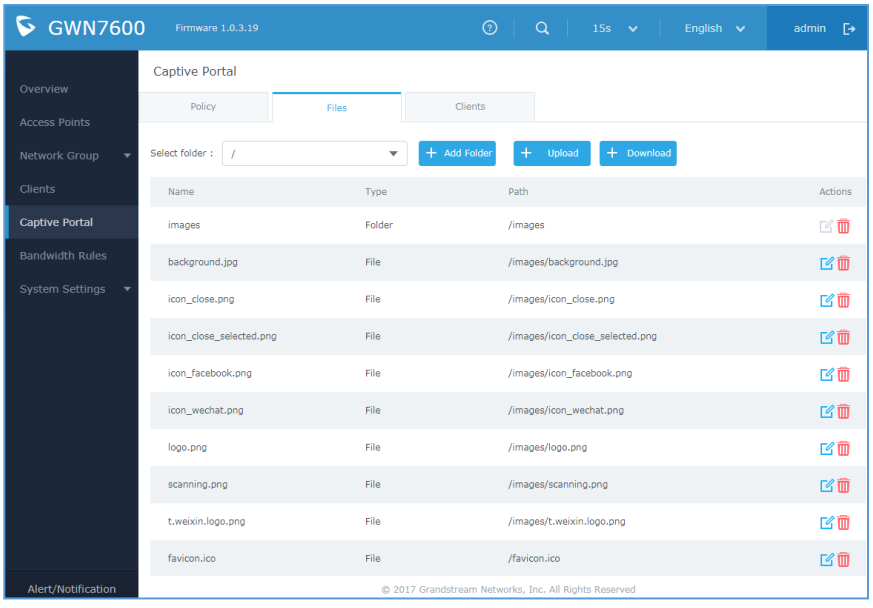


Figure 32: Captive Portal Files

User can add folder in corresponding folder by selecting the folder and click on + Add Folder.

Click on + Upload to upload a file from local device.

Click on + Download to download the files in Captive Portal folder.

Click on to edit the corresponding file, in another word, to replace the file with a new one.

Click on to delete the file.

Clients

This section listed the clients connects or trying to connect to Wi-Fi.

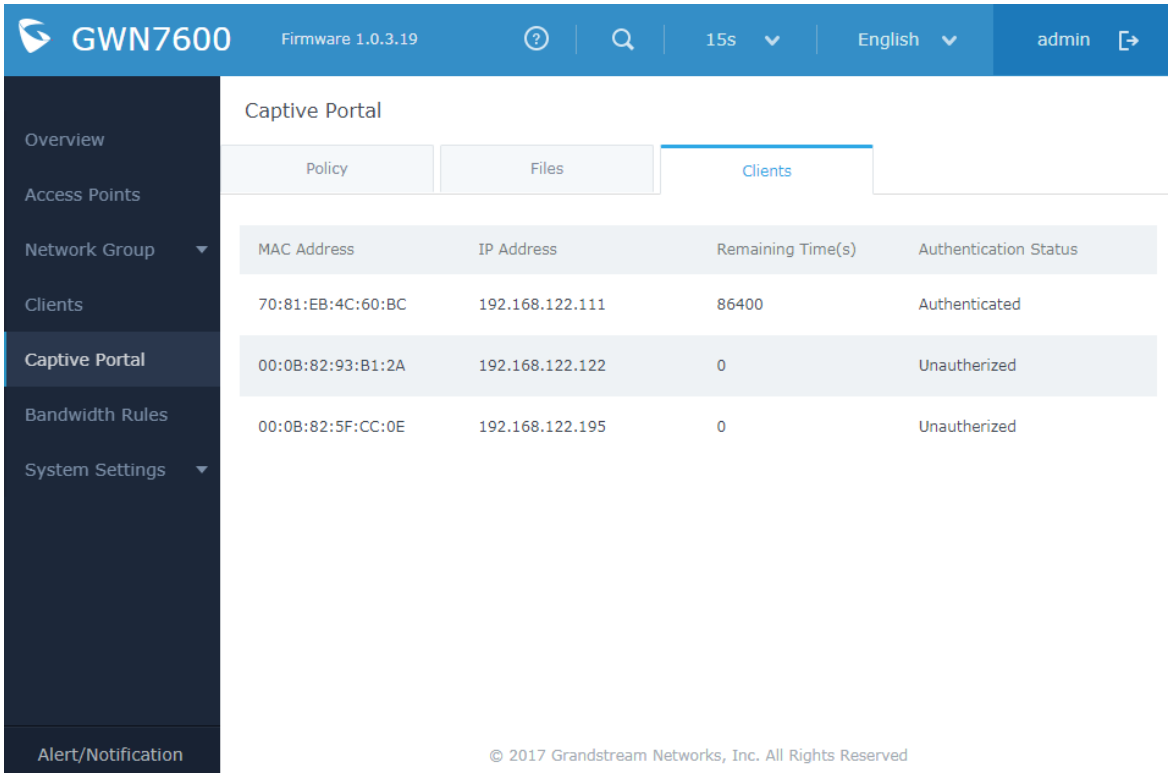


Figure 33: Captive Portal Clients

BANDWIDTH RULES

Setting Bandwidth Rules will make the best of the WiFi bandwidth. In this section, user can add bandwidth rules for the AP.

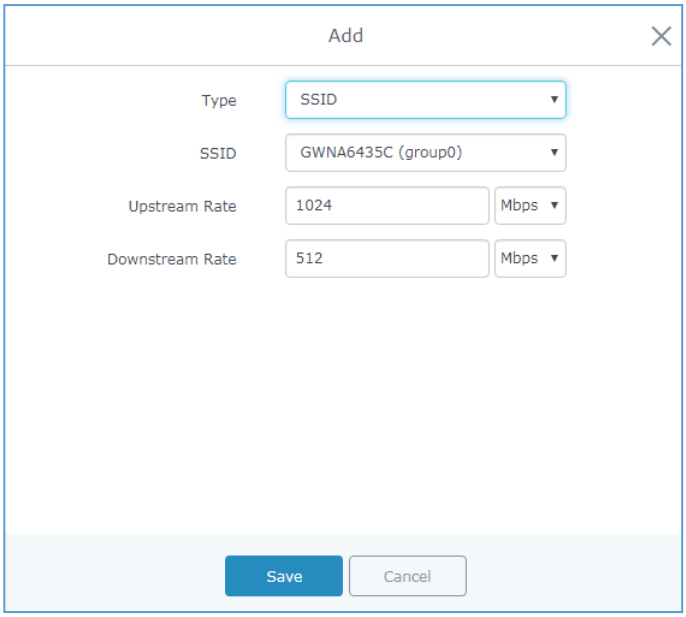


Figure 34: Add Bandwidth Rules

There rules are available here, SSID, MAC and IP address. And the order of priority is IP address, MAC and SSID.

SYSTEM SETTINGS

Maintenance

Users can access Maintenance page from GWN7600LR WebGUI-> **System Settings-> Maintenance**.

Basic

Basic page allows Country and Time configuration.

Table 10: Basic

Field	Description
Country	Select the country from the drop-down list. This can affect the number of channels depending on the country standards.
Time Zone	Configure time zone for the GWN7600LR. Make sure to reboot the device to take effect.
NTP Server	Configure the IP address or URL of the NTP server. The device will obtain the date and time from the configured server.
Date Display Format	Change the Date Display Format, three options are possible YYYY/MM/DD, MM/DD/YYYY and DD/MM/YYYY

Upgrade

The Upgrade Web page allows upgrade related configuration.

Table 11: Upgrade

Field	Description
Authenticate Config File	Authenticate configuration file before acceptance. Default is disabled.
XML Config File Password	Enter the password for encrypting the XML configuration file using OpenSSL. The password is used to decrypt the XML configuration file if it is encrypted via OpenSSL.
Upgrade Via	Specify uploading method for firmware and configuration. 3 options are available: HTTP, HTTPS and TFTP.
Firmware Server	Configure the IP address or URL for the firmware upgrade server.
Config Server	Configure the IP address or URL for the configuration file server.
Check/Download New Firmware at Boot	Choose whether to enable or disable automatic upgrade and provisioning after reboot. Default is disabled.
Allow DHCP options 66 and 43 override	Configure whether to allow DHCP options 66 and 63 to override the upgrade and provisioning setting.

Automatic Upgrade(m)	Specify the time to check for firmware upgrade (in minutes).
Reboot	Click on Reboot button to reboot the device.
Download Configuration	Click on Download to download the device's configuration file.
Upload Configuration	Click on Upload to upload the device's configuration file.
Upgrade Now	Click on Upgrade, to launch firmware/config file provisioning. Please make sure to Save and Apply changes before clicking on Upgrade.
Factory Reset	Click on Reset to restore the GWN7600LR to factory default settings

Access

The Access Web page provide configuration for admin and user password.

Table 12: Access

Field	Description
Current Administrator Password	Enter the current administrator password
New Administrator Password	Change the current password. This field is case sensitive with a maximum length of 32 characters.
Confirm New Administrator Password	Enter the new administrator password one more time to confirm.
New User Password	Configure the password for user-level Web GUI access. This field is case sensitive with a maximum length of 32 characters.
Confirm New User Password	Enter the new User password again to confirm.

Syslog

The syslog Web page provides configuration settings for syslog.

Table 13: Syslog

Field	Description
Syslog Server	Enter the IP address or URL of Syslog server.
Syslog Level	Select the level of Syslog, 5 levels are available: **None, Debug, Info, Warning** and **Error**.

Debug

GWN7600LR offers many features for managing and monitoring connected clients to network groups, as well as debugging and troubleshooting

Capture

This section is used to generate packet trace captures from network groups interfaces which will help to sniff packets within the network group for troubleshooting purpose or monitoring...Users will need to plug a USB device to the USB port on the back of the GWN7600LR.

To access Capture page, go to **System Settings->Debug->Capture**.

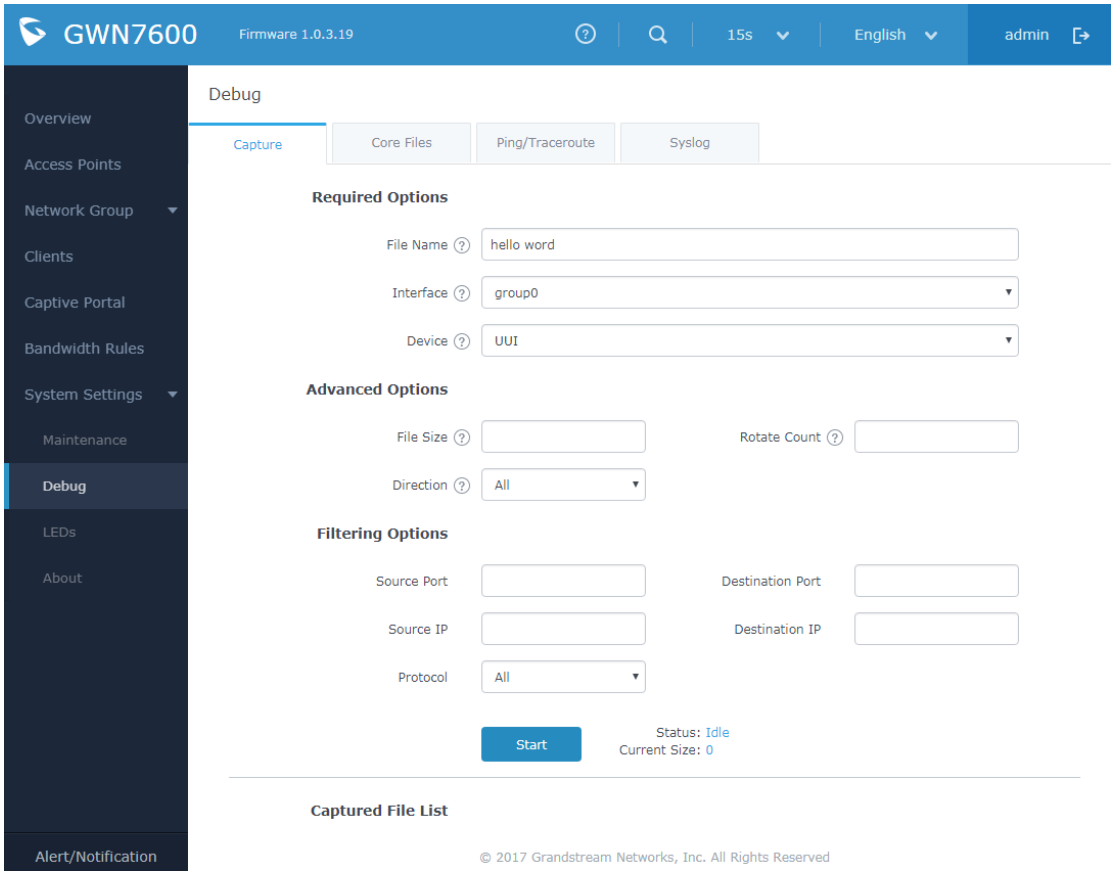


Figure 35: Capture page

The below table will show different fields used on debug page

Table 14: Debug

Required Options	
File Name	Enter the name of the capture file that will be generated.
Interface	Choose a network group as Interface on which the traffic will be captured.
Device	Choose a device plugged to USB port to save the capture once started.
Advanced Options	
File Size	Set a File size that the capture will not exceed.
Rotate Count	Set a value for rotating captures.
Direction	Choose if you want to get all traffic or only outgoing or incoming to the chosen interface.

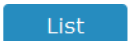
Filtering Options	
Source Port	Set the Source Port to filter capture traffic coming from the defined source port.
Destination Port	Set the Destination Port to filter capture traffic coming from the defined port.
Source IP	Set the Source IP to filter capture traffic coming from the defined source IP.
Dest IP	Set the Destination IP to filter capture traffic coming from the defined destination IP.
Protocol	Choose ALL or a specific protocol to capture (IP, ARP, RARP, TCP, UDP, ICMP, IPv6)

Click on 

to start capturing on a certain device plugged to the USB port.

Click on 

to stop the capture.

Click on 

to show the captured files on a chosen device, users could check the capture files details.

Click on 

to delete all files.

Click on  next to a capture file to download it on a local folder.

Click on  to delete the corresponding capture file.

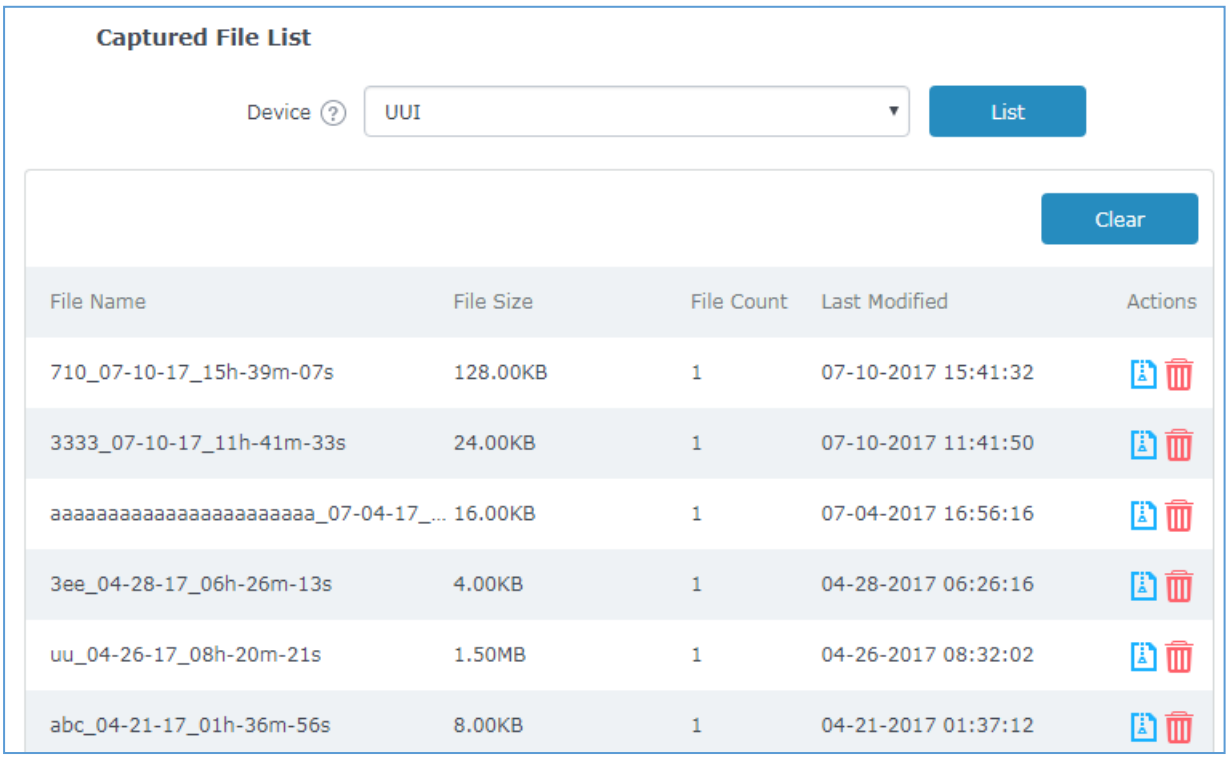


Figure 36: Capture Files

Core Files

The Core Files Web page displays core dumps generated when the GWN7600LR crashes. This is helpful for troubleshooting purposes, if any core dump found on this page please help to contact our support team for further investigation using following link: https://helpdesk.grandstream.com/

Ping/Traceroute

Ping and Traceroute are useful debugging tools to verify reachability with other clients across the network. The GWN7600LR offers both Ping and Traceroute tools for IPv4 and IPv6 protocols.

To use these tools, go to GWN7600LR **WebGUI->System Settings->Debug-> Ping/Traceroute.**

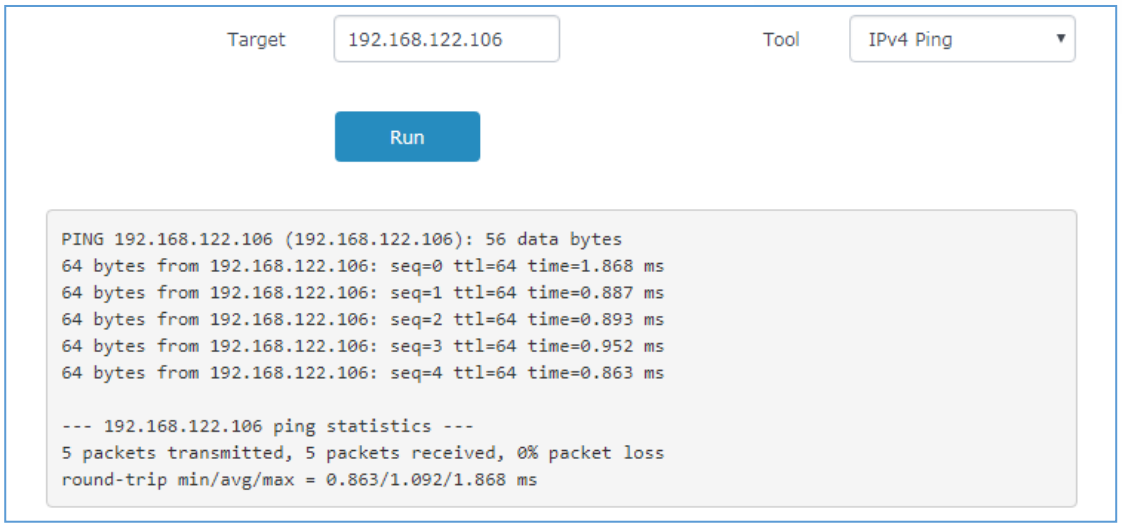


Figure 37: IP Ping

- Next to **Tool** choose from the dropdown menu: - IPv4 Ping for an IPv4 Ping test to Target
  - IPv6 Ping for an IPv6 Ping test to Target
  - IPv4 Traceroute for an IPv4 Traceroute to Target
  - IPv6 Traceroute for an IPv6 Traceroute to Target
- Type in the destination's IP address in **Target** field.
- Click on **Run**.

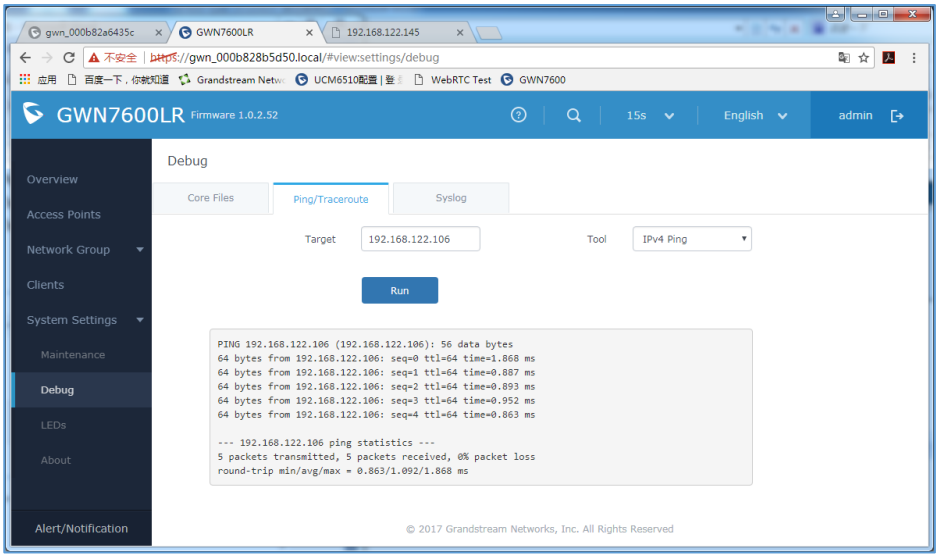


Figure 38: IP Traceroute

Syslog

The syslog Web page displays logs generated by the GWN7600LR for troubleshooting purpose as shown in figure below.

Syslog messages are also displayed in real time under Web GUI ->**System Settings->Debug->Syslog.**

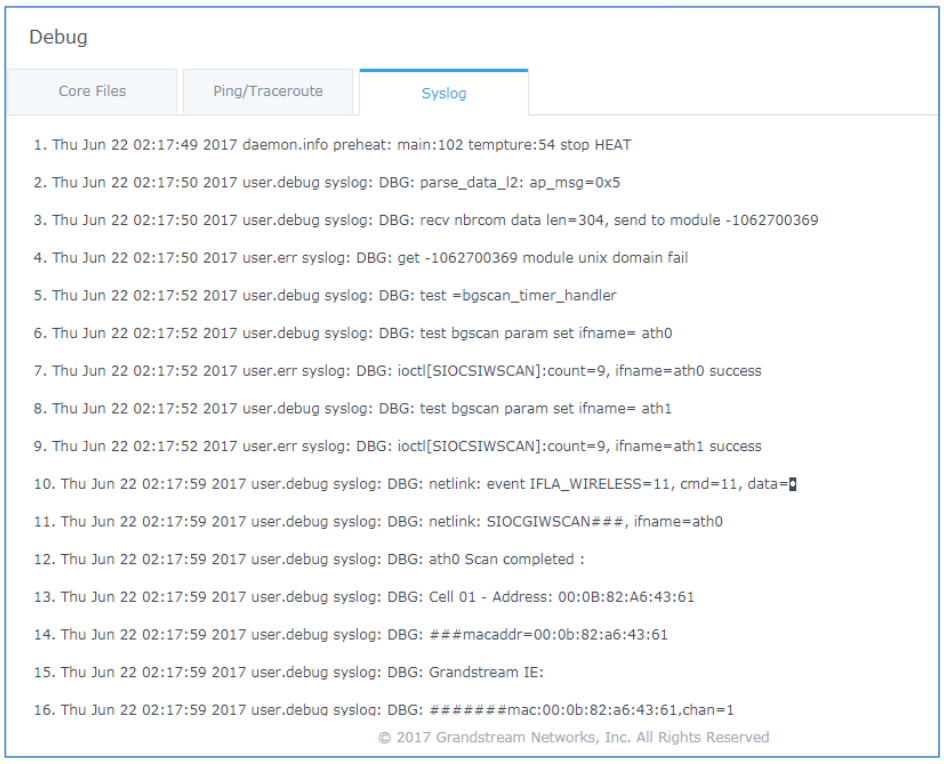


Figure 39: Syslog

LEDs

Table 15 LEDs

Field	Description
LEDs Always Off	Configure whether to disable the AP LED dictator
Schedule Stop Hour	Configure the hour the AP LED dictator is disabled. The valid range is from 0 to 23. And the value can not be empty.
Schedule Start Hour	Configure the minute the AP LED dictator is disabled. The valid range is from 0 to 59.
Schedule Stop Minute	Configure the hour the AP LED dictator is enabled. The valid range is from 0 to 23. And the value can not be empty.
Schedule Start Minute	Configure the minute the AP LED dictator is enabled. The valid range is from 0 to 59.
Schedule Weekdays List of Weekdays	Select the days the AP LED is desired to be disabled or enabled.

UPGRADING AND PROVISIONING

Upgrading Firmware

The GWN7600LR can be upgraded to a new firmware version remotely or locally. This section describes how to upgrade your GWN7600LR.

Upgrading via Web GUI

The GWN7600LR can be upgraded via TFTP/HTTP/HTTPS by configuring the URL/IP Address for the TFTP/HTTP/HTTPS server and selecting a download method. Configure a valid URL for TFTP, HTTP or HTTPS; the server name can be FQDN or IP address.

Examples of valid URLs:
firmware.grandstream.com/BETA
192.168.5.87

The upgrading configuration can be accessed via **Web GUI->System Settings->Maintenance -> Upgrade**.

Table 16: Network Upgrade Configuration

Upgrade Via	Allow users to choose the firmware upgrade method: TFTP, HTTP or HTTPS.
Firmware Server	Define the server path for the firmware server.
Check Update on Boot	Allows the device to check if there is a firmware from the configured firmware server at boot.
Automatic Upgrade check interval(m)	Set the value for automatic upgrade check in minutes.
Upgrade Now	Click on Upgrade button to begin the upgrade. Note that the device will reboot after downloading the firmware.

Upgrading Slave Access Points.

When the GWN7600LR is being paired as slave using another GWN7600LR acting as Master Access Point Controller, users can upgrade their paired access points from the GWN7600LR acting as Master Access Point Controller.

To upgrade a slave access point, log in to the GWN7600LR Controller and go to **Access Points.**

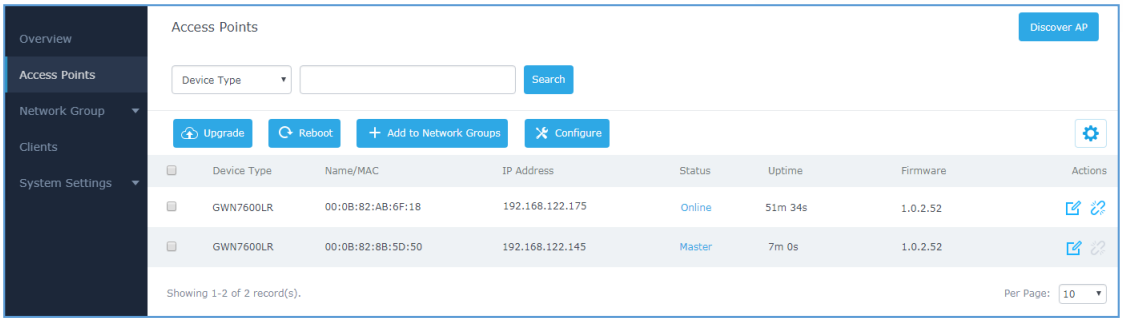


Figure 40: Access Points

Make sure that firmware server path is set correctly under Maintenance, and click on 

to upgrade all selected access points,

The status of the device will show Upgrading, wait until it finishes and reboots, then it will appear online again.

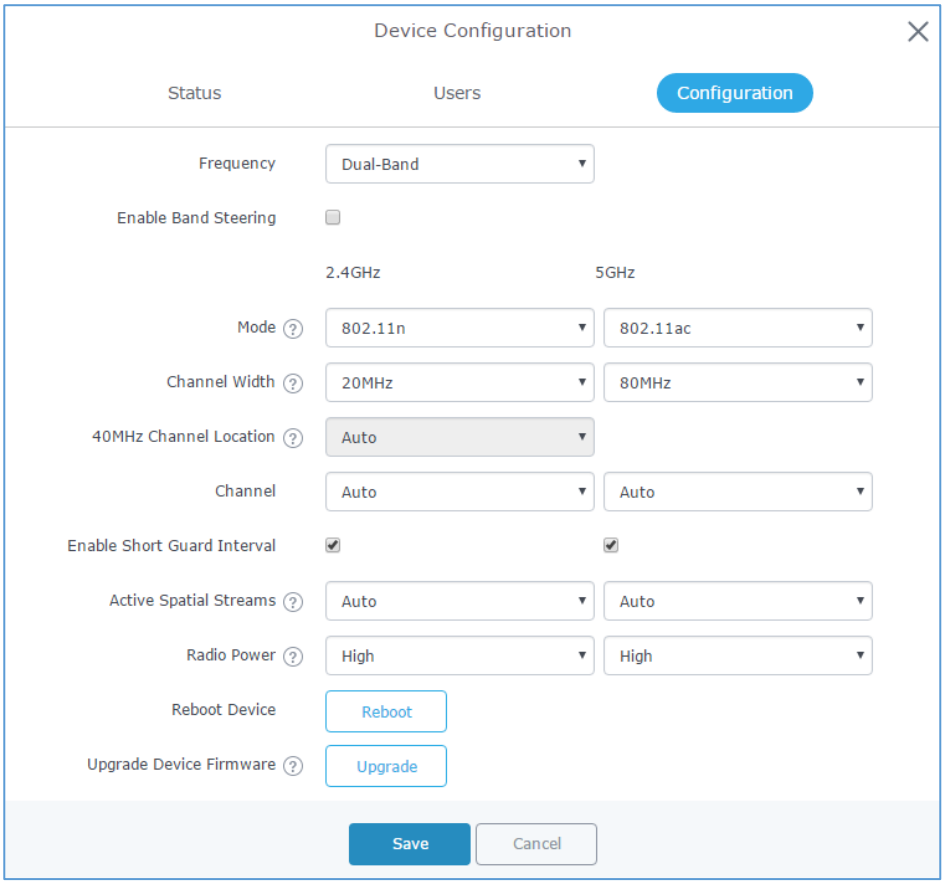


Figure 41: Device Configuration

The status of the device will show Upgrading, wait until it finishes and reboots, then it will appear online again.

Note:

- Please do not interrupt or power cycle the GWN7600LR during upgrading process.
- The Master Access Point needs to be upgraded from **Web GUI->System Settings->Maintenance.** It cannot be upgraded from Access Points page like the Paired Access Points.

Service providers should maintain their own firmware upgrade servers. For users who do not have TFTP/HTTP/HTTPS server, some free windows version TFTP servers are available for download from
http://www.solarwinds.com/products/freetools/free_tftp_server.aspx
http://tftpd32.jounin.net

Please check our website at http://www.grandstream.com/support/firmware for latest firmware.

Instructions for local firmware upgrade via TFTP:

1. Unzip the firmware files and put all of them in the root directory of the TFTP server;
2. Connect the PC running the TFTP server and the GWN7600LR to the same LAN segment;
3. Launch the TFTP server and go to the File menu->Configure->Security to change the TFTP server's default setting from "Receive Only" to "Transmit Only" for the firmware upgrade;
4. Start the TFTP server and configure the TFTP server in the GWN7600LR web configuration interface;
5. Configure the Firmware Server to the IP address of the PC;
6. Update the changes and reboot the GWN7600LR.

End users can also choose to download a free HTTP server from http://httpd.apache.org/ or use Microsoft IIS web server.

Provisioning and backup

The GWN7600LR configuration can be backed up locally or via network. The backup file will be used to restore the configuration on GWN7600LR when necessary.

Download Configuration

Users can download the GWN7600LR configurations for restore purpose under **Web GUI->System Settings-> Maintenance -> Upgrade**

Click on Download to download locally the configuration file.

Configuration Server (pending)

Administrators can download and provision the GWN7600LR by putting the config file on a TFTP/HTTP or HTTPS server, and set Config Server to the TFTP/HTTP or HTTPS server used for the GWN7600LR to be provisioned with that config server file.

Reset and reboot

Administrators could perform a reboot and reset the device to factory functions under **Web GUI**->**System Settings**->**Maintenance-> Upgrade** by clicking on Reboot button.

Reset Will restore all the GWN7600LR itself to factory settings.

EXPERIENCING THE GWN7600LR WIRELESS ACCESS POINT

Please visit our website: http://www.grandstream.com to receive the most up- to-date updates on firmware releases, additional features, FAQs, documentation and news on new products.

We encourage you to browse our product related documentation, FAQs and User and Developer Forum for answers to your general questions. If you have purchased our products through a Grandstream Certified Partner or Reseller, please contact them directly for immediate support.

Our technical support staff is trained and ready to answer all your questions. Contact a technical support member or submit a trouble ticket online to receive in-depth support.

Thank you again for purchasing Grandstream GWN7600LR Wireless Access Point, it will be sure to bring convenience and color to both your business and personal life