

# Unleashed 200.6 User Guide

Supporting Release 200.6

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# Introducing Ruckus Unleashed

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## Introducing the Ruckus Unleashed Platform

Ruckus Unleashed provides a controller-less option for smaller Wi-Fi deployments where a small number of access points are needed (such as in smaller schools, coffee shops, warehouses, retail, etc.), while providing many of the enterprise-class features that traditionally required a Ruckus WLAN controller (e.g., ZoneDirector or SmartZone controller).

Ruckus Unleashed enables controller-less Wi-Fi architecture for small business environments with superior performance, lower costs and simplified management. Separate controllers and access point licenses are not needed, significantly reducing up front costs. The simplified web interface also makes deploying Unleashed very easy.

Ruckus Unleashed is custom-designed to help small business owners grow their businesses, deliver an excellent customer experience and manage costs while supporting enterprise-class Wi-Fi and a highly customizable control of mobile devices with minimal IT staff.

Unleashed access points have built-in controller capabilities, including user access controls, guest networking functions, advanced Wi-Fi security and traffic management. As businesses grow to multiple sites or a larger scale deployments, Ruckus offers an easy migration path to controller-based Wi-Fi, using the same Ruckus access points.

With the Ruckus Unleashed platform, customers can now deploy a few APs (up to 25) without the need to purchase and install a controller, and without having to sacrifice many features that previously required a controller, such as Zero-IT, Dynamic PSK (DPSK), Smart Mesh, ChannelFly, Application Recognition and Control, Bonjour Gateway/Bonjour Fencing, and one-step firmware upgrades of the entire network.

### **NOTE**

Some controller features are not currently supported but are planned for a future release.

## Unleashed Network Overview

A Ruckus Unleashed network consists of an Unleashed Master AP and up to 24 Unleashed member APs (max 25 total).

### **NOTE**

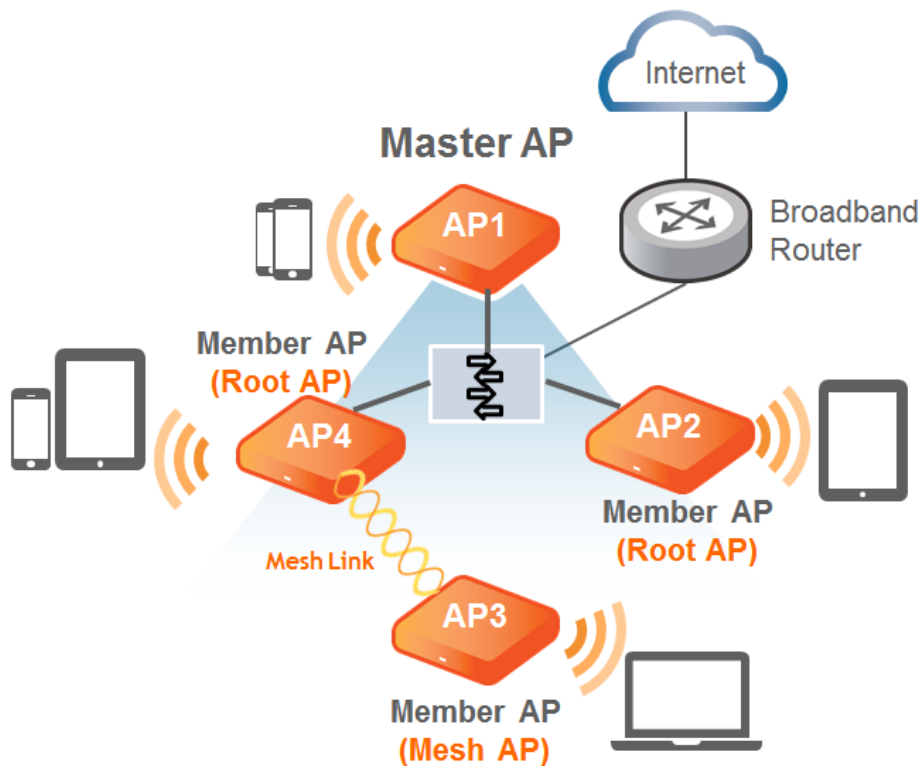
The maximum number of concurrent/connected clients supported is 512 per Unleashed group/cluster, which requires a minimum of two Unleashed APs (One Master and one Member AP). A Master AP alone can support a maximum of 100 connected clients.

In addition to serving Wi-Fi clients like a normal AP, the Unleashed Master AP also performs the same functions as a ZoneDirector controller would perform; i.e., all control functions are performed through the controller and pushed to the other APs on the network.

An Unleashed member AP joins a Master AP in the same subnet automatically. Unleashed member APs will not attempt to join a ZoneDirector or SmartZone controller on the network. If the Master AP is offline, one of the member APs will assume the role of Unleashed Master and take over control of the Unleashed network.

The following figure illustrates the basic components of an Unleashed network.

**FIGURE 1** Basic Unleashed Network topology



## Unleashed Feature Parity with ZoneDirector

The Ruckus Unleashed platform provides many of the same features that are currently available using a ZoneDirector wireless LAN controller:

- Smart Mesh
- One-step firmware upgrades of the entire network from a single interface
- Layer 2 roaming
- Zero-IT support for automatic configuration of client Wi-Fi settings
- Dynamic Pre-Shared Keys (DPSK)
- WLAN types:
  - Captive Portal
  - Hotspot (WISPr)
  - Guest Access
  - Social Media (Facebook, LinkedIn, Microsoft, Google)

- WeChat
- 802.1X EAP authentication using an external AAA server (RADIUS)
- Bonjour Gateway
- WLAN encryption/authentication options:
  - Open + None
  - Open + None + MAC Auth
  - Open + None + Web Auth
  - Open + WPA2 + AES + PSK
  - Open + WPA2 + AES + DPSK
  - 802.1X + WPA2 + AES + AAA
- Radio Frequency (RF) management features:
  - BeamFlex
  - ChannelFly
  - Background Scanning
  - Automatic Channel Selection based on ChannelFly or Background Scanning
  - SpeedFlex
  - Band Steering
  - Rogue AP detection
- Client management features:
  - Access Control Lists
  - Application Recognition and Control
  - HTTP/HTTPs Redirect
  - Up to 512 local users supported (on the internal database)
  - Up to 512 client devices supported (depending on encryption/auth method)
  - Self-Service Guest Pass
  - Client Load Balancing
  - Client Isolation
  - Client Fingerprinting and Device Access Policies
- DHCP server (configured manually from Unleashed Network Master AP)
- SNMP Management
- Management IP Interface
- Multi-language support
- WLAN Prioritization
- Dynamic VLAN
- Enable/Disable WLANs on a per-radio basis

# Unleashed Limitations and Deviations from ZoneDirector

While many ZoneDirector features are included, Unleashed does not provide the entire ZoneDirector feature set.

The following features are either not supported, supported but with limitations, or are currently unsupported but planned for a future release:

- No layer 3 roaming. All APs must be in the same subnet.
- Tunneled WLANs are not supported.
- IPv6 is not supported.
- No interface to communicate with SmartCell Insight, SPoT, or the ZoneDirector Remote Control mobile app.
- No North Bound Interface to pass client authentication responsibility to an external entity.
- No WLAN Groups or AP Groups.

## Unleashed-Only Features

The following features are unique to the Unleashed platform and do not correspond to any existing ZoneDirector or other Ruckus controller features:

- The Unleashed platform does not require an external controller - all controller functions are performed through a single "Master AP" web interface. The Unleashed Master AP serves the same function as a ZoneDirector controller would perform on the network; i.e., all control functions are performed through the controller and pushed to the other APs on the network.
- An Unleashed Member AP automatically takes over all AP control functions if the Master AP is offline.
- Preferred Master: Admins can configure an AP to serve as the "preferred" Unleashed Master AP. If the preferred Master is offline, another member AP will become the Master. When the preferred Master comes back online, it will resume the Unleashed Master role.
- The Unleashed user interface provides simplified and more intuitive controls for some controller functions, and hides or removes some of the less-used options for easier navigation and configuration.
- Gateway Mode: The Unleashed Master AP can be configured as a gateway router, performing all NAT and DHCP functions as well as serving as the Unleashed network controller and serving wireless clients.

## Unleashed Access Point Physical Features

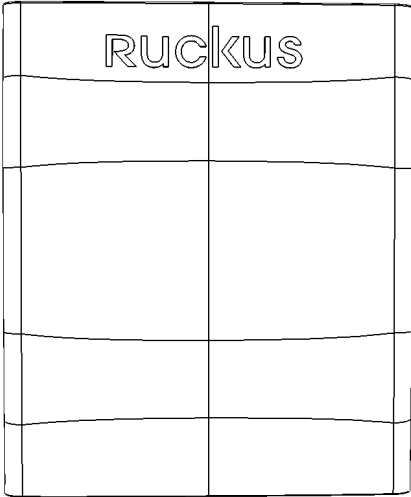
This section describes the physical features of the Unleashed Access Points currently available.

### C110

The Unleashed C110 is an 802.11ac Wave 2 dual-band concurrent Wi-Fi Wall Switch AP with integrated 4-port gigabit Ethernet and Cable Modem backhaul in a form factor designed for mounting to electrical outlet boxes.

This section describes the physical features of the Ruckus Unleashed C110 802.11ac Cable Modem Access Point.



**FIGURE 2** C110 Access Point








**Rear Panel**

The C110 AP features five LEDs on its rear panel. (LEDs are concealed when mounted.)

**TABLE 1** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.

**TABLE 1** Front Panel LEDs (continued)





LED	Status	Description
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.




**TABLE 1** Front Panel LEDs (continued)

LED	Status	Description
CTL	 CTL Solid Green	Unleashed Master AP.
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.

**TABLE 1** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.

**TABLE 1** Front Panel LEDs (continued)

LED	Status	Description
5G	 <p>5G Flashing Green</p>	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

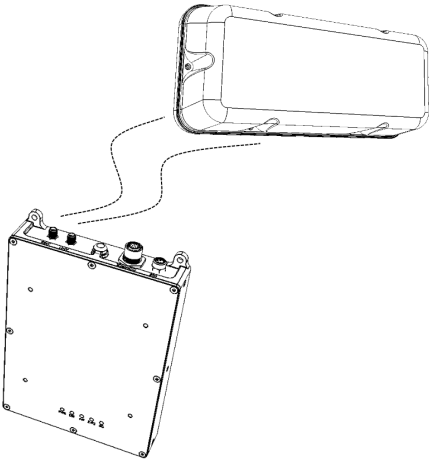
## E510

The Unleashed E510 is a modular access point designed for deployment in scenarios with specific form factor needs such as outdoor lighting, railway, street furniture, and sports and entertainment venues.

The E510 addresses the need for a modular AP where specific deployment situations preclude the antenna structure and onboard intelligence being installed as a single module.

This section describes the physical features of the Ruckus Unleashed E510 802.11ac Wave 2 Access Point.






**FIGURE 3** E510 Access Point



### Front Panel

The E510 AP features five LEDs on its front panel.






**TABLE 2** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.




**TABLE 2** Front Panel LEDs (continued)

LED	Status	Description
CTL	 <p>CTL</p> <p>Flashing Green (slow, every 2 seconds)</p>	Network problem. Cannot contact Unleashed Master.
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).

**TABLE 2** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.

**TABLE 2** Front Panel LEDs (continued)

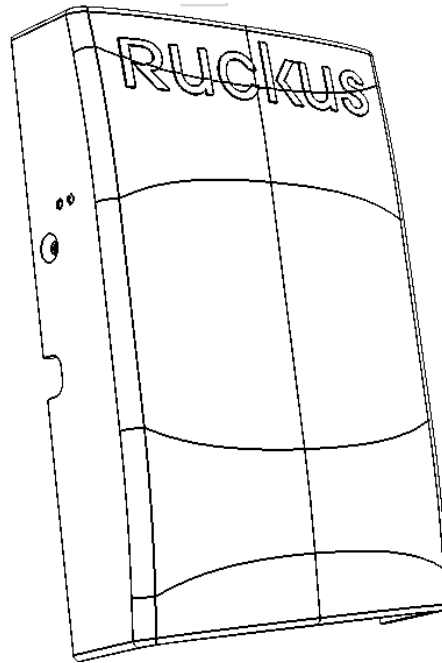
LED	Status	Description
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

### H320

The H320 is an 802.11ac Wave 2 dual-band concurrent Wi-Fi Wall Switch AP with one Gigabit uplink port and two 10/100 access ports, in a form factor designed for mounting to electrical outlet boxes.

This section describes the physical features of the Ruckus Unleashed H320 802.11ac Access Point.



**FIGURE 4 H320 Access Point**



### Rear Panel






The H320 AP features five LEDs on its rear panel. (LEDs are concealed when mounted.)

**TABLE 3 Front Panel LEDs**

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.



**TABLE 3** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.


**TABLE 3** Front Panel LEDs (continued)

LED	Status	Description
CTL	 CTL Solid Green	Unleashed Master AP.
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.

**TABLE 3** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.

**TABLE 3** Front Panel LEDs (continued)

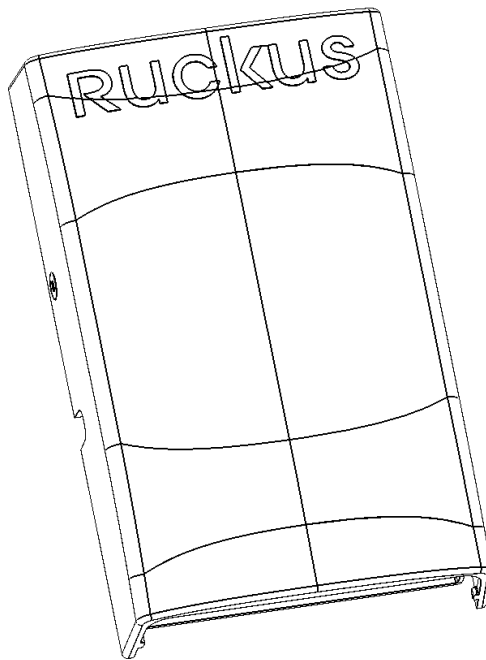
LED	Status	Description
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## H510

The H510 is an 802.11ac Wave 2 dual-band concurrent Wi-Fi Wall Switch AP with integrated 5-port gigabit Ethernet, in a form factor designed for mounting to electrical outlet boxes.

This section describes the physical features of the Ruckus Unleashed H510 802.11ac Access Point.

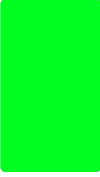

**FIGURE 5** H510 Access Point





### *Rear Panel*

The H510 AP features five LEDs on its rear panel. (LEDs are concealed when mounted.)






**TABLE 4** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.

**TABLE 4** Front Panel LEDs (continued)

LED	Status	Description
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.
CTL	 CTL Solid Green	Unleashed Master AP.
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).

**TABLE 4** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.

**TABLE 4** Front Panel LEDs (continued)

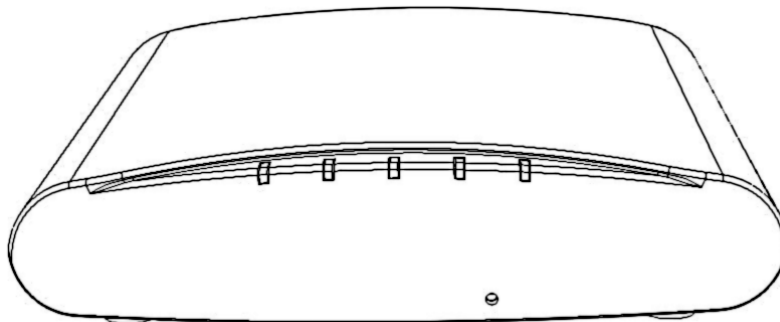
LED	Status	Description
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## R310

The Unleashed R310 is a dual-band concurrent 2x2:2 802.11ac Access Point that delivers high-performance reliable 802.11ac wireless networking at a competitive price point in a compact form factor.

This section describes the physical features of the Ruckus Unleashed R310 802.11ac Access Point.

**FIGURE 6** R310 Access Point





## Front Panel

The R310 AP features five LEDs on its front panel.

**TABLE 5** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL	Unleashed Member AP.




**TABLE 5** Front Panel LEDs (continued)

LED	Status	Description
CTL	<p>Off</p>  <p>CTL</p> <p>Flashing Green (slow, every 2 seconds)</p>	Network problem. Cannot contact Unleashed Master.
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).

**TABLE 5** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.

**TABLE 5** Front Panel LEDs (continued)

LED	Status	Description
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## R500 and R600

This section describes the physical features of the Unleashed R500 and Unleashed R600 dual-band 802.11ac Access Points.

**NOTE**

The Unleashed R500 and R600 APs are physically identical from the outside. The only differences are internal - different radio streams. Therefore the following information applies to both Unleashed AP models.




**FIGURE 7 R500 Access Point**



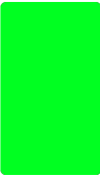



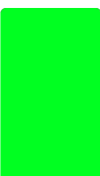
**Front Panel**

The R500/R600 AP features five LEDs on its front panel.





**TABLE 6 Front Panel LEDs**

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.





**TABLE 6** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.
CTL	 CTL Solid Green	Unleashed Master AP.

**TABLE 6** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.

**TABLE 6** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

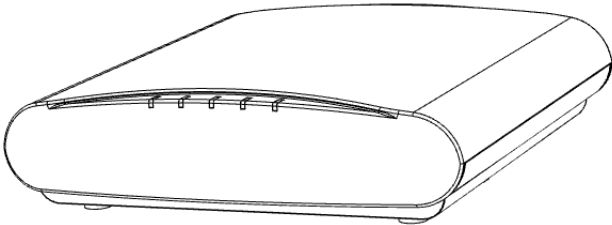


# R510

The Unleashed R510 brings cutting edge 802.11ac Wave 2 to the mid-tier segment. It improves aggregate network throughput and benefits both Wave 2 & non-Wave 2 clients.

This section describes the physical features of the Ruckus Unleashed R510 802.11ac Wave 2 Access Point.



**FIGURE 8 R510 Access Point**








## Front Panel

The R510 AP features five LEDs on its front panel.

**TABLE 7 Front Panel LEDs**

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.






**TABLE 7** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.


**TABLE 7** Front Panel LEDs (continued)

LED	Status	Description
CTL	 CTL Solid Green	Unleashed Master AP.
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.

**TABLE 7** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.

**TABLE 7** Front Panel LEDs (continued)

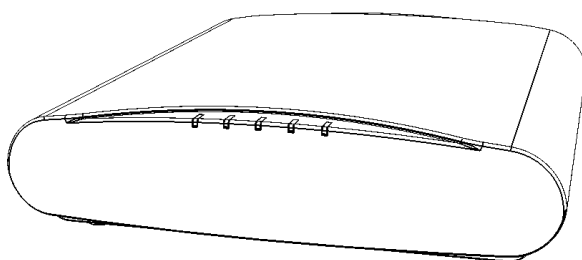
LED	Status	Description
5G	 <p>5G Flashing Green</p>	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## R610

The Unleashed R610 is a dual-band concurrent 3x3:3 802.11ac Wave 2 Access Point that delivers high-performance wireless networking with aggregate rates of up to 1300 Mbps (5GHz) 600 Mbps (2.4GHz) maximum PHY rate.

This section describes the physical features of the Ruckus Unleashed R610 802.11ac Wave 2 Access Point.


**FIGURE 9** R610 Access Point





### Front Panel

The R610 AP features five LEDs on its front panel.


**TABLE 8** Front Panel LEDs

LED	Status	Description
PWR	 <p>PWR Off</p>	No power connected.






**TABLE 8** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.

**TABLE 8** Front Panel LEDs (continued)

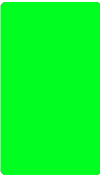

LED	Status	Description
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).
AIR	 <p>AIR</p>	Upstream mesh connection issue.

**TABLE 8** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.



**TABLE 8** Front Panel LEDs (continued)

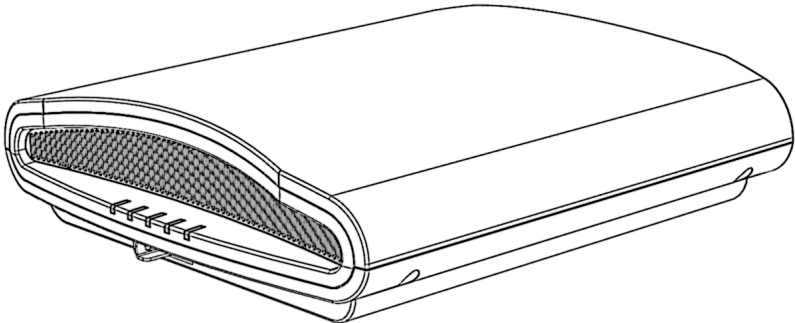
LED	Status	Description
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## R710

The Unleashed R710 is the first Ruckus Unleashed 802.11ac Wave 2 access point, providing 4x4:4 radio chains and MU-MIMO support for high density installations.

This section describes the physical features of the Ruckus Unleashed R710 AP.






**FIGURE 10** R710 Access Point





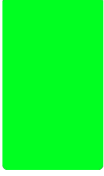

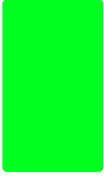
### Front Panel

The R710 AP features five LEDs on its front panel.






**TABLE 9** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.




**TABLE 9** Front Panel LEDs (continued)

LED	Status	Description
CTL	 <p>CTL</p> <p>Flashing Green (slow, every 2 seconds)</p>	Network problem. Cannot contact Unleashed Master.
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).

**TABLE 9** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.

**TABLE 9** Front Panel LEDs (continued)

LED	Status	Description
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

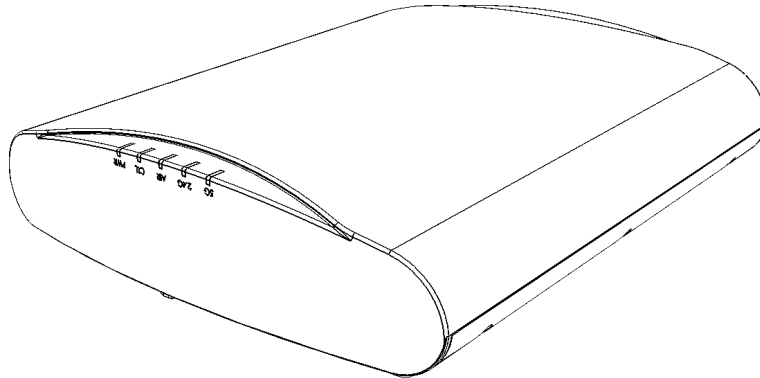
## R720

The Unleashed R720 is a dual-band concurrent 4x4 802.11ac Wave 2 Access Point capable of 160 MHz and 80+80 MHz channelization, designed for high density indoor applications.

The R720 features one 10/100/1000 Ethernet port, and one 100/1000/2500 Ethernet port that supports 802.3af and 802.3at Power Over Ethernet (PoE), and a USB port for IoT applications.

This section describes the physical features of the Ruckus Unleashed R720 AP.



**FIGURE 11** R720 Access Point



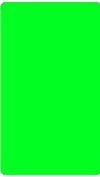



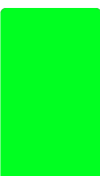
**Front Panel**

The R720 AP features five LEDs on its front panel.






**TABLE 10** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.

**TABLE 10** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.
CTL	 CTL Solid Green	Unleashed Master AP.

**TABLE 10** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.



**TABLE 10** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## T300 Family

The Unleashed T300 is the first Ruckus 802.11ac outdoor access point.

This section describes the physical features of the Ruckus Unleashed T300 family of dual-band 802.11ac Outdoor Access Points.

The T300 is available in four antenna variants:

- T300: Standard omni antenna
- T300e: External antenna variant
- T301n: Narrow sector antenna variant
- T301s: Sector antenna variant

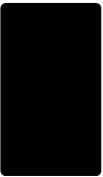
**FIGURE 12** T300 Outdoor Access Point







### Front Panel

The T300 (and T300e, T301n, T301s) AP features five LEDs on its front panel.

**TABLE 11** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.






**TABLE 11** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.



**TABLE 11 Front Panel LEDs (continued)**

LED	Status	Description
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).
AIR	 <p>AIR</p>	Upstream mesh connection issue.

**TABLE 11** Front Panel LEDs (continued)

LED	Status	Description
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.

**TABLE 11 Front Panel LEDs (continued)**

LED	Status	Description
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## T310 Family

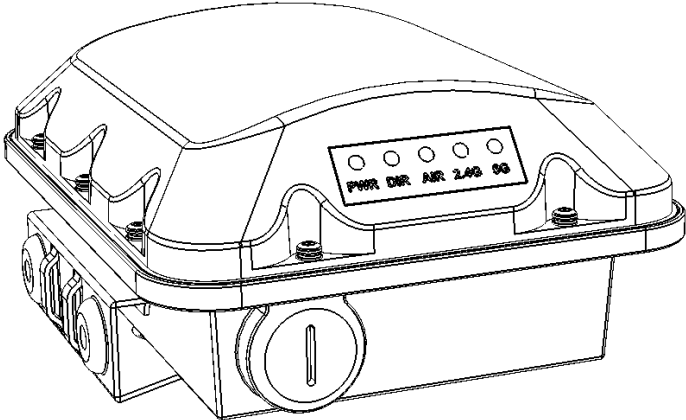
The Unleashed T310 family provides 802.11ac "Wave 2" features, including MU-MIMO, in an outdoor access point.

This section describes the physical features of the Ruckus Unleashed T310 family of dual-band 802.11ac Wave 2 Outdoor Access Points.

The T310 is available in four antenna variants:

- T310c: Standard omni antenna
- T310d: Standard omni antenna, extended temperature range
- T310n: Narrow sector antenna variant
- T310s: Sector antenna variant




**FIGURE 13** T310d Outdoor Access Point









**Front Panel**

The T310 features five LEDs on its front panel.

**TABLE 12** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR	System started, no routable IP address detected.

**TABLE 12 Front Panel LEDs (continued)**




LED	Status	Description
PWR	Flashing Green  PWR	Routable IP address received.
CTL	Solid Green  CTL	Unleashed Member AP.
CTL	Off  CTL	Network problem. Cannot contact Unleashed Master.
CTL	Flashing Green (slow, every 2 seconds)  CTL	Receiving configuration or image upgrade.
CTL	Flashing Green (fast, 2x per second)  CTL	Unleashed Master AP.
CTL	Solid Green  CTL	



**TABLE 12** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.

**TABLE 12 Front Panel LEDs (continued)**

LED	Status	Description
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## T610 and T610s

The Ruckus Unleashed T610 is an outdoor dual radio 4x4:4 802.11ac Wave 2 access point with two 1 Gigabit Ethernet ports, PoE in, and 802.1ax Ethernet port aggregation.

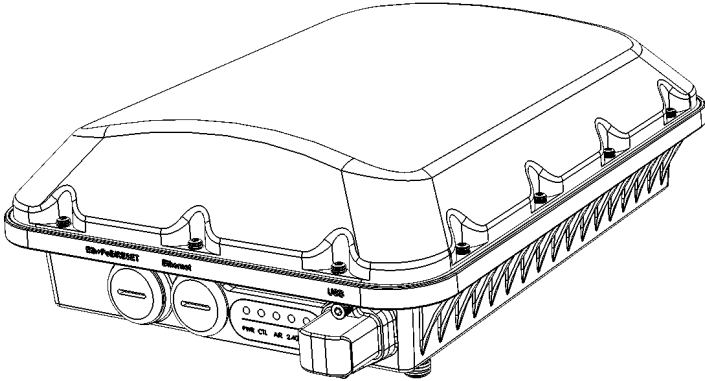
The T610 also includes a USB port for BLE Smart Beacon, Zigbee or other IoT devices.

This section describes the physical features of the Ruckus Unleashed T610 and T610s access points.

**NOTE**

The T610s is the 120 degree sector antenna variant of the T610. It includes all of the same physical features as the T610 (omni) version.


**FIGURE 14** Unleashed T610/T610s Outdoor Access Point



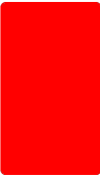

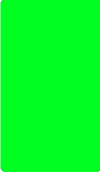


### Front Panel

The T610 (and T610s) AP features five LEDs on its front panel.

**TABLE 13** Front Panel LEDs

LED	Status	Description
PWR	 PWR Off	No power connected.





**TABLE 13** Front Panel LEDs (continued)

LED	Status	Description
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL Off	Unleashed Member AP.
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.

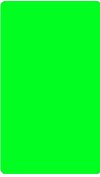

**TABLE 13** Front Panel LEDs (continued)

LED	Status	Description
CTL	 <p>CTL</p> <p>Flashing Green (fast, 2x per second)</p>	Receiving configuration or image upgrade.
CTL	 <p>CTL</p> <p>Solid Green</p>	Unleashed Master AP.
AIR	 <p>AIR</p> <p>N/A</p>	No upstream mesh connection (Root AP).
AIR	 <p>AIR</p>	Upstream mesh connection established (Mesh AP).
AIR	 <p>AIR</p>	Upstream mesh connection issue.

**TABLE 13 Front Panel LEDs (continued)**

LED	Status	Description
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.
5G	 5G Amber (solid)	Radio is up, no clients are connected to the 5 GHz radio.

**TABLE 13** Front Panel LEDs (continued)

LED	Status	Description
5G	 5G Solid Green	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 5G Flashing Green	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.

## T710 and T710s

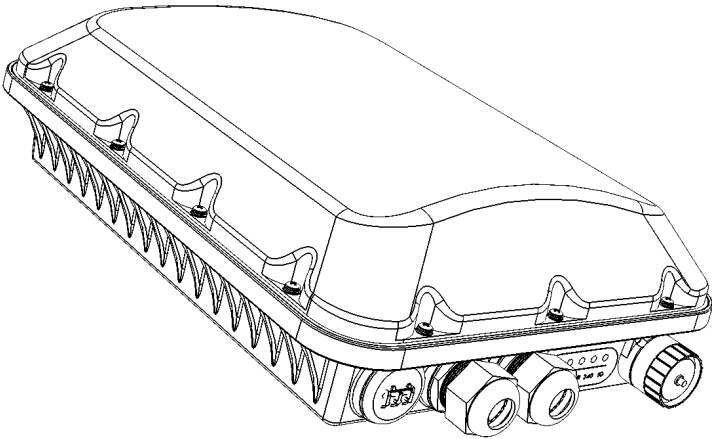
The Unleashed T710 is the first outdoor Ruckus Unleashed 802.11ac Wave 2 access point.

This section describes the physical features of the Ruckus Unleashed T710 and T710s access points.

**NOTE**

The T710s is the 120 degree sector antenna variant of the T710. It includes all of the same physical features as the T710 (omni) version.






**FIGURE 15** Unleashed T710/T710s Outdoor Access Point



## Front Panel





The T710 (and T710s) AP features five LEDs on its front panel.

**TABLE 14** Front Panel LEDs






LED	Status	Description
PWR	 PWR Off	No power connected.
PWR	 PWR Solid Red	Boot up in process.
PWR	 PWR Flashing Green	System started, no routable IP address detected.
PWR	 PWR Solid Green	Routable IP address received.
CTL	 CTL	Unleashed Member AP.



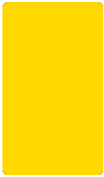
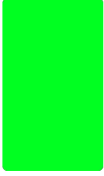

**TABLE 14** Front Panel LEDs (continued)

LED	Status	Description
	Off	
CTL	 CTL Flashing Green (slow, every 2 seconds)	Network problem. Cannot contact Unleashed Master.
CTL	 CTL Flashing Green (fast, 2x per second)	Receiving configuration or image upgrade.
CTL	 CTL Solid Green	Unleashed Master AP.
AIR	 AIR N/A	No upstream mesh connection (Root AP).
AIR	 AIR	Upstream mesh connection established (Mesh AP).

**TABLE 14** Front Panel LEDs (continued)

LED	Status	Description
AIR	 AIR	Upstream mesh connection issue.
2.4G	 2.4G Off	Radio is down.
2.4G	 2.4G Amber (solid)	Radio is up, no clients are connected to the 2.4 GHz radio.
2.4G	 2.4G Solid Green	Radio is up, at least one client is connected to the 2.4 GHz radio.
5G	 5G Off	Radio is down.

**TABLE 14** Front Panel LEDs (continued)

LED	Status	Description
5G	 <p>5G</p> <p>Amber (solid)</p>	Radio is up, no clients are connected to the 5 GHz radio.
5G	 <p>5G</p> <p>Solid Green</p>	Radio is up, at least one client is connected to the 5 GHz radio.
5G	 <p>5G</p> <p>Flashing Green</p>	Radio is up, at least one downstream Mesh AP is connected to the 5G radio.



# Setting Up an Unleashed Wi-Fi Network

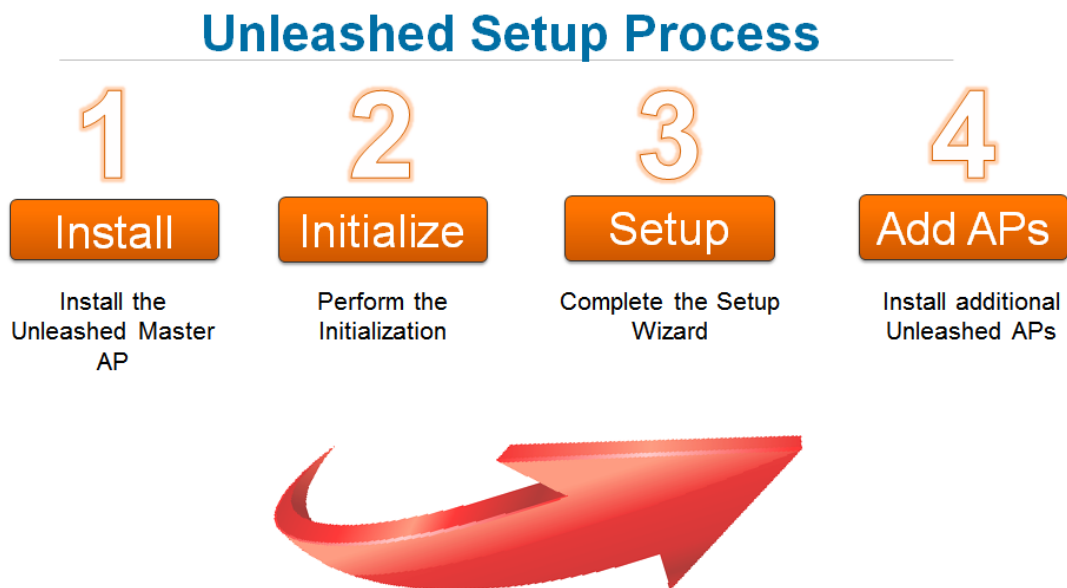
- Overview of the Setup Process..... 73
- Step 1: Unpack and Install the Unleashed Master AP..... 74
- Step 2: Configure Your Unleashed Network..... 74
- Step 3: Customize Your Wireless LANs..... 86
- Step 4: Deploy Additional Unleashed Member Access Points..... 89

## Overview of the Setup Process

The following section describes the steps required for setup and configuration of a Ruckus Unleashed wireless network.

1. [Step 1: Unpack and Install the Unleashed Master AP](#) on page 74
2. [Step 2b: Setup Using a Web Browser](#) on page 77
3. [Step 3: Customize Your Wireless LANs](#) on page 86
4. [Step 4: Deploy Additional Unleashed Member Access Points](#) on page 89
5. Begin Using Your Ruckus Unleashed Network!

**FIGURE 16** Unleashed setup overview



For a video presentation of this setup process, see the Ruckus Training video [Installing the Unleashed Master AP](#).

## Step 1: Unpack and Install the Unleashed Master AP

1. Choose which Unleashed AP will become the Unleashed Master AP (the AP that performs all of the control functions of your Unleashed network). Any Unleashed AP can be the Master.

**NOTE**

Do NOT connect multiple APs to power and the network all at once. In the initial setup stage, you should choose one AP as the Master AP and connect it to the network and power, and then complete the initial setup steps on this Master AP before connecting any other APs. Once setup is complete, you can continue connecting other APs to power and the network.

2. Perform the hardware installation according to the instructions in the *Unleashed Access Point Quick Setup Guide* that is included in the box with each Unleashed AP.
3. Once powered on and connected to the local network, the Unleashed AP boots up and begins broadcasting a temporary unencrypted WLAN named "ConfigureMe-[xxxxxx]".

**NOTE**

DNS-spoof is enabled on the AP to intercept DNS queries and respond with the Master AP's IP address. Clients associated to this temporary WLAN do not have Internet access.

## Step 2: Configure Your Unleashed Network

Unleashed can be deployed using either a Mobile App (available for iOS and Android), or using your PC's web browser.

Refer to the relevant section depending on which method you prefer to use:

### Step 2a: Setup Using the Unleashed Mobile App

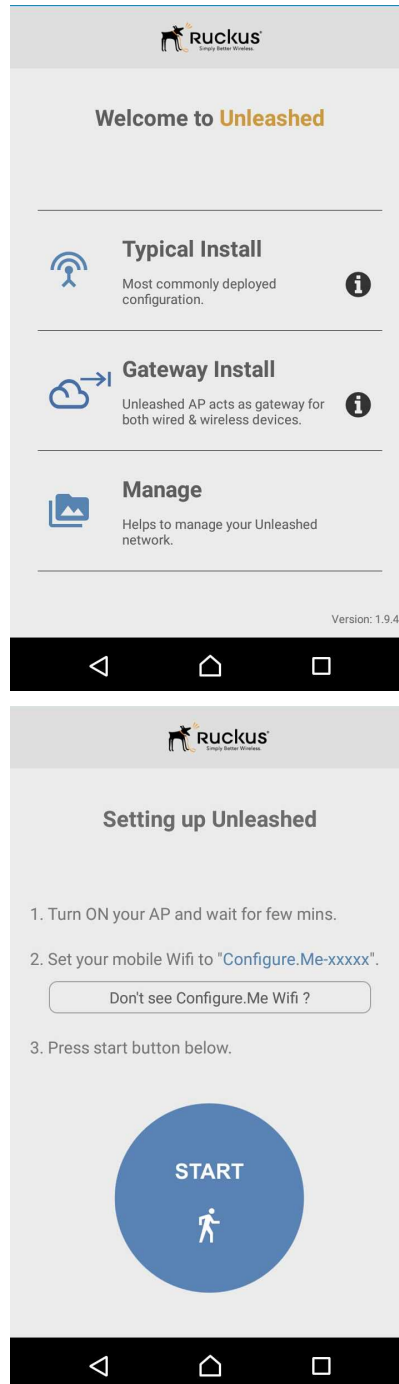
To perform setup using the Unleashed Mobile App, download the iOS or Android app from the app store.

As soon as the Unleashed AP is powered on and connected to the local network, it boots up and begins broadcasting a temporary unencrypted WLAN named "Configure.Me-[xxxxxx]" from both radios.

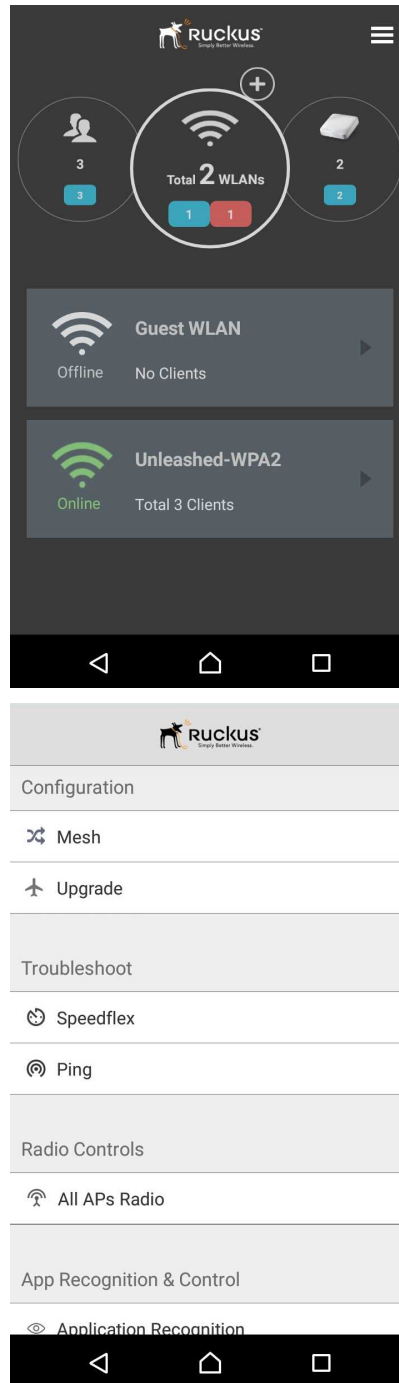
1. Using your client's Wi-Fi connection settings, select and associate to the "Configure.Me-[xxxxxx]" WLAN.

2. Launch the app, and follow the on-screen instructions to configure your Unleashed network(s).

**FIGURE 17** Unleashed Mobile App for iOS and Android



**FIGURE 18** Configuring Unleashed from the Mobile App



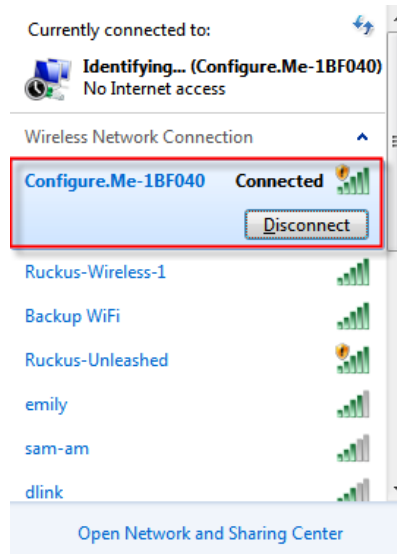


## Step 2b: Setup Using a Web Browser

To perform setup using a web browser, connect to the Unleashed setup network using any Wi-Fi capable client device.

1. Using your the Wi-Fi configuration settings on your client device (such as a laptop or mobile device), select and associate to the **Configure.Me-[xxxxxx]** WLAN, and launch a web browser.
2. In your browser's URL bar, enter the following address and press **Enter**: [unleashed.ruckuswireless.com](http://unleashed.ruckuswireless.com).

**FIGURE 19** Connect to "Configure.Me-[xxxxxx]" WLAN, then launch a web browser

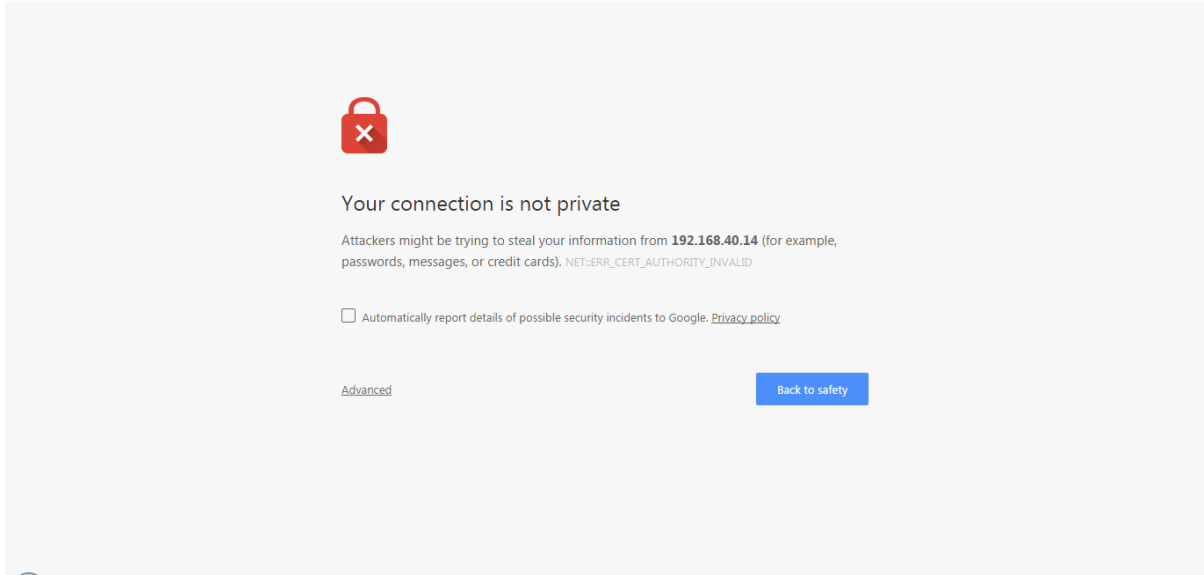


3. Depending on your browser, you may be presented with a security warning saying "This connection is not trusted" (Firefox) or "Your Connection is Not Private" (Chrome) or "There is a problem with this website's security certificate" (Internet Explorer). This is normal, as the Unleashed AP does not have an SSL certificate that is recognized by your browser.

Setting Up an Unleashed Wi-Fi Network  
Step 2: Configure Your Unleashed Network

4. Click **Advanced > Proceed to [IP address] (unsafe)** (Chrome), or **I Understand the Risks > Add Exception... > Confirm Security Exception** (Firefox), or **Continue to this website (not recommended)** (IE) to continue.

**FIGURE 20** Security warning (Chrome)



5. You will be redirected to the *Setup Wizard*, which guides you through the process of setting up the Unleashed Master AP.

6. Work through the Setup Wizard and check your configuration choices on the final page, before clicking **Finish** to complete the setup.
  - a) On the first page of the wizard, "System", select your **Language** from the menu.
  - b) Enter a **System Name** for the Unleashed system. This system name can be used to identify the Unleashed device on your local area network.
  - c) Select your **Country Code** from the menu.

**NOTE**

This option is not displayed if the AP is shipped from the factory with a fixed country code.

- d) If you want to enable Mesh networking for your Unleashed network, select the check box next to **Mesh**. See [Mesh Networking](#) on page 201 for more information.

**NOTE**

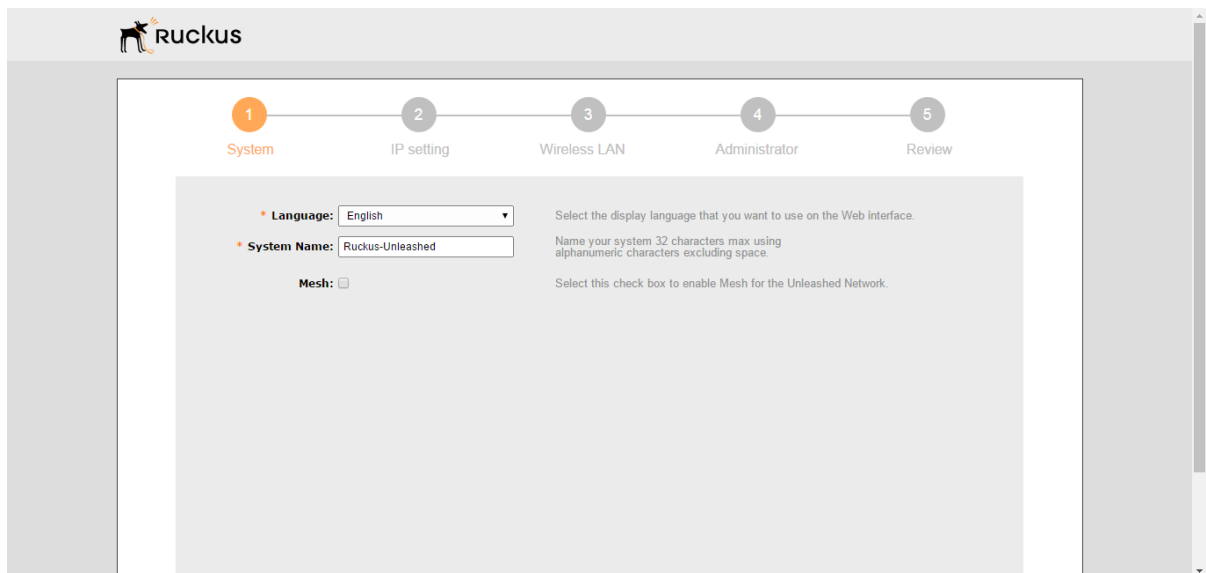
If the Unleashed AP does not support Mesh (e.g., R310), it can be configured as the Unleashed Master, but it will not be able to participate in the mesh network.

**NOTE**

If the Master AP is in Gateway mode and the WAN port is connected via PPPoE, Mesh can be enabled, but the Master AP cannot be a member of a mesh tree; all of the other connected member APs can be part of a mesh tree.

- e) Click **Next** to continue.

**FIGURE 21** Setup Wizard 1



- f) On the *IP Setting* page, select whether the AP will serve as a **Gateway** using one Ethernet port as a WAN port (connected to a cable modem, PPPoE connection, etc.) and the other as a LAN port.

**NOTE**

If your modem/router already provides gateway functionality, do not enable Gateway mode on the Unleashed Master AP. For more information on Gateway mode, see [Gateway Mode](#) on page 188.

- g) Select whether to assign a manual IP address or allow the system to obtain an IP address automatically using DHCP. Default is Dynamic (DHCP).

**NOTE**

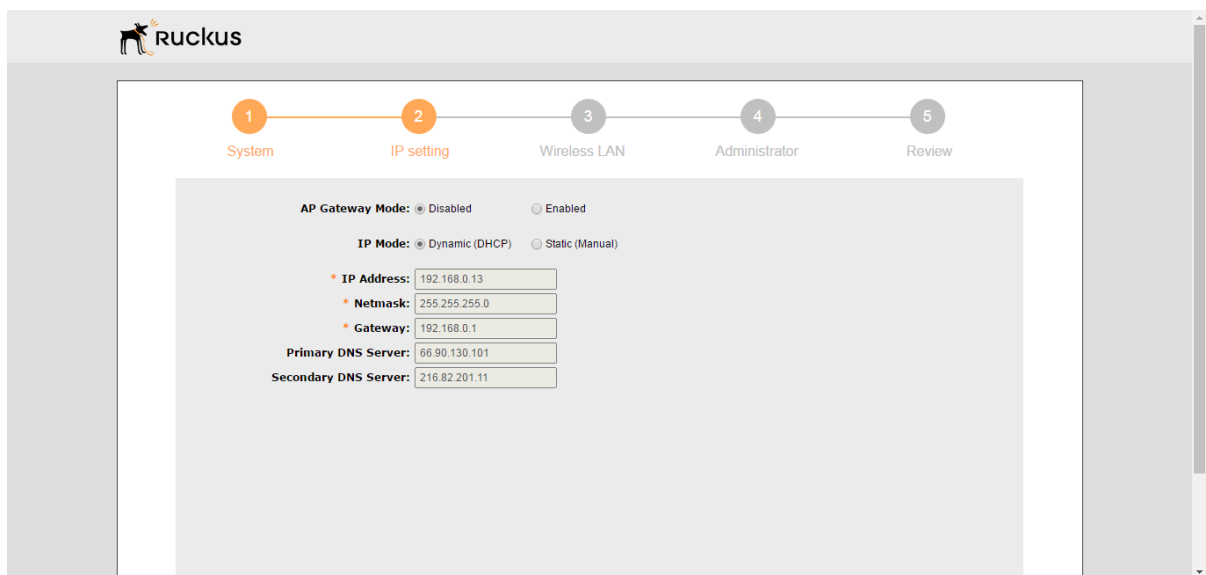
If you plan to manually assign and maintain IP addresses for your wireless network then select **Static (Manual)** and enter your Unleashed Master AP's IP address. Ensure that the IP address is outside the range assigned for Wi-Fi clients. Otherwise, leave the default of Dynamic (DHCP) and let Unleashed do all the work for you.

- h) If you choose Manual, enter an IP Address, Netmask, Gateway address and DNS server(s) in the fields provided.

**NOTE**

Optionally, if a manual IP address is configured, you can enable the built in DHCP Server to provide IP addresses to clients on Unleashed's own subnet. (For more information, see [DHCP Server](#) on page 191)

**FIGURE 22 Setup Wizard 2**



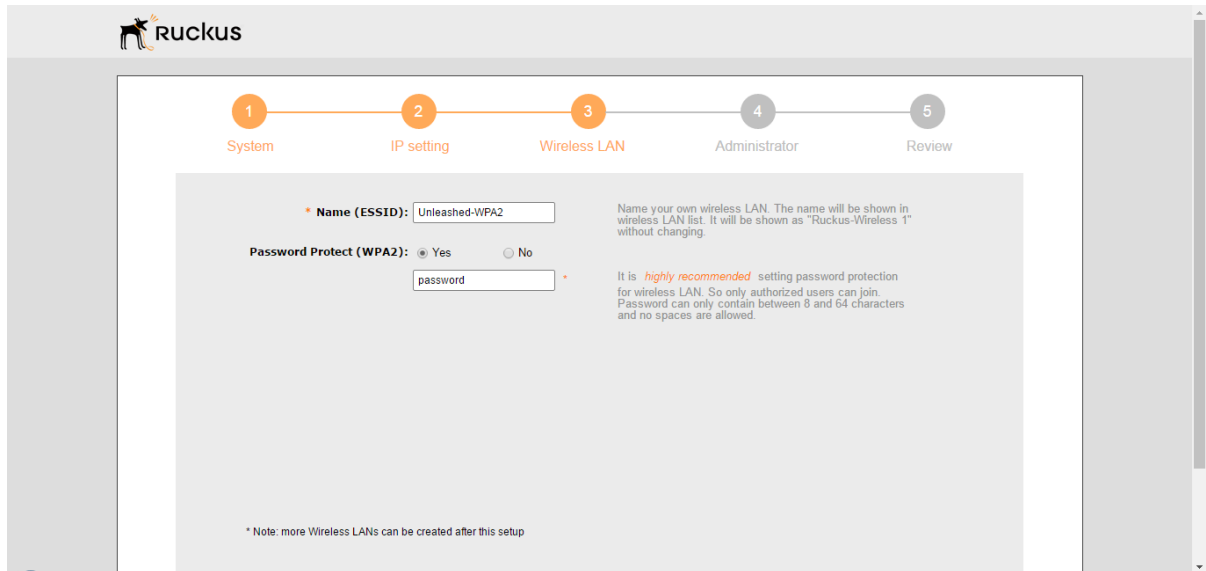
- i) Click **Next** to continue.
- j) On the **Wireless LAN** page, clear the text box and enter a **Name** for your first wireless LAN.
- k) Select an **Encryption Method** (Open or WPA2).

**NOTE**

WPA2 is highly recommend for the highest level of security.

- l) If WPA2 encryption is selected, enter a **Password** consisting of 8-63 alphanumeric characters.
- m) Click **Next** to continue.

FIGURE 23 Setup Wizard 3



- n) On the **Administrator** page, enter an **Admin Username** and **Password**.
- o) Re-enter the password in **Confirm Password**.
- p) Optionally, enter a **Security Email**, **Security Question** and **Security Answer** to allow you to reset your password in the event that your username or password are forgotten.
- q) Click **Next** to continue.

FIGURE 24 Setup Wizard 4

The screenshot shows the 'Administrator' step of a six-step setup wizard. The progress bar at the top indicates steps 1 through 6: System, Management IP, Wireless LAN, Administrator (highlighted), Register, and Review. The main content area contains the following fields:

- \* Admin Username:  (placeholder: xxx xx xx xxxxxxxxxxxx xx xxxxxxxxxxxx)
- \* Password:
- \* Confirm Password:
- \* Security Email:  (this will be used to reset forgotten password)
- \* Security Question:  (this will be used to reset forgotten password)
- \* Security Answer:  (your answer to security questions)

At the bottom right, there are 'Back' and 'Next' buttons.

- r) On the **Review** page, check that all the settings you have made are correct. If any settings need to be changed, click **Back** to go back to the previous wizard page.
- s) If you are satisfied with your choices, click **Finish** to complete the setup.

FIGURE 25 Setup Wizard 5

The screenshot shows the 'Review' step of a five-step setup wizard. The progress bar at the top indicates steps 1 through 5: System, IP setting, Wireless LAN, Administrator, and Review (highlighted). The main content area contains the following information:

Review the information below and click Finish to configure

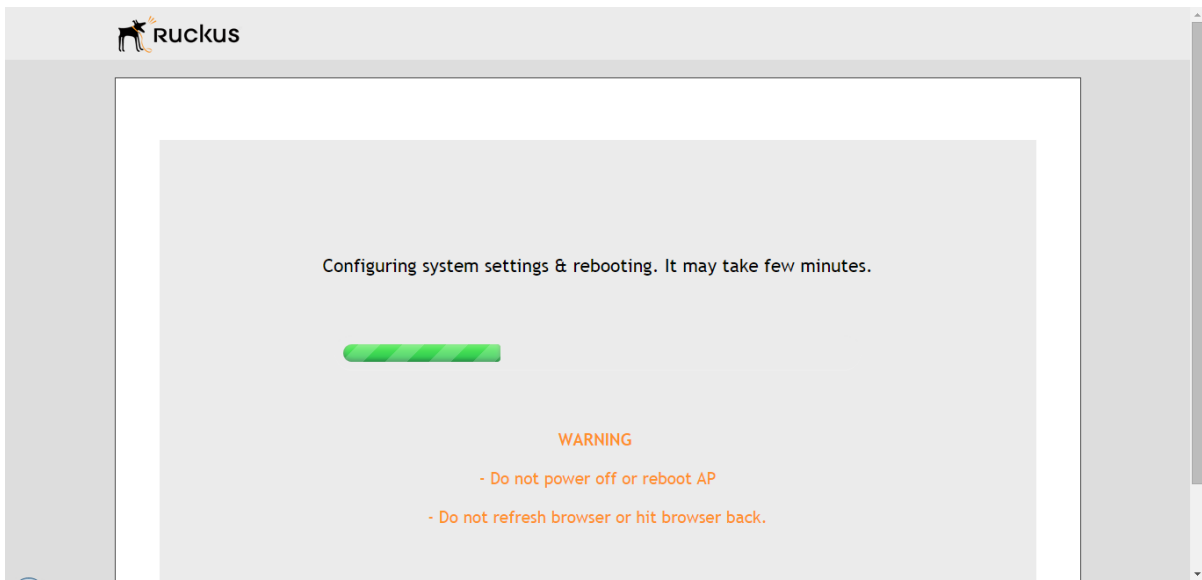
System Name	Ruckus-Unleashed
IP Mode	Dynamic (DHCP)
IP setting	192.168.0.13
Wireless LAN	Unleashed-WPA2
Admin Username	admin
Admin Password	**** <input type="checkbox"/> show password
Mesh	Mesh-461484314409
System Time	System time will be automatically set. (Your current PC time is 1/4/2017, 11:14:14 AM)

7. After clicking the **Finish** button, the Unleashed Master AP will reboot and a "**Configuring system settings & rebooting**" page is displayed. Wait for the progress screen to complete before proceeding.

**NOTE**

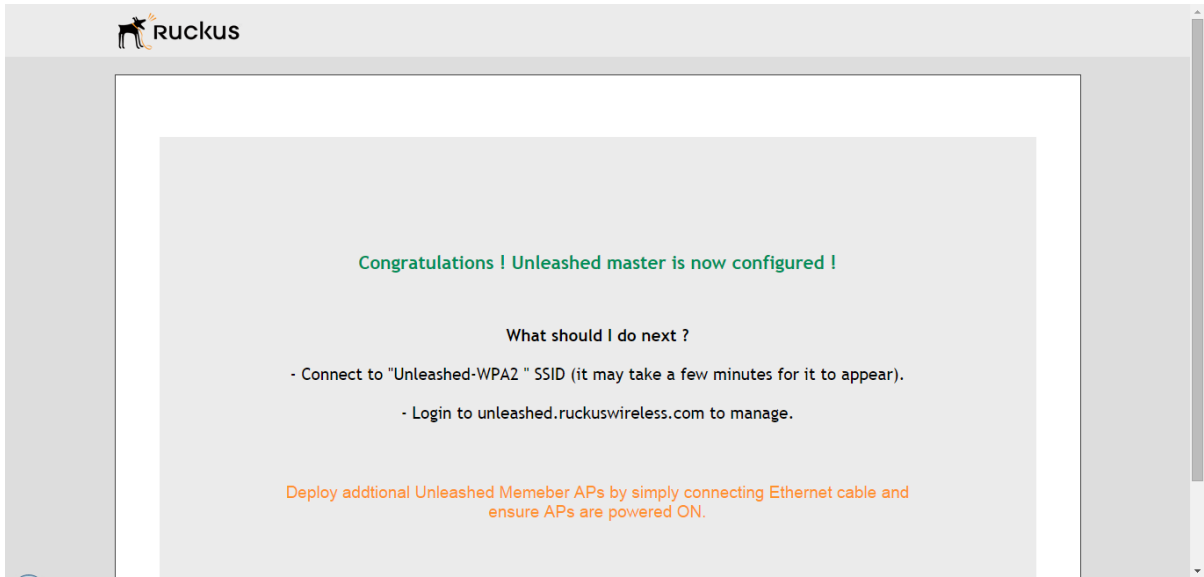
Do not disconnect power or network cables during this process, and do not click your browser's Back or Refresh buttons.

**FIGURE 26** Configuring system settings and rebooting progress screen



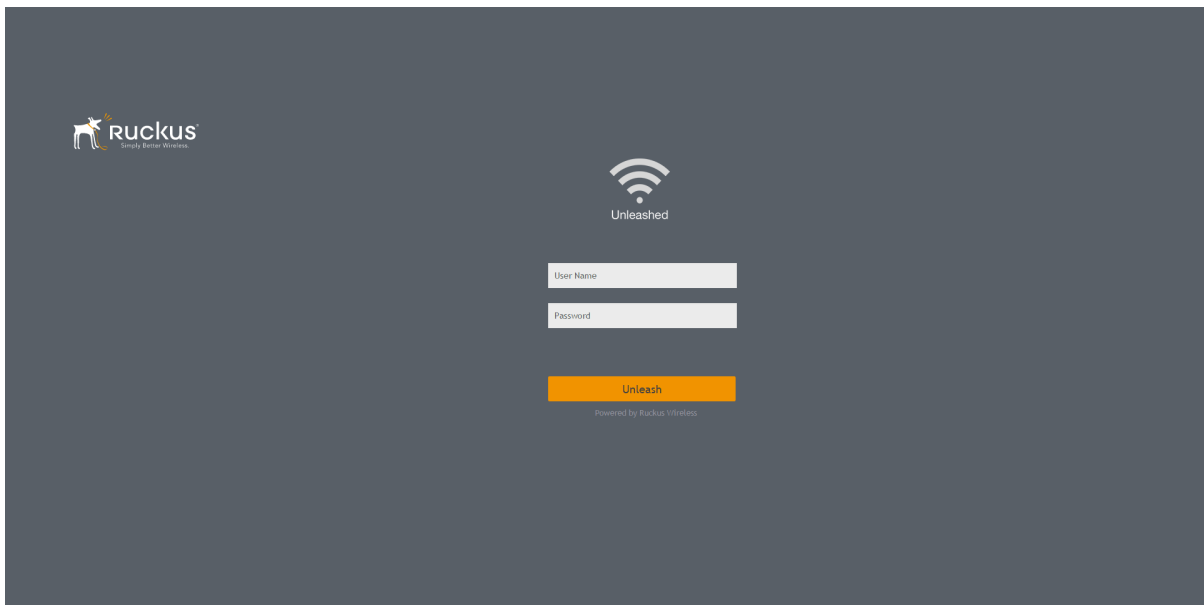
8. After setup is complete, the "Congratulations!" screen appears. Ensure that you are connected to the WLAN you configured, then click **Finish**. You will be redirected to the login page.

**FIGURE 27** "Congratulations! Unleashed Master is now configured" screen



9. Enter your **User Name** and **Password**, and click **Unleash** to login.

**FIGURE 28** Login screen





10. After successful login, you will be presented with the **Unleashed Dashboard**, which displays an overview of your Ruckus Unleashed network.

**FIGURE 29** Unleashed Dashboard

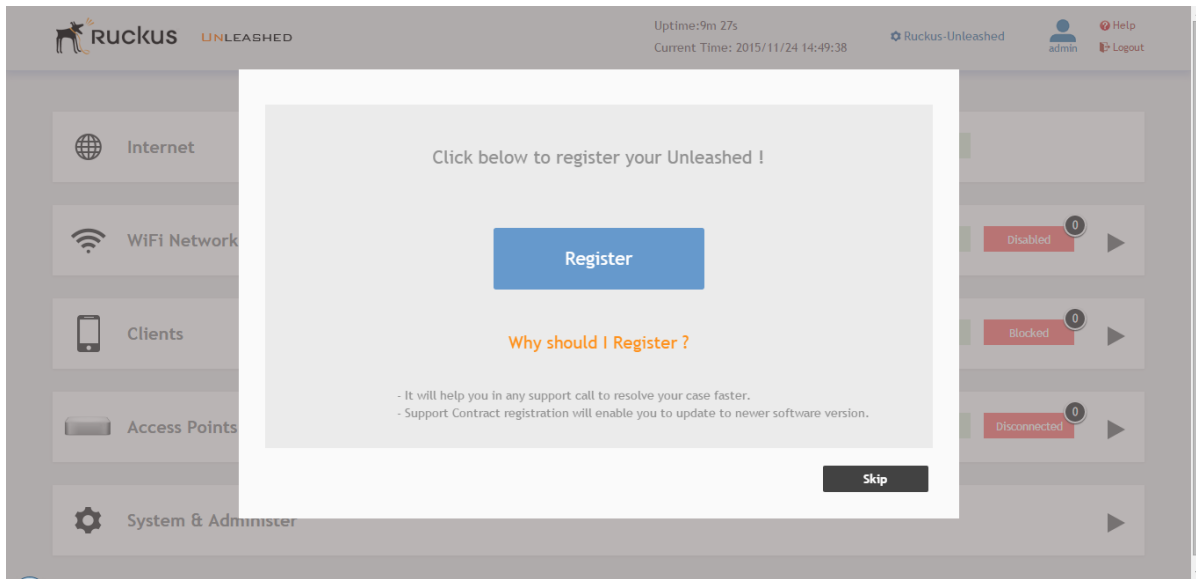


11. Continue to [Step 3: Customize Your Wireless LANs](#) on page 86

**NOTE**

The first time that you log into the Unleashed Admin Interface, you will be presented with a Register screen, prompting you to register your Unleashed Master AP with Ruckus. This registration is optional, and you can skip this step and register later if you prefer. Ruckus recommends that you register your Unleashed APs with us to assist in receiving updates and important notifications, and to make it easier to receive support in case you need to contact Ruckus for customer assistance. See [Registration](#) on page 253 for more information.

**FIGURE 30** The Registration page (optional) appears the first time you log in - Click Register to register now, or click Skip to skip this step and register later.



## Step 3: Customize Your Wireless LANs

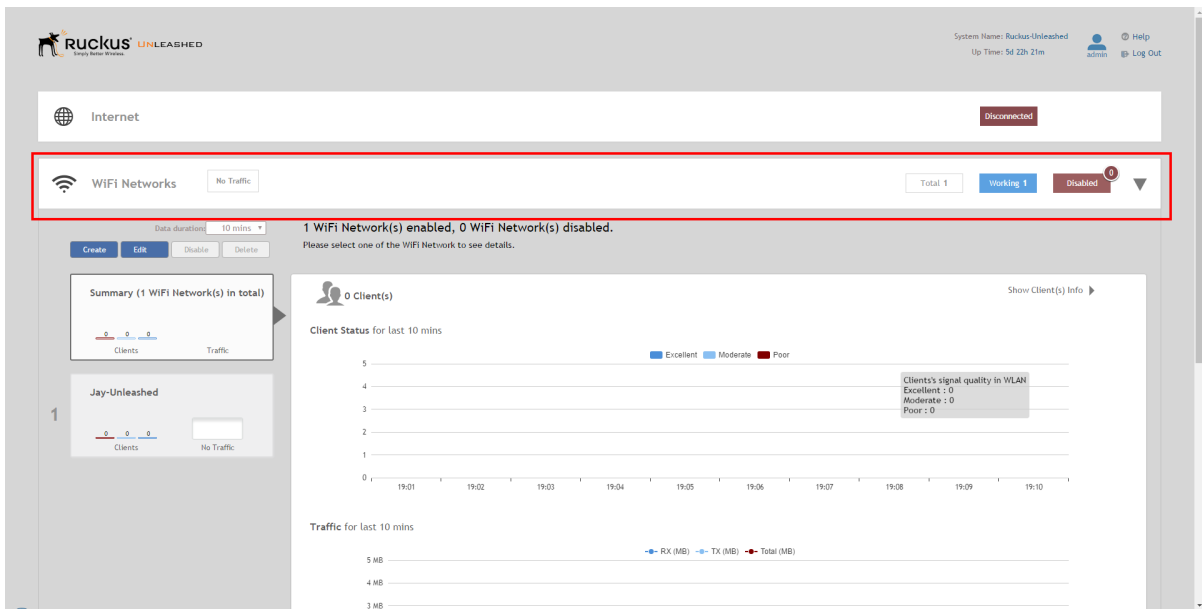
Once the Unleashed Master AP has been initialized, you can fine-tune the settings of your first WLAN (that you created during the setup wizard), and create any additional WLANs needed prior to attaching additional Unleashed member APs.

Then, when you deploy additional member APs in whatever order you prefer, they will automatically retrieve all WLAN configuration settings (and any other settings you have configured) from the Unleashed Master AP.

To customize an existing wireless LAN:

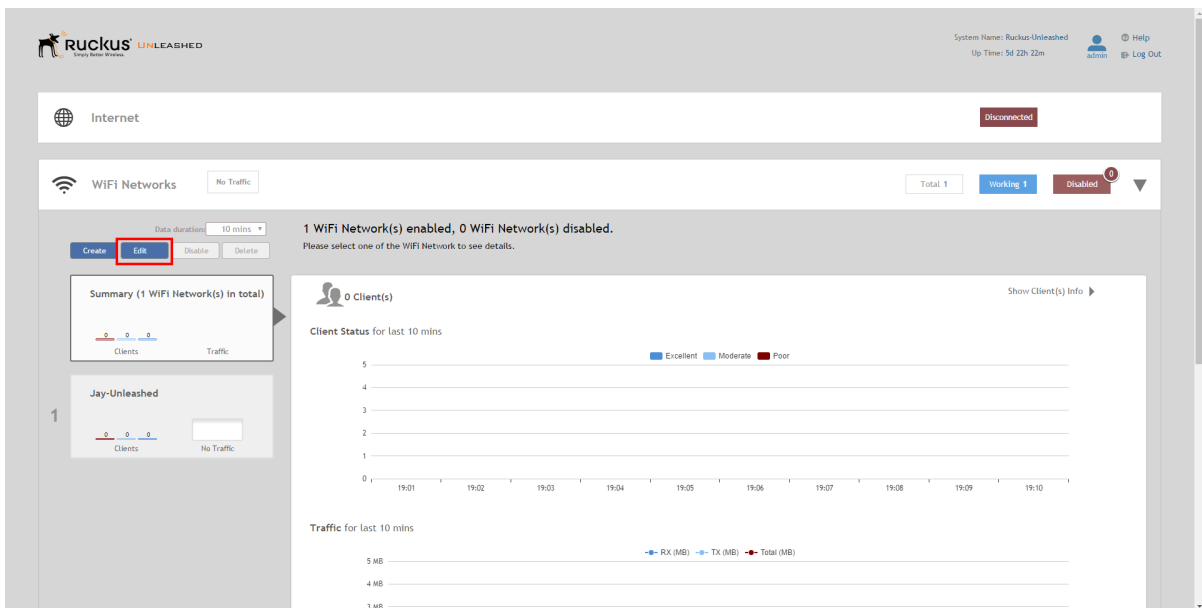
1. From the **Dashboard**, click anywhere in the **Wi-Fi Networks** section to expand the display of your deployed WLANs.

**FIGURE 31** Click the Wi-Fi networks section to expand



2. Select the WLAN box from the list on the left, and click the **Edit** button to edit the WLAN's settings.

**FIGURE 32** Select WLAN and click Edit to configure the WLAN settings



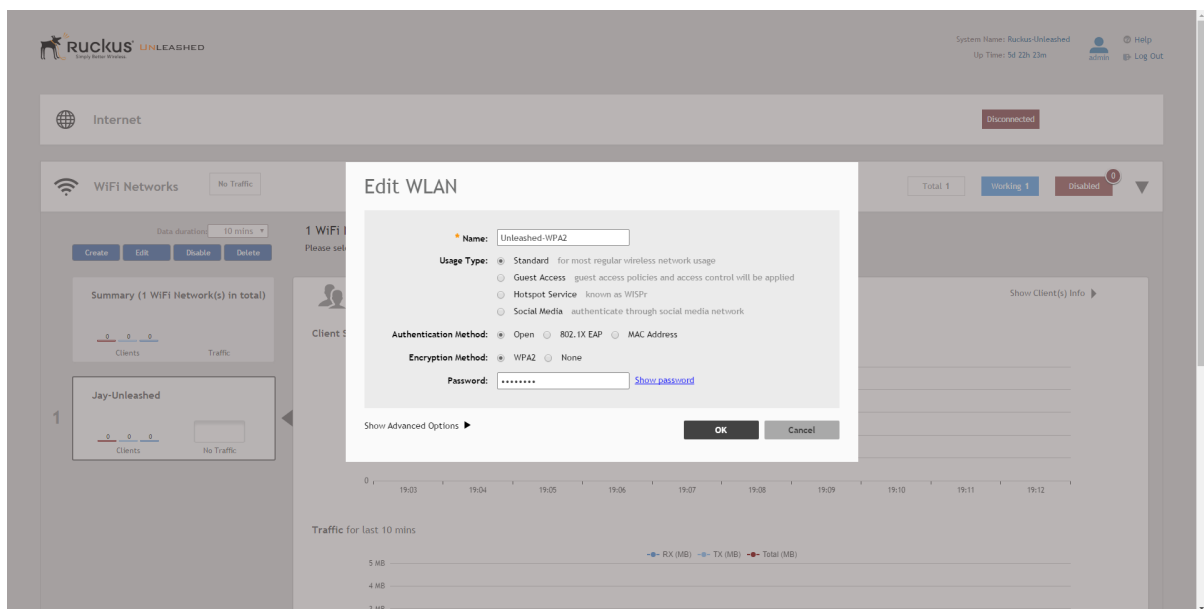
- Configure the following WLAN settings:
  - Name:** Enter a recognizable Name for this WLAN.
  - Usage Type:** Select Standard for most typical wireless network usage scenarios. Select Guest Access to create a Guest WLAN, or select Hotspot to create a Hotspot WLAN.
  - Authentication:** Select Open, for open authentication, or authenticate users against an external authentication server using 802.1X or MAC address.
  - Authentication Server:** Select an AAA server (or Local Database) to authenticate users when 802.1X or MAC authentication method is selected.
  - Encryption Method:** Select WPA2 for standard wireless security. Select None for no encryption.
  - Passphrase:** Enter a WPA2 password for use when connecting to this WLAN if WPA2 is selected.

**NOTE**

For information on additional WLAN configuration options, see [WLAN Configuration](#) on page 97.

- Click **OK** to save your changes.
- Repeat for any additional WLANs you would like to create. All WLANs will be deployed to each new member AP as soon as it joins the Unleashed network.

**FIGURE 33** Configure your first WLAN



Congratulations! Your Unleashed network is now configured and ready for use. You may now proceed to [Creating a New WLAN](#) on page 98, or [Step 4: Deploy Additional Unleashed Member Access Points](#) on page 89.

## Step 4: Deploy Additional Unleashed Member Access Points

Deploying additional Unleashed member APs is simply a matter of connecting them via Ethernet to the same Layer 2 network and providing power. They will discover the Unleashed Master and join automatically. No additional steps are necessary.

The second and any additional APs that join an Unleashed network will automatically assume the role of Unleashed "member AP." Thereafter, if the Master AP goes offline, one of the member APs will become the new Master and assume control of the Unleashed network.

### **NOTE**

When a member AP joins the Master for the first time, if it is running a different firmware version than the Master, it will automatically download and upgrade (or downgrade) itself to the correct firmware version to match that of the Master, reboot, and then rejoin the Unleashed network once the proper firmware is running.



# Using the Admin Interface

- Unleashed Administration Interface Overview.....91
- Navigating the Dashboard.....91
- Using the Dashboard Components.....92

## Unleashed Administration Interface Overview

The Unleashed Admin Interface provides tools for use in managing all aspects of your Unleashed deployment.

It contains configuration pages for managing Internet connection status, Unleashed Access Points, wireless LANs, user accounts, system settings and administrator preferences.

## Navigating the Dashboard

The Ruckus Unleashed platform's primary interface - used for monitoring and configuring all aspects of your Unleashed network - is called the Dashboard. The Dashboard is divided into three main sections, as shown in the following image. These three main sections and their subsections are described in the table below.

**FIGURE 34** The Dashboard



**TABLE 15** Unleashed Dashboard Components

Number	Component	Description
1	System Name and Uptime	Displays the System Name that you configured and the Uptime since the last reboot.
2	Admin Info	Displays currently logged in Admin name, a link to this <b>Online Help</b> , and a <b>Logout</b> button.

**TABLE 15** Unleashed Dashboard Components (continued)

Number	Component	Description
3	Network Components	These five subsections provide general overviews of each component. Click any of the components to expand the subsection for more detailed information and configuration options. See <a href="#">Using the Dashboard Components</a> on page 92.

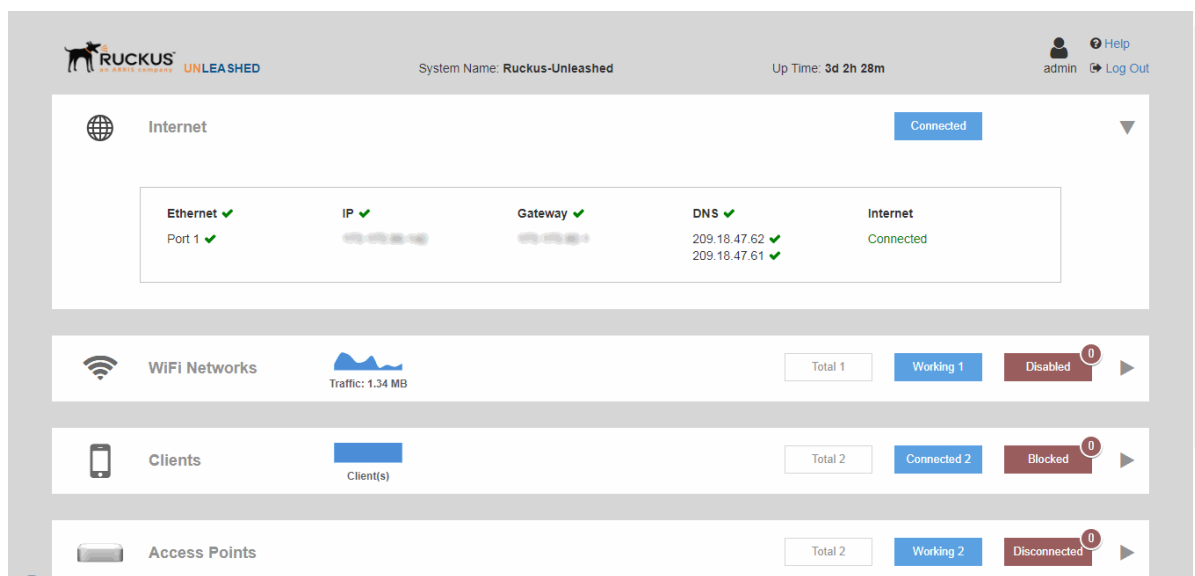
## Using the Dashboard Components

Each of the five Dashboard components can be expanded by clicking anywhere in the section to display more detailed information and links to configuration options for that component.

### Internet

This component provide details on the Unleashed Master AP's upstream connection to the internet, including public IP address, DNS servers, Gateway address, and the Ethernet port being used as the WAN port.

**FIGURE 35** Internet component



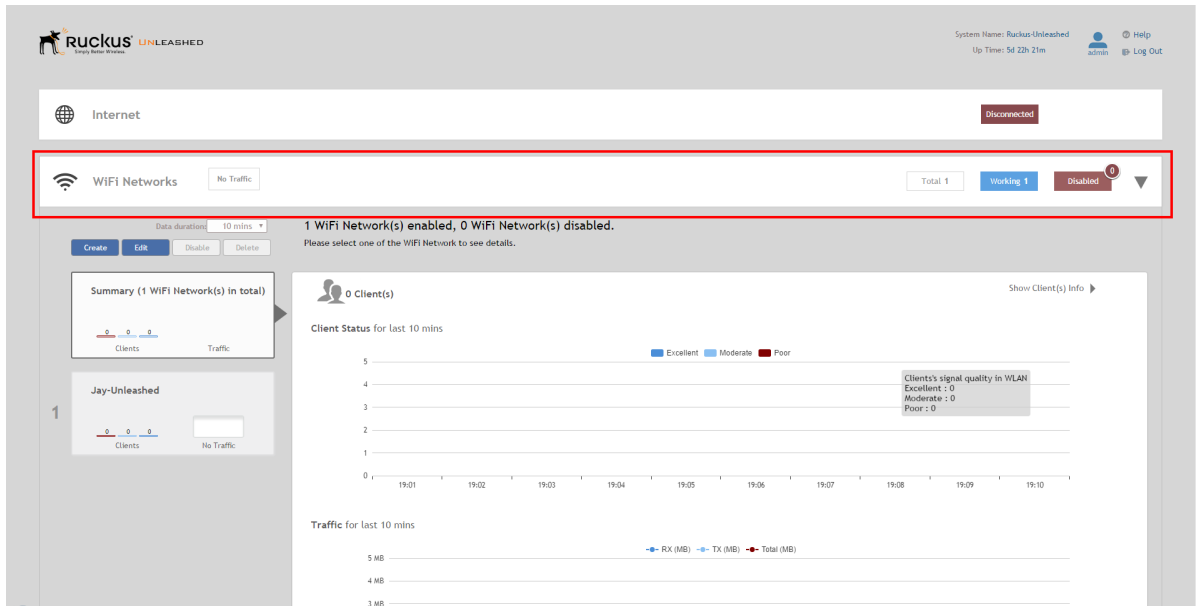
### Wi-Fi Networks

This component displays an overview of the wireless LANs that you have deployed. Its three categories display the numbers of *Total* wireless LANs, the number that are currently in *Working* state, and those that are in *Disabled* state.

Each of the three categories can be clicked to view a detailed list of the WLANs in the *Total*, *Working* or *Disabled* category.



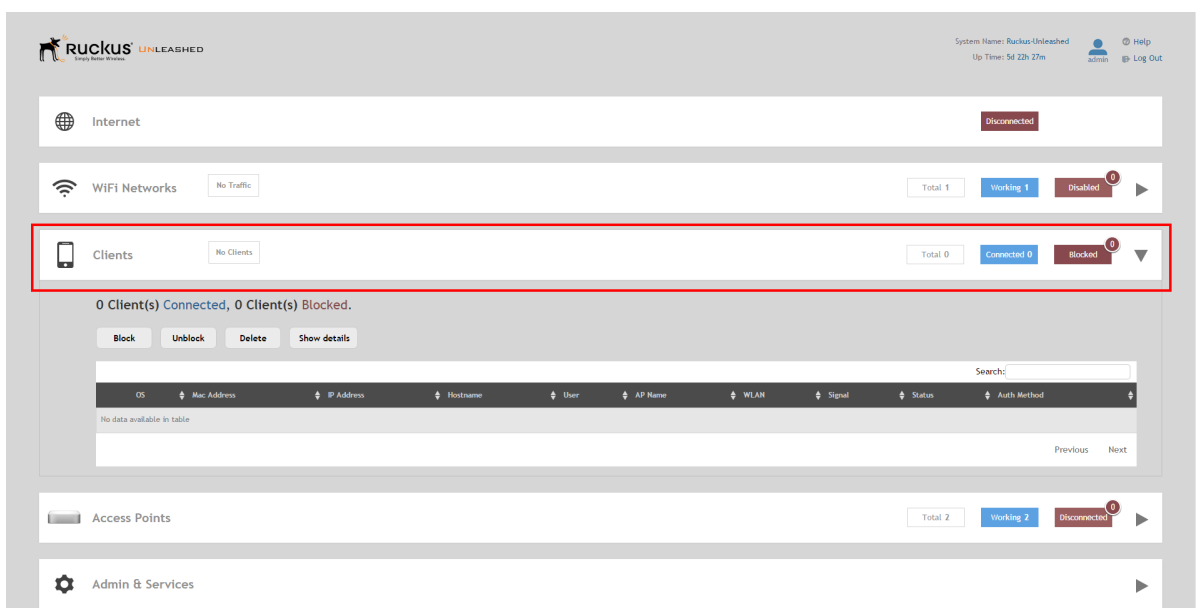
**FIGURE 36** Wi-Fi Networks - click the section to display a list of all WLANs



## Clients

The Clients component provides an overview of the number of *Total*, *Connected* and *Blocked* clients. When expanded, the Clients sub-component provides additional options to search for a client by MAC address, to show details on a client, to temporarily delete a client or to permanently block a client.

**FIGURE 37** Clients Component



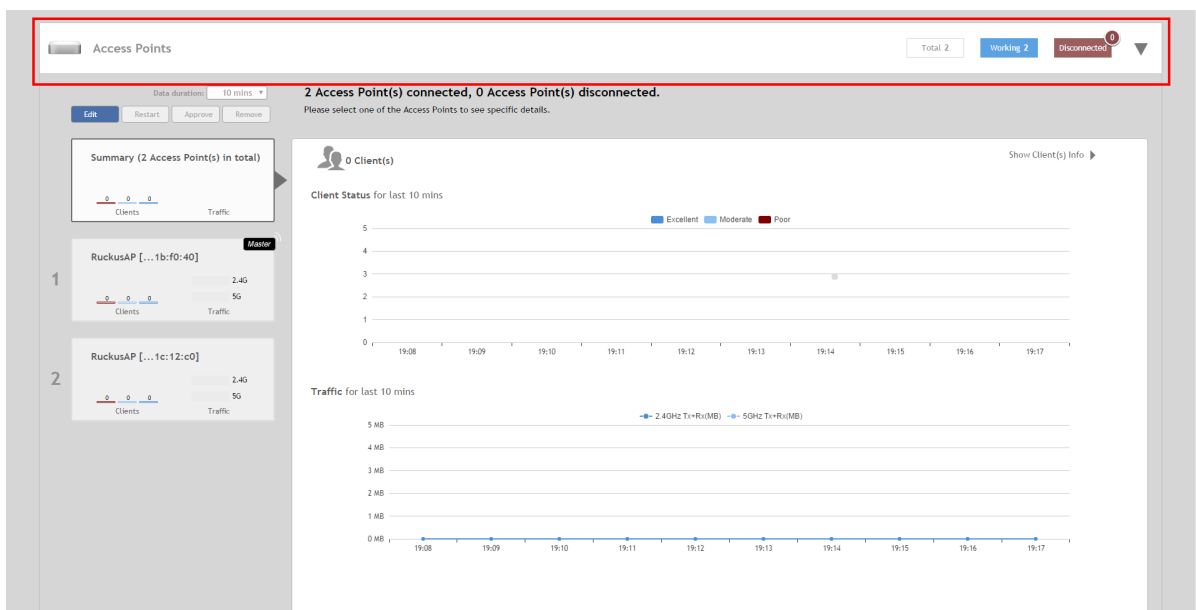
## Access Points

The Access Points component provides an overview of the Unleashed APs in your network, and is divided into three subsections: *Total*, *Working* and *Disconnected*. Click any of the three subsection buttons to expand the Access Points component and display a list of APs in that category.

When the Access Points component is expanded, it displays a list of all of the APs being managed by your Unleashed Master AP. The list includes all APs - including the Master AP itself, currently connected member APs, as well as any APs that have previously joined but are currently disconnected.

Each AP (whether working or disconnected) is represented by one of the large boxes on the left side of the screen. Click one of the AP boxes to display details about that specific AP.

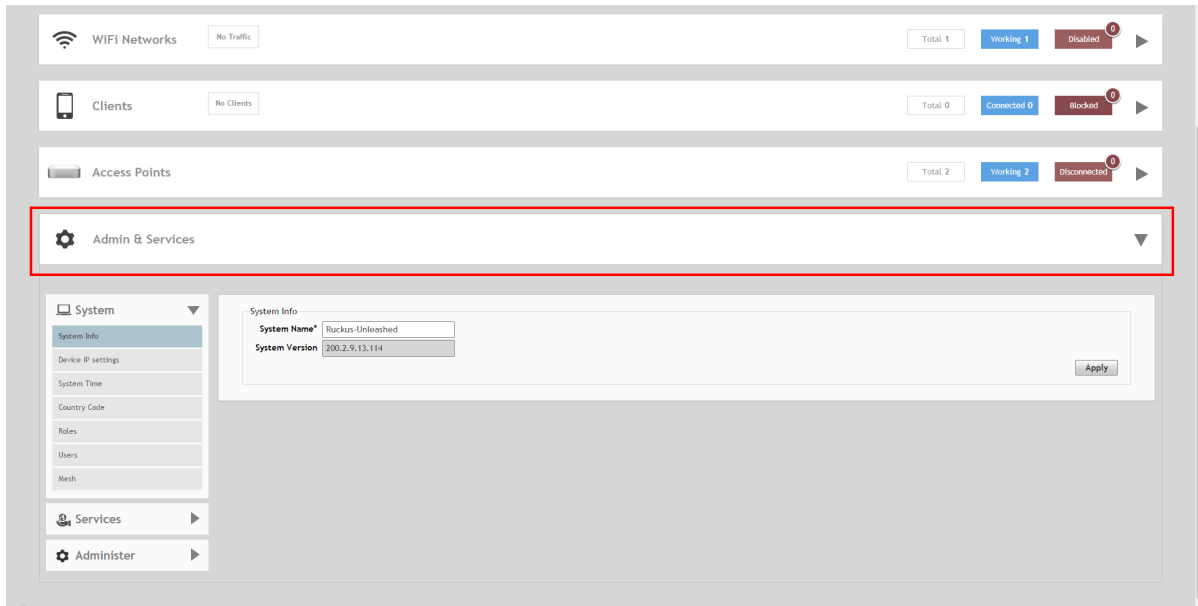
**FIGURE 38** Access Points component - click an AP box to display details on that AP



## Admin & Services

The Admin & Services component provides options for configuring system settings and services such as system IP address, Dynamic PSK, Bonjour Gateway, Application Recognition, Guest Access, Hotspot service, Radio Control settings and Wireless Intrusion Prevention (WIPS) services.

**FIGURE 39** Admin & Services component





# WLAN Configuration

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- [WLAN Configuration Overview](#)..... 97
- [WLAN Usage Types](#).....97
- [Creating a New WLAN](#)..... 98
- [Configuring Global WLAN Settings](#)..... 137
- [Editing an Existing WLAN](#)..... 139
- [Deleting a WLAN](#)..... 140
- [Temporarily Disabling a WLAN](#)..... 141

## WLAN Configuration Overview

The **Wi-Fi Networks** section of the Dashboard provides tools for managing all aspects of your Unleashed wireless networks. It contains pages for creating new WLANs, modifying or deleting existing WLANs, and configuring global wireless settings for deployment on all WLANs.

## WLAN Usage Types

Each WLAN must be configured as one of the following usage types:

- **Standard Usage:** To create a WLAN with specific options, choose "Standard Usage."
- **Guest Access:** Use this WLAN type for a guest WLAN. Guest access policies and access controls will be applied. For more information, see [Guest WLANs](#) on page 100.
- **Hotspot Service:** Use this WLAN type for a Hotspot (aka, WISPr) WLAN. If Hotspot is used, a Hotspot Service must first be configured on the **Admin & Services > Services > Hotspot Service** page (or from the **Wi-Fi Networks > Create WLAN > Create Service** page). For more information, see [Hotspot Services](#) on page 228.
- **Social Media:** Social Media WLANs require the visitor to log in using a social media account before being granted Internet access. For more information, see [Social Media WLANs](#) on page 134.
- **WeChat:** WeChat WLANs are a special type of social media login WLAN specifically for login using the WeChat app. For more information, see [WeChat WLANs](#) on page 136.

# Creating a New WLAN

In addition to the initial WLAN you created during the Setup Wizard process, you can create new WLANs using the Wi-Fi Networks section.

1. To create a new WLAN, expand the **Wi-Fi Networks** section and click **Create**.

FIGURE 40 Click Create to create a new WLAN

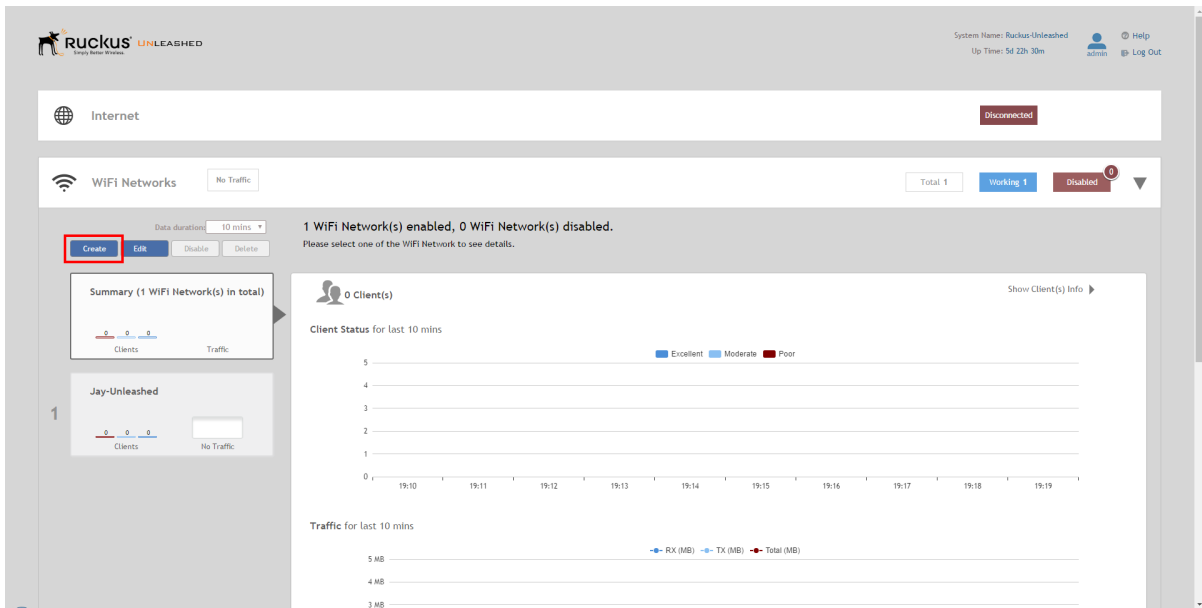
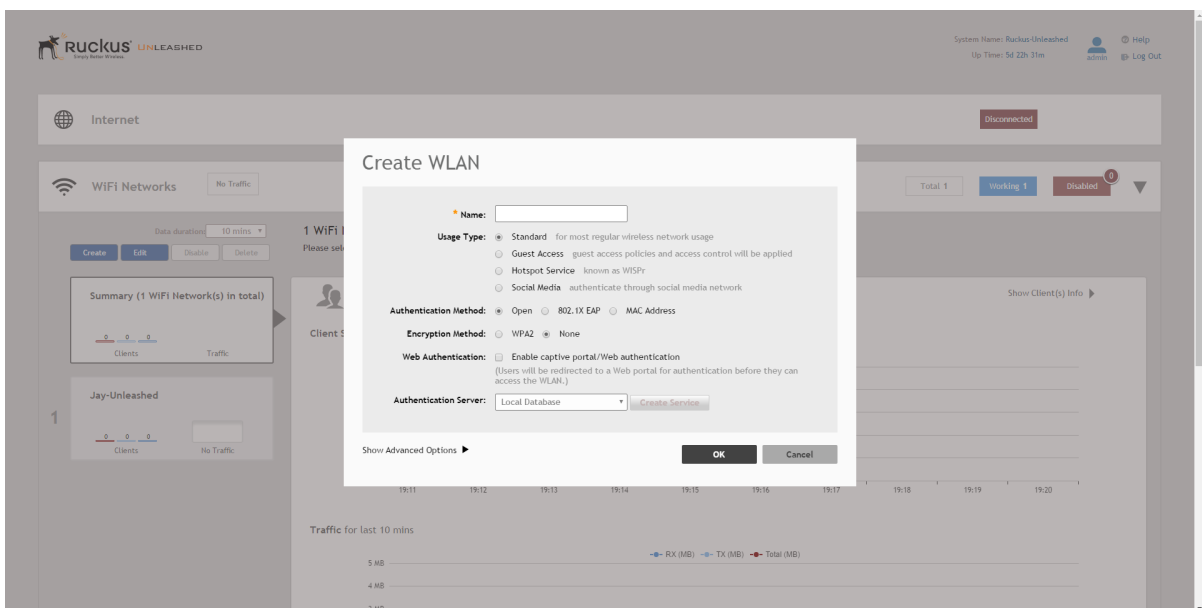


FIGURE 41 Creating a new WLAN



2. Select the WLAN **Usage Type** from the following options:
  - **Standard:** Use this WLAN type for most regular wireless network usage.
  - **Guest Access:** Use this WLAN type for a guest WLAN. Guest access policies and access controls will be applied. For more information, see [Guest WLANs](#) on page 100.
  - **Hotspot Service:** Use this WLAN type for a Hotspot (aka, WISPr) WLAN. If Hotspot is used, a Hotspot Service must first be configured on the **Admin & Services > Services > Hotspot Service** page (or from the **Wi-Fi Networks > Create WLAN > Create Service** page). For more information, see [Hotspot Services](#) on page 228.
  - **Social Media:** Social Media WLANs require the visitor to log in using a social media account before being granted Internet access. For more information, see [Social Media WLANs](#) on page 134.
  - **WeChat:** WeChat WLANs are a special type of social media login WLAN specifically for login using the WeChat app.
3. Select the **Authentication Method** to use:

**NOTE**

Unless using an external authentication server (i.e., RADIUS server) select **Open** authentication, and combine with **WPA2** encryption for secure Wi-Fi access.

- **Open:** No authentication method is used. "Open" authentication allows the use of WPA2, WEP or no encryption. Open authentication + WPA2 encryption (also known as WPA-PSK) is the most common type of WLAN encryption method and should be the default configuration if there are no special requirements for authentication or encryption.
  - **802.1X EAP:** Authentication against either the internal database or an external RADIUS server. The 802.1X EAP authentication method (also known as "WPA2-Enterprise") provides effective authentication regardless of the encryption method, and requires a back-end (RADIUS) authentication server. WPA2-Enterprise provides secure connectivity by ensuring that every device must authenticate to an authentication server before it is allowed access to network resources. Authentication can be based on digital certificates, and granular policies can be designed to govern the level of access, provide visibility and control over devices on the network.
  - **MAC Address:** Authentication using the client's MAC address against an external RADIUS server.
4. Select the **Encryption Method** to use:
    - **WPA2:** Encrypt traffic using the WPA2 standard. WPA2 is the only encryption method certified by the Wi-Fi Alliance, and is the recommended method.
    - **None:** No encryption; communications are sent in clear text.
  5. Choose whether a **Captive Portal** will be used for web-based authentication.
  6. If either 802.1X EAP, MAC Address or Web Auth (Captive Portal) options are chosen, select an **Authentication Server** from the list.
    - a) If an external authentication server is to be used rather than the internal database, click **Create Service** to create an AAA server object to authenticate against.

**NOTE**

Alternatively, you can create AAA servers on the **Admin & Services > Services > AAA Servers** page. For more information, see [AAA Servers](#) on page 211.

7. Click **OK** to save your changes and deploy the new WLAN.

**NOTE**

For advanced WLAN configuration options, see [Advanced WLAN Configuration](#) on page 143.

## Guest WLANs

By creating a Guest WLAN, visitors to your organization can be allowed limited (or unlimited) access to your wireless network, with configurable guest access policies.

Once the Guest WLAN is deployed, visitors can be given the option to self-activate their devices using a Self-Service Guest Pass, or authenticate to any of your internal WLANs using Zero-IT activation via the BYOD Onboarding Portal, or both.

Unleashed provides the following options for different types of Guest WLANs:

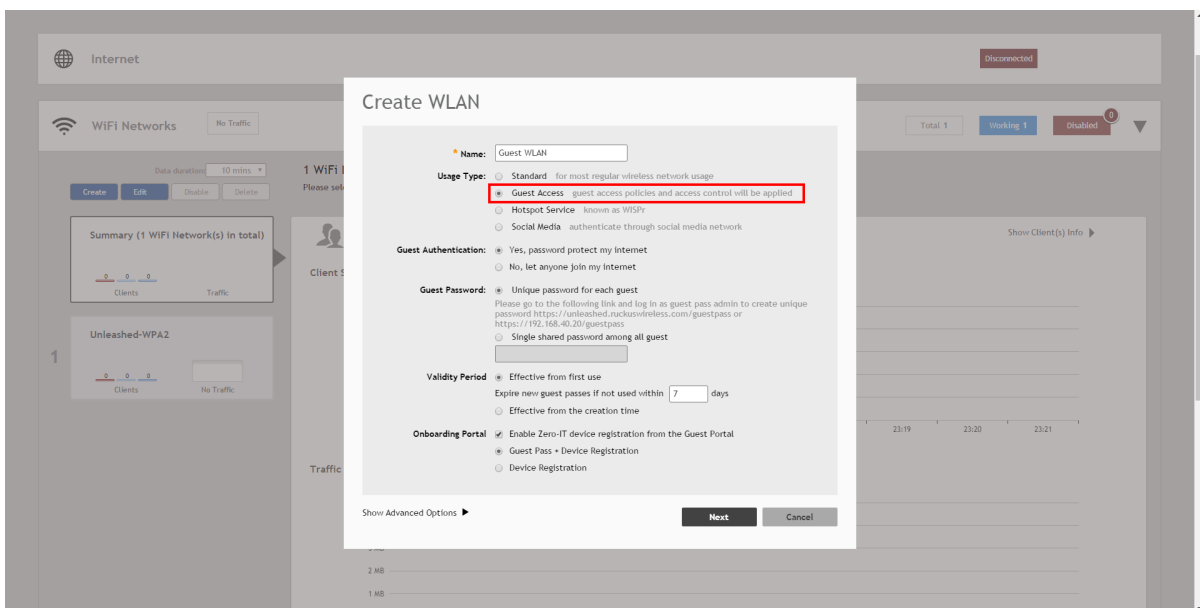
- No authentication (open WLAN): Any client can connect, no password or captive portal required.
- Authentication with shared key: Any client can connect using the same shared password.
- Authentication with unique key (Guest Pass): Guest Pass keys must be generated for each guest, either by an admin (guest pass operator), or using the Self-Service Guest Pass feature.
  - Admin generated: Each Guest Pass has to be generated by a guest pass operator.
  - Self-service: Users can self-authenticate their clients to the guest WLAN, in one of two ways:
    - › No sponsor approval: No restrictions. Any client can request a Guest Pass, and it will be provided immediately.
    - › Sponsor approval: Guests are required to request a Guest Pass, which must be approved by a sponsor before being delivered to the user via email or SMS.

## Deploying a Guest WLAN

Unleashed provides extensive options for customizing guest wireless networks, both in terms of how users connect, and what access privileges they are given once connected.

1. Go to **Wi-Fi Networks > Create**.
2. Type a **Name** for the guest WLAN.
3. In **Usage Type**, select **Guest Access**.

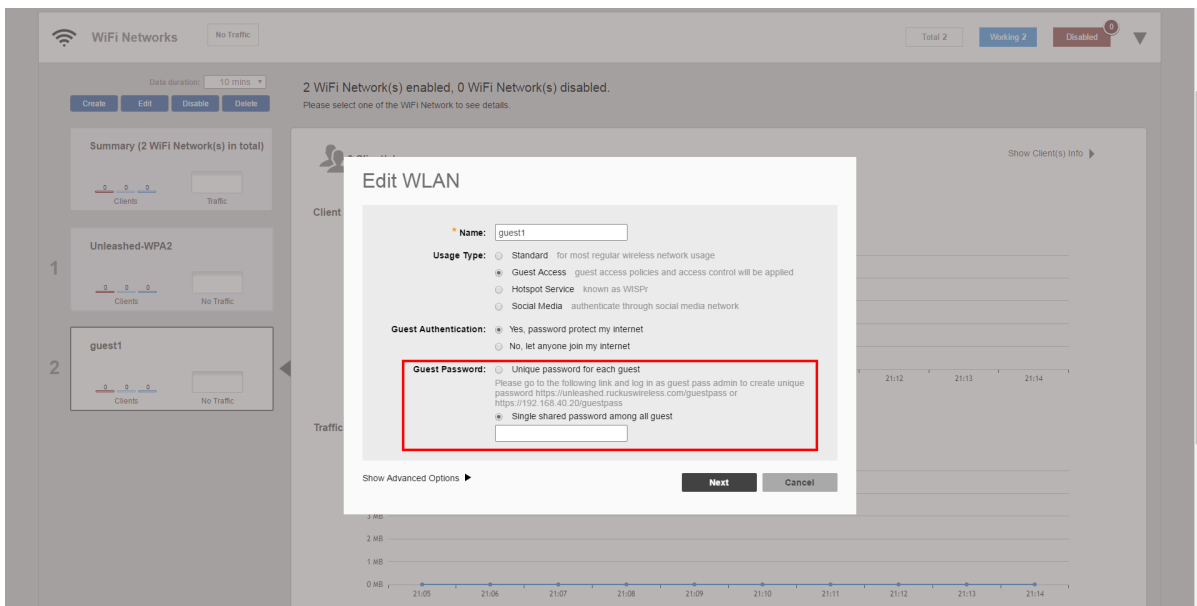
**FIGURE 42** Create a new Guest WLAN





4. In **Guest Authentication**, choose either to password protect this guest WLAN, or to allow anyone to connect with no password required ("Open" authentication).
5. If you selected **Yes, password protect my internet** in the previous step, choose one of the following:
  - **Unique password for each guest:** Guest Passes must first be generated, in batch or individually, for each visitor before they will be able to log in using a guest pass. For more information, see [Working with Guest Passes](#) on page 114.
  - **Single shared password among all guests:** This option allows you to skip the Guest Pass requirement, and simply provide a single password for all visitors.

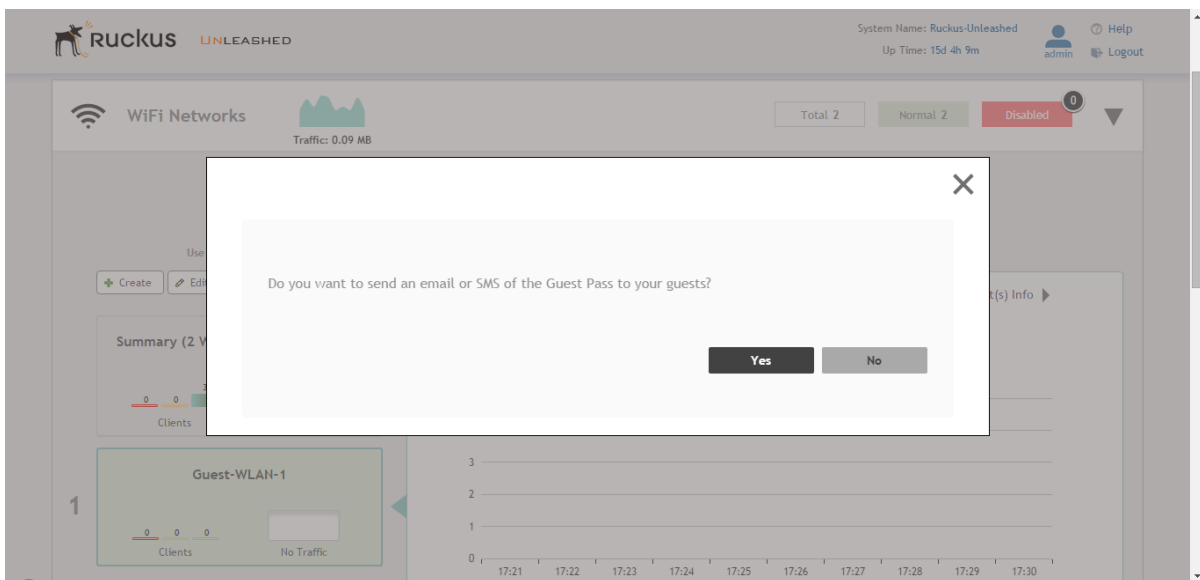
**FIGURE 43** Select single shared password among all guests or unique password for each guest



6. In **Validity Period**, choose whether the guest passes will be **effective from first use** or **effective from creation time**, and enter a value for **Expire new guest passes if not used within \_\_\_ days** if the **effective from first use** option is selected.
7. In **Onboarding Portal**, choose whether to allow guests the option to register their devices on your internal (non-guest) WLANs using the Onboarding Portal. For more information, see [Using the BYOD Onboarding Portal](#) on page 109.
8. Optionally, click **Show Advanced Options**, and configure any advanced options, such as restricted subnet access, WLAN priority, access controls, application visibility, etc. See [Advanced WLAN Configuration](#) on page 143 for more information.
9. Click **Next**.

10. The next screen prompts you to either use the Ruckus logo or upload your own logo to be displayed on the **Guest Access** login page. You can customize any of the following:
  - **Company Logo:** If you want to include a logo, you will need to prepare a web-ready graphic file, in one of three acceptable formats (.JPG, .GIF or .PNG). Make sure the logo file meets the following specifications:
    - Length: 138 x 40 pixels
    - File size: 20kB
  - **Welcome Message:** The default welcome message, "Welcome to the Guest Access login page" can be replaced with any text you choose.
  - **User Redirection URL:** Choose whether to redirect the user to the original website he/she wanted to visit after successful login, or to redirect to a URL you specify in the **Redirect user to this website** field.
  - **Terms and Conditions:** Choose whether to display the terms and conditions before guests can access your network. You can also edit the default terms and conditions by clicking **Show Preview**, and replacing the default text with any text you choose.
  - **Guest Pass Self-Service:** Allow users to self-authenticate their clients to your guest WLAN. For more information, see [Guest Pass Self-Service](#) on page 114.
11. Click **OK** to save your changes.
12. The next screen prompts you to begin the configuration for email and SMS delivery of Guest Passes. Click **Yes** to configure email and SMS settings, or click **No** to skip this step. You can configure these settings later from the **Admin & Services** pages, if you prefer. See [Configuring Email and SMS Settings](#) on page 103 for more information.

**FIGURE 44** Continue to configure email and SMS delivery settings



13. Continue to [Configuring Email and SMS Settings](#) on page 103.

## Configuring Email and SMS Settings

In order for Unleashed to send guest pass codes to guest users via email and/or SMS, it needs to have an email server or SMS server information configured.

To configure email and SMS server settings:

1. Go to **Admin & Services > Services > System Info**.
2. In the **Email** tab, enable the **Enable Email Server** check box, and then enter the following:
  - **From email address:** Type the email address from which Unleashed will send email messages.
  - **SMTP Server name:** Type the full name of the server provided by your ISP or mail administrator. Often, the SMTP server name is in the format smtp.company.com.
  - **SMTP Server port:** Type the SMTP port number provided by your ISP or mail administrator. Often, the SMTP port number is 25 or 587. The default SMTP port value is 587.
  - **SMTP Authentication username:** Type the user name provided by your ISP or mail administrator. This might be just the part of your email address before the @ symbol, or it might be your complete email address. If you are using a free email service (such as Hotmail or Gmail), you typically have to type your complete email address.
  - **SMTP Authentication password:** Type the password that is associated with the user name above.
  - **Confirm SMTP Authentication password:** Retype the password you typed above to confirm.
  - **SMTP Encryption Options:** If your mail server uses TLS encryption, click the SMTP Encryption Options link, and then select the TLS check box. Additionally, select the STARTTLS check box that appears after you select the TLS check box. Check with your ISP or mail administrator for the correct encryption settings that you need to set.
3. To verify that Unleashed can send email messages using the SMTP settings you configured, click the **Test** button.
  - If Unleashed is able to send the test message, the message **Success!** appears at the bottom of the Email Notification page.
  - If Unleashed is unable to send the test message, the message **Failed!** appears at the bottom of the Email Notification page. Go back to the previous step, and then verify that the SMTP settings are correct.

4. Click **Apply**. The email notification settings you configured become active immediately.

**FIGURE 45** Email Server settings

The screenshot shows the configuration page for the Email Server. On the left is a navigation menu with 'System' selected, containing sub-items like System Info, IP settings, System Time, Country Code, Roles, Users, and Mesh. Below this are 'Services' and 'Administer' sections. The main content area has three sections:

- System Info:** Fields for System Name (Ruckus-Unleashed), System Version (200.5.10.0.225), and Unleashed ID (un461484314409150489319666) with a Generate button. An Apply button is at the bottom right.
- Email Server:** A checkbox 'Enable Email Server' is checked. Fields include From Email Address (test@example.com), SMTP Server Name (smtp.example.com), SMTP Server Port (587), SMTP Authentication Username (username), SMTP Authentication Password (masked), and Confirm SMTP Authentication Password (masked). There is an expandable section for SMTP Encryption Options. A Test button (highlighted with a red box) and an Apply button are at the bottom right.
- SMS settings:** A checkbox 'Enable SMS Server' is unchecked. A radio button 'twilio account information' is selected. There is an Account Sid field and a link to 'register a new twilio account'.

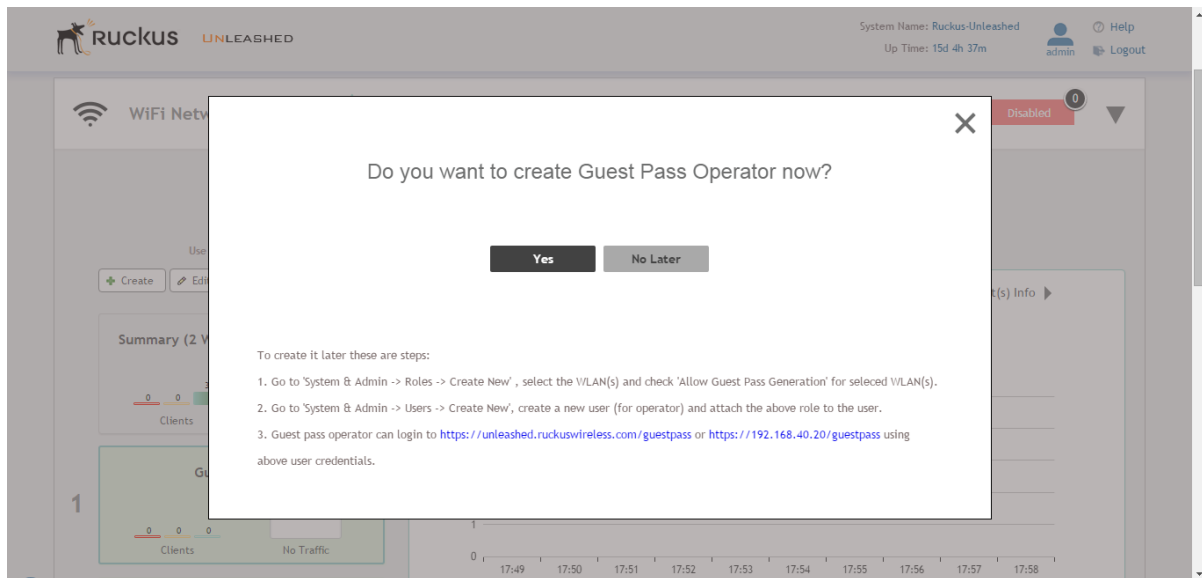
5. Configure SMS delivery as described in *Delivering Guest Passes via SMS*.

## Creating a Guest Pass Operator

Guest Pass Operators are individuals within an organization who have the authority to generate guest passes for visitors. This task describes how to create a user role for a category of user that is allowed to generate and manage guest passes.

1. After configuring Email and SMS settings, you will be prompted to configure a Guest Pass Operator.

**FIGURE 46** Optionally configure a Guest Pass Operator now



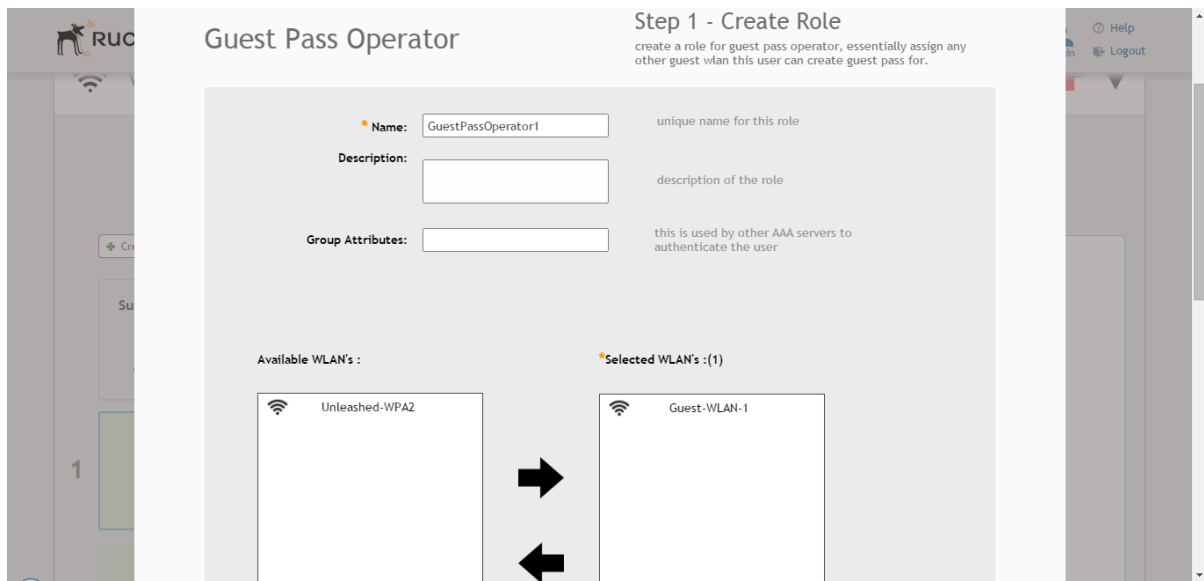
2. Click **Yes** to configure this role now. Or click **No Later** to configure these settings later.

### NOTE

To configure additional operator roles, go to **Admin & Services > System > Roles > Create New**, select the guest WLAN(s) to allow, and check **Allow Guest Pass Generation** for the selected WLAN(s).

3. If you clicked **Yes**, you will be presented with the **Guest Pass Operator** configuration screen. Use this screen to configure the following options:
  - **Name:** Enter a unique name for the operator role.
  - **Description:** Optional description of the role.
  - **Group Attributes:** Used by AAA servers to authenticate the user.
  - **Available WLANs:** The list of available WLANs that the operator is allowed to choose from.
  - **Selected WLANs:** The list of WLANs for which the operator can issue guest passes.

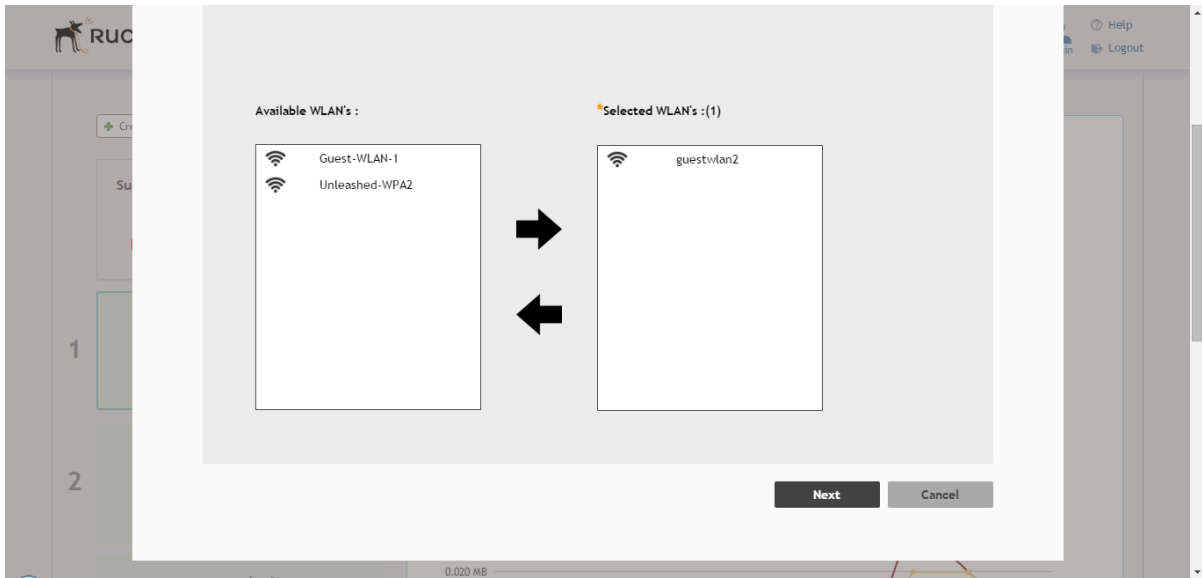
**FIGURE 47** Create Guest Pass Operator - step 1



4. Use the arrows to move WLANs to/from the list of **Available WLANs** to **Selected WLANs** for which the Guest Pass Operator will be allowed to issue guest passes.

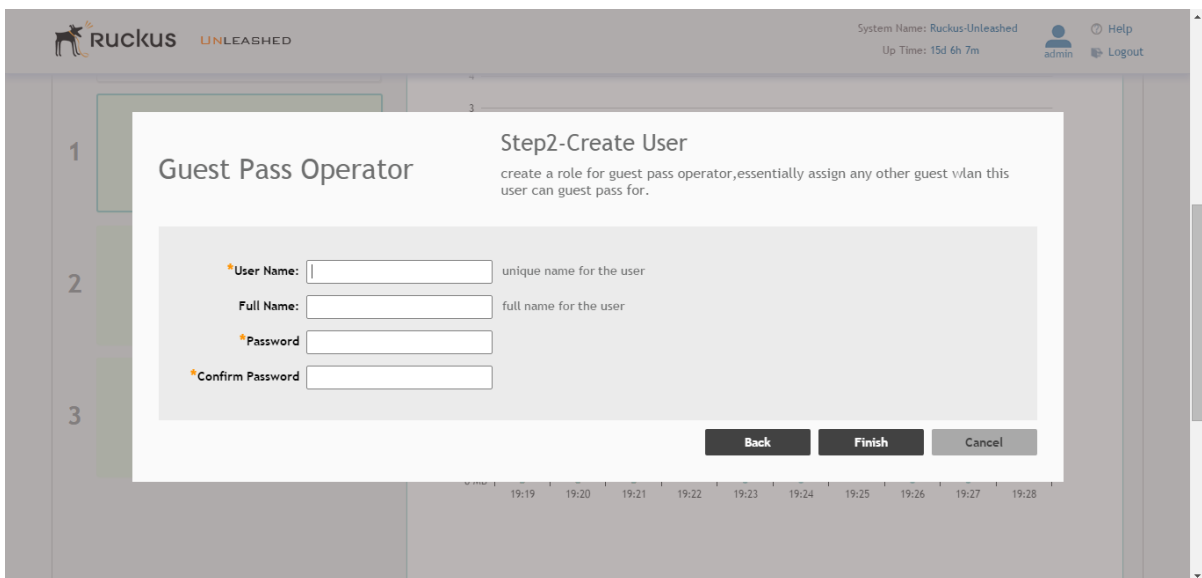
5. Click **Next** to continue.

**FIGURE 48** Move WLANs from available to selected



6. On the next screen that appears, **Guest Pass Operator - Step 2: Create User**, enter a user name and password to create a user with this role.

**FIGURE 49** Create Guest Pass Operator - step 2

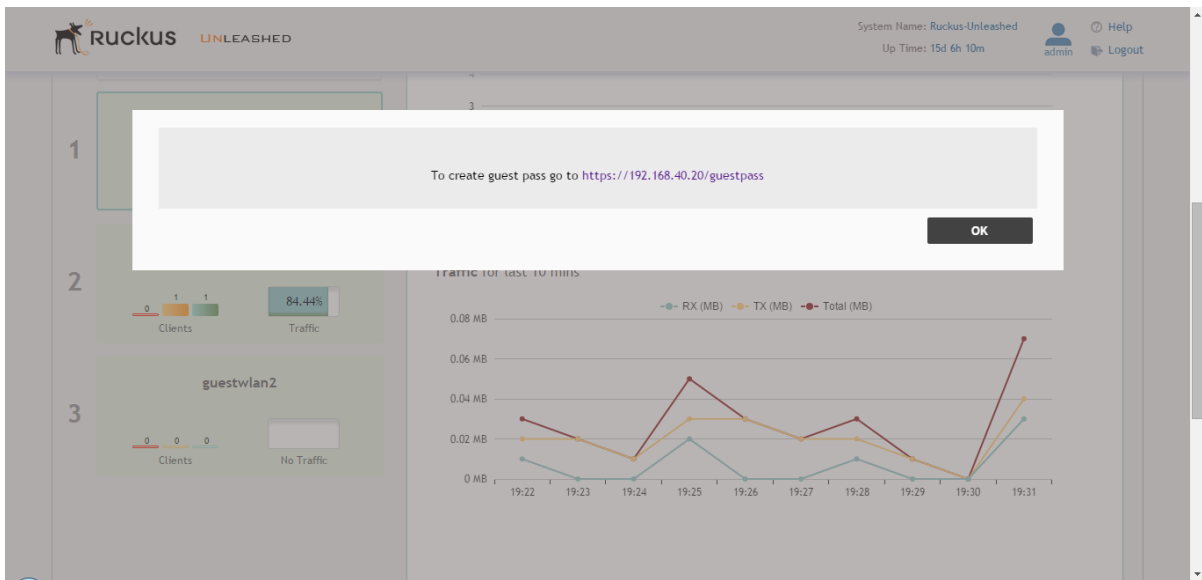


- You have completed creating a user with the Guest Pass operator role. The confirmation screen displays the URL where this user can create guest passes.

**NOTE**

Users with the Guest Pass operator role can login to <https://unleashed.ruckuswireless.com/guestpass> or [https://\[host\\_ip\\_address\]/guestpass](https://[host_ip_address]/guestpass) using the above user credentials.

**FIGURE 50** Guest pass operator created, to create a guest pass go to URL



- To create additional users for the operator role, go to **Admin & Services > System > Users > Create New**, and attach the above role to the user.

### Configuring Guest Subnet Restrictions

By default, guest pass users are automatically blocked from the Unleashed network subnet (format: A.B.C.D/M) and the subnet of the AP to which the guest user is connected.

If you want to create additional rules that allow or restrict guest users from specific subnets, use the **Restricted Subnet Access** section.

You can create up to 22 subnet access rules, which will be enforced both on both the Unleashed Master AP and all connected member APs.

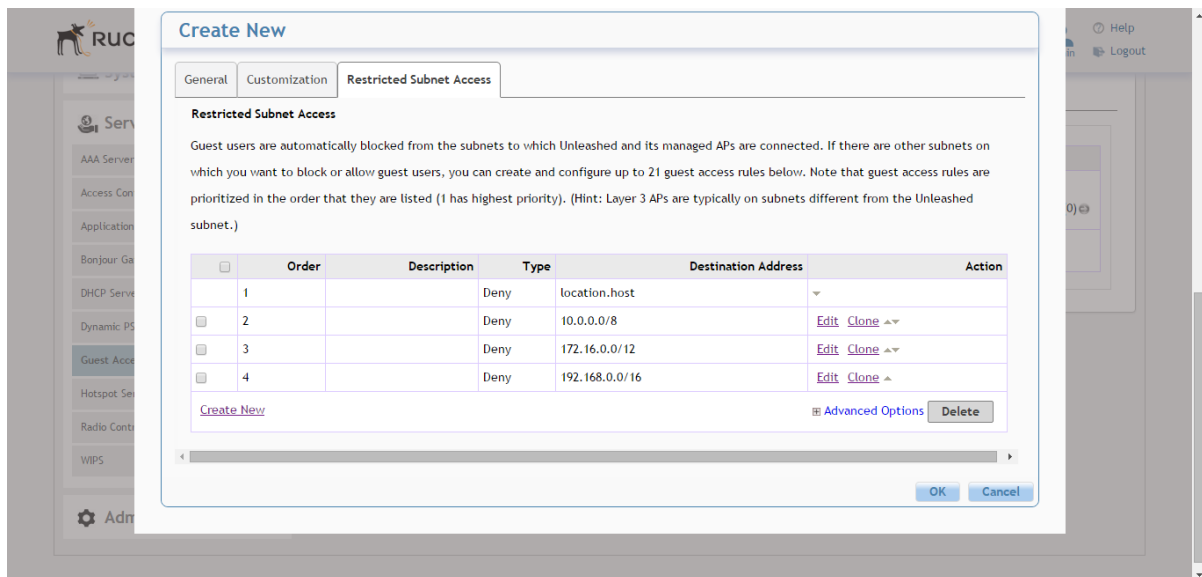
To create a guest access rule for a subnet:

- Go to **Wi-Fi Networks** and click **Create** to create a new guest WLAN, or **Edit** to modify an existing guest WLAN.
- In **Usage Type**, ensure that **Guest Access** is selected.
- Click the arrow next to **Show Advanced Options** to expand the advanced options section.
- Click the **Restricted Subnet Access** tab.
- Click **Create New** to create a new subnet restriction. Text boxes appear under the table columns in which you can enter parameters that define the access rule.
- Under **Description**, type a name or description for the access rule that you are creating.



7. Under **Type**, select Deny if this rule will prevent guest users from accessing certain subnets, or select Allow if this rule will allow them access.
8. Under **Destination Address**, type the IP address and subnet mask (format: A.B.C.D/M) on which you want to allow or deny users access.
9. If you want to allow or restrict subnet access based on the application, protocol, or destination port used, click the **Advanced Options** link, and then configure the settings.
10. Click **OK** to save the subnet access rule.
11. Repeat Steps 5 to 10 to create up to 22 subnet access rules.

**FIGURE 51** Configuring guest Restricted Subnet Access



## Using the BYOD Onboarding Portal

The Onboarding Portal feature provides a series of intuitive option screens allowing mobile users to choose whether to connect devices to a Guest WLAN or to self-configure their mobile devices to authenticate to an internal WLAN using Zero-IT activation.

To enable the Onboarding Portal for mobile devices:

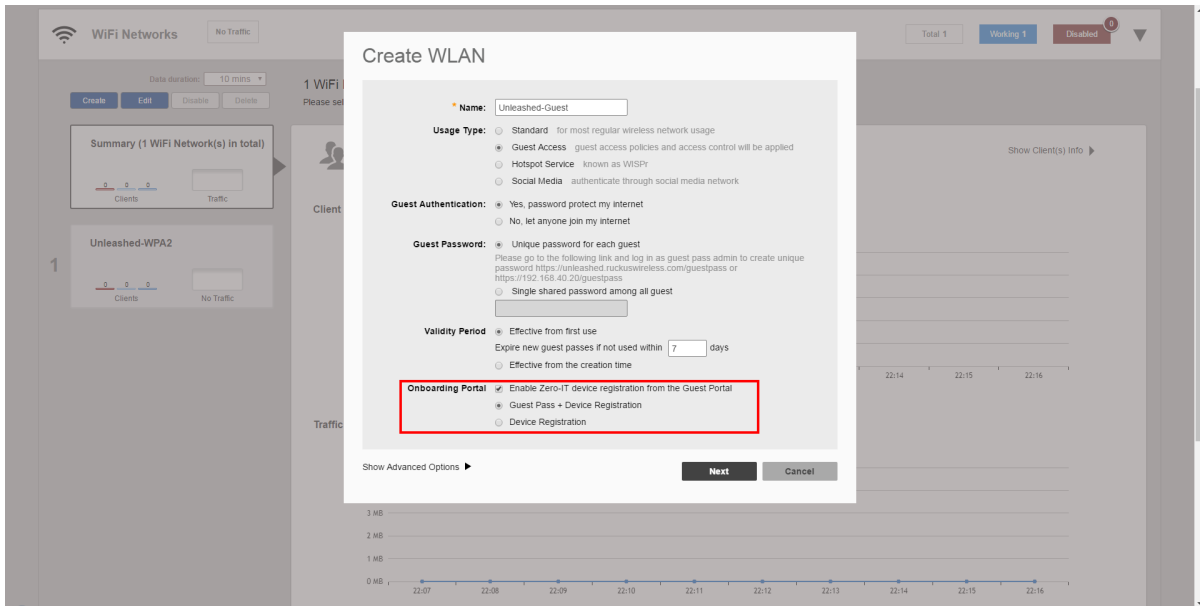
1. Expand the **Wi-Fi Networks** section of the Dashboard.
2. Select an existing guest WLAN and click **Edit** or click **Create** to configure a new guest WLAN.
3. Enable the check box next to **Onboarding Portal** to enable Zero-IT device registration from the Guest Portal.
4. Select one of the following options to display when connecting to the Onboarding Portal:
  - **Guest Pass + Device Registration:** Show both buttons.
  - **Device Registration:** Show Zero-IT Device Registration button only.
5. If **Guest Pass** is enabled, configure Guest Pass options as described in [Working with Guest Passes](#) on page 114.
6. Click **Next** to continue to the next guest WLAN configuration page.

- Optionally, configure additional guest WLAN settings, and click **OK** to apply.

**NOTE**

For information on these settings, see [Deploying a Guest WLAN](#) on page 100.

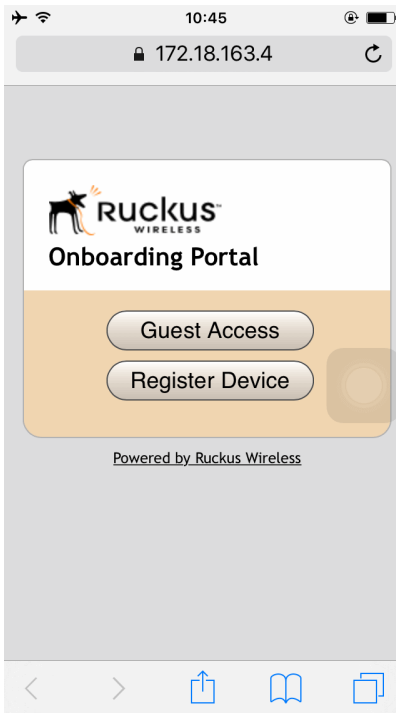
**FIGURE 52** Enable Onboarding Portal



When a client connects to the open Guest WLAN for the first time, the Ruckus **Onboarding Portal** page is displayed. The screen displays one or both of the following options, depending on your choice in Step 4 above:

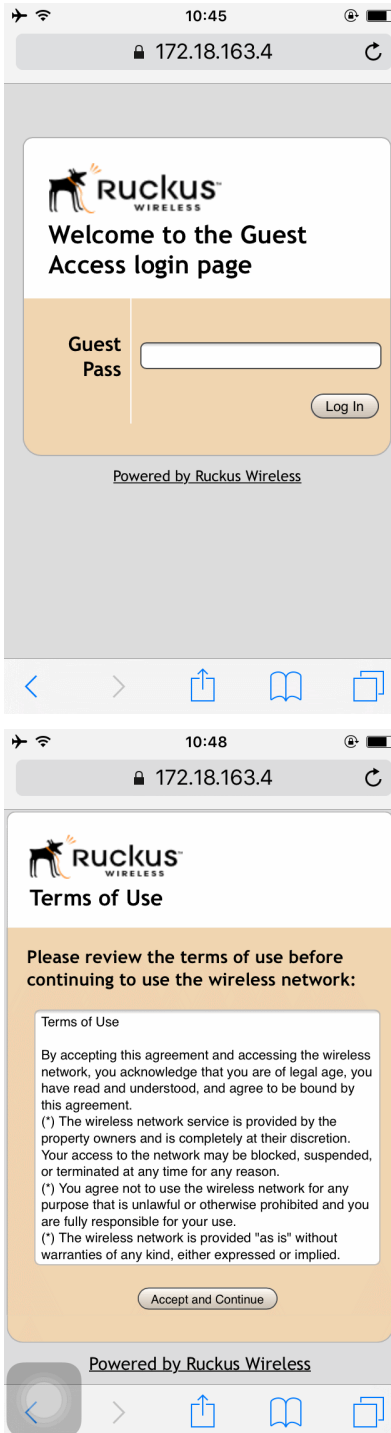
- **Guest Access:** Connect this device to a guest WLAN.
- **Register Device:** Download a Zero-IT activation file to register this device for access to one or more internal WLANs.

**FIGURE 53** The Onboarding Portal for mobile devices



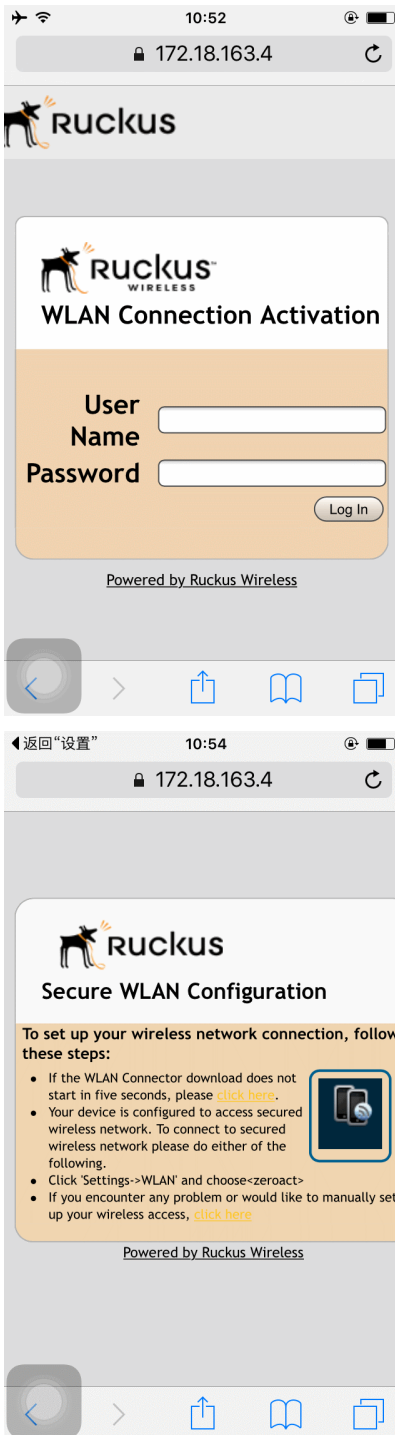
If the user clicks the **Guest Access** button, the process is the same as when connecting to a Guest WLAN and all settings on the **Guest Access** configuration page will be put into effect.

**FIGURE 54** Guest Access welcome and terms of use screens



If the user clicks the **Register Device** button, the web page will be redirected to the **WLAN Connection Activation** page, from which the user can enter user name and password to activate this device. A Zero-IT activation file is generated for download once the client device is registered with Unleashed.

**FIGURE 55** Activate device using the WLAN Connection Activation screen, and download activation file



After running the downloaded Zero-IT file, the device will be configured with the settings to automatically connect to the secure internal/corporate WLAN.

**NOTE**

You may need to manually switch from the guest WLAN to the secure WLAN after activation (on some mobile devices).

**NOTE**

You may need to manually delete any previously installed Zero-IT activation files before a new one can be run. On some devices (including some Android versions), the activation file will not run if an older existing package of the same name with a conflicting signature is already installed.

## Working with Guest Passes

Guest passes are temporary privileges granted to guests to allow access your wireless LANs.

Unleashed provides many options for customizing guest passes, controlling who is allowed to issue guest passes, and controlling the scope of access to be granted.

With Guest Pass authentication enabled, guests are required to enter a guest pass code when connecting to a guest WLAN. Temporary guest passes can be issued for single users, multiple users, one-time login, time-limited multiple logins for a single guest user, or can be configured so that a single guest pass can be shared by multiple users. Additionally, they can be batch generated if many short-term guest passes need to be created at once.

Guest passes can be delivered in any of the following ways:

- Printout
- Send SMS with guest credentials
- Send email with guest credentials

**NOTE**

To enable guest pass delivery via email or SMS, you must first configure an email server or an SMS delivery account (Twilio or Clickatell) from the **Email** tab or the **SMS** tab.

## Guest Pass Self-Service

The Guest Pass Self-Service feature allows guests to your organization to self-activate their devices to access your guest WLANs.

The Guest Pass Self-Service feature allows guests to connect to a guest SSID and submit basic information (name, email address and mobile phone number) to receive a guest pass code. The guest then enters this code to gain access to the internet, with no IT involvement required.

Using the default settings, a guest user connects to a self-service guest WLAN and enters his contact information to receive a guest pass code. The user then activates the guest pass, and can now freely use the internet.

Additional configuration options allow the administrator to set the guest pass delivery method (either displayed directly on the device screen, or sent to the user via email, SMS, or both) to set session length and access duration, and to require "sponsor approval" prior to providing a guest pass to the new guest user.

Enabling Guest Pass Self-Service

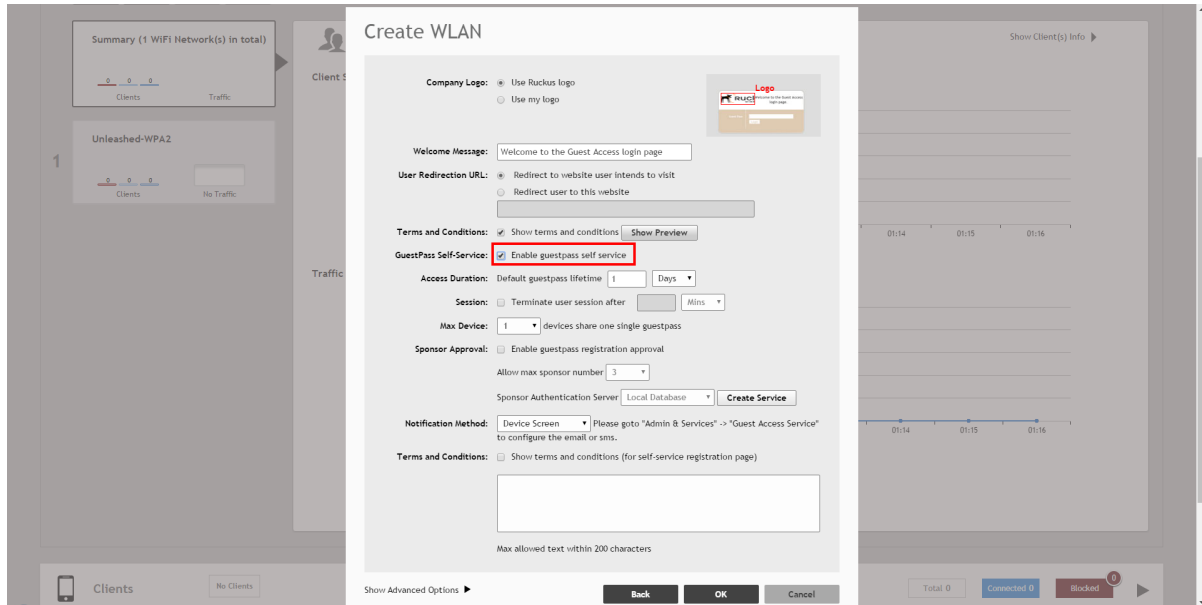
Use the following procedure to allow visitors to self-activate their devices to your Guest WLAN(s).

To enable Guest Pass Self-Service for a Guest WLAN:

1. Go to **Wi-Fi Networks**, and click **Create** to create a new guest WLAN, or **Edit** to edit an existing WLAN.
2. Enter a **Name** for the WLAN, and in **Usage Type**, select **Guest Access**.
3. Click **Next**. The second WLAN creation screen appears.

4. Locate the **Guest Pass Self-Service** option and select the **Enable guest pass self service** button. Additional options appear.

**FIGURE 56** Select Enable Guest Pass Self Service



5. Configure the following options as required:
  - **Access Duration:** Select the default access time provided with one guest pass in days, hours or weeks. (Default is one day.)
  - **Session:** Optionally, enable the session limitation to require guest pass users to re-login after the specified time period.
  - **Max Device:** Allow multiple devices to share a single guest pass. (Default is one device.)
  - **Sponsor Approval:** Select this option to require email approval for issuing self-service guest passes. (See [Requiring Sponsor Approval for Self-Service Guest Pass Authentication](#) on page 115.)
  - **Notification Method:** Select whether the guest pass will be delivered via email, SMS, or displayed directly on the device screen. When Sponsor Approval is selected, the Device Screen option is not allowed.
  - **Terms and Conditions:** Enable this option to display a message to the user before proceeding to registration/ authentication.
6. Click **OK** to save your changes.

#### Requiring Sponsor Approval for Self-Service Guest Pass Authentication

If the "Sponsor Approval" option is enabled, when the user connects to the WLAN, he or she submits registration information along with a Sponsor's email address and waits for sponsor approval.

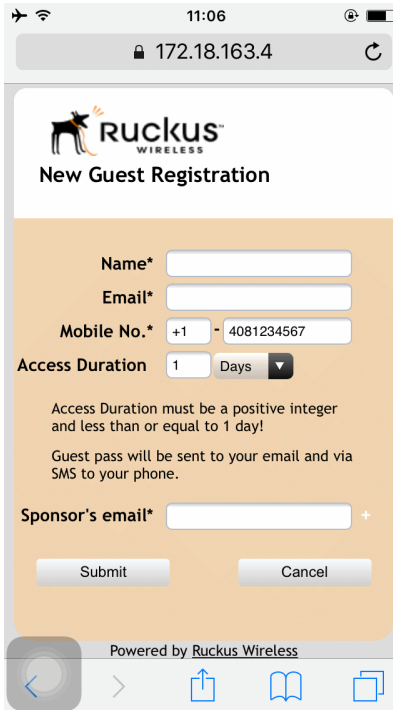
The Sponsor receives an email request and clicks a link to allow this user access to the guest WLAN. Once the registration is approved, Unleashed then generates a guest pass and sends it to the user via email and/or SMS using the contact information the user provided.

**NOTE**

If using Sponsor Approval, Unleashed must be configured with your SMTP settings for email delivery, or with a valid Twilio or Clickatell account to deliver guest passes via SMS. See [Delivering Guest Passes via Email](#) on page 132 and [Delivering Guest Passes via SMS](#) on page 133 for more information.

When a user connects to a guest WLAN with Sponsor Approval enabled, the **New Guest Registration** page displays an additional mandatory field, **Sponsor's email**.

**FIGURE 57** New Guest Registration page - with Sponsor Approval enabled



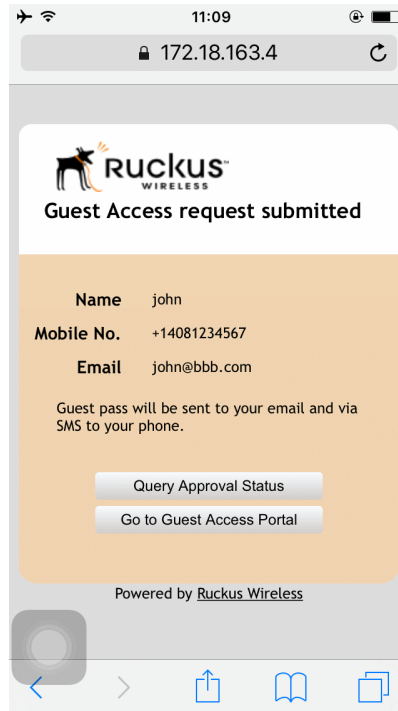
To request, approve and activate a sponsor-approved guest pass, use following procedure:

1. On the **New Guest Registration** screen, enter your **Name**, **Mobile** number and **Email** address.



2. Enter the sponsor's email address and click **Submit**. A guest pass request email is sent to the sponsor's address, and the **Guest Access request submitted** screen is displayed.

**FIGURE 58** Guest Access Request Submitted page



3. The sponsor will then receive an email requesting approval for guest pass activation.
4. As the sponsor, open the email and click the link to open the **Sponsor/Approver Authentication** page.

**FIGURE 59** Sponsor Accept Email

---

Dear sponsor/admin,

You have designated as the sponsor for a guest access request

Name            John Doe  
Mobile No       +60123456789  
Email            john.doe@bbb.com

Click on link to approve  
<https://zd-ip/sponsor?emer=6878d4dwes8097H899>

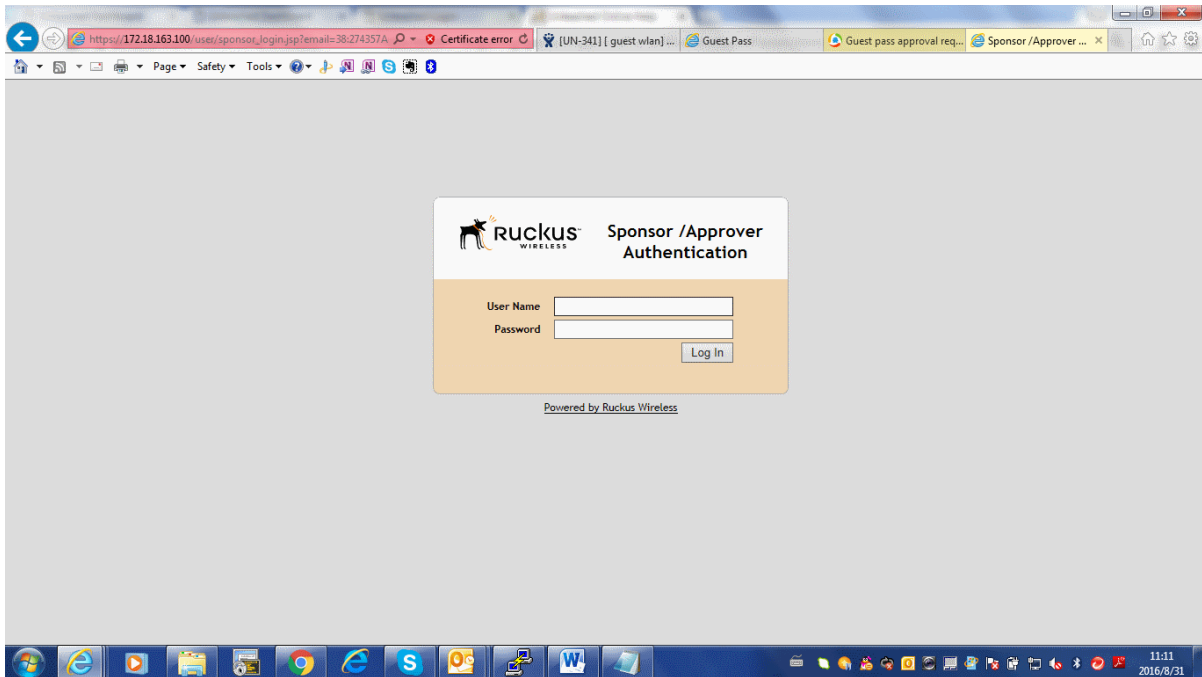
From the Ruckus Guest Access Registrar

5. On the **Sponsor/Approver Authentication** page, enter a valid **User Name** and **Password** and click **Log in** to continue.

**NOTE**

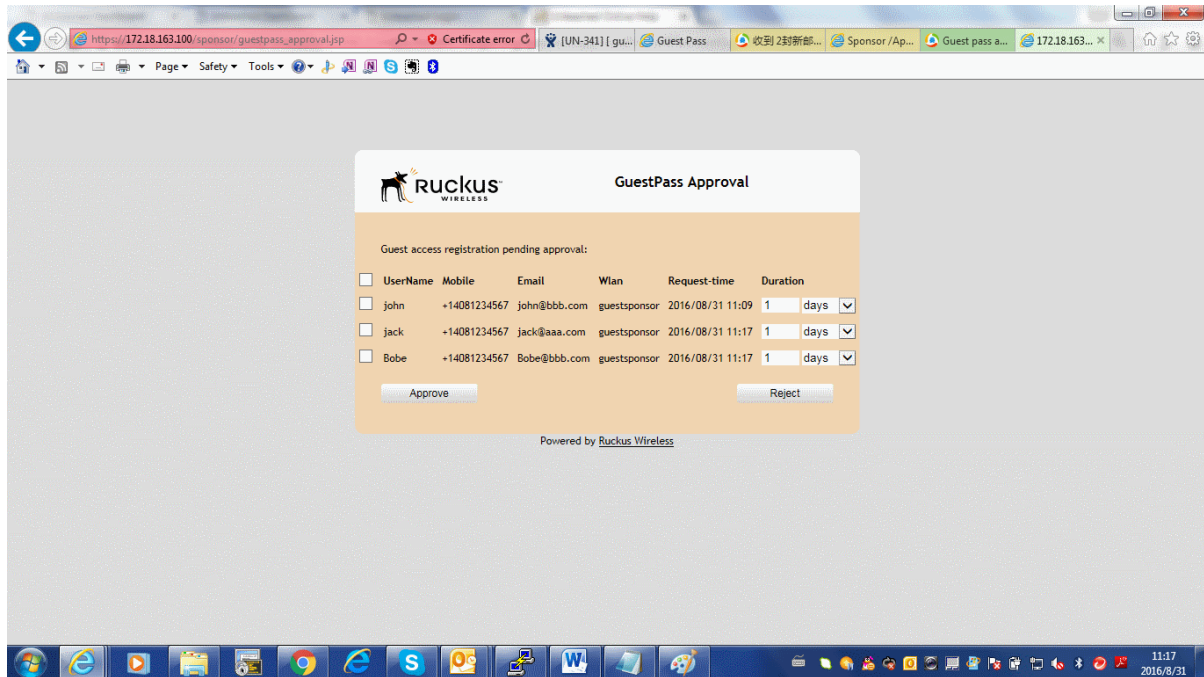
This user name and password must exist on the Authentication Server (Local Database, Active Directory, or RADIUS) configured for this guest access service.

**FIGURE 60** Sponsor Login



- Upon successful login, the **Guest Pass Approval** page appears, displaying the name, phone and email addresses of all pending guest pass requests. Select the check boxes next to each guest pass you wish to approve, set the **Duration** for each, and click **Approve** to approve them.

**FIGURE 61** Guest Pass Approval



- Approving a guest pass triggers delivery of an email (and/or SMS message) containing the guest pass code to the guest.
- As a guest user, open this email and copy the **Guest Pass** code to the clipboard.

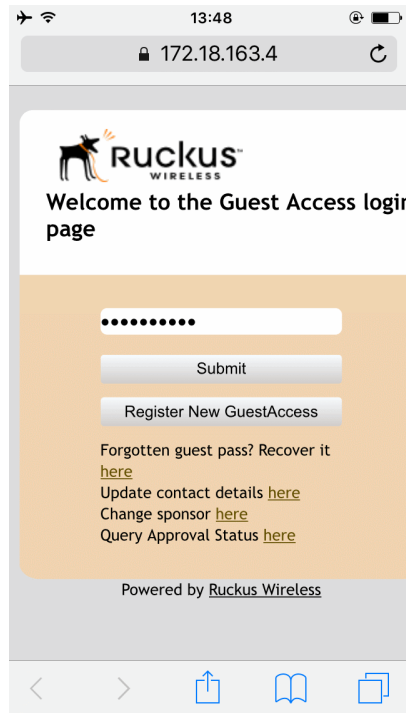
**FIGURE 62** Guest pass activation email

Dear Alice,  
 You request for guest access has been approved  
 Name: Alice  
 Mobile No: +8618066900071  
 Email: [zhao\\_yuhu@pactera.com](mailto:zhao_yuhu@pactera.com)  
 Guestpass: NSCZH-XSXAD  
 Access is valid till 1 day

- Launch a web browser and browse to any URL. You will be redirected to the **Welcome** login page.

10. Enter the **Guest Pass** code received in the activation email (or SMS) and click **Submit**.

**FIGURE 63** Enter Guest Pass code and click Submit



11. You have successfully authenticated to this guest network using the guest pass provided. Click **Continue** to complete activation and continue to your original destination URL.

**FIGURE 64** Click Continue to begin using the wireless network



### **Controlling Guest Pass Generation Privileges**

By default, guest pass generation privileges are given to all authenticated users in the Default user role.

In order to change the guest pass generation privileges for a group of users, refer to [Configuring User Roles](#) on page 197.

For more information on creating a Guest Pass Operator role, refer to [Creating a Guest Pass Operator](#) on page 105.

### **Generating and Delivering a Single Guest Pass**

You can provide the following instructions to users with guest pass generation privileges.

A single guest pass can be used for one-time login, time-limited multiple logins for a single guest user, or can be configured so that a single guest pass can be shared by multiple users.

#### **NOTE**

The following procedure will guide you through generating and delivering a guest pass. For instructions on how to generate multiple guest passes, see [Generating and Printing Multiple Guest Passes at Once](#) on page 126.

#### **NOTE**

If printing the guest pass, make sure that your computer is connected to a local or network printer before starting.

To generate a single guest pass:

1. In your web browser's address bar, type the URL of the **Unleashed Guest Pass Generation** page:

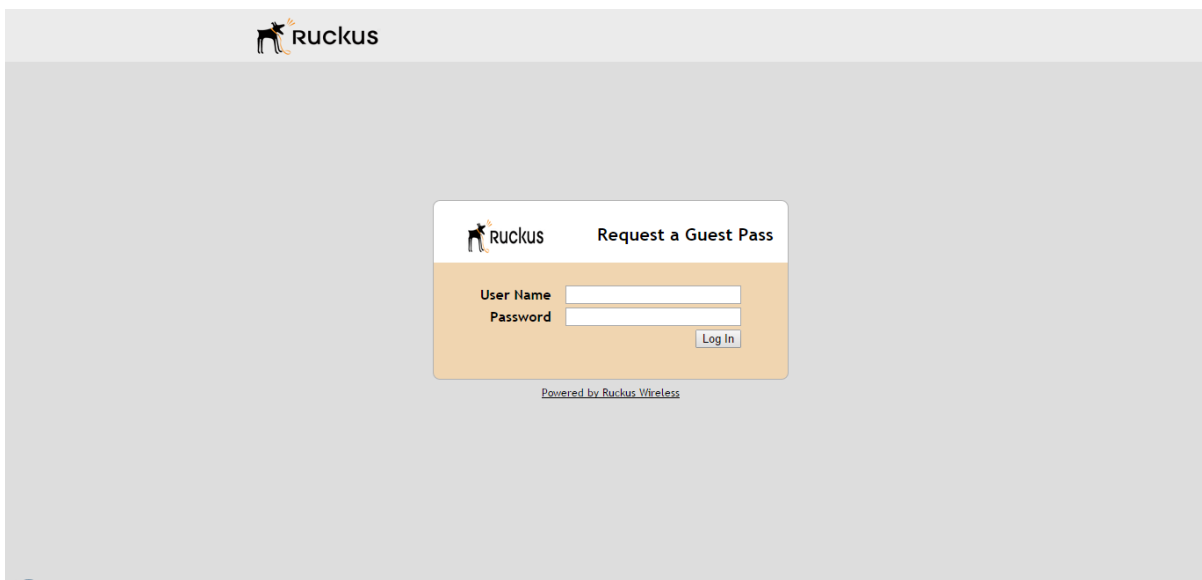
`https://{unleashed-hostname-or-ipaddress}/guestpass`

2. In **User Name**, type your user name. In **Password**, type your password.

**NOTE**

This user must have guest pass generation privileges, as described in [Controlling Guest Pass Generation Privileges](#) on page 121.

**FIGURE 65** Request a Guest Pass



3. Click **Log In**. The **Guest Information** page appears. On this page, you need to provide information about the guest user to enable Unleashed to generate the guest pass.

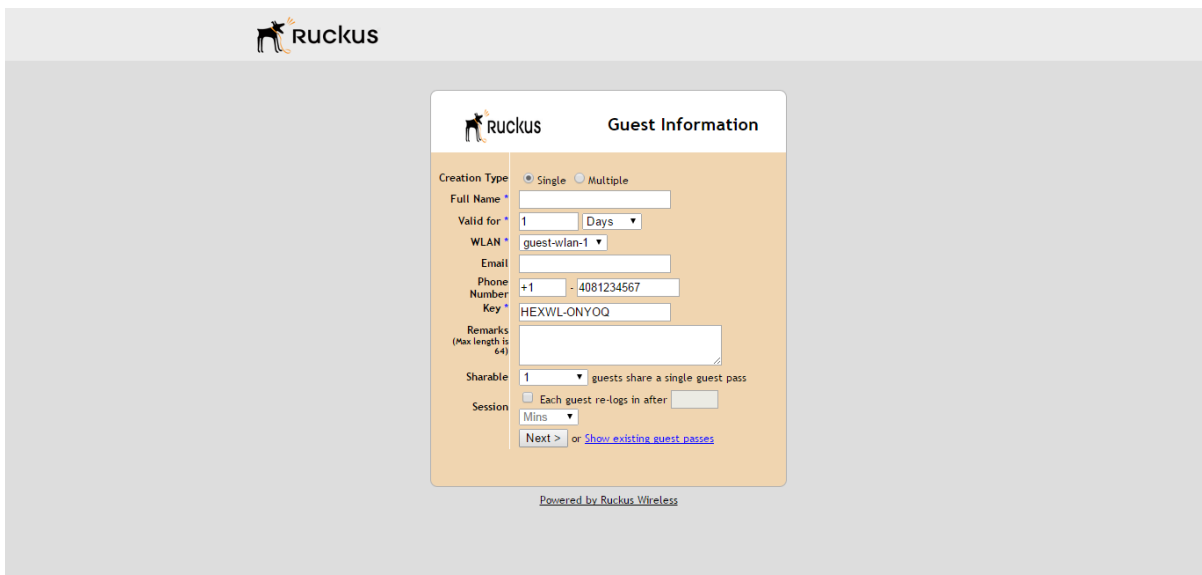
4. On the **Guest Information** page, fill in the following options:
  - **Creation Type:** Choose **Single** to generate a single guest pass. To generate multiple guest passes in batch, see [Generating and Printing Multiple Guest Passes at Once](#) on page 126.
  - **Full Name:** Type the name of the guest user for whom you are generating the guest pass.
  - **Valid for:** Specify the time period when the guest pass will be valid. Do this by typing a number in the blank box, and then selecting a time unit (Hours, Days or Weeks).
  - **WLAN:** Select the WLAN for this guest (typically, a "guest" WLAN).
  - **Email** (optional): Enter the email address for this user.
  - **Phone Number** (optional): Enter a phone number for this user.
  - **Key:** Leave as is if you want to use the random key that Unleashed generated. If you want to use a key that is easy to remember, delete the random key, and then type a custom key. For example, if Unleashed generated the random key OVEGS-RZKKF, you can change it to "joe-guest-key". Customized keys must be between 1 and 16 ASCII characters.

**NOTE**

Each guest pass key must be unique and is distributed on all guest WLANs. Therefore, you cannot create the same guest pass for use on multiple WLANs.

- **Remarks** (optional): Type any notes or comments. For example, if the guest user is a visitor from a partner organization, you can type the name of the organization.
- **Sharable:** Use this option to allow multiple users to share a single guest pass.
- **Session:** Enable this check box and select a time increment after which guests will be required to log in again. If this feature is disabled, connected users will not be required to re-log in until the guest pass expires.

**FIGURE 66** Creating a Guest Pass



5. Click **Next**. The **Wireless Access Portal** page appears.
6. Choose whether to activate this guest pass for either yourself or a guest, and click **Next**.
7. The **Request a Guest Pass** page appears.

8. Enter the guest **User Name** and **Password**, and click **Log In**.
9. The **Guest Pass Generated** page appears. This page presents the guest pass code and a list of options for delivering this code to your guest(s). Options include **email** (if you configured an email address for the guest), **SMS** (if you configured a phone number for the guest) and **Print Instructions**.
10. If you want to print out the guest access instructions, select the guest pass instructions that you want to print out from the drop-down menu. If you did not create custom guest pass printouts, select **Default**.
11. Click **Print Instructions**. A new browser page appears and displays the guest pass instructions. At the same time, the **Print** dialog box appears.
12. Select the printer that you want to use, and then click **OK** to print the guest pass instructions.

You have completed generating and delivering a guest pass for your guest user.

**FIGURE 67** Wireless Access Portal

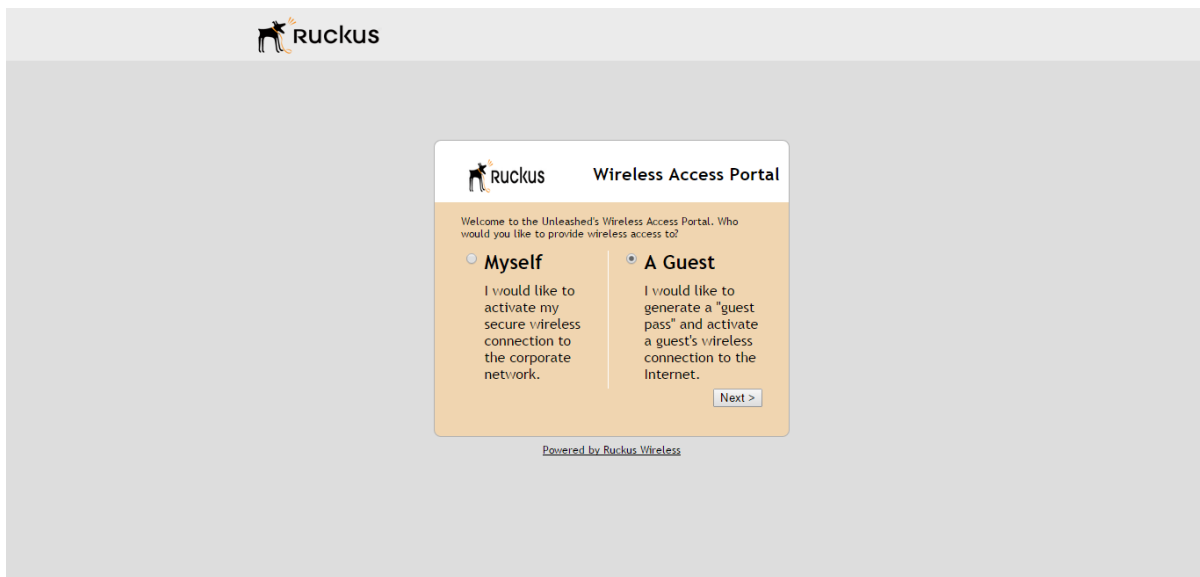




FIGURE 68 Guest Pass Generated

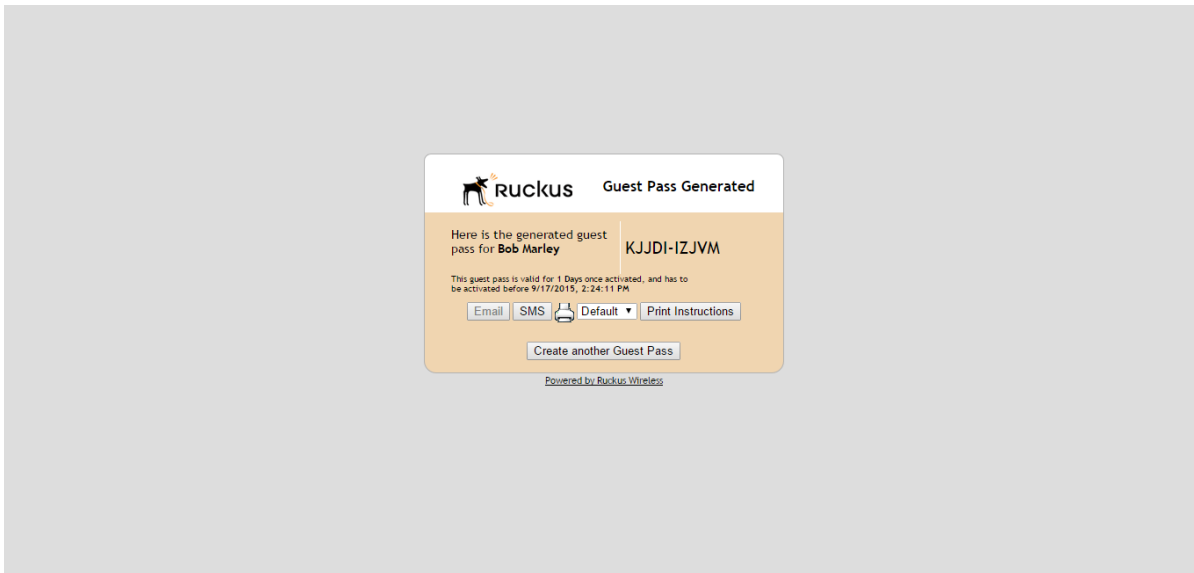


FIGURE 69 Sample Guest Pass Printout

## Connecting as a Guest to the Corporate Wireless Network



Greetings, **Bob Marley**

You have been granted access to the company wireless network, which you can use to access both the World Wide Web and Internet, and to check your personal email.

Your guest pass key is: **KJJDI-IZJVM**

This guest pass is valid for **1 Days** once activated, and has to be activated before **9/17/2015, 2:24:11 PM**

Connect your wireless-ready PC to this network: **guest-wlan-1**, as detailed in the instructions printed below.

Before you start, please review the following requirements.

### Requirements

- A wireless-network-ready computer
- The corporate "guest" network name
- The guest pass (a text "key")

### Connecting

Using your guest pass to connect requires a series of two procedures: (1) connecting your PC to the company "guest" network, then (2) logging in as a qualified guest.

#### Finding the Wireless "Guest" Network

- 1 On your PC/Windows desktop, check the system tray for a Wireless Connection icon (the tool tip reads "Wireless Network Connection/[name]").
- 2 Right-click this icon and choose **View Available Wireless Networks**.
- 3 When the Wireless Network Connection window appears, the "guest" WLAN will be listed.
- 4 Select the WLAN "guest" network (various "neighbor nets" may also be listed) and click **Connect**.
- 5 If a Wireless Network Connection confirmation dialog box asks you to confirm "connecting to an unsecured network", click **Connect Anyway**.

If you want to create additional guest passes one by one, click **Create Another Guest Pass**. Alternatively, you can generate multiple guest passes in batch as described in [Generating and Printing Multiple Guest Passes at Once](#) on page 126.

### **Generating and Printing Multiple Guest Passes at Once**

You can provide the following instructions to users with guest pass generation privileges.

#### **NOTE**

The following procedure will guide you through generating and printing multiple guest passes. For instructions on how to generate a single guest pass, see [Generating and Delivering a Single Guest Pass](#) on page 121.

#### **NOTE**

Before starting, make sure that your computer is connected to a local or network printer.

To generate and print multiple guest passes at the same time:

1. In your web browser's address bar, type the URL of the Unleashed Guest Pass Generation page:

```
https://{unleashed-hostname-or-ipaddress}/guestpass
```

2. In **User Name**, type your user name. In **Password**, type your password.
3. Click **Log In**. The **Guest Information** page appears. On this page, you need to provide information about the guest users to enable Unleashed to generate the guest passes.

4. On the **Guest Information** page, fill in the following options:

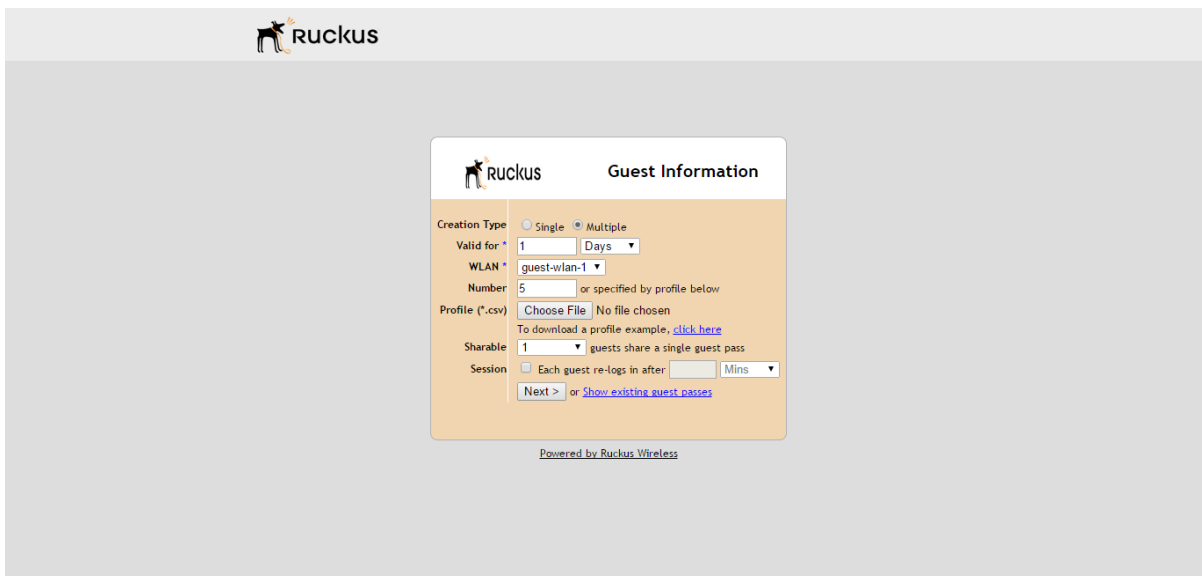
- **Creation Type:** Click Multiple.
- **Valid for:** Specify the time period during which the guest passes will be valid. Do this by typing a number in the blank box, and then selecting a time unit (Days, Hours, or Weeks).
- **WLAN:** Select one of the existing WLANs with which the guest users will be allowed to associate.
- **Number:** Select the number of guest passes that you want to generate. Unleashed will automatically populate the names of each user (Batch-Guest-1, Batch-Guest-2, and so on) to generate the guest passes.

**NOTE**

Each guest pass key must be unique and is distributed on all guest WLANs. Therefore, you cannot create the same guest pass for use on multiple WLANs.

- **Profile (\*.csv):** If you have created a Guest Pass Profile (see Creating a Guest Pass Profile), use this option to import the file.
- **Sharable:** Configure this option if you want to allow multiple users to share a single guest pass (default: 1; not shared).
- **Session:** Enable this check box and select a time increment after which guests will be required to log in again. If this feature is disabled, connected users will not be required to re-log in until the guest pass expires.

**FIGURE 70** Generating Multiple Guest Passes

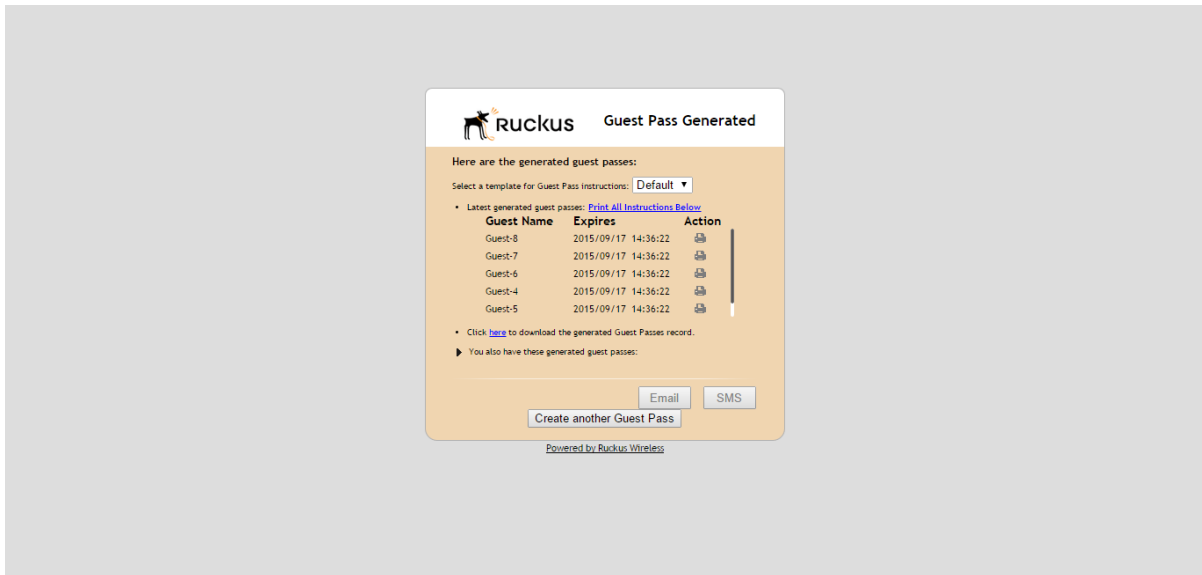


**NOTE**

If you want to be able to identify the guest pass users by their names (for monitoring or auditing purposes in a hotel setting, for example), click **Choose File**, and upload a guest pass profile instead. See [Creating a Guest Pass Profile](#) on page 128 for more information.

5. Click **Next**. The **Guest Pass Generated** page appears, displaying the guest pass user names and expiration dates.

**FIGURE 71** Multiple Guest Passes generated



6. In **Select a template for Guest Pass instructions**, select the guest pass instructions that you want to print out. If you did not create custom guest pass printouts, select **Default**.
7. Print the instructions for a single guest pass or print all of them.
  - To print instructions for all guest passes, click **Print All Instructions**.
  - To print instructions for a single guest pass, click the **Print** link that is in the same row as the guest pass for which you want to print instructions.A new browser page appears and displays the guest pass instructions. At the same time, the **Print** dialog box appears.
8. Select the printer that you want to use, and then click **OK** to print the guest pass instructions.

You have completed generating and printing guest passes for your guest users. If you want to save a record of the batch guest passes that you have generated, click the **here** link in "Click **here** to download the generated Guest Passes record," and then download and save the CSV file to your computer.

### Creating a Guest Pass Profile

1. Log in to the guest pass generation page.
2. In **Creation Type**, click **Multiple**.
3. Click the **click here** link in **To download a profile sample, click here**.
4. Save the sample guest pass profile (in CSV format) to your computer.
5. Using a spreadsheet application, open the CSV file and edit the guest pass profile by filling out the following columns:
  - **#Guest Name:** Type the name of the guest user (one name per row).
  - **Remarks:** (Optional) Type any note or remarks about the guest pass.
  - **Key:** Type a guest pass key consisting of 1-16 alphanumeric characters. If you want Unleashed to generate the guest pass key automatically, leave this column blank.

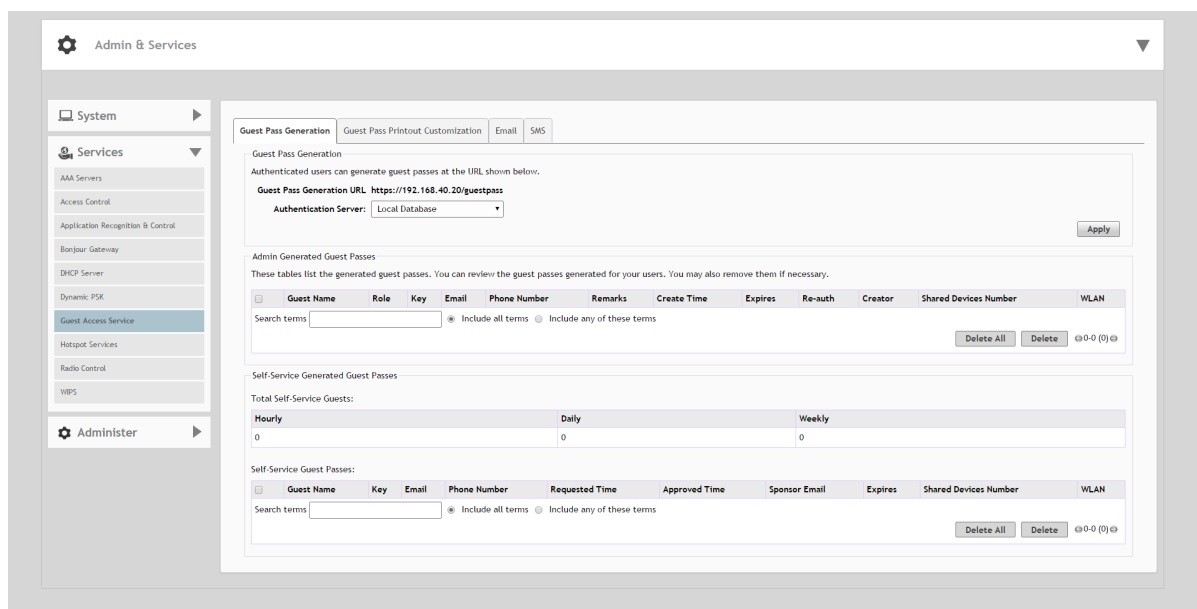
- Go back to the Guest Information page, and then complete steps 4 to 8 in [Generating and Printing Multiple Guest Passes at Once](#) on page 126 to upload the guest pass profile and generate multiple guest passes.

### Monitoring Generated Guest Passes

Once you have generated guest passes for your visitors, you can monitor and, if necessary, delete them to revoke the guests' access privileges.

- Go to **Admin & Services > Services > Guest Access Service > Guest Pass Generation**.
- Review the generated guest passes in the **Admin Generated Guest Passes** and **Self-Service Generated Guest Passes** tables.
- To remove a guest pass, select the check box for the guest pass, and click the **Delete** button. Click **Delete All** to delete all generated guest passes at once.

FIGURE 72 Viewing generated Guest Passes



### Creating a Custom Guest Pass Printout

The guest pass printout is a printable HTML page that contains instructions for the guest pass user on how to connect to the wireless network.

The authenticated user who is generating the guest pass will need to print out this HTML page and provide it to the guest pass user. A guest pass in English and one in French are included by default.

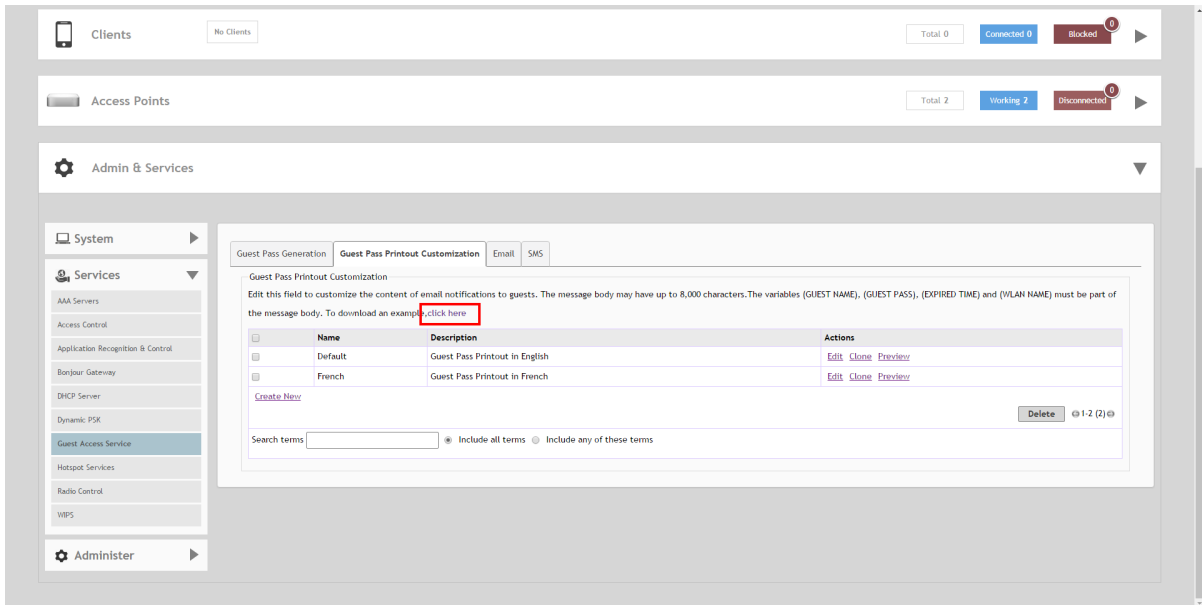
As administrator, you can create custom guest pass printouts. For example, if your organization receives visitors who speak different languages, you can create guest pass printouts in other languages.

To create a custom guest pass printout:

- Go to **System & Admin > Services > Guest Access Service > Guest Pass Printout Customization**.

2. Click the **click here** link to download an example of an existing printout.

**FIGURE 73** Guest Pass Printout customization



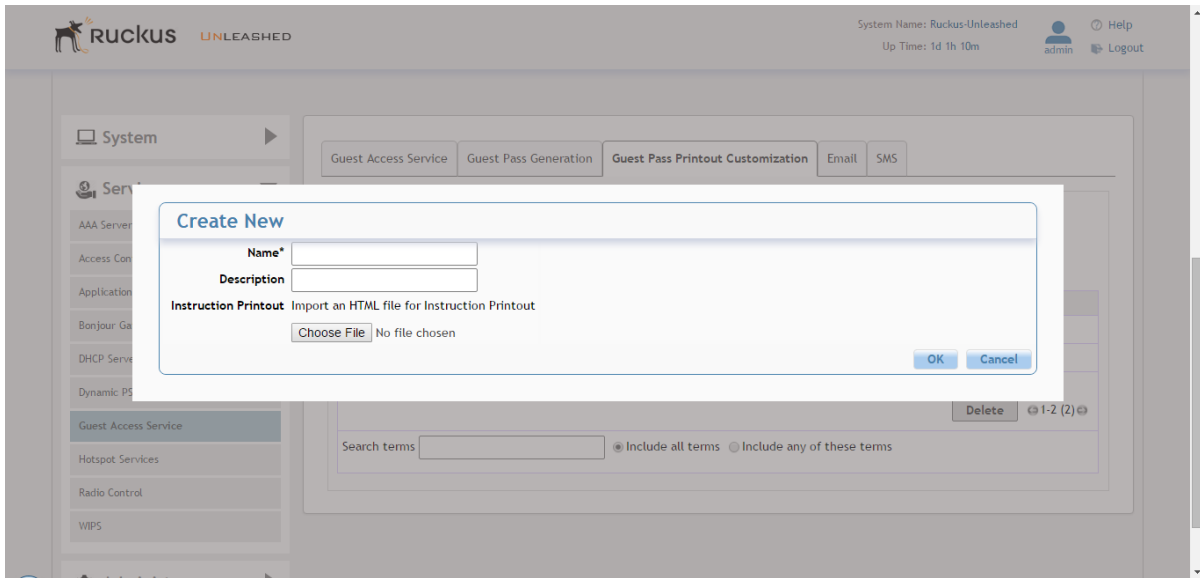
3. Save the HTML file to your computer.
4. Using a text or HTML editor, customize the guest pass printout. Note that only ASCII characters can be used. You can do any or all of the following:
  - Reword the instructions
  - Translate the instructions to another language
  - Customize the HTML formatting

**NOTE**

The guest pass printout contains several tokens or variables that are substituted with actual data when the guest pass is generated. When you customize the guest pass printout, make sure that these tokens are not deleted. For more information on these tokens, see [Guest Pass Printout Tokens](#) on page 131.

- Go back to the **Guest Pass Printout Customization** screen, and then click **Create New**. The **Create New** form appears.

**FIGURE 74** Create New Guest Pass Printout file



- In **Name**, type a name for the guest pass printout that you are creating. For example, if this guest pass printout is in Spanish, you can type **Spanish**.
- In **Description** (optional), add a brief description of the guest pass printout.
- Click **Choose File**, select the HTML file that you customized earlier, and then click **Open**. Unleashed copies the HTML file to its database.
- Click **Import** to save the HTML file to the Unleashed AP.

You have completed creating a custom guest pass printout. When users generate a guest pass, the custom printout that you created will appear as one of the options that they can print.

#### Guest Pass Printout Tokens

The following table lists the tokens that are used in the guest pass printout. Make sure that they are not accidentally deleted when you customize the guest pass printout.

**TABLE 16** Tokens that you can use in the guest pass printout

Token	Description
{GP_GUEST_NAME}	Guest pass user name.
{GP_GUEST_KEY}	Guest pass key.
{GP_IF_EFFECTIVE_FROM_CREATION_TIME}	If you set the validity period of guest passes to Effective from the creation time (in the Guest Pass Generation section), this token shows when the guest pass was created and when it will expire.
{GP_ELSEIF_EFFECTIVE_FROM_FIRST_USE}	If you set the validity period of guest passes to Effective from first use (in the Guest Pass Generation section), this token shows the number of days during which the guest pass will be valid after activation. It also shows the date and time when the guest pass will expire if not activated.
{GP_ENDIF_EFFECTIVE}	This token is used in conjunction with either the {GP_ELSEIF_EFFECTIVE_FROM_FIRST_USE} or {GP_ENDIF_EFFECTIVE} token.

**TABLE 16** Tokens that you can use in the guest pass printout (continued)

Token	Description
{GP_VALID_DAYS}	Number of days for which the guest pass is valid.
{GP_VALID_TIME}	Date and time when the guest pass expires.
{GP_GUEST_WLAN}	Name of WLAN that the guest user can access.

### **Delivering Guest Passes via Email**

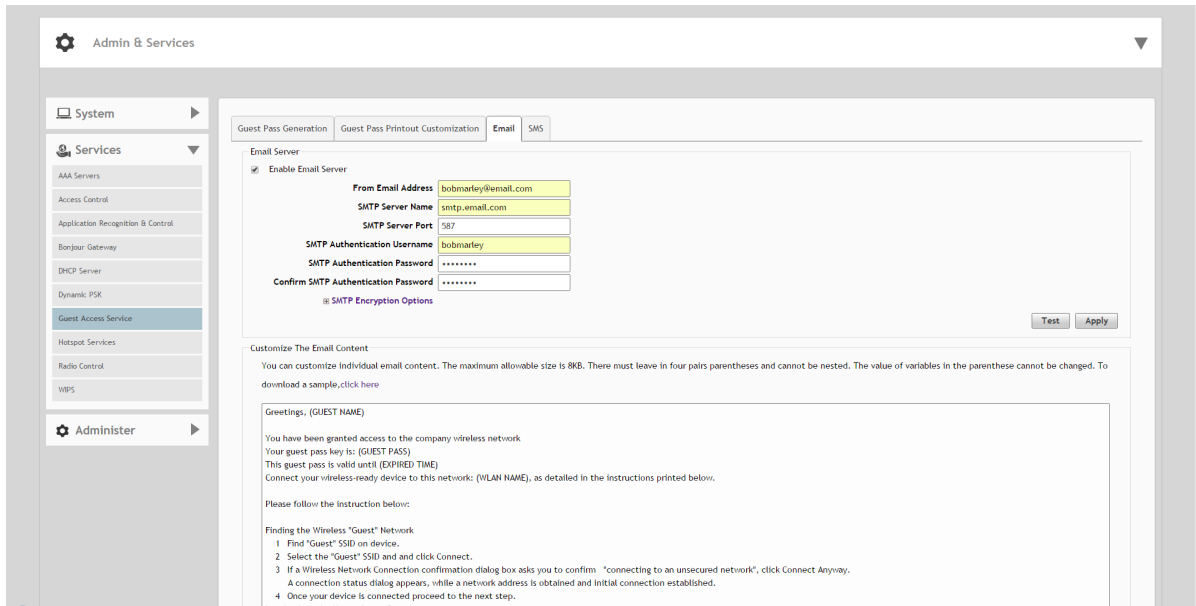
To allow Unleashed to deliver Guest Passes via email, you must configure an email account (and its SMTP settings) from which Unleashed will send the emails.

Use the following procedure to enable guest pass delivery via email:

1. Go to **Admin & Services > Services > Guest Access Service > Email**.
2. Enable the check box next to **Enable email server**.
3. Configure the following settings according to your local email server and user preferences:
  - **From email address:** Type the email address from which Unleashed will send email messages.
  - **SMTP Server Name:** Type the full name of the server provided by your ISP or mail administrator. Often, the SMTP server name is in the format smtp.company.com. For Hotmail addresses, the SMTP server name is smtp.live.com.
  - **SMTP Server Port:** Type the SMTP port number provided by your ISP or mail administrator. Often, the SMTP port number is 25 or 587. The default SMTP port value is 587.
  - **SMTP Authentication Username:** Type the user name provided by your ISP or mail administrator. This might be just the part of your email address before the @ symbol, or it might be your complete email address. If you are using a free email service (such as Hotmail or Gmail), you typically have to type your complete email address.
  - **SMTP Authentication Password:** Type the password that is associated with the user name above.
  - **Confirm SMTP Authentication Password:** Retype the password you typed above to confirm.
  - **SMTP Encryption Options:** If your mail server uses TLS encryption, click the **SMTP Encryption Options** link, and then select the **TLS** check box. Additionally, select the **STARTTLS** check box that appears after you select the **TLS** check box. Check with your ISP or mail administrator for the correct encryption settings that you need to set. If using a Yahoo! email account, **STARTTLS** must be disabled. If using a Hotmail account, both **TLS** and **STARTTLS** must be enabled.
4. To verify that Unleashed can send email messages using the SMTP settings you configured, click the **Test** button.
  - If Unleashed is able to send the test message, the message **Success!** appears. Continue to the next step.
  - If Unleashed is unable to send the test message, the message **Failed!** appears. Go back to the previous step and verify that the SMTP settings are correct.
5. Click **Apply**. The email notification settings you configured become active immediately.



**FIGURE 75** Testing Guest Access email settings



**NOTE**

To customize the content of the email message that guest pass users will receive, follow the instructions in the **Customize the Email Content** section.

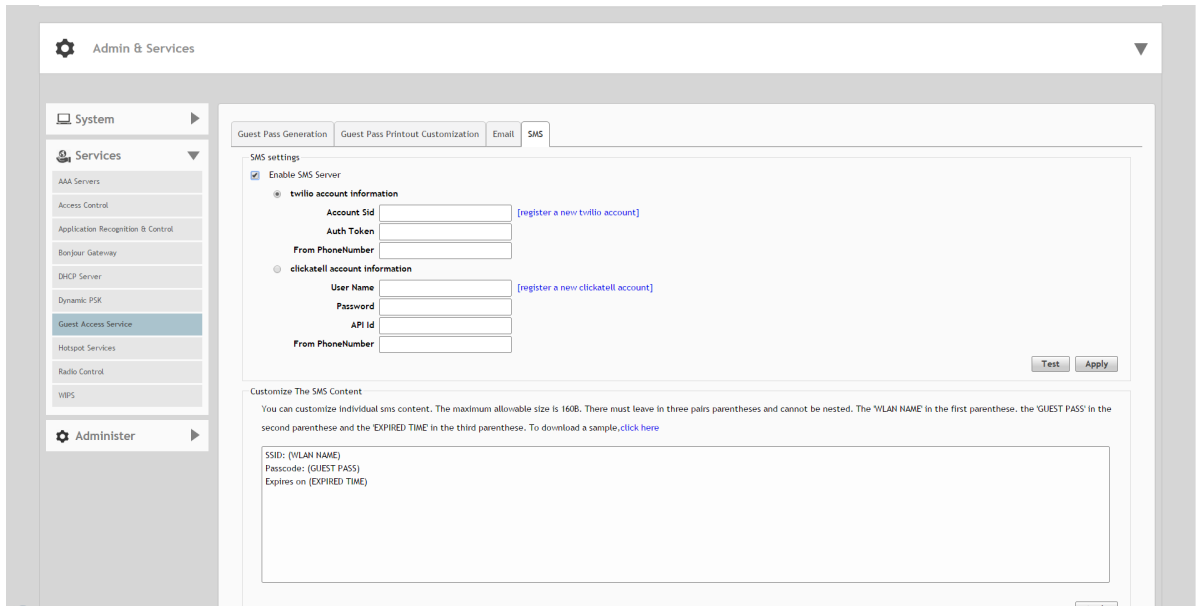
**Delivering Guest Passes via SMS**

If you want to deliver Guest Passes to your guests via SMS, you can configure Unleashed to use an existing Twilio or Clickatell account for SMS delivery. The first step is to configure Unleashed to be able to access your Twilio or Clickatell account information.

1. Go to **Admin & Services > Services > Guest Access Service > SMS**.
2. In **SMS Settings**, enable the check box next to **Enable SMS Server**.
3. Enter your **Account SID**, **Auth Token** and **From Phone Number** (Twilio) or your **User Name**, **Password** and **API ID** (Clickatell).
4. Click the **Test** button to test your settings.
5. Once confirmed, click **Apply** to save your changes.

You can now allow guest pass generators to deliver guest pass codes to guests using the SMS button when generating a new guest pass. (You must also enter a phone number for receiving the SMS messages for each guest pass created.)

FIGURE 76 Configuring SMS settings



**NOTE**

To customize the content of the SMS message that guest pass users will receive, follow the instructions in the **Customize the SMS Content** section.

## Social Media WLANs

Social Media WLANs allow guest users to access the Internet using a social media account instead of using a WPA password or Guest Pass to login.

The following social media login methods are currently supported:

- [Facebook Wi-Fi](#) on page 135
- [Google/Google+](#) on page 135
- [LinkedIn](#) on page 135
- [Microsoft Live](#) on page 136

For each of these social media WLAN options, you must create an application or activate a service on the respective website first, before your users will be able to log in using their social media accounts.

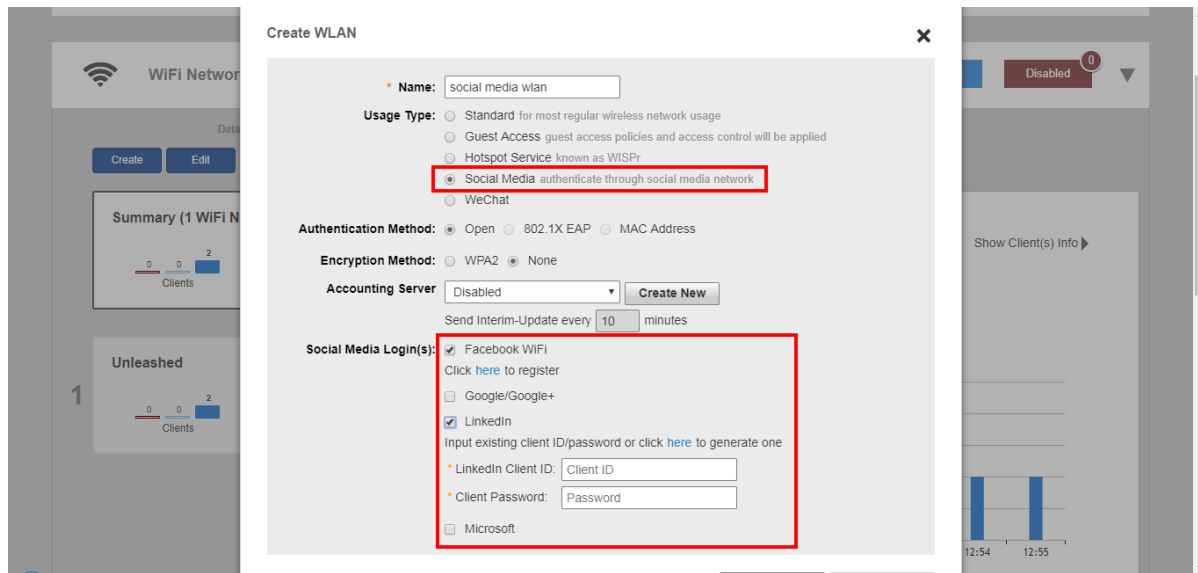
**NOTE**

Beginning with release 200.6, multiple social media login types can be enabled for the same WLAN.

**NOTE**

WeChat WLANs are not included and must be configured independently.

**FIGURE 77** Creating a Social Media WLAN



### Facebook Wi-Fi

Business owners can use this WLAN type to require users to visit the business owner's Facebook page and "check in" using a Facebook account before being allowed free access to the Internet.

The business owner can also display advertisements and other announcements on this Facebook page, and can control the guest session length and other options using the Facebook Wi-Fi configuration panel. For more information, see the [Facebook Wi-Fi Help Center](#).

The following caveats and limitations should be considered before deploying a Facebook Wi-Fi (or other social media) WLAN:

- You can create a maximum of four Social Media WLANs.
- Users must launch a browser to trigger the Facebook authentication.
- Invalid users are determined by Facebook. Unleashed queries facebook.com once every five minutes to verify the authentication status of all currently connected users. If an invalid response is received, the end user will be deleted within five minutes. If Unleashed fails to receive a response, it will re-send the request four times. If there is no response after five requests, Unleashed will delete the related stations.

### Google/Google+

To create a Google/Google+ Social Media WLAN, you must enter an Application ID and Application Secret.

Refer to the Google documentation for instructions on configuring your Google/Google+ account to provide social media login details. Google+ complies with the OAuth 2.0 specification. For more information on OAuth 2.0, refer to the OAuth website, <http://oauth.net>.

### LinkedIn

To configure a LinkedIn social media WLAN, you must first configure an application on the LinkedIn developer apps website.

Refer to the following URL for the LinkedIn developer network: <https://www.linkedin.com/developer/apps> for more information.

## Microsoft Live

To create a Microsoft Live social media WLAN, you must first create an application on the Microsoft Live developer application page.

Go to the following URL to launch Microsoft Live development dashboard and create an application: <https://account.live.com/developers/applications/index>.

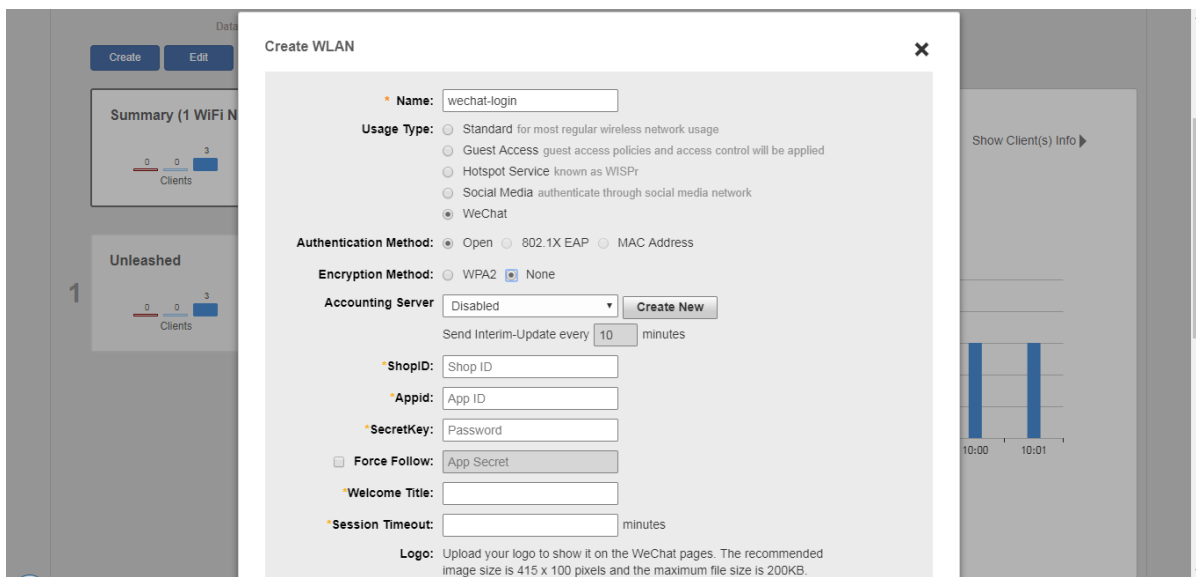
## WeChat WLANs

"WeChat Connects Wi-Fi" is a solution that allows clients to authenticate to a wireless LAN easily using a WeChat login instead of a username/password.

The solution also allows business owners to easily serve advertisements to visitors, enabling convenient monetization of their Wi-Fi service.

The ZoneDirector WeChat WLAN implementation supports the WeChat mobile app only; the desktop version is not supported, nor are smart phones without the WeChat app (web browser login is not supported).

FIGURE 78 Creating a WeChat WLAN



## Connecting to a WeChat WLAN

When a user connects to a WeChat WLAN, the WeChat app launches automatically and attempts to authenticate the user to the WLAN using the user's WeChat login credentials.

To connect to a WeChat WLAN:

1. The user connects to the WeChat WLAN, and launches a web browser. (Depending on OS, the browser may launch automatically.)
2. On the WeChat welcome screen, click "Connect to Wi-Fi via WeChat."

The WeChat app is launched, and attempts to connect to the WeChat server automatically.

3. Once the user is authenticated, the app then displays a connection successful message along with the customer's information as configured on the customer's official WeChat account. (This can include advertisements, for example.)
4. The user clicks a button to accept the terms and conditions, and can then be redirected to the customer's website.

## Hotspot WLANs

A hotspot is a venue or area that provides Internet access to devices with wireless networking capability. Hotspots are commonly available in public venues such as hotels, airports, coffee shops and shopping malls.

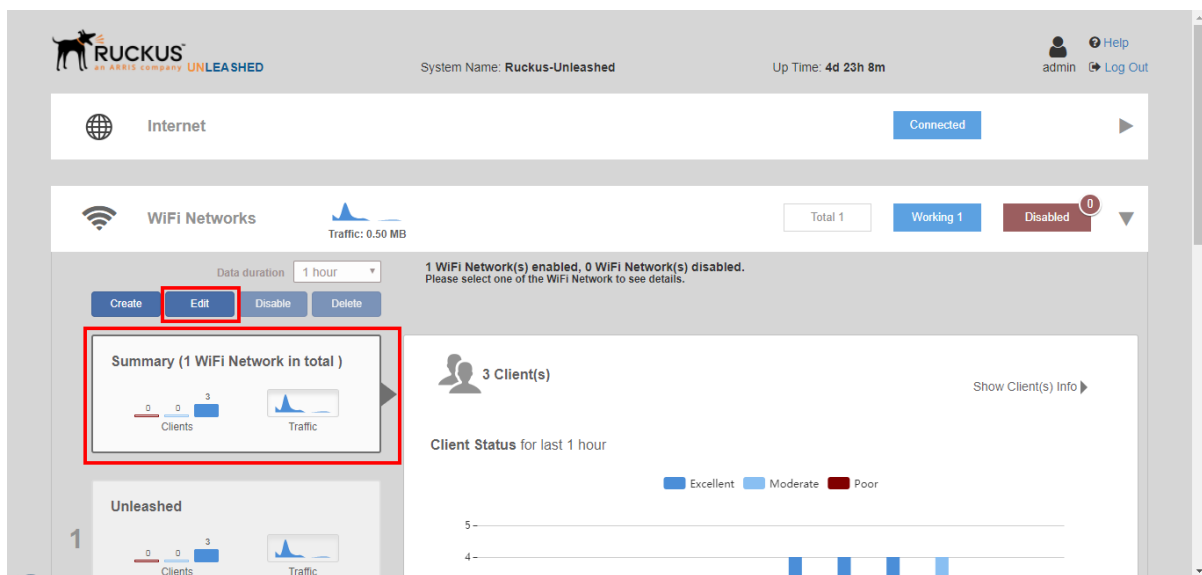
Unleashed supports Hotspot WLANs that conform to the WISPr (Wireless Internet Service Provider roaming) standard. For more information on Hotspot services, see [Hotspot Services](#) on page 228.

## Configuring Global WLAN Settings

Select the Summary box and click Edit to edit global settings for all WLANs.

1. To configure global settings for all WLANs, expand the **Wi-Fi Networks** section, select the Summary WLAN box, and click the **Edit** button.

**FIGURE 79** Click Edit to configure global settings for all WLANs



2. When the **Global Configuration** dialog appears, select any of the following tabs to configure settings for all WLANs:
  - **Zero-IT Activation:** Select an Authentication Server from the list, or click **Create Service** to create a new one.
  - **Bypass Apple CNA Feature:** Select WLAN types that will enable the Bypass Apple CNA feature.
  - **Web Portal Logo:** Replace the Ruckus logo with your own logo to be displayed on the login page when clients connect to a Web Auth WLAN.

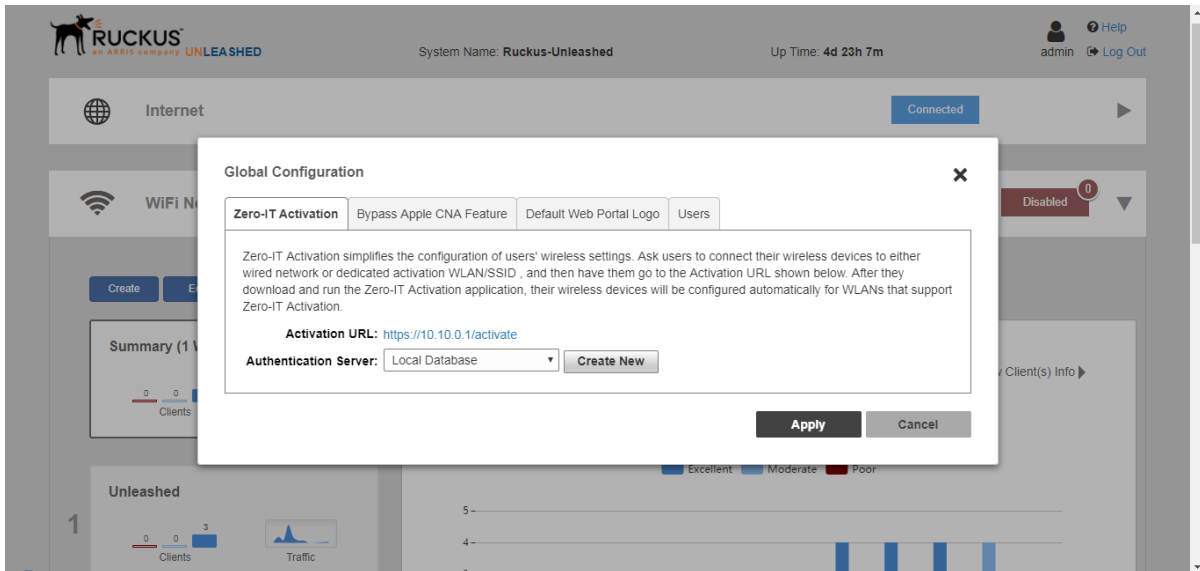
**NOTE**

The recommended image size is 138 x 40 pixels. Max file size is 20kb.

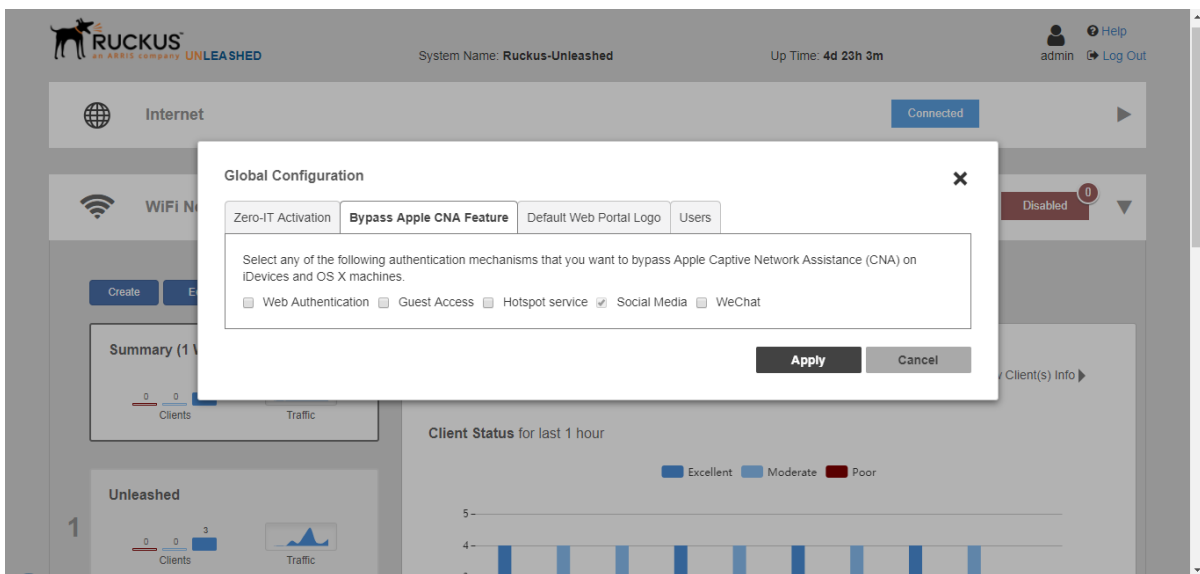
- **Users:** Create new users on the internal database.

3. Click **Apply** to save your changes.

**FIGURE 80** Global Configuration settings for all WLANs



**FIGURE 81** Bypass Apple CNA Feature



## Editing an Existing WLAN

To edit an existing WLAN, expand the **Wi-Fi Networks** section, click on the **WLAN** that you want to configure, and click **Edit**.

FIGURE 82 Click Edit to edit an existing WLAN

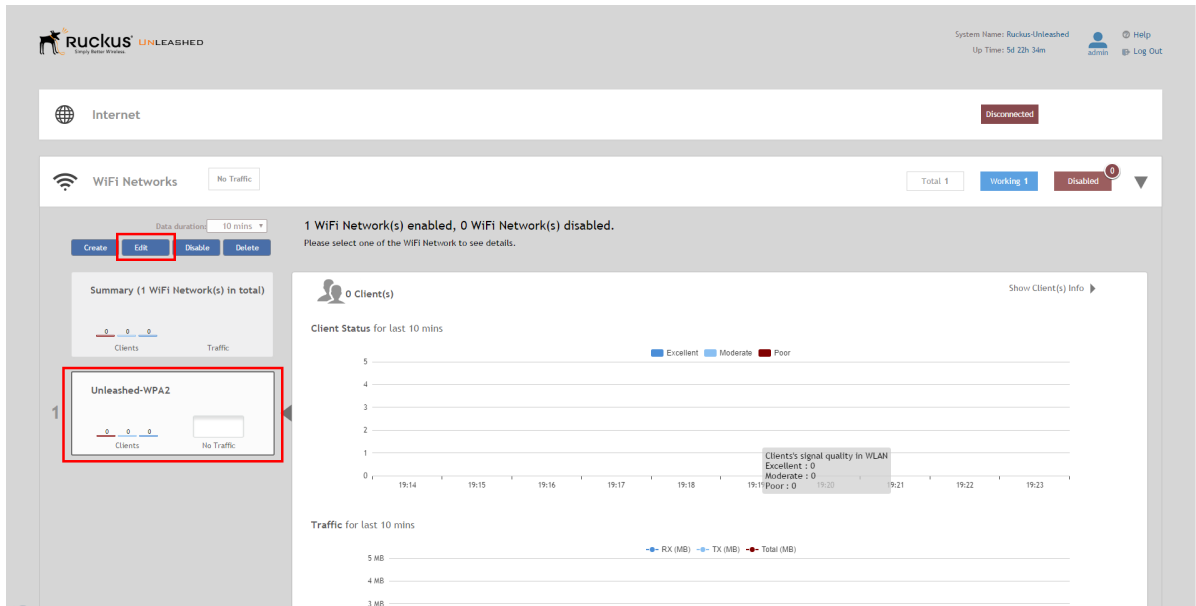
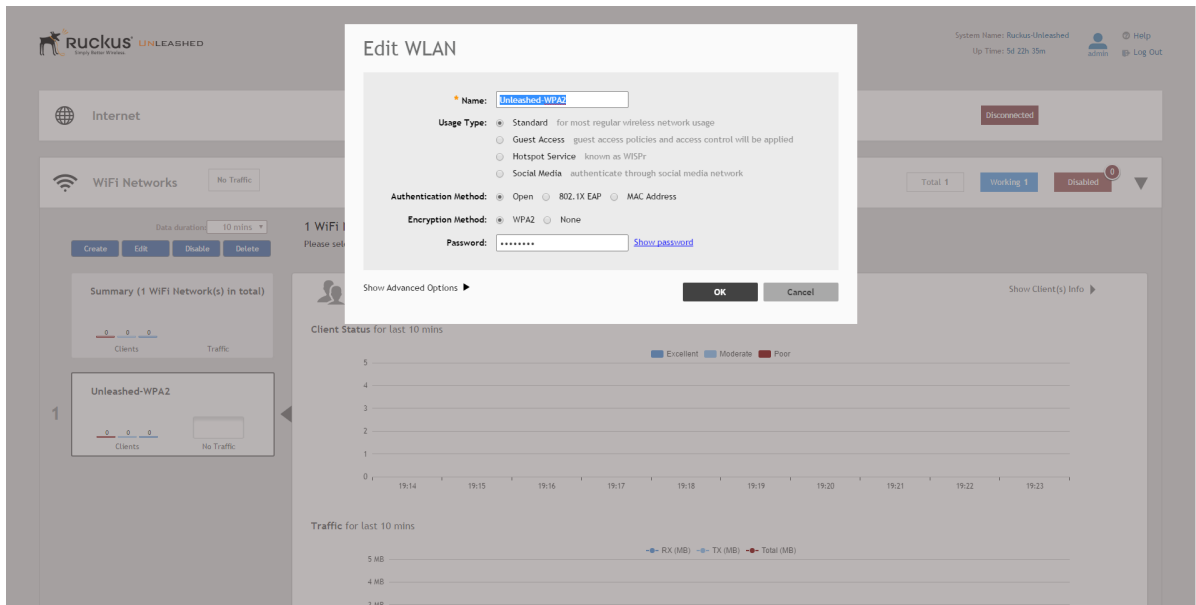


FIGURE 83 Modify WLAN settings



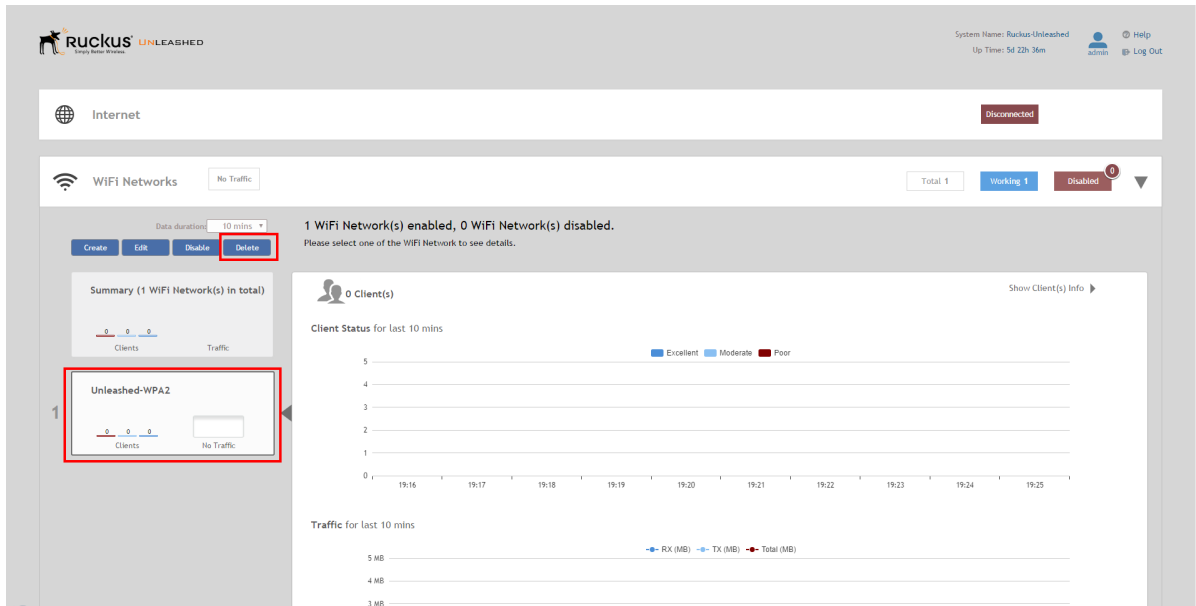
If you made any changes, click **OK** to confirm your changes.

## Deleting a WLAN

To delete a WLAN, open the **Wi-Fi Networks** section, select the **WLAN box** from the list on the left side that you want to delete, and click **Delete**.



FIGURE 84 Deleting a WLAN



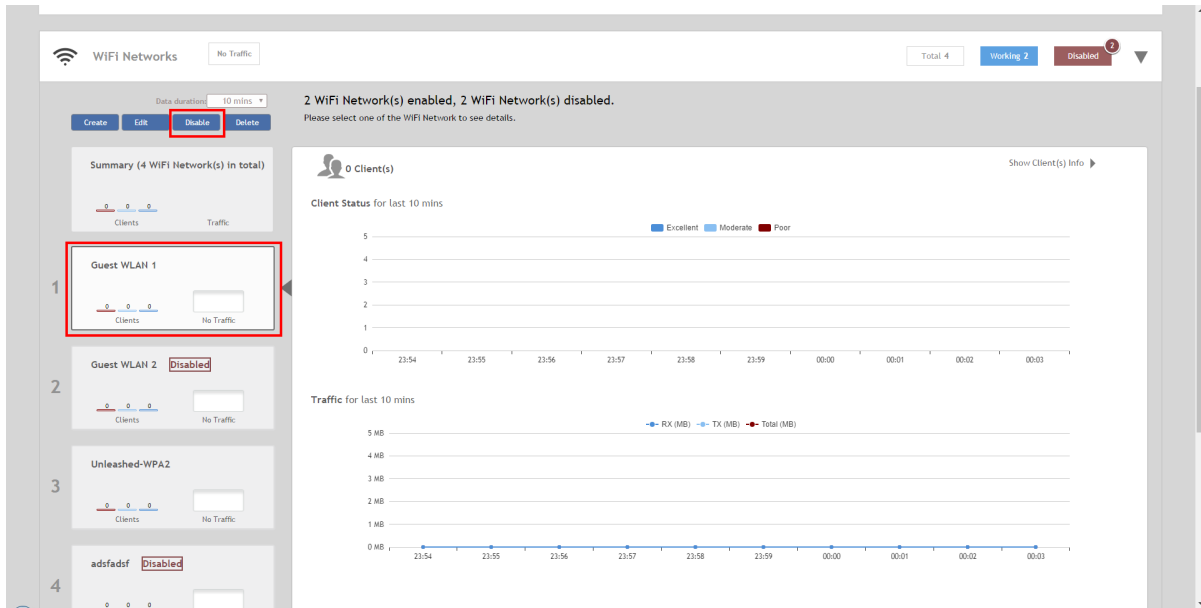
Click **OK** when prompted to delete the selected WLAN.

## Temporarily Disabling a WLAN

To temporarily disable a WLAN:

1. Open the **Wi-Fi Networks** section, select the **WLAN** box from the list on the left side that you want to disable, and click **Disable**.
2. A confirmation dialog appears, click **OK** to confirm.
3. To re-enable, click the **Enable** button.

FIGURE 85 Click Disable to temporarily disable a WLAN



# Advanced WLAN Configuration

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- [WLAN Advanced Options Overview.....](#) 143
- [Advanced WLAN Options.....](#) 143

## WLAN Advanced Options Overview

The WLAN configuration Advanced options include options for configuring advanced WLAN options such as Zero-IT and DPSK, WLAN priority, access controls, rate limiting, application visibility, load balancing, wireless client isolation and inactivity timeouts.

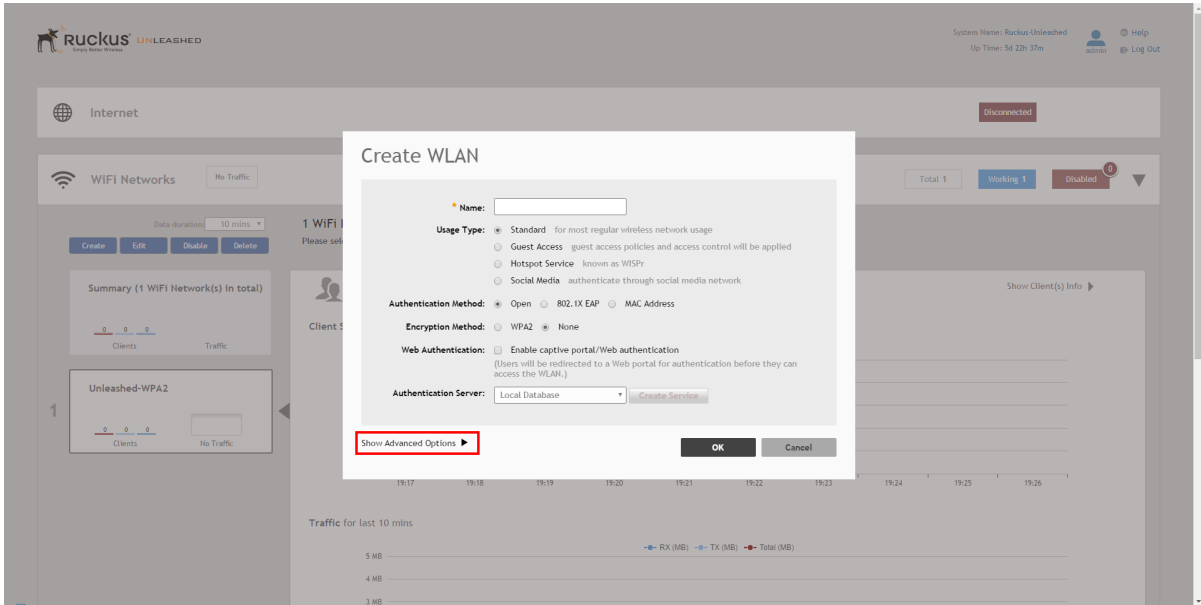
## Advanced WLAN Options

To edit the advanced options for a WLAN:

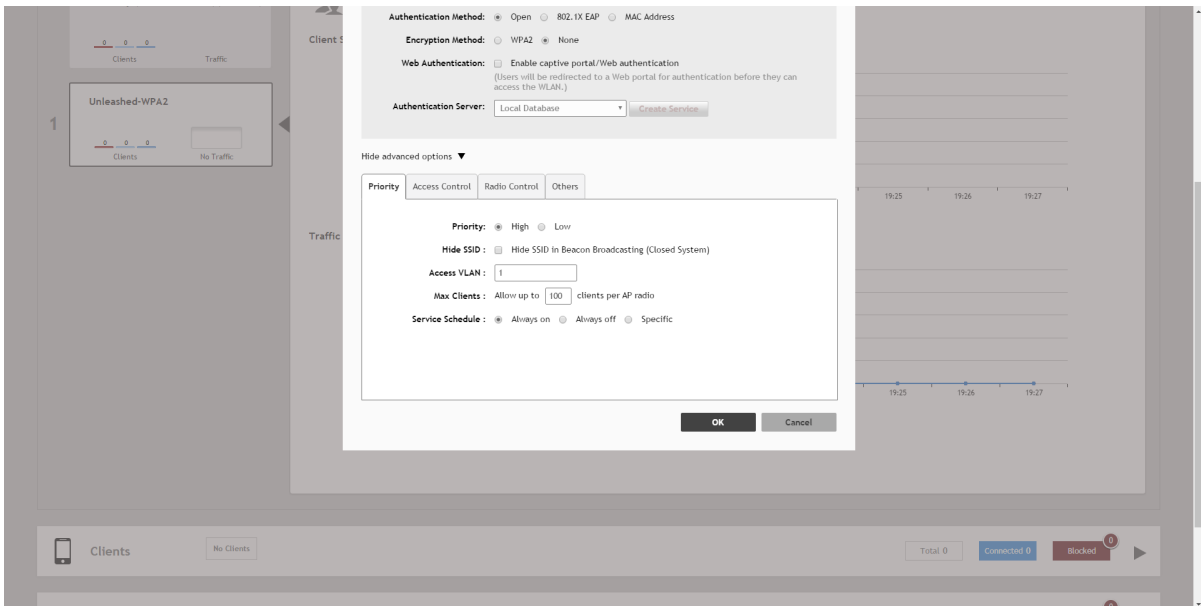
1. Select the WLAN you want to configure from the **Wi-Fi Networks** component and click **Edit**, or click **Create** to create a new custom WLAN.

- Click the arrow next to **Show advanced options** to expand the advanced options section.

**FIGURE 86** Click Show Advanced Options



**FIGURE 87** WLAN advanced options



3. Configure the following advanced options according to your preferences:
  - **Priority:** Contains options for setting the WLAN's priority level, WLAN visibility, Access VLAN, Max Clients and Service Schedule. See [WLAN Priority Settings](#) on page 148.
  - **Access Control:** Contains options for configuring Call Admission Control, Rate Limiting, Access Controls, Application Visibility and Application Denial Policies. See [Access Control Settings](#) on page 149.
  - **Radio Control:** Contains options for configuring radio settings including Fast BSS transition, Background Scanning, Load Balancing and Band Balancing. See [Radio Control Settings](#) on page 152.
  - **Others:** Contains options for configuring Force DHCP, client Inactivity Timeout, and Wireless Client Isolation. See [Other WLAN Settings](#) on page 154.
4. Click **OK** to save your changes.

## Zero-IT and DPSK Settings

Zero-IT and Dynamic Pre-Shared Key (DPSK) are two unique Ruckus technologies that work together to provide advanced security, improved credentials maintenance, and reduced IT support required for wireless device setup.

### Zero-IT

Zero-IT Activation allows network users to self-activate their devices for secure access to your wireless networks with no manual configuration required by the network administrator.

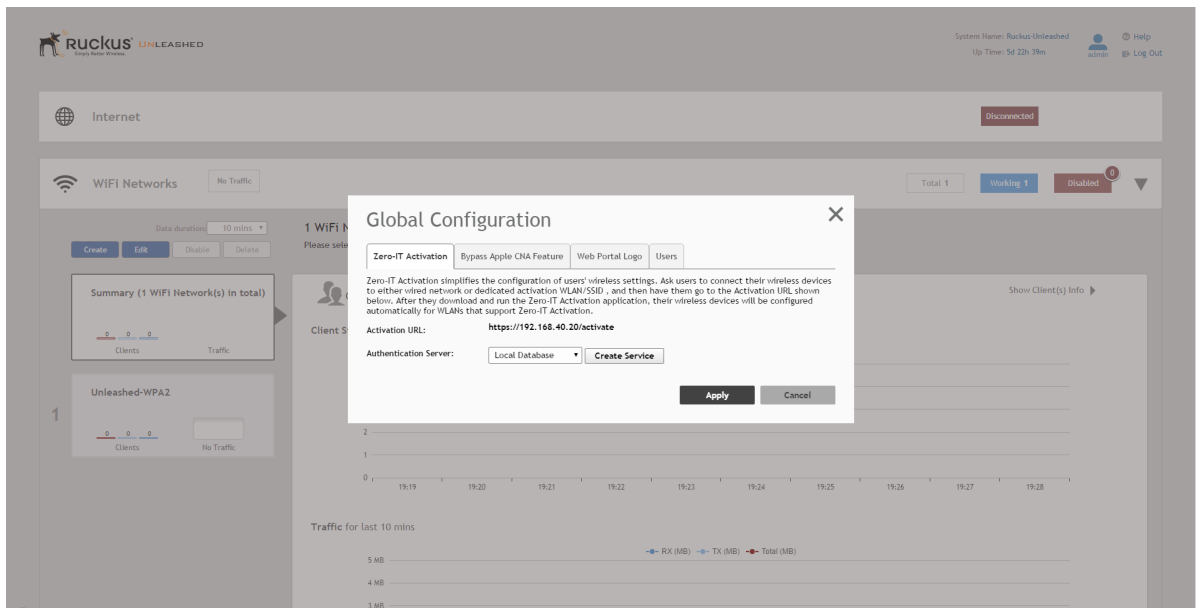
Once your Unleashed network is set up, you need only direct users to the **Activation URL**, and they will be able to automatically activate their devices to securely access your wireless LAN.

At the activation URL, users must first enter a valid user name and password to be granted this access. Users can be authenticated against either an internal database (manually configured for each user), or against an external authentication server, such as Active Directory or RADIUS. For smaller deployments, you can manually create user accounts from the *Users* screen. If an external server is used, you must configure Unleashed with the IP address and login for the external auth server.

Once authentication is successful, a Zero-IT Activation file is downloaded and run on the client device, automatically configuring the device's wireless connection settings.

Zero-IT must be enabled on a WLAN in order for Dynamic PSK to be enabled.

**FIGURE 88** Zero-IT Authentication Server configuration



## Dynamic PSK

Many small and medium-sized businesses do not have a RADIUS server on their network, but do want to provide the best possible security to their users and protect their networks from unauthorized access.

WPA2-PSK (passphrase) based networks are relatively simple to set up yet ensure a high level of security for user traffic over the air. However, a shared password must be shared among all network users. At some point this can lead to compromised network security if the passphrase falls into the hands of an unintended user, after which, the administrator will be forced to change the passphrase and provide the new passphrase to all users to input into every device.

Dynamic PSK (DPSK) is a unique Ruckus feature that enhances the security of normal Pre-shared Key (PSK) wireless networks. Unlike typical PSK networks, which share a single key amongst all devices, a Dynamic PSK network assigns a unique key to every authenticated user. Therefore, when a person leaves the organization, network administrators do not need to change the key on every device. Dynamic PSK offers the following benefits over standard PSK security:

- Every device on the WLAN has its own unique Dynamic PSK (DPSK) that is valid for that device only.
- Each DPSK is bound to the MAC address of an authorized device; even if that PSK is shared with another user, it will not work for any other machine.
- Since each device has its own DPSK, you can also associate a user (or device) name with each key for easy reference.
- Each DPSK may also have an expiration date; after that date, the key is no longer valid and will not work.
- DPSKs can be created and removed without impacting any other device on the WLAN.
- If a hacker manages to crack the DPSK for one client, it does not expose other devices that are encrypting their traffic with their own unique DPSKs.

DPSKs can be created in bulk and manually distributed to users and devices, or they can be sent as part of the Zero-IT automatic provisioning file that is sent when a client connects to the network for the first time using Zero-IT Activation.

## Enabling Zero-IT for a WLAN

To enable Zero-IT for a WLAN:

1. Expand the **Wi-Fi Networks** section, and click **Create** (or **Edit** an existing WLAN).
2. Select **Standard** for **Usage Type**, and either **Open/WPA2** for **Authentication** and **Encryption** method, or **802.1X EAP** for authentication against an external RADIUS server.
3. Click **Show advanced options**, then select the **Zero-IT & DPSK** tab.
4. Enable the **Zero-IT Activation** check box.
5. Optionally, click **Advanced options** to configure Dynamic PSK. (See [Enabling DPSK for a WLAN](#) on page 147 for more information).
6. Click **OK** to save.

This WLAN is now ready to allow users to self-configure their client devices using a Zero-IT installer that will be provided once a user logs in.

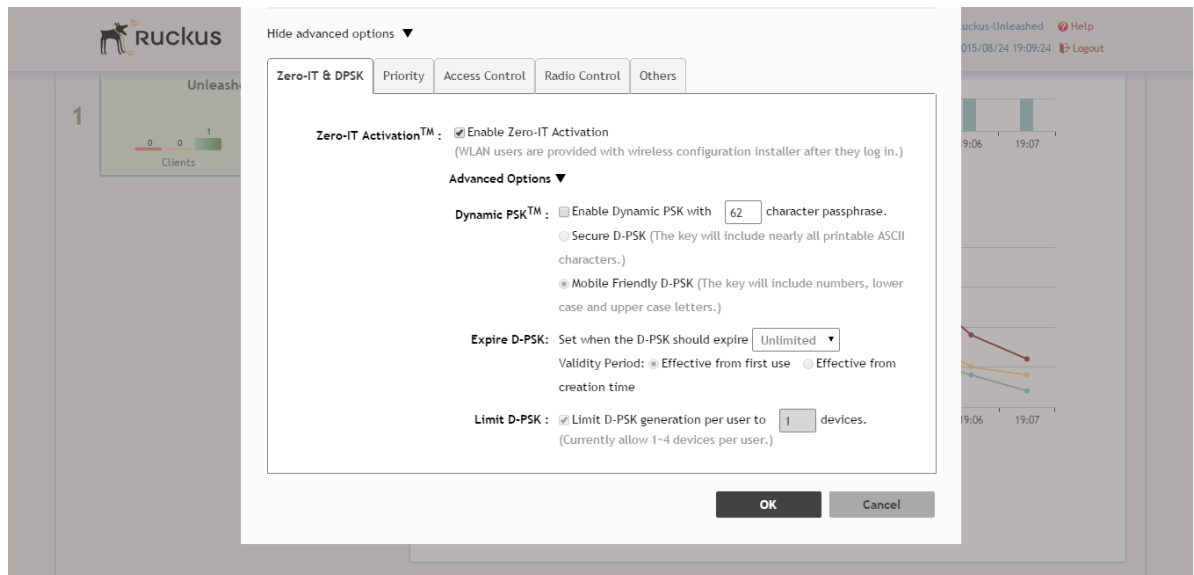
## Enabling DPSK for a WLAN

To enable DPSK for a WLAN:

1. Expand the **Wi-Fi Networks** section, and click **Create** (or **Edit** an existing WLAN).
2. Select **Standard** for **Usage Type**, and either **Open/WPA2** for **Authentication** and **Encryption** method, or **802.1X EAP** for authentication against an external RADIUS server.
3. Click **Show advanced options**, then select the **Zero-IT & DPSK** tab.
4. Next to **Dynamic PSK**, enable the check box next to **Enable Dynamic PSK with \_\_\_ character passphrase**, and enter a PSK passphrase length (between 8 and 62 characters).
5. Choose whether to use **Secure DPSK** or **Mobile Friendly DPSK**.
  - **Secure DPSK:** Includes almost all printable ASCII characters, including periods, hyphens, dashes, etc. This option is more secure, however it is difficult to input for mobile clients whose keyboards may not contain the entire set of printable ASCII characters.
  - **Mobile Friendly DPSK:** Choose this option if this WLAN will be used for mobile clients. This option limits the range of characters to lower case and upper case letters and numbers, which makes it easier for users to input the DPSK when activating a mobile client to a Zero-IT WLAN. (You may also want to limit the DPSK length to 8 characters for the convenience of your mobile client users.)
6. **Expire DPSK:** Set when the DPSK should expire. In **Validity** period, choose whether the DPSK expiration period will start from first use or creation time.
7. **Limit DPSK:** By default each authenticated user can generate multiple DPSKs. Select this option to limit the number of DPSKs each user can generate (1-4).
8. Click **OK** to save your changes.

This WLAN is now ready to authenticate users using Dynamic Pre-Shared Keys once their credentials are verified against either the internal database or an external AAA server.

FIGURE 89 Zero-IT and DPSK configuration settings for a WLAN



**NOTE**

For information on DPSK management and batch generation, see [Dynamic PSK](#) on page 226.

## WLAN Priority Settings

The **WLAN > Advanced Options > Priority** tab provides the following options:

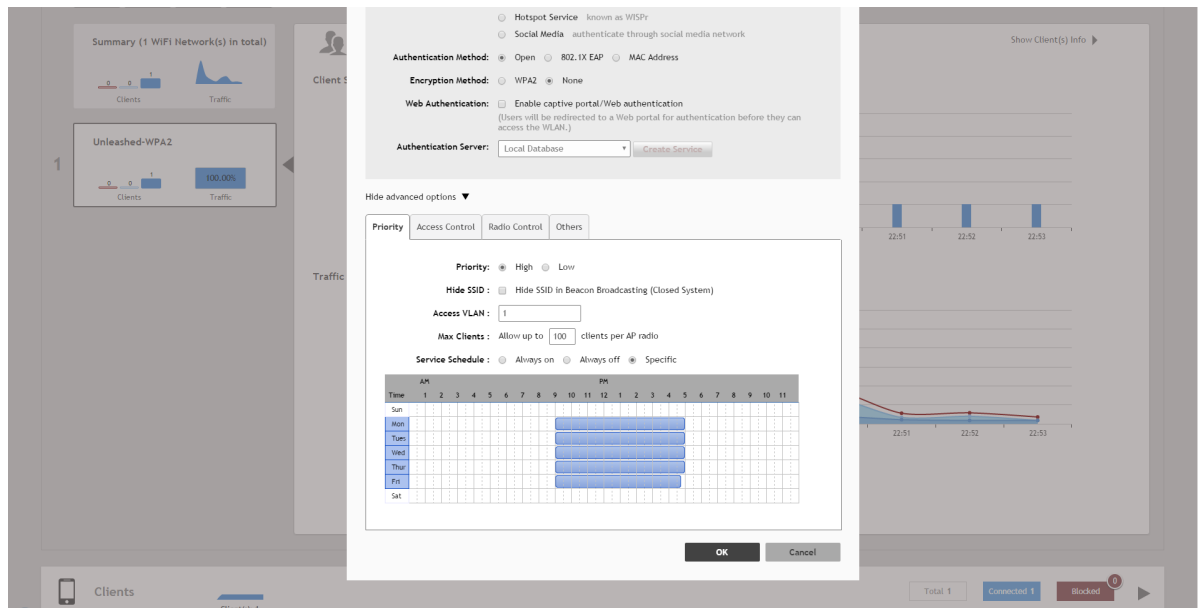
- **Priority:** Set the priority of this WLAN to Low if you would prefer that other WLAN traffic takes priority. For example, if you want to prioritize internal traffic over guest WLAN traffic, you can set the priority in the guest WLAN configuration settings to "Low." By default, all WLANs are set to High priority.
- **Hide WLAN:** Activate this option if you do not want the ID of this WLAN advertised at any time. This will not affect performance or force the WLAN user to perform any unnecessary tasks.
- **Access VLAN:** By default, all wireless clients are placed into a single VLAN (with VLAN ID 1). If you want to tag this WLAN traffic with a different VLAN ID, enter a valid VLAN ID (2- 4094) in the box.
- **Max Clients:** Limit the number of clients that can associate with this WLAN per AP radio (default is 100, max is 256).
- **Service Schedule:** Use the Service Schedule tool to control which hours of the day, or days of the week to enable/disable WLAN service. For example, a WLAN for student use at a school can be configured to provide wireless access only during school hours. Click on a day of the week to enable/disable this WLAN for the entire day. Colored cells indicate WLAN *enabled*. Click and drag to select specific times of day. You can also disable a WLAN temporarily for testing purposes, for example.

**NOTE**

This feature will not work properly if the Unleashed network does not have the correct time. To ensure the correct time is always maintained, configure an NTP server and point the Unleashed Master AP to the NTP server's IP address, as described in [Configuring the System Time](#) on page 194.



**FIGURE 90** Configuring a specific Service Schedule for a WLAN

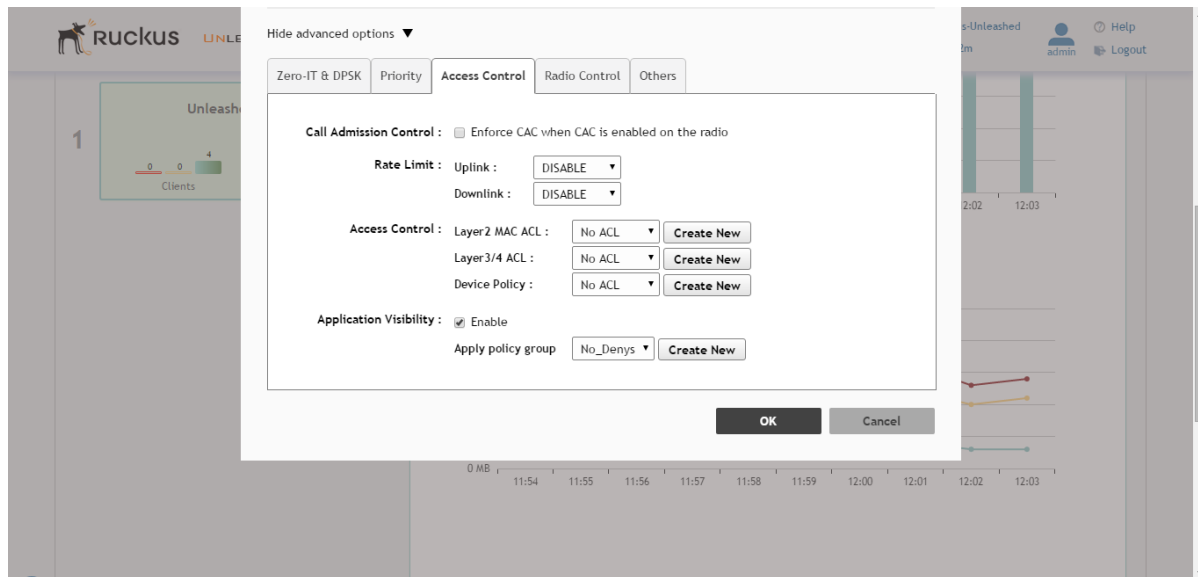


## Access Control Settings

The *WLAN > Advanced Options > Access Control* page provides the following options:

- **Call Admission Control:** (Disabled by default). Enable Wi-Fi Multimedia Admission Control (WMM-AC) to support Polycom/Spectralink VIEW certification. When enabled, the AP announces in beacons if admission control is mandatory or not for various access categories and admits only the traffic streams it can support based on available network resources. When network resources are not sufficient to provide this level of performance, the new traffic stream is not admitted. Call Admission Control is effective only when both AP and the client support WMM-AC. Ruckus APs are capable of handling hundreds of simultaneous clients, but when it comes to VoIP traffic, the number of VoIP calls needs to be policed to ensure adequate voice/video quality. Ruckus recommends limiting bandwidth allocation to six calls (four active calls and two reserved for roaming) on the 2.4 GHz radio and 10 calls on the 5 GHz radio (seven active and three reserved for roaming). Enable this feature if you want this WLAN to serve as a VoIP WLAN to support Spectralink phones.
- **Rate Limit:** Rate limiting controls fair access to the network. When enabled, the network traffic throughput of each network device (i.e., client) is limited to the rate specified in the traffic policy, and that policy can be applied on either the uplink or downlink. Toggle the Uplink and/or Downlink drop-down lists to limit the rate at which WLAN clients upload/download data. The "Disabled" state means rate limiting is disabled; thus, traffic flows without prescribed limits.
- **Access Control:** Toggle this drop-down list to select Access Control Lists (L2 or L3/L4) and Device Policy to apply to this WLAN. An access control entry or a device policy must be created before being available here. For more information, see [Access Control](#) on page 214.
- **Application Visibility:** Enable this option to allow APs to collect client application data, which can then be consolidated for use by the [Application Recognition and Control](#) on page 219 pie charts.
  - **Apply Policy Group:** This option allows the administrator to deny application access by blocking any HTTP host name or L4 port. Using application denial policies, administrators can block specific applications if they are seen to be consuming excessive network resources, or enforce network usage policies such as blocking social media sites. (For more information, see [Application Policies](#) on page 150.)

**FIGURE 91** Advanced WLAN settings - Access Control configuration



## Application Policies

For instructions on configuring Application Control Policies, see [Creating an Application Control Policy](#) on page 151.

This option allows the administrator to deny application access by blocking any HTTP host name (FQDN - Fully Qualified Domain Name) or L4 port. Using application denial policies, administrators can block specific applications if they are seen to be consuming excessive network resources, or enforce network usage policies such as blocking social media sites.

The following usage guidelines need to be taken into consideration when defining application control policies:

- "www.corporate.com" – This will block access to the host web server at the organization "corporate.com" i.e., the FQDN. It will not block access to any other hosts such as ftp, ntp, smtp, etc. at the organization "corporate.com".
- "corporate.com" – This will block access to all hosts at the domain "corporate.com," i.e., it will block access to www.corporate.com, ftp.corporate.com, smtp.corporate.com, etc.
- "corporate" – This will block access to any FQDN containing the text "corporate" in any part of the FQDN. Care should be taken to use as long as possible string for matching to prevent inadvertently blocking sites that may contain a shorter string match i.e., if the rule is "net" then this will block access to any sites that have the text "net" in any part of the FQDN or ".net" as the FQDN suffix.
- \*.corporate.com – This is an invalid rule. Wildcard "\*" and other regular expressions cannot be used in any part of the FQDN.
- "www.corporate.com/games" - This is an invalid rule. The filter cannot parse and block access on text after the FQDN, i.e., in this example it cannot filter the microsite "/games".

### NOTE

Many global organizations have both a ".com" suffix and country specific suffix such as ".co.uk", ".fr", ".au".etc. To block access to, for example, the host web server in all regional specific web sites for an organization, a rule like "www.corporate" could be used.

**NOTE**

Many global organizations use distributed content delivery networks such as Akamai. In such cases creating a rule such as "www.corporate.com" may not prevent access to the entire site. Further investigation of the content network behavior may need to be undertaken to fully prevent access.

**NOTE**

When using port-based rules, there is no distinction between the TCP and UDP protocols, so care should be taken if wishing to block a specific application port, as this will apply to both IP protocols and may inadvertently block another application using the other protocol.

## Creating an Application Control Policy

Application control policies can be used to block access to certain applications, to rate limit traffic identified as belonging to certain applications, or to perform QoS traffic shaping on traffic identified as belonging to a certain application.

**NOTE**

For more information on configuring and enforcing application control policies, see [Application Policy](#) on page 220.

To create an Application Control Policy:

1. Go to **WLAN > Advanced Options > Access Control**.
2. Enable **Application Visibility**.
3. In **Apply policy group**, click **Create New** to create a new policy.

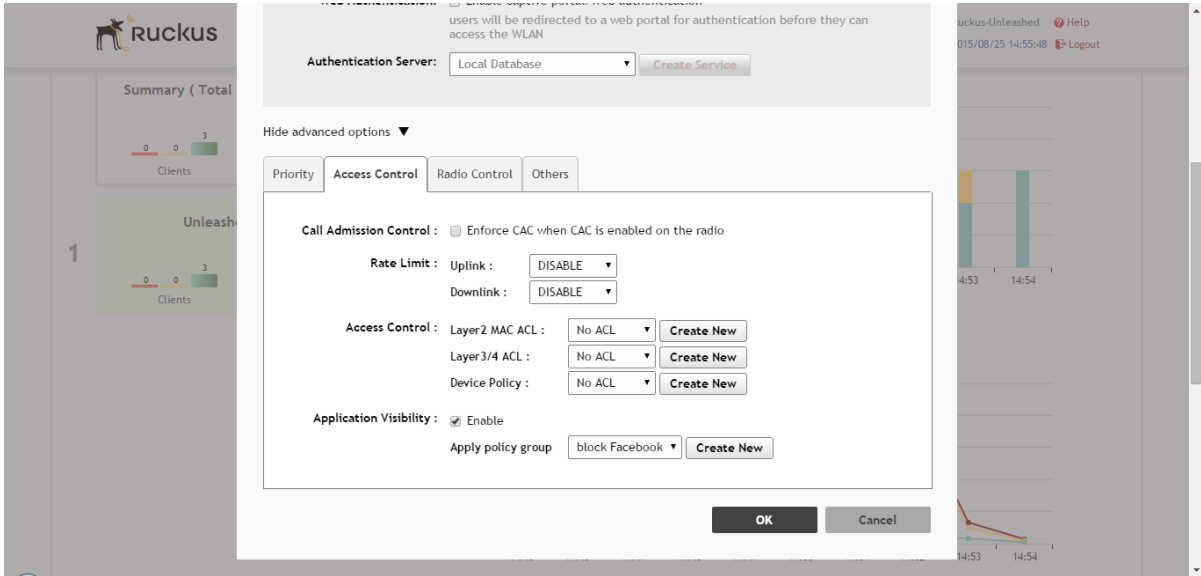
**NOTE**

Alternatively, go to *Admin & Services > Services > Application Recognition & Control > Application Policy* to configure multiple application policies and then apply them to WLANs one by one.

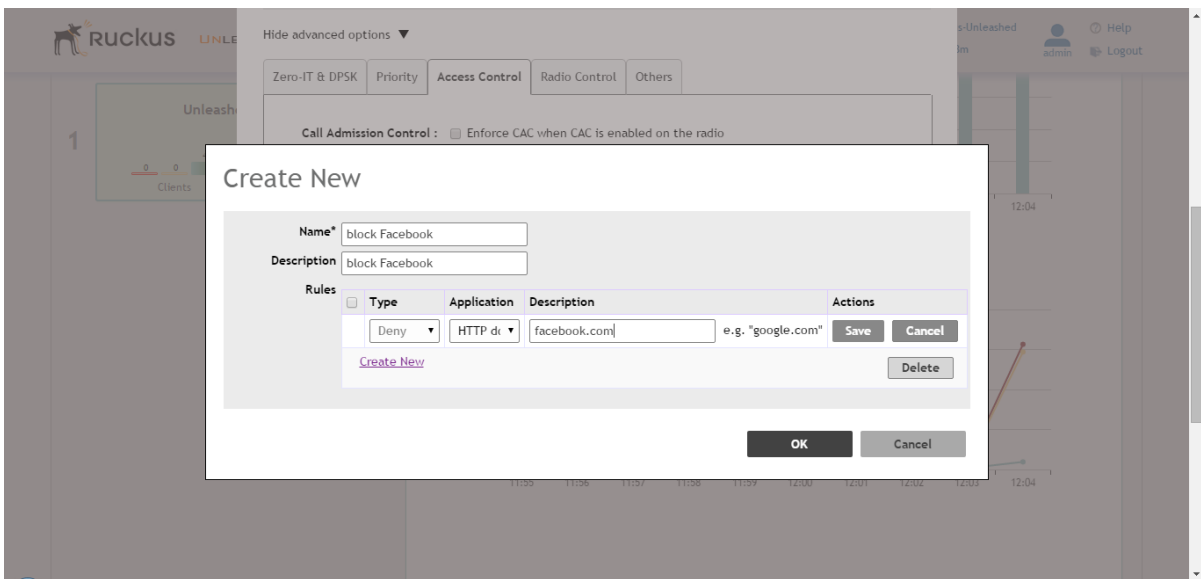
4. Enter a **Name** and optionally a **Description** for the policy.
5. In **Rules**, click **Create New** to create a new rule for this policy.
6. In **Rule Type**, select whether this will be a Denial policy, a Rate Limiting policy or a QoS policy.
7. In **Application Type**, Select **System Defined** or one of the user-defined application types (IP-based, port-based or application name-based).
8. In **Application**, select the user-defined application from the list, or select the application category and application name from the list of system-defined applications.
9. If the Rule Type you selected was Rate Limiting or QoS, enter the uplink and downlink speeds at which to limit this application, or the QoS traffic shaping rules to enforce if it is a QoS rule.

10. Click **Save** to save the rule, and click **OK** to save the policy.

**FIGURE 92** Applying an Application Control Policy to a WLAN



**FIGURE 93** Creating an Application Control Policy for a specific website



## Radio Control Settings

The *WLAN > Advanced Options > Radio Control* tab provides options for configuring WLANs individually. Many of these options can also be configured globally from the *Enhanced Services > Radio Control* page. For information on configuring global radio control options, see [Configuring Global AP Settings](#) on page 160.

The following options can be configured on a per-WLAN basis:

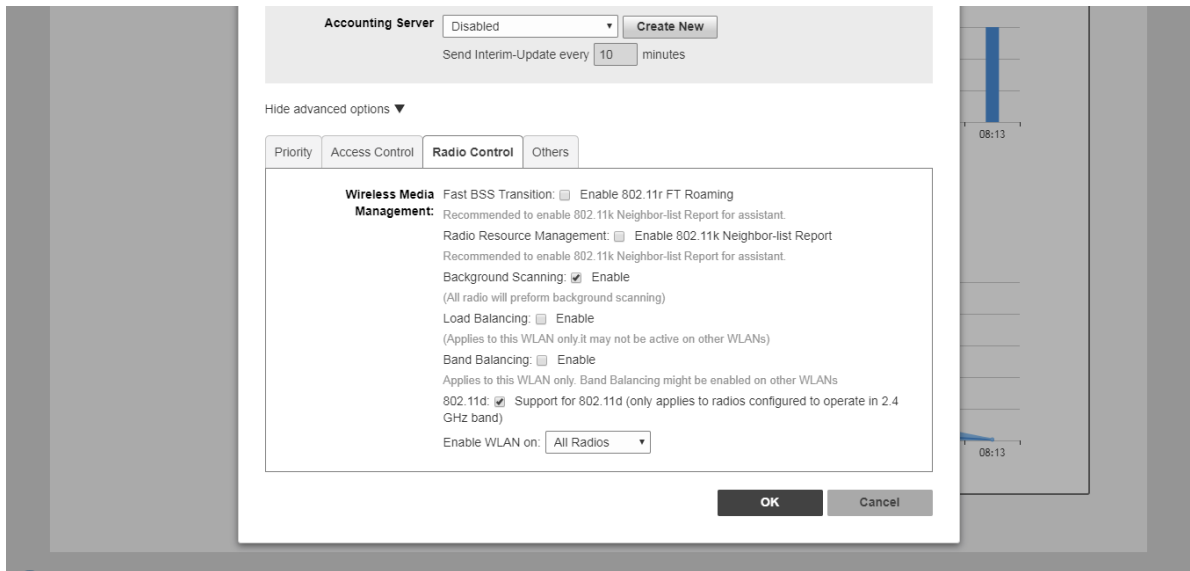
- **Fast BSS Transition:** (Disabled by default) The Fast BSS Transition feature uses messages and procedures defined in 802.11r to allow continuous connectivity for wireless devices in motion, with fast and secure handoffs from one AP to another. A fast BSS transition is a BSS transition in the same mobility domain that establishes the state necessary for data connectivity before the re-association rather than after the re-association. In this way, clients that support the 11r standard (including iOS devices) can achieve significantly faster roaming between APs.
- **Radio Resource Management:** (Disabled by default) Radio Resource Management utilizes 802.11k Neighbor Reports, which are sent by the AP to inform clients of the preferred roaming target AP. The client sends neighbor report request to an AP, and the AP returns a neighbor report containing information about known neighbor APs that are candidates for a service set transition.
- **Background Scanning:** Background Scanning regularly samples the activity in all Access Points to assess RF usage for automatic optimal channel selection, to detect rogue APs, and to determine which APs are near each other for radio resource management and load balancing. These scans sample one channel at a time in each AP so as not to interfere with network use.
- **Load Balancing:** Enabling load balancing can improve WLAN performance by helping to spread the client load between nearby access points. The load balancing feature can be controlled from within the Unleashed web interface to balance the number of clients per radio on adjacent APs. "Adjacent APs" are determined by the Unleashed Master AP by measuring the RSSI during channel scans. After startup, the Unleashed Master AP uses subsequent scans to update the list of adjacent radios periodically and when a new AP sends its first scan report. When an AP leaves, the Unleashed Master AP immediately updates the list of adjacent radios and refreshes the client limits at each affected AP. Once the Unleashed Master AP is aware of which APs are adjacent to each other, it begins managing the client load by sending desired client limits to the APs. These limits are "soft values" that can be exceeded in several scenarios, including: (1) when a client's signal is so weak that it may not be able to support a link with another AP, and (2) when a client's signal is so strong that it really belongs on this AP. The APs maintain these desired client limits and enforce them once they reach the limits by withholding probe responses and authentication responses on any radio that has reached its limit.
- **Band Balancing:** Band balancing balances the client load on radios by distributing clients between the 2.4 GHz and 5 GHz radios. This feature is enabled by default. To balance the load on a radio, the AP encourages dual-band clients to connect to the 5 GHz band when the configured percentage threshold is reached.
- **802.11d:** The 802.11d standard provides specifications for compliance with additional regulatory domains (countries or regions) that were not defined in the original 802.11 standard. This option is enabled by default. For optimal performance of Apple iOS devices, it is recommended that you enable this option.

**NOTE**

Some legacy embedded devices (such as wireless bar code scanners) may not operate properly if this option is enabled.

- **Enable WLAN on:** Manually enable/disable WLAN service per radio. Default is enabled on both radios. Select **2.4 GHz only** to disable WLAN service on the 5 GHz radio, or **5 GHz only** to disable WLAN service on the 2.4 GHz radio.

FIGURE 94 Radio Control options

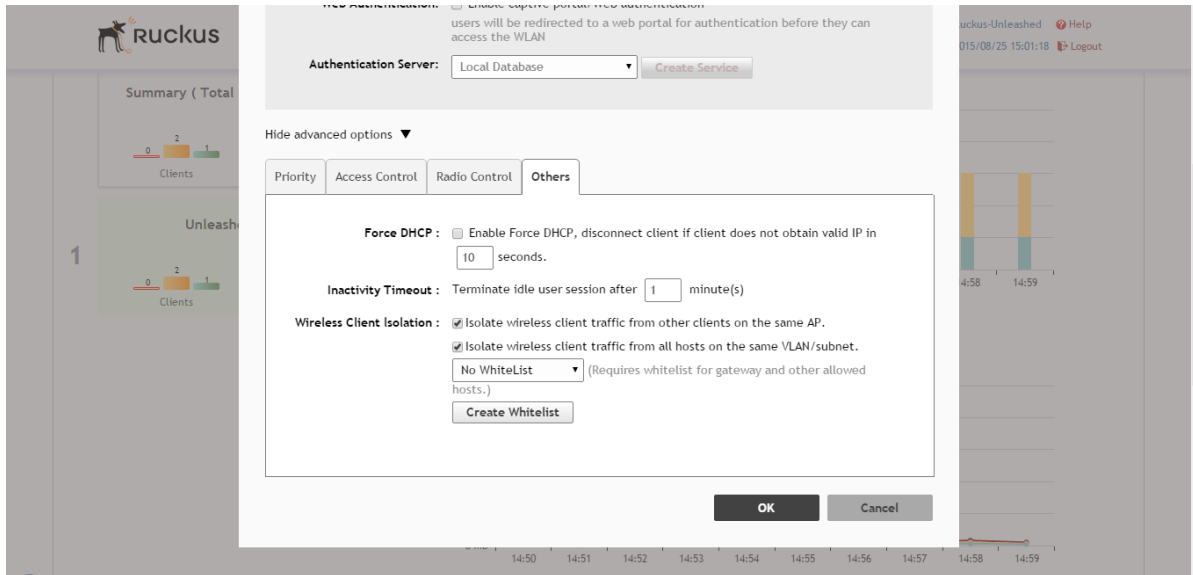


## Other WLAN Settings

The *WLAN > Advanced Options > Others* tab provides the following options:

- **Force DHCP:** (Disabled by default) Enable this option to force clients to obtain a valid IP address from DHCP within the specified number of seconds. This prevents clients configured with a static IP address from connecting to the WLAN.
- **Inactivity Timeout:** Enter a value in minutes after which idle stations will be disconnected (1 to 500 minutes).
- **Wireless Client Isolation:** In Wireless Client Isolation, select the level of client isolation you want to enforce:
  - **Isolate wireless client traffic from other clients on the same AP:** Enable client isolation on the same Access Point (clients on the same subnet but connected to other APs will still be able to communicate).
  - **Isolate wireless client traffic from all hosts on the same VLAN/subnet:** Prevent clients from communicating with any host on the same subnet or VLAN other than those listed on the Client Isolation Whitelist. If this option is chosen, you must select a Whitelist from the drop-down list. (See [Configuring Client Isolation Whitelists](#) on page 155.)

**FIGURE 95** WLAN > Advanced Options > Others tab



### Configuring Client Isolation Whitelists

When Wireless Client Isolation is enabled on a WLAN, all communication between clients and other local devices is blocked at the Access Point.

To prevent clients from communicating with other nodes, the Access Point drops all ARP packets from stations on the WLAN where client isolation is enabled and which are destined to IP addresses that are not part of a per-WLAN white list.

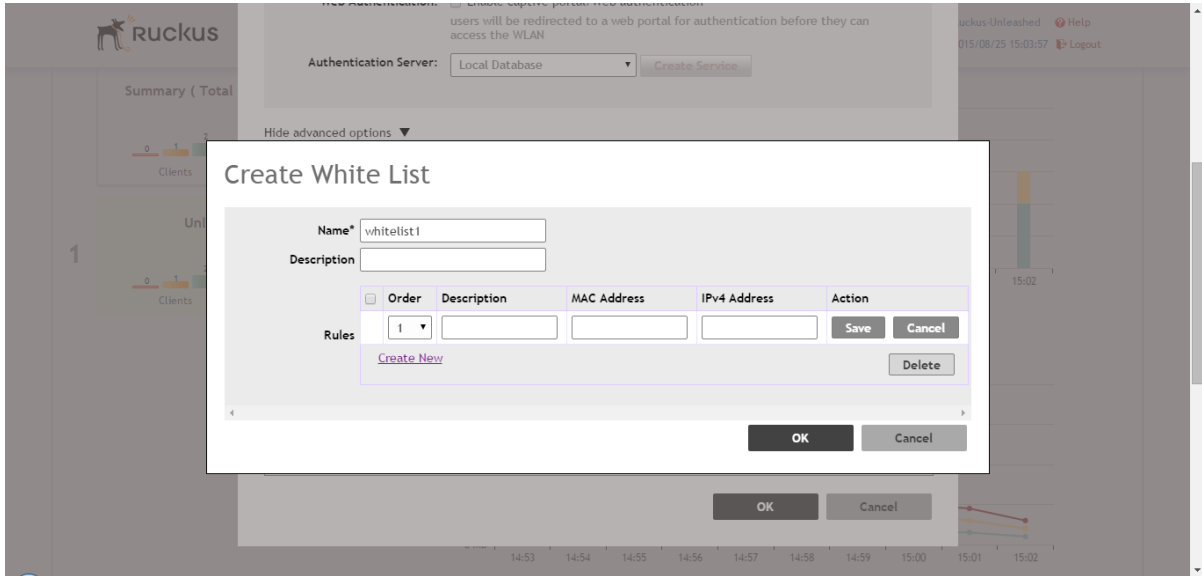
You can create exceptions to client isolation (such as allowing access to a local printer, for example) by creating Client Isolation Whitelists.

To configure a Client Isolation Whitelist:

1. Go to **Wi-Fi Networks > Advanced Options > Others**.
2. Select both check boxes under **Wireless Client Isolation**. (Isolate wireless clients from other clients on the same AP, and from all hosts on the same VLAN/subnet).
3. Click **Create Whitelist**.
4. Enter a **Name** and optionally a **Description** for the access policy.
5. In **Rules**, you can create multiple device-specific rules for each device to be white listed.
  - **Description:** Description of the device.
  - **MAC Address:** Enter the MAC address of the device.
  - **IPv4 Address:** Enter the IP address of the device.
6. Click **Save** to save the rule you created.
7. To change the order in which rules are implemented, select the order from the drop-down menu in the Order column. You can also **Edit** or **Clone** rules from the **Action** column. To delete a rule, select the box next to the rule and click **Delete**.

8. Click **OK** to save the white list.

**FIGURE 96** Configuring a Client Isolation Whitelist





# Access Point Configuration

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- [Show Client Info](#)..... 159
- [Configuring Global AP Settings](#)..... 160
- [Monitoring an Individual AP](#)..... 162
- [Configuring an Individual AP](#)..... 167
- [Restarting an AP](#)..... 170
- [Removing an AP](#)..... 170

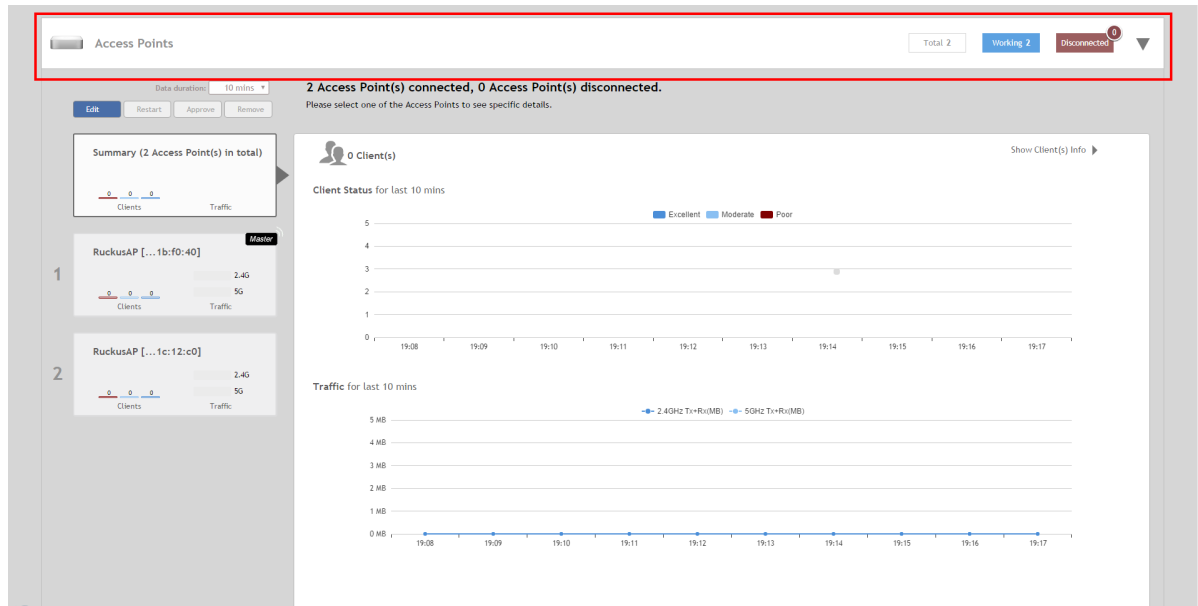
## Access Point Configuration Overview

The Access Points component provides tools for monitoring and configuring all Unleashed APs at once, and for configuring each AP individually.

Expand the component to view an overview of the connected and disconnected Unleashed APs that are recognized by this Unleashed network. This screen contains the following elements:

- **Summary Box:** Click this box to view a summary of all APs' clients, signal quality and traffic statistics.
- **Individual AP Boxes:** Click any of these boxes to view details specific to that AP.
- **Show Mesh Topology:** Click this link to view the Mesh topology.
- **Show Client Info:** Click this link to view a table of currently connected clients.
- **Client Status** bar chart: This chart displays the number of connected clients and client signal quality across all connected APs at one-minute intervals (over the last 10 minutes).
- **Traffic** graph: This graph displays the Received (Rx), Transmit (Tx) and Total traffic values over time for the last 10 minutes, at one-minute intervals.

FIGURE 97 Access Points Component



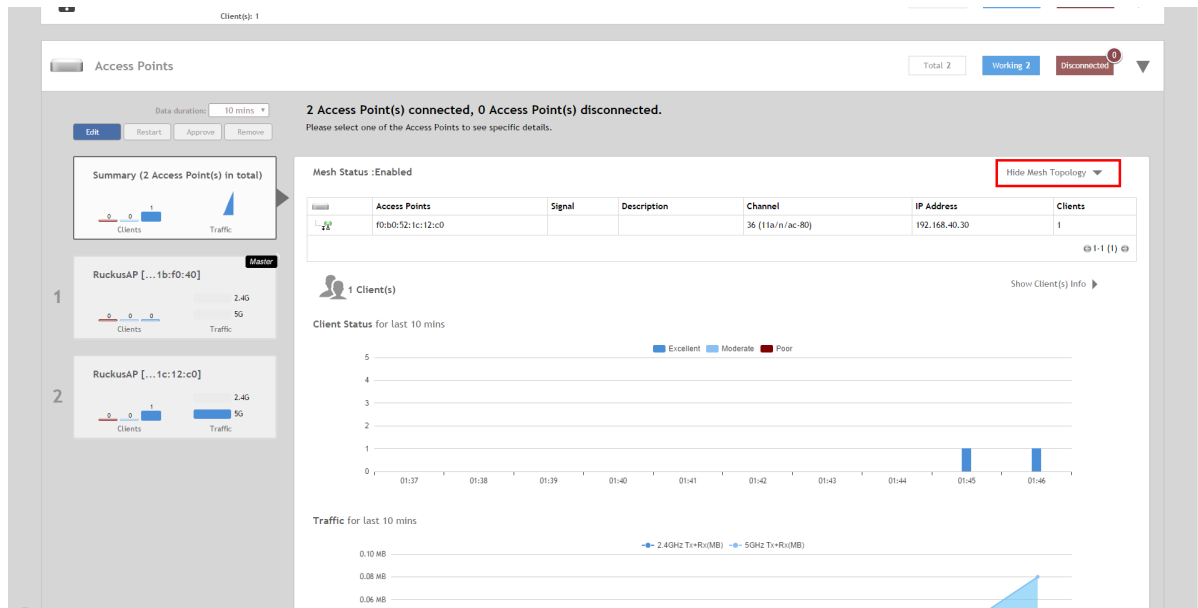
## Show Mesh Topology

Click this link to display the Mesh topology.

The **Mesh Topology** table displays the relationships between Root APs and Mesh APs in the Mesh. The table includes the following information:

- Access Points: Lists the APs in the Mesh by MAC address.
- Signal: Displays the signal quality of the Mesh link to/from the uplink AP.
- Description: The AP description, if configured.
- Channel: Displays the channel used by the Mesh link, as well as the channel width (20/40/80).
- IP Address: The IP address of the Root or Mesh AP.
- Clients: Number of clients connected to the AP.

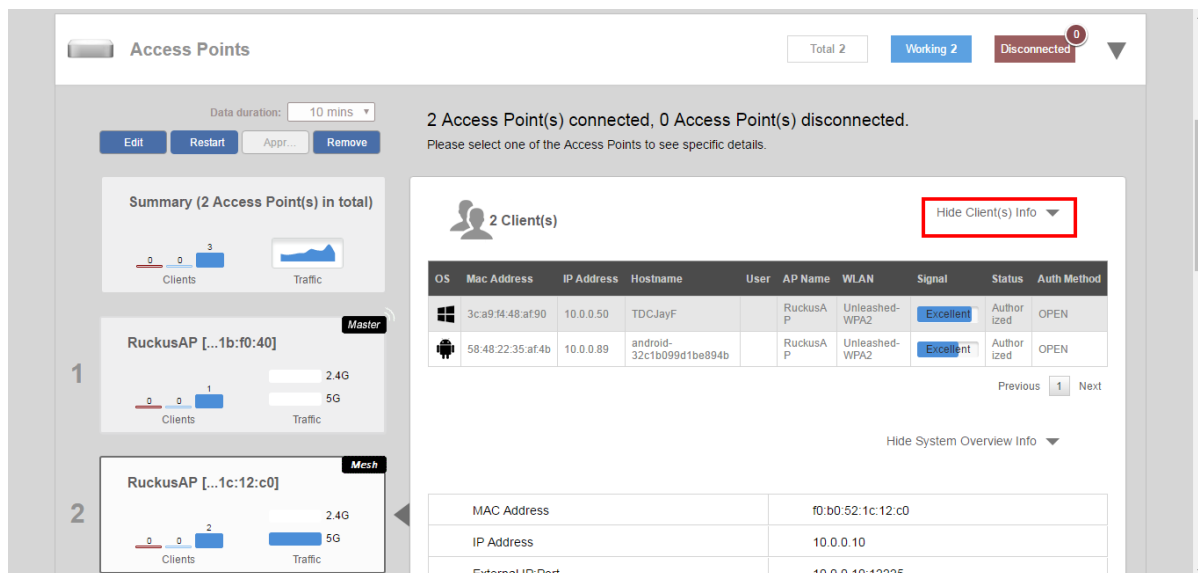
FIGURE 98 Mesh Topology



## Show Client Info

Click this link to display the currently connected clients list.

FIGURE 99 Client Info summary



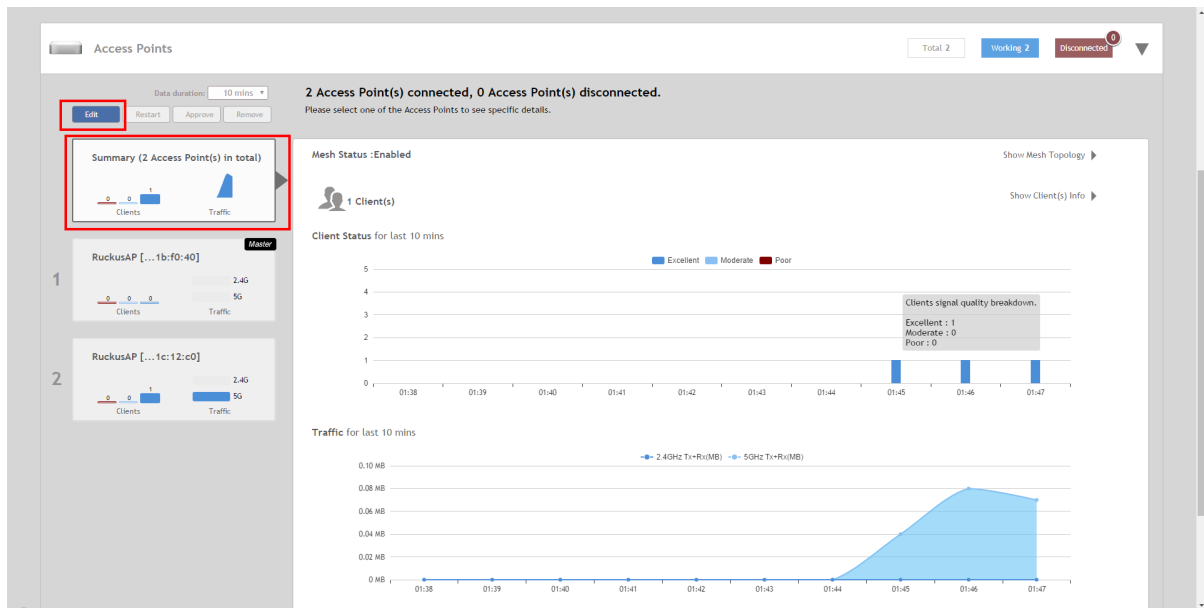
# Configuring Global AP Settings

Global AP settings are applied to all members of the Unleashed network.

To configure settings for all APs connected to the Unleashed network:

1. Click the **Edit** button in the **Access Points** component.

**FIGURE 100** Click Edit to configure AP global settings



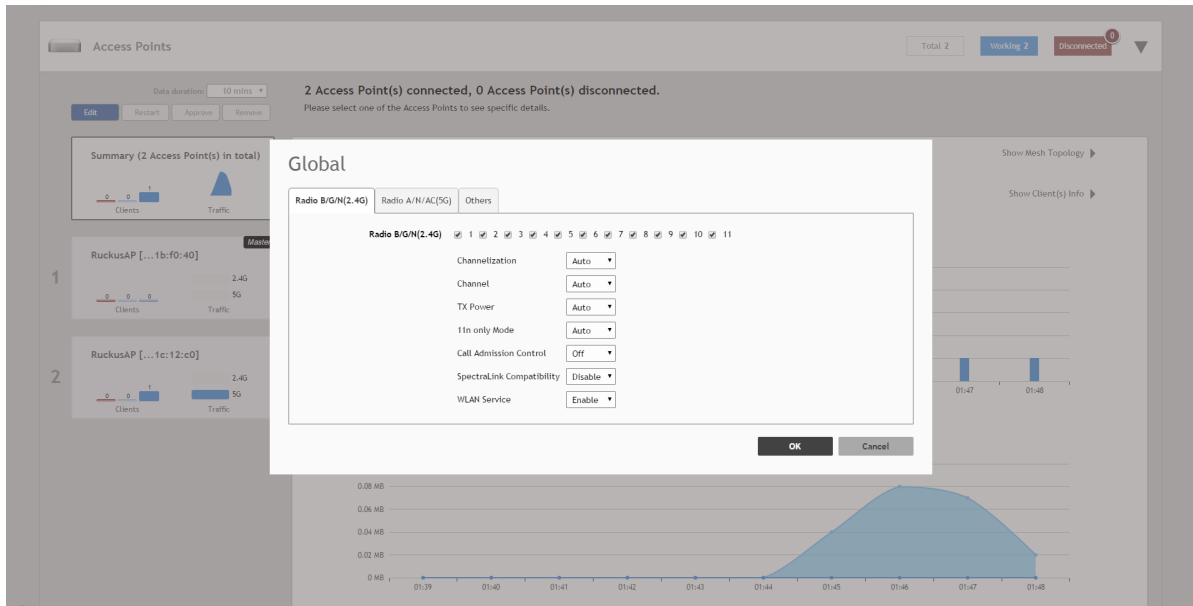
2. Configure the following global AP settings according to your preferences:
  - **Radio B/G/N (2.4G):** Configure options for the 2.4 GHz radio on all Unleashed APs.
  - **Radio A/N/AC (5G):** Configure options for the 5 GHz radio on all Unleashed APs.
  - **Others:** Configure Model-Specific controls including Max Clients by AP model, and whether to disable status LEDs.
3. Click **OK** to save your changes.

## Radio B/G/N (2.4G)

Select or deselect channels from which to choose during the automatic channel selection process or select a specific channel on which to operate, or enable 11n only mode, or enable Call Admission Control or Spectralink Compatibility for this radio.

Additionally, you can disable WLAN service for this radio entirely.

**FIGURE 101** Global 2.4 GHz radio configuration screen

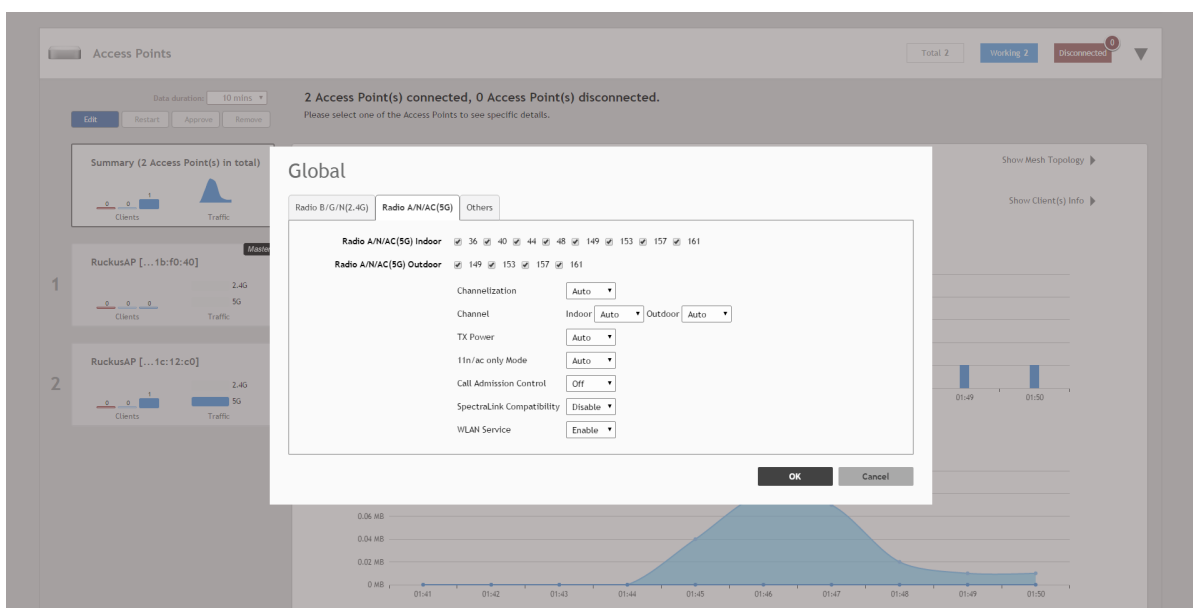


## Radio A/N/AC (5G)

Select or deselect channels from which to choose during the automatic channel selection process or select a specific channel on which to operate, or enable 11n/ac only mode, or enable Call Admission Control or Spectralink Compatibility for this radio.

Additionally, you can disable WLAN service for this radio entirely.

**FIGURE 102** Global 5 GHz radio configuration screen

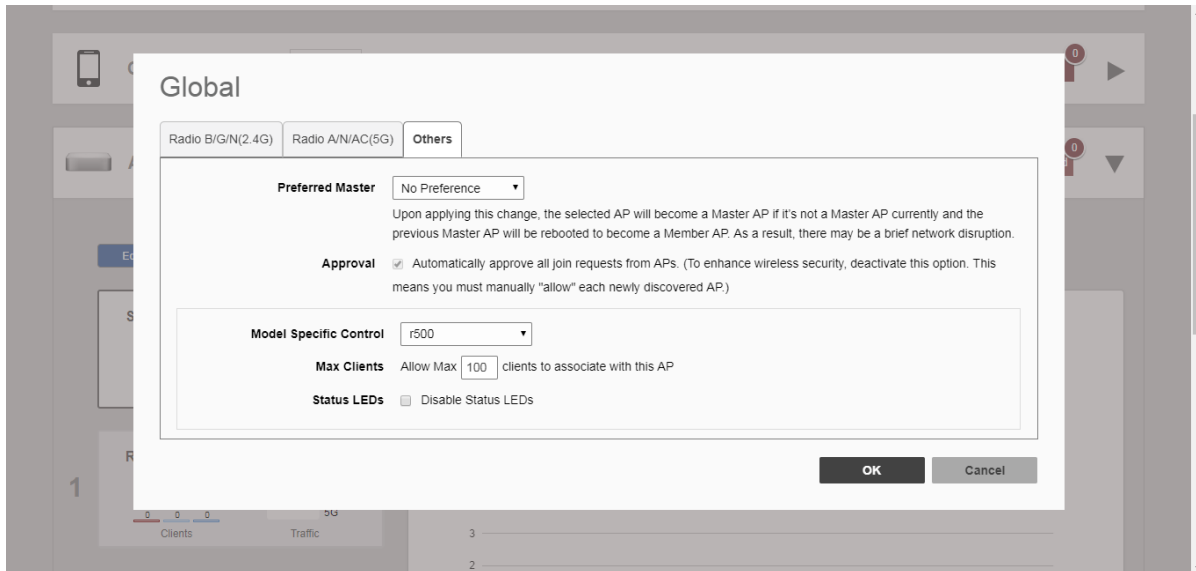


## Others

The **Access Points > Global Edit > Others** page provides the following options:

- **Preferred Master:** Select a specific AP to be the Master AP and, if the preferred Master AP reboots, it will resume the role of Master AP again once it rejoins the Unleashed network. By default, there is no preference as to which AP should become the Master AP; the first AP that is deployed automatically becomes the Master AP. Using the Preferred Master setting, users can configure one AP to have priority. Any (non-mesh) AP can become the Master if the preferred Master is offline, but when the Preferred Master comes back online, it will assume the Master role again.
- **Model Specific Control:** Select which AP model to configure from the drop-down list. The options below can be configured independently for each Unleashed AP model.
- **Max Clients:** Enter the maximum number of clients per AP.
- **Status LEDs:** Enable this option to disable the status LEDs on the AP. This can be useful if your APs are installed in a public location and you don't want to draw attention to them.

**FIGURE 103** Configuring other global AP settings

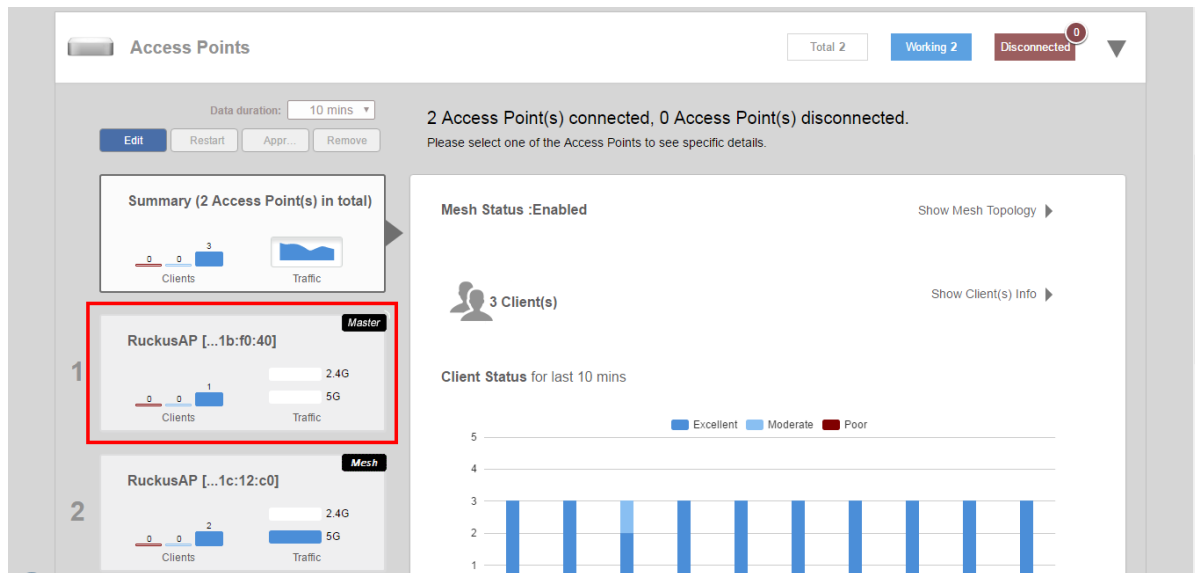


## Monitoring an Individual AP

The AP detail display includes buttons that can be used to **Edit**, **Restart** or **Remove** the AP from the network, graphs displaying signal quality and traffic statistics, and links to more detailed information on the AP and its connected clients.

To monitor and configure an AP individually, click on its box on the left side of the screen when the **Access Points** component is expanded.

**FIGURE 104** Viewing an individual AP by clicking on its box



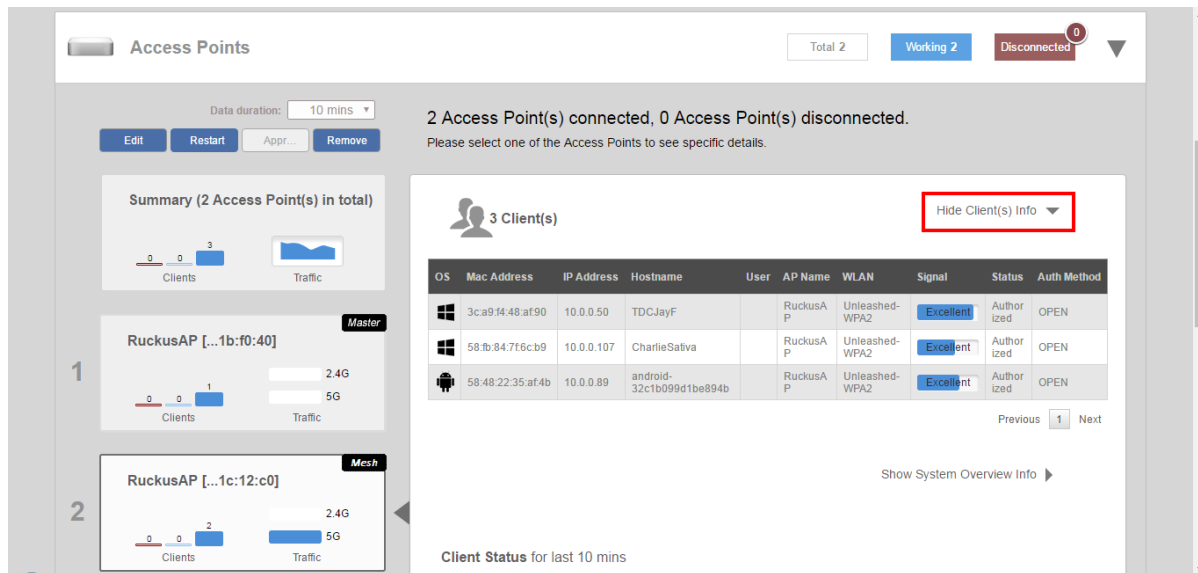
The individual AP monitoring screen contains the following UI elements:

- **Edit:** Click this button to configure an AP individually.
- **Restart:** Click this button to restart the AP.
- **Approve:** If auto-approval is disabled, click this button to approve the AP and allow it to join the Unleashed network.
- **Remove:** Click this button to remove this AP from the Unleashed network.
- **Show Client Info:** Click this link to display a list of clients currently connected to the AP. Details for each client include MAC address, IP address, OS, Host Name, MAC address of the AP to which the client is currently connected, WLAN name, Signal Strength indicator, Auth Status, and Duration online.
- **Show System Overview:** Click this link to display AP-specific information including MAC address, IP address, External IP and Port number, Model name, Serial Number and firmware Version.
- **Client Status:** Displays a breakdown of client numbers by signal quality (Excellent, Moderate or Poor) over time, in one minute intervals.
- **Traffic:** Displays the total traffic (Tx + Rx) on the AP radio in one-minute intervals.

## Show Client Info

Click the **Show Client Info** link to display a list of clients connected to this AP.

FIGURE 105 Show Client Info from AP page



## Show System Overview

Click this link to display the AP's system information.

Click the **Show System Overview** link to display detailed information on this AP. The expanded section displays the AP's general information, radio channels in use, mesh type, max clients, firmware version, and two buttons: **Save Logs** and **Speed Test**.

Click **Save Logs** to generate a txt log file that can be useful for troubleshooting. Click **Speed Test** to measure the AP's connection performance.

### NOTE

The Max Clients displayed for the Unleashed Master AP may be lower than the configured maximum, as the Unleashed Master has to perform additional tasks other than serving clients. The Master AP maximum client load varies by AP model. These limits apply only to the current Unleashed Master AP. All other member APs will honor the max clients set from the global AP model-specific controls page (**Access Points > Summary > Edit > Others > Max Clients**).

The AP system overview also displays the AP's Ethernet port status, including link status (up/down) and link speed.



FIGURE 106 System Overview Info

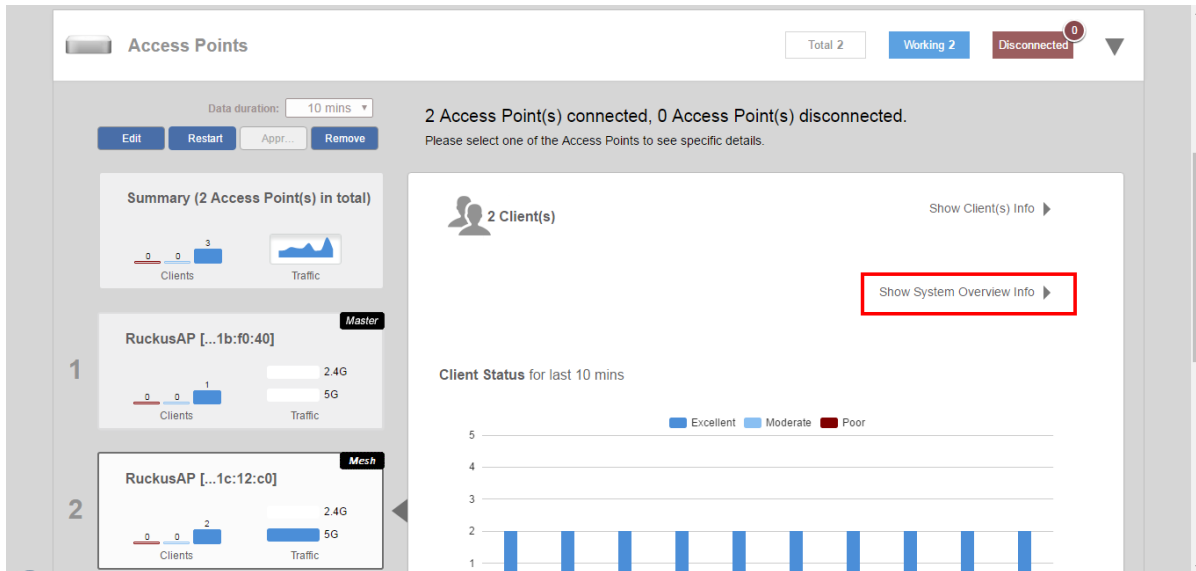
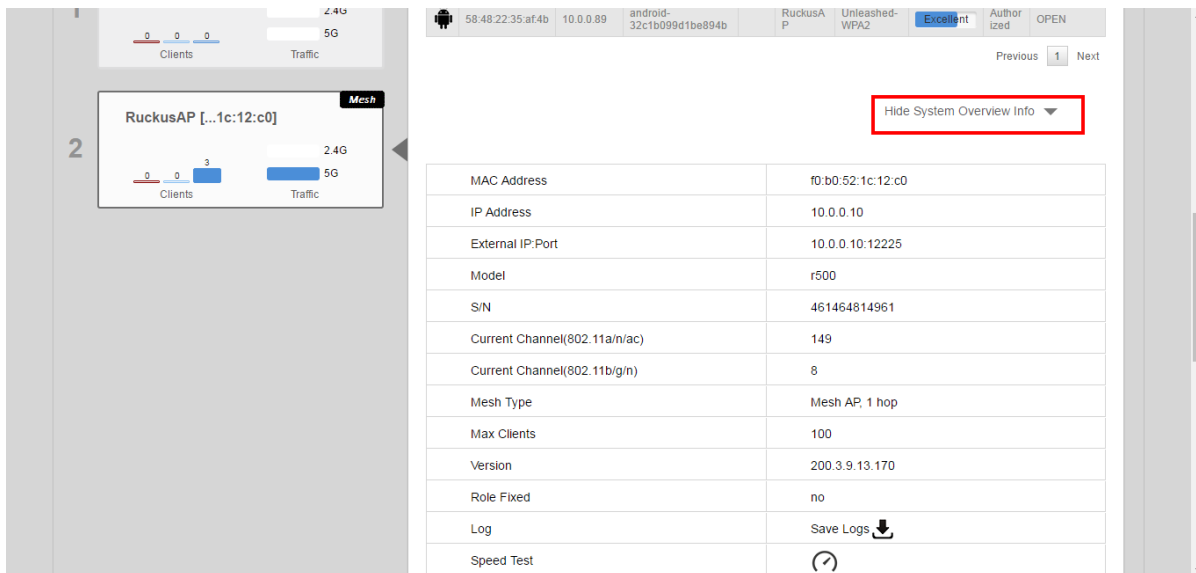


FIGURE 107 Viewing an AP's System Overview



**FIGURE 108** Click Save Logs to save the AP's current log file as a txt file on your computer

The screenshot shows the configuration page for a Ruckus AP. On the left, there are two summary cards: one for the main AP and one for a mesh AP. The main AP card shows 0 clients and 3 traffic units. The mesh AP card shows 0 clients and 0 traffic units. The main content area is a table of system information. The 'Log' row has a 'Save Logs' button with a download icon, which is highlighted with a red box. Below the table is a 'LAN Port Status' section with a table showing the status of eth0 and eth1 ports. At the bottom, there is a 'Client Status' section for the last 1 hour.

IP Address	10.10.6.114
External IP:Port	10.10.6.114:12225
Model	R500
S/N	461464814961
Mesh Type	Mesh AP, 1 hop
Current Channel(802.11a/n/ac)	36
Current Channel(802.11b/g/n)	1
Max Clients	100
Version	200.6.10.1.173
Role Fixed	yes
Log	Save Logs
Speed Test	

Interface	Logical	Physical	Label
eth0	Up	Up 10Mbps full	10/100/1000 PoE LAN1
eth1	Down	Down	10/100/1000 LAN2

### Running SpeedFlex on an AP

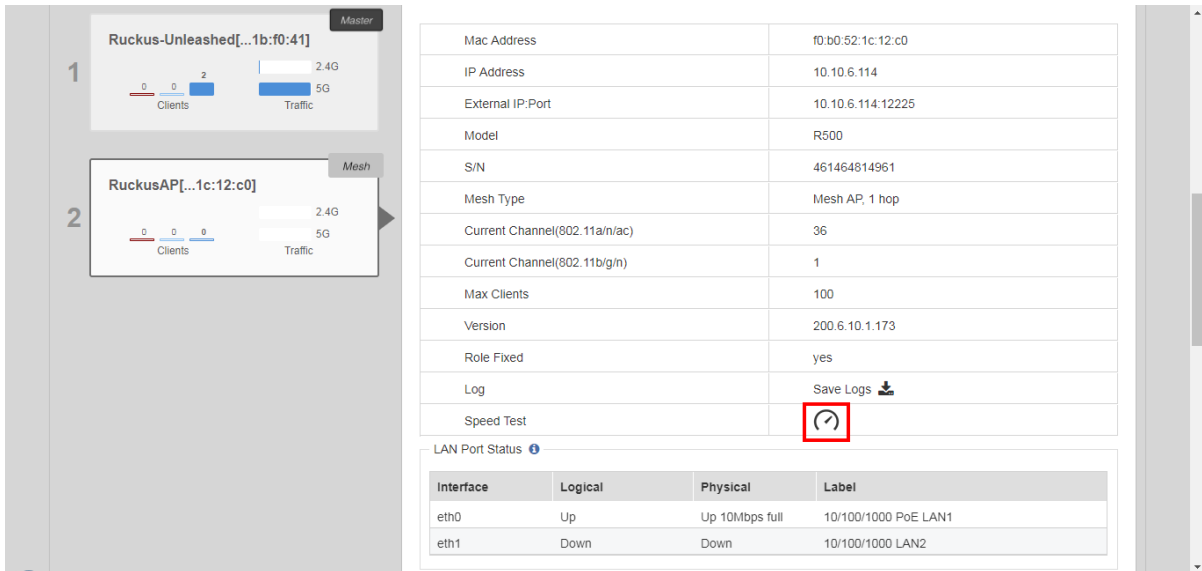
The SpeedFlex tool provides a way of measuring real-life uplink/downlink performance between wireless devices in a specific environment.

To run a SpeedFlex performance test on an AP:

1. Expand the **Access Points** screen, and select the AP you want to test from the list of APs on the left side.
2. Click **Show System Overview** to expand the AP overview screen.

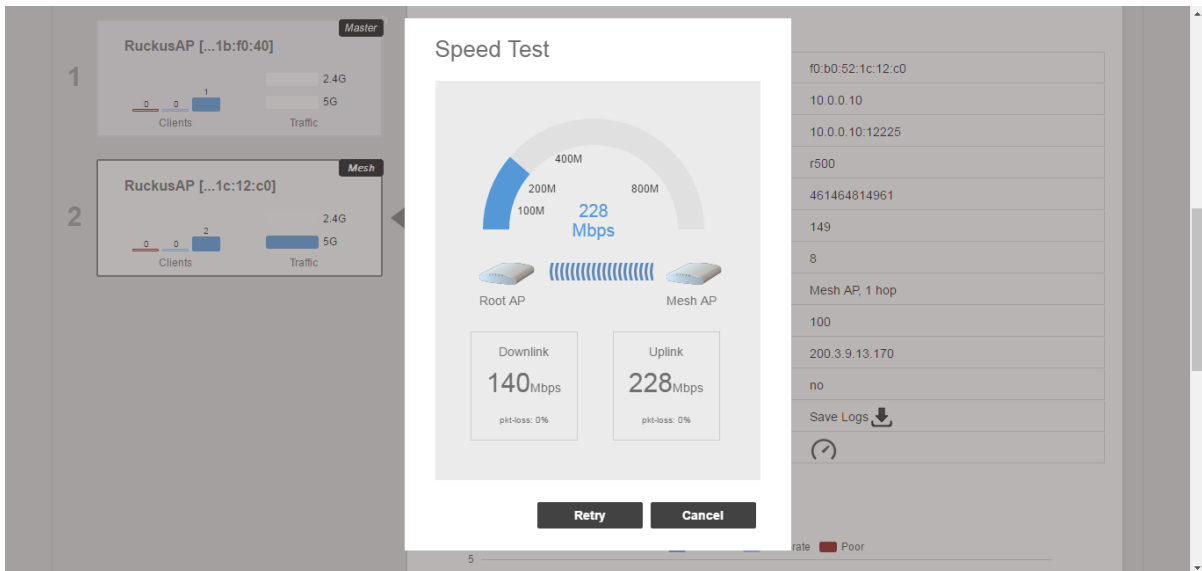
- Click the **Speed Test** icon.

**FIGURE 109** Click Speed Test icon



- Once the test is complete, the uplink/downlink results are displayed, along with packet loss percentages.

**FIGURE 110** SpeedFlex test results



## Configuring an Individual AP

To configure a specific AP, go to **Dashboard > Access Points**, click on the AP you want to configure, and click **Edit**.

FIGURE 111 Click Edit to configure an AP

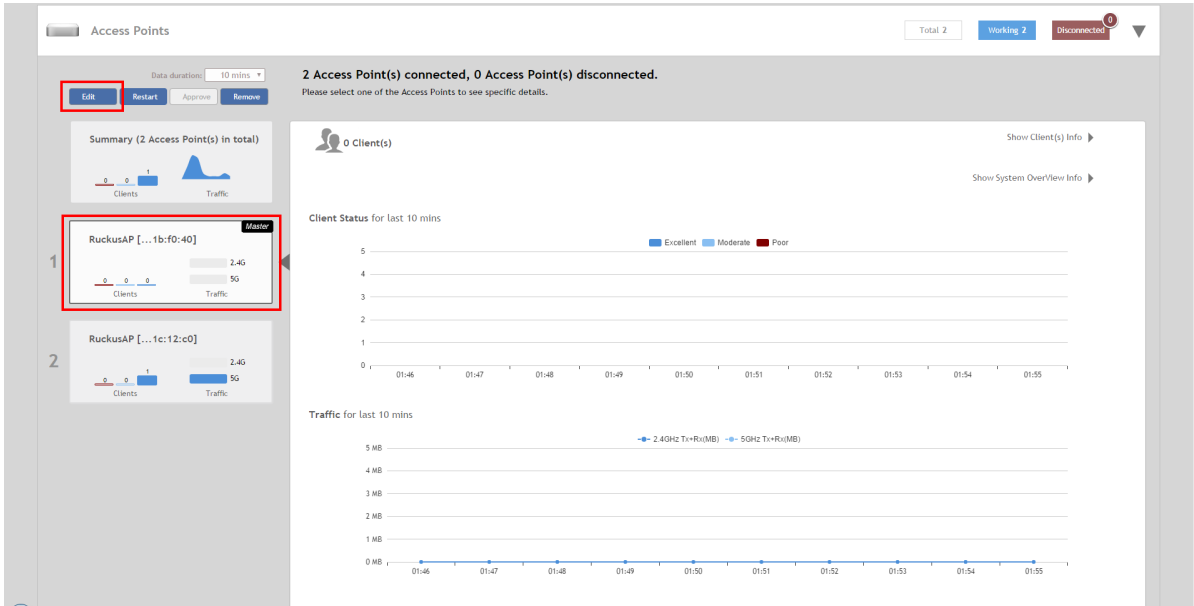
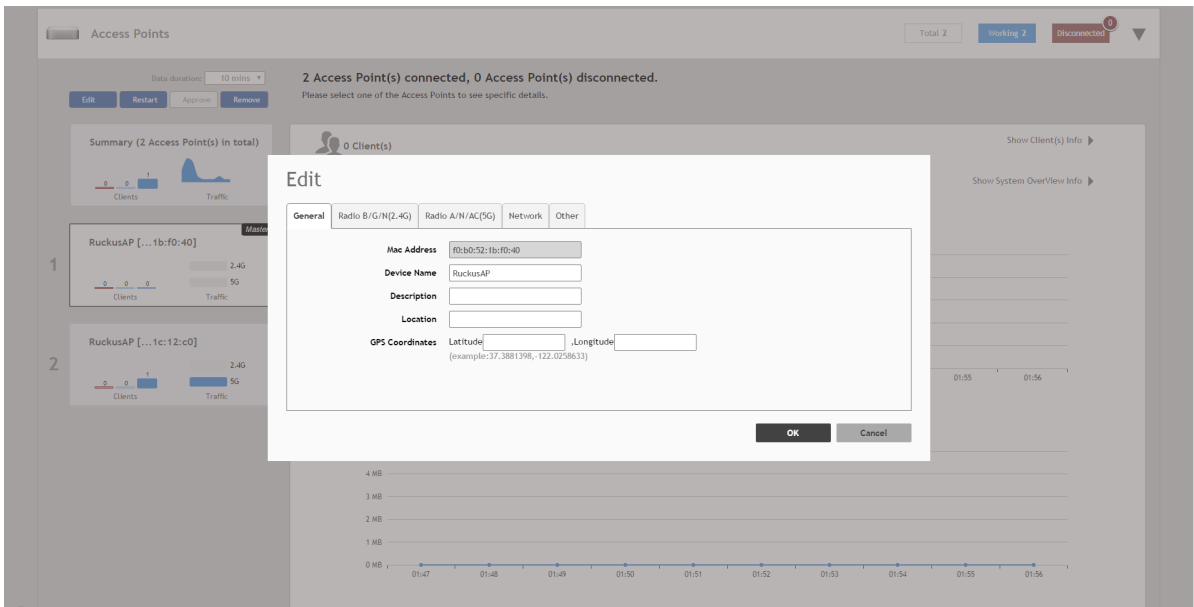


FIGURE 112 Editing an AP's configuration settings



In general, the settings available on the individual AP's **Edit** screens are the same as those for global AP settings (see [Configuring Global AP Settings](#) on page 160). Configuring these settings for an individual AP overrides the global AP settings.

However, some settings are only configurable on a per-AP basis, as follows:

- **General:** Configure the AP's Device Name, Description, Location and GPS Coordinates.
- **Radio B/G/N (2.4G):** Enable/disable WLAN service for this radio.
- **Radio A/N/AC (5G):** Enable/disable WLAN service for this radio.

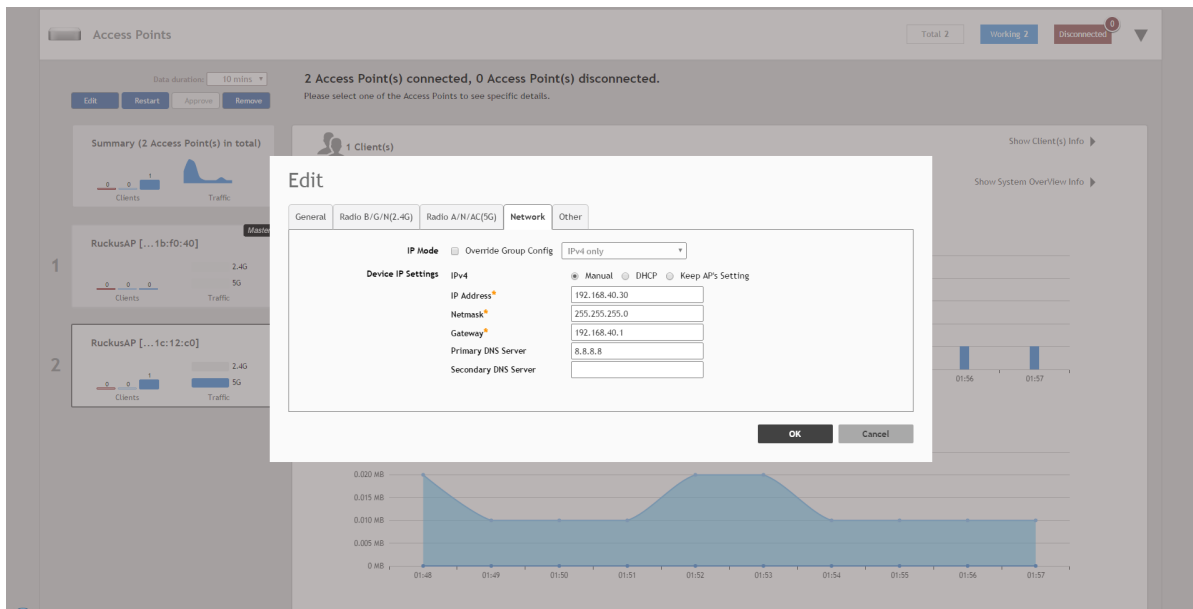
- **Network:** Configure a manual (static) IP address, or allow the AP to obtain an IP address using DHCP.

**NOTE**

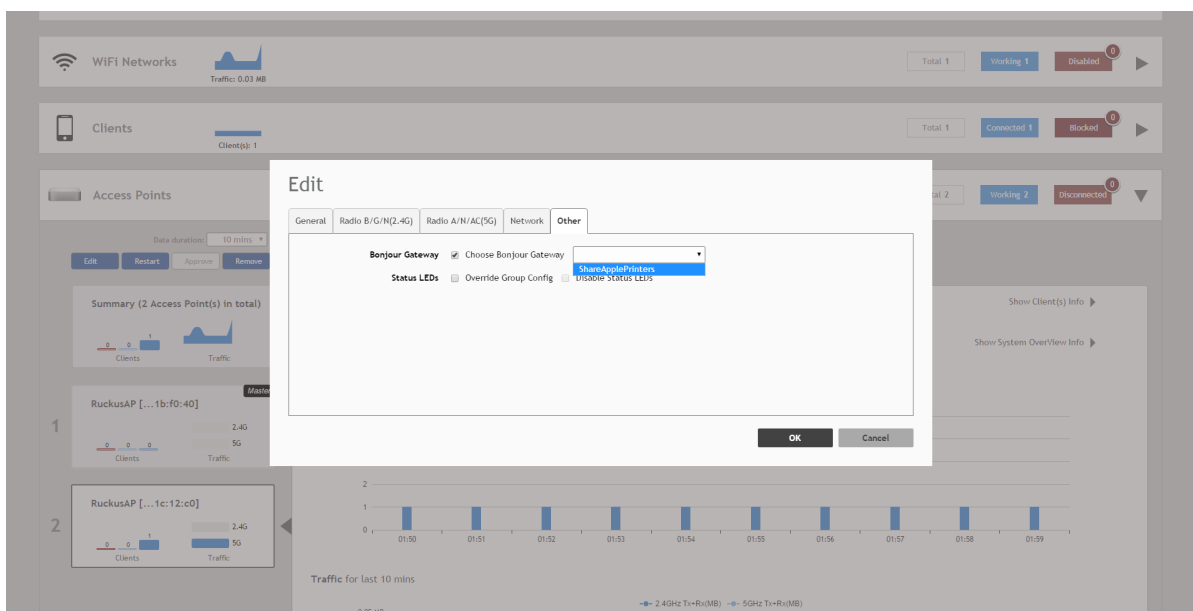
For the current Unleashed Master AP, you cannot configure the IP address settings here. You must go to **Admin & Services > System > Device IP Settings** to change the Master's IP settings.

- **Other:** Designate this AP to serve as a Bonjour Gateway AP (See [Bonjour Gateway](#) on page 224), or enable/disable the AP's Status LEDs.

**FIGURE 113** Configure an AP with a static IP address from the AP's Edit > Network tab



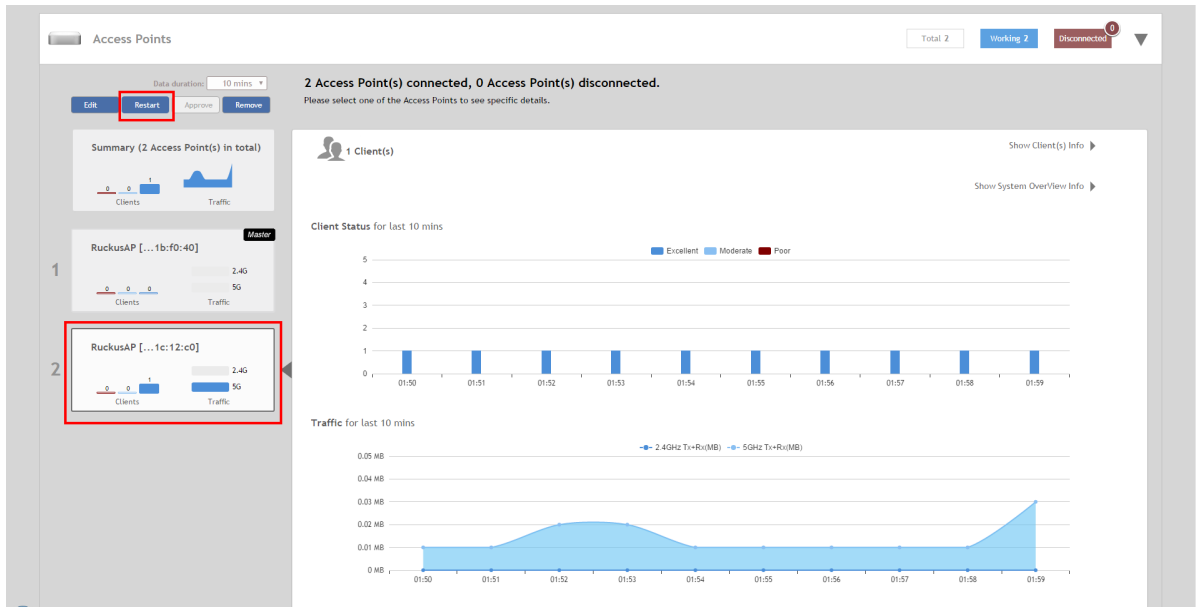
**FIGURE 114** Bonjour Gateway service and Status LED configuration



# Restarting an AP

To restart an AP, expand the Access Points section, click the AP's box on the left side, then click **Restart**.

**FIGURE 115** Click Restart to reboot a single AP



## NOTE

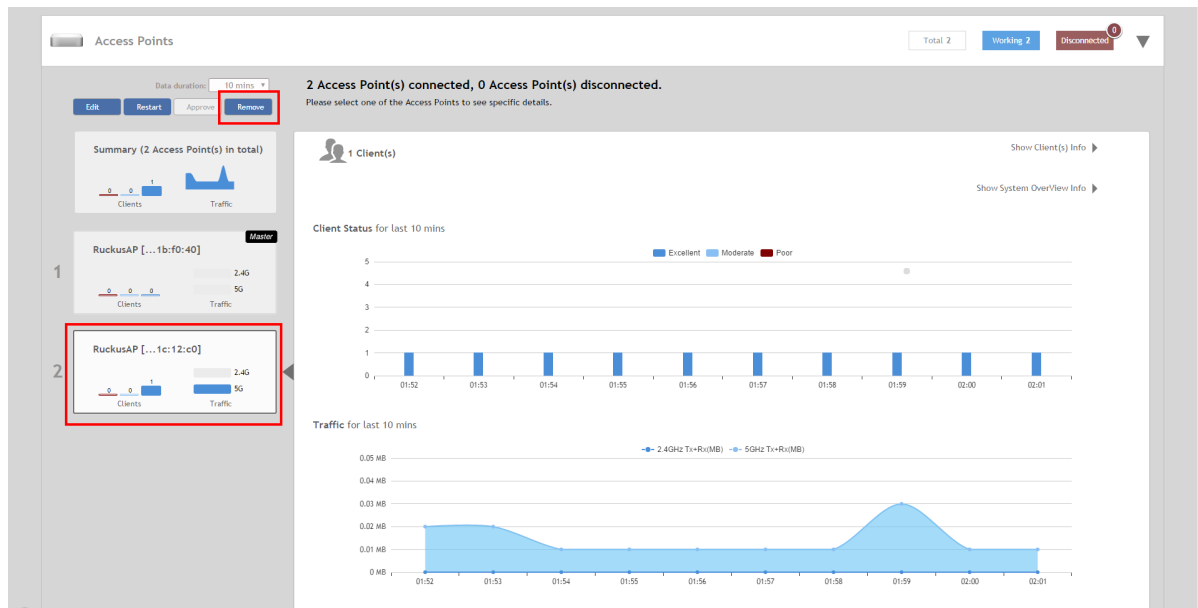
Restarting the Unleashed Master AP will prompt you to click **OK** to confirm, as the network will experience a brief service interruption during the restart process. Additionally, restarting the Master AP will force another AP to assume the role of Master (when more than one Unleashed AP exists on the network).

# Removing an AP

To remove a member AP from the Unleashed network, expand the Access Points section, click the AP's box on the left side, then click **Remove**.

Once removed, the **Approve** button becomes available. Click **Approve** to allow the AP to rejoin the Unleashed network.

FIGURE 116 Removing an AP







# Working with Clients

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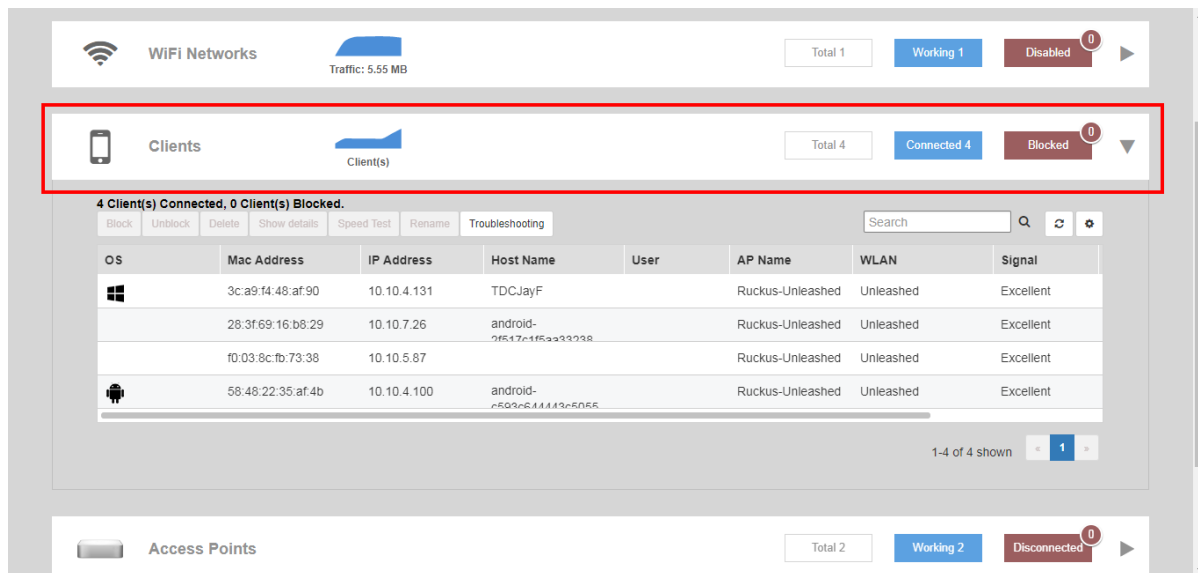
## Client Management Overview

The Unleashed Admin Interface provides tools for monitoring and managing wireless clients, including blocking and deleting client devices, viewing an overview of client traffic, and drilling down into details about a specific client's connection status and traffic statistics.

## Viewing the Clients List

To view a list of currently connected wireless clients, expand the **Clients** section on the **Dashboard**.

**FIGURE 117** Viewing the currently connected Clients list



The clients list displays the number of connected and blocked clients, along with a table that lists the details on the client such as its MAC address, IP address, OS, Hostname, User, connected AP, WLAN, and Signal level indicator.

To view additional details about a specific client, enable the check box next to the client's MAC address and click **Show Details**.

FIGURE 118 Click Show Details to view client details

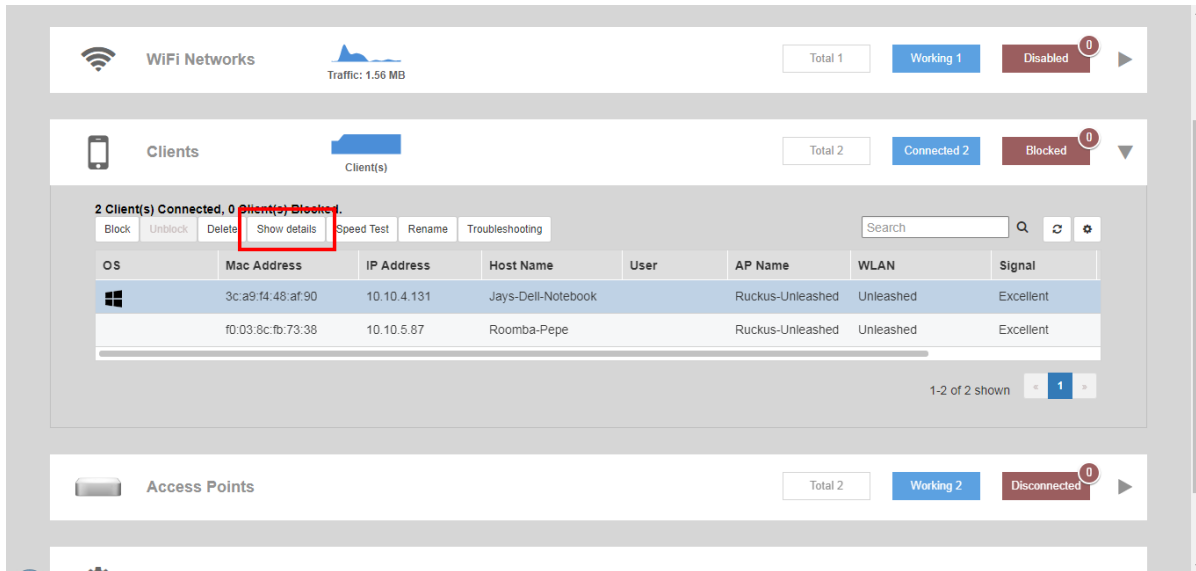
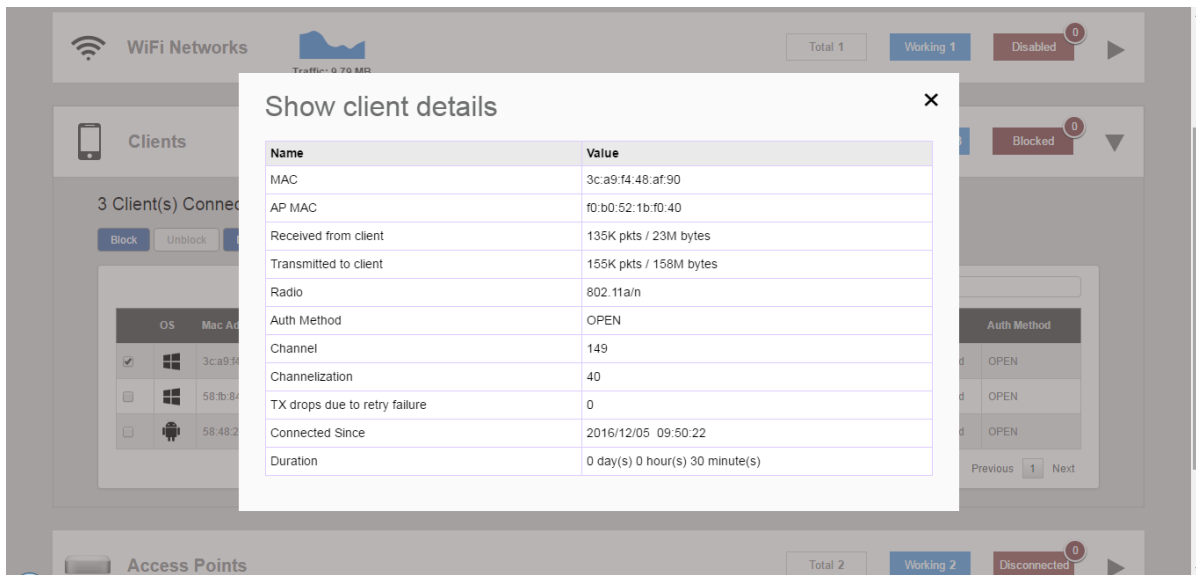


FIGURE 119 Viewing details on a specific client



## Running a SpeedFlex Performance Test on a Wireless Client

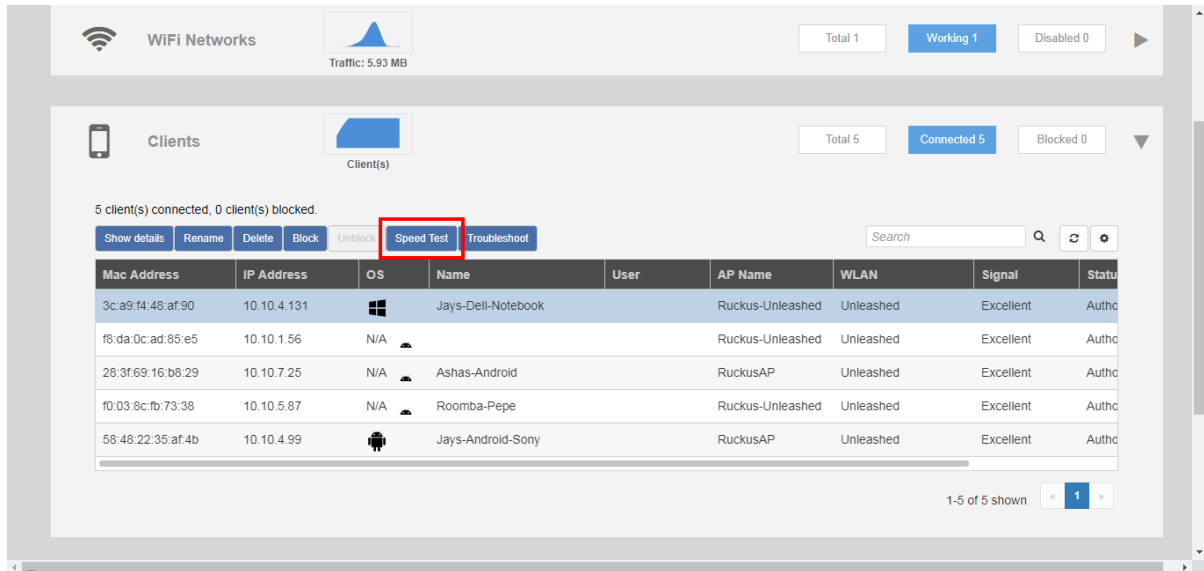
You can test the wireless throughput to a client using the SpeedFlex tool.

To do so, you will need to install and run the SpeedFlex application on the client device.

1. Expand the **Clients** menu.

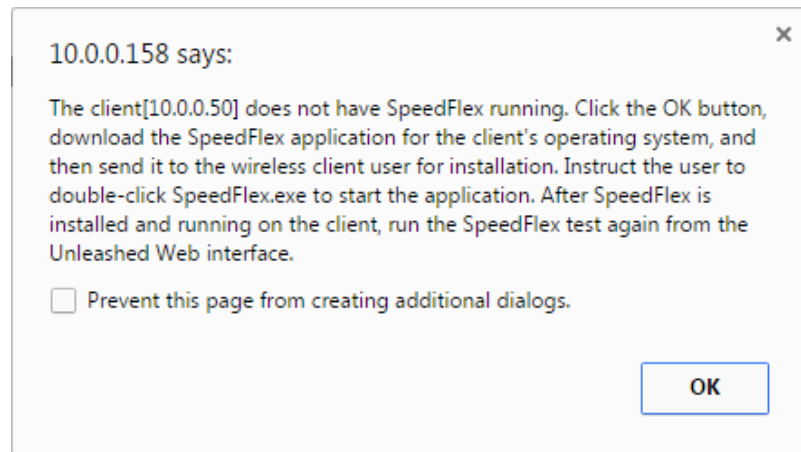
2. Select a client device from the list and click **Speed Test**.

**FIGURE 120** Select a client and click Speed Test



3. A Speed Test dialog appears. Click **Start** to begin.
4. If the SpeedFlex application is not already running on the client, follow the instructions to install and run the application on your client device.

**FIGURE 121** The client does not have SpeedFlex running



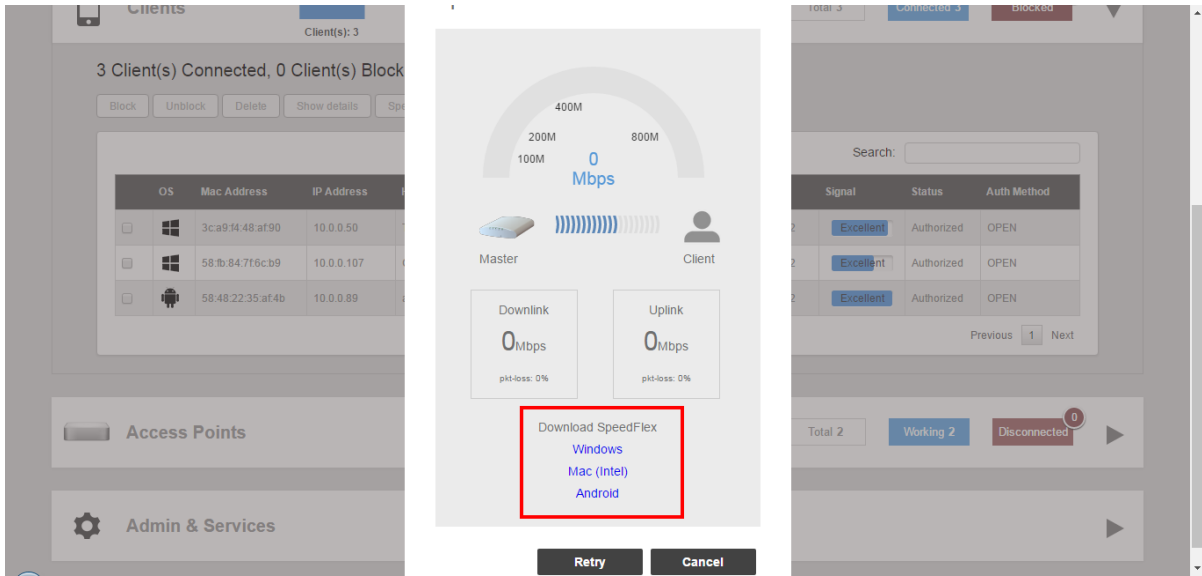
## Working with Clients

### Running a SpeedFlex Performance Test on a Wireless Client

5. Download the SpeedFlex application for your Operating System. Choices are:

- Windows
- Mac (Intel)
- Android

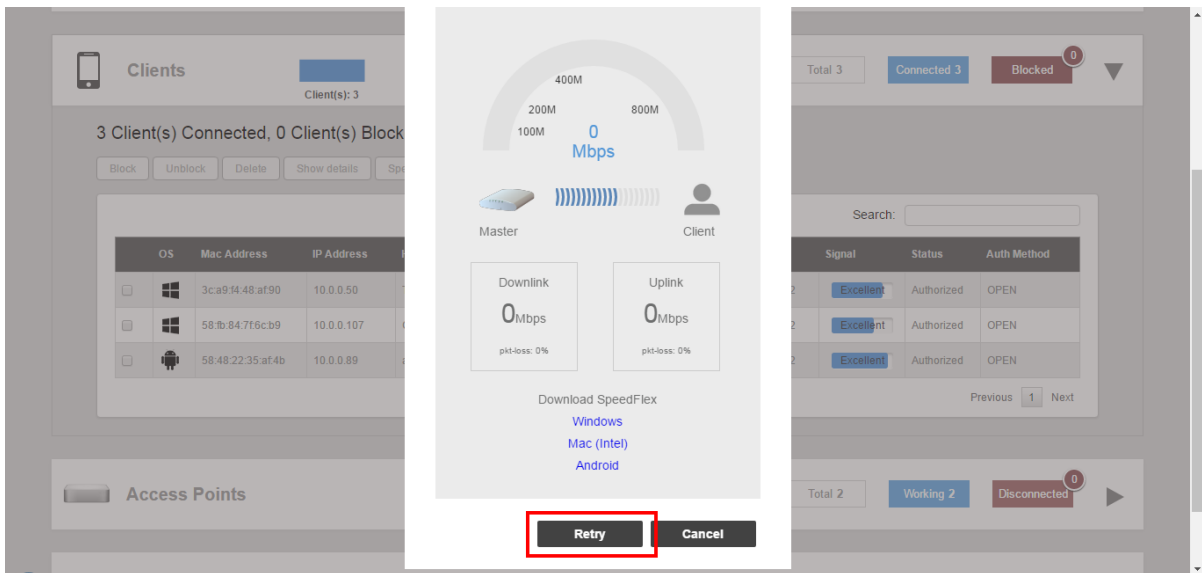
**FIGURE 122** Download SpeedFlex



6. Install and run the application.

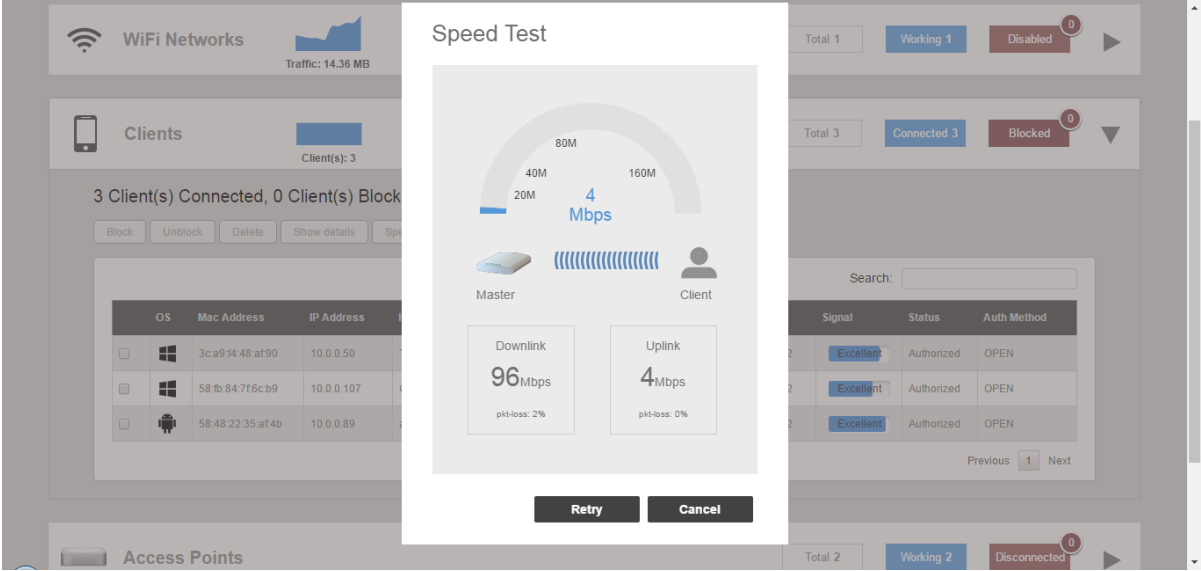
7. With the application running, click **Retry**.

**FIGURE 123** Click Retry



- 8. When the test is complete, the average Downlink and Uplink speed results are displayed along with packet loss percentages.

FIGURE 124 SpeedFlex results



# Renaming a Client

Unleashed collects client host names from the client's operating system and displays them in client lists, tables and charts on the web interface. However, often the host names provided by the OS are not very useful in identifying clients on the network.

Entering a custom host name manually via the web interface is one way to address this issue.

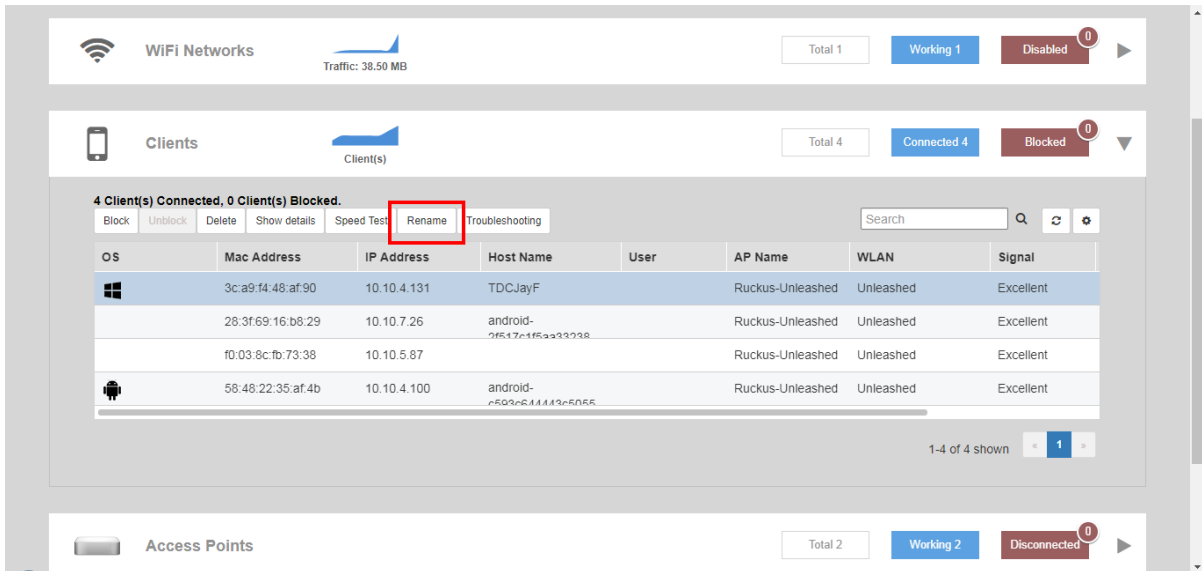
Any renamed clients will be displayed using the new name whenever they are online. The maximum number of marked clients is 520. When this max is reached, Unleashed will delete the oldest renamed offline stations, 10 stations at a time, and trigger an alarm event to indicate the renamed stations have been deleted.

To rename a connected wireless client:

- 1. Open the **Clients** component, and select the client you want to rename from the list.

2. Click **Rename**.

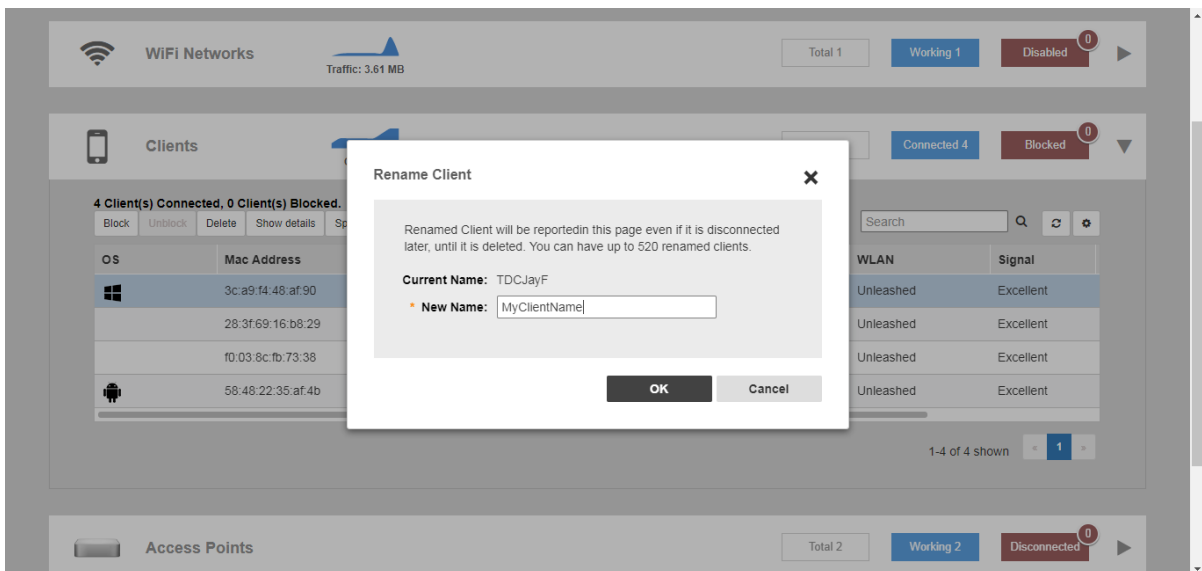
**FIGURE 125** Rename a client



The *Rename Client* dialog appears.

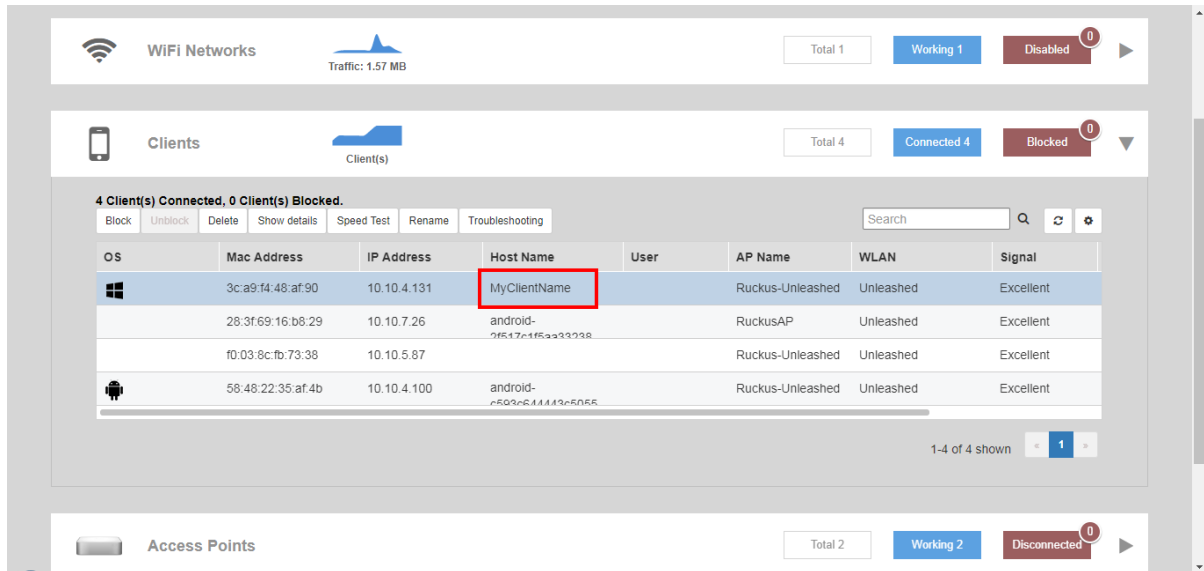
3. Enter the **New Name**, and click **OK**.

**FIGURE 126** Enter new client name



- The new client name now appears in clients lists in the *Host Name* column.

**FIGURE 127** New name appears in Host Name



## Client Connection Troubleshooting

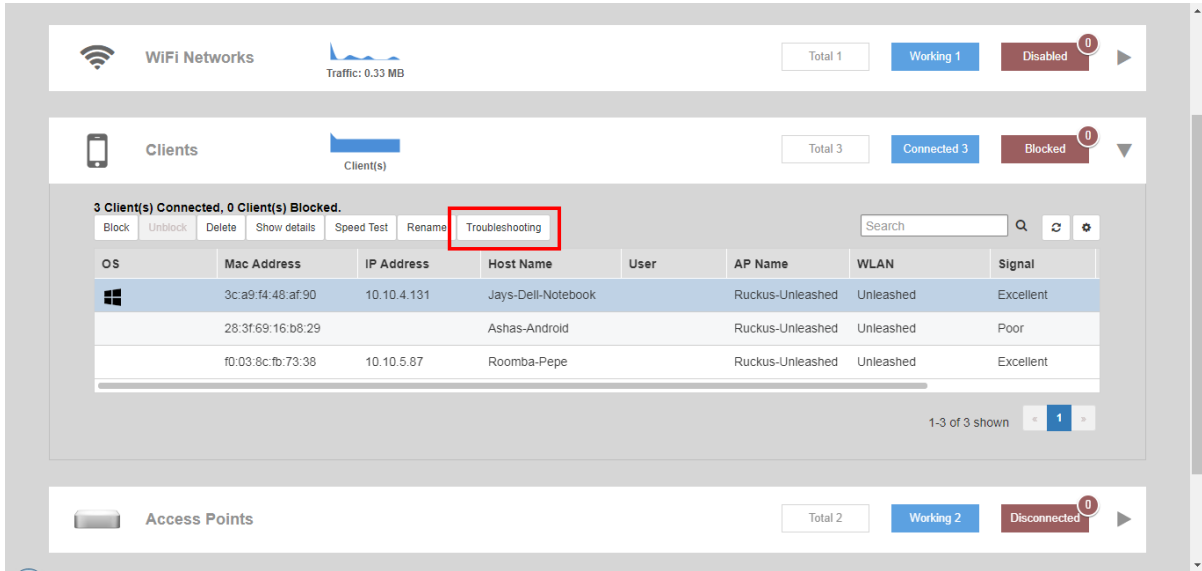
The client connectivity trace feature is designed to help customers diagnose wireless client connection issues to determine why a client fails to connect to the wireless network.

To perform a client connectivity trace:

- Open the **Clients** section, and select the problematic client from the list.

2. Click **Troubleshooting**.

**FIGURE 128** Click Troubleshooting to perform client connectivity trace

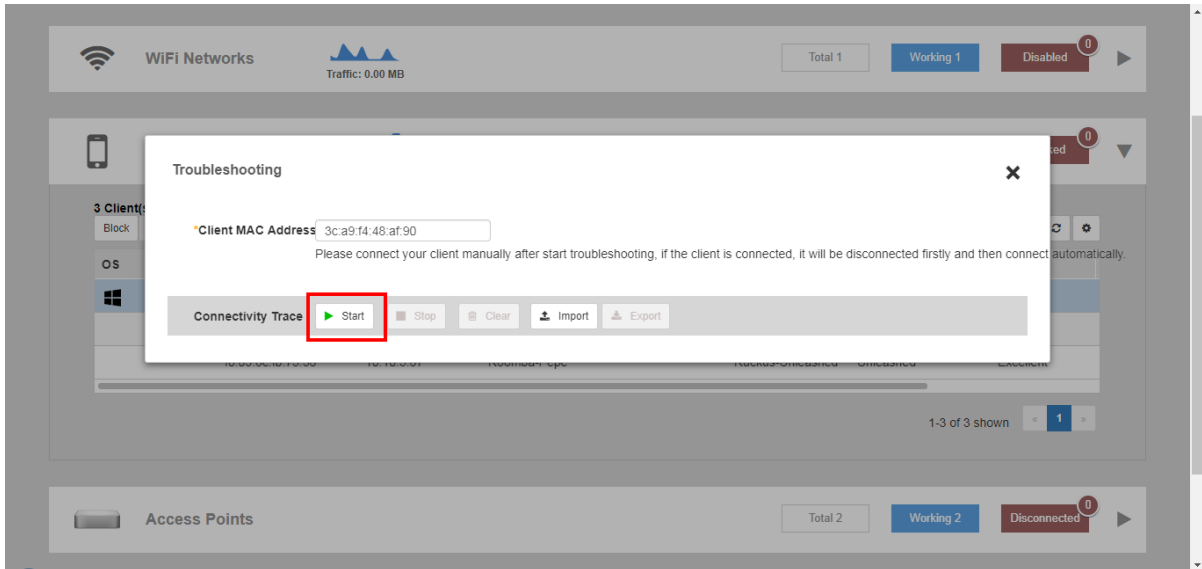


The *Troubleshooting* screen appears.

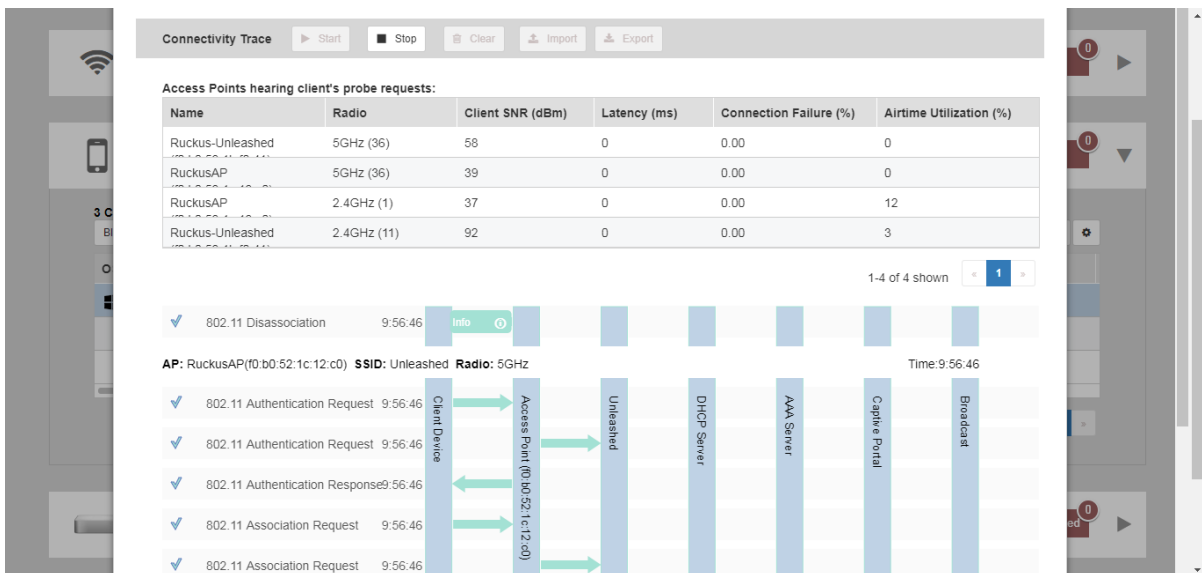


- In *Connectivity Trace*, click the **Start** button to begin. The association trace begins. The page refreshes to display detailed results.

**FIGURE 129** Click Start to begin connectivity trace



**FIGURE 130** Connectivity trace in progress

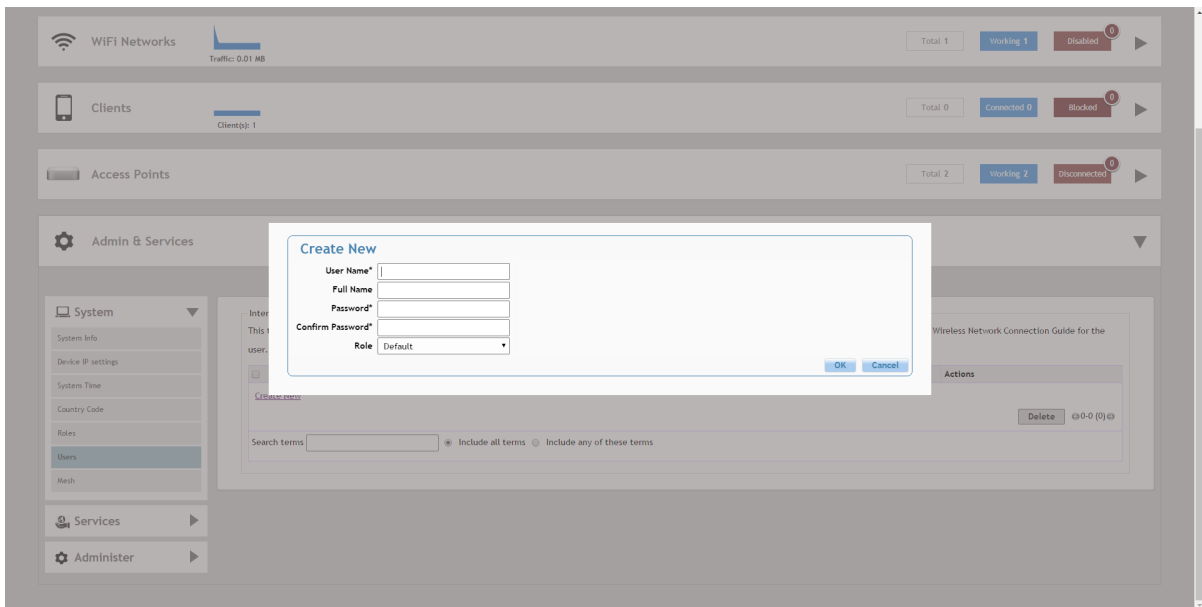


- Examine the results to isolate the problematic step in the process.
- If needed, you can download the client connectivity data to a file, which can later be imported for analysis. Click **Export** to download the data file and save it to your local computer. Click **Import** to import a previously exported file back into Unleashed.

## Adding Client Accounts to the Internal User Database

1. Go to **Admin & Services > System > Users** and click **Create New**.
2. Enter a **User Name**, optional **Full Name**, **Password**, **Confirm Password**, and select a **Role** for this user.
3. Click **OK** to create the new user.

FIGURE 131 Creating a new User on the Internal User Database



## Authenticating Clients Using an External Database

In addition to the Internal User Database, Unleashed also supports authenticating clients using an external authentication server.

To enable this feature, you must first create an "AAA Server" entry, and then apply the AAA server to one or more WLANs with external authentication enabled. Unleashed supports the following types of external authentication servers:

- Microsoft Active Directory
- RADIUS

For more information on configuring AAA servers, see [AAA Servers](#) on page 211.

# Configuring Admin & Services Settings

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- [Configuring System Settings](#)..... 183
- [Mesh Networking](#)..... 201
- [Services](#).....210
- [Administration Settings](#)..... 243

## Admin & Services Overview

The **Admin & Services** settings provide tools for use in managing many of the "under the hood" features of your Unleashed deployment.

These options allow you to configure system settings such as system name and IP address, services such as Bonjour Gateway, Application Recognition, Guest Access and Hotspot, and admin settings such as admin user name and password, diagnostics and network management options.

The Admin & Services component is divided into the following sub-components:

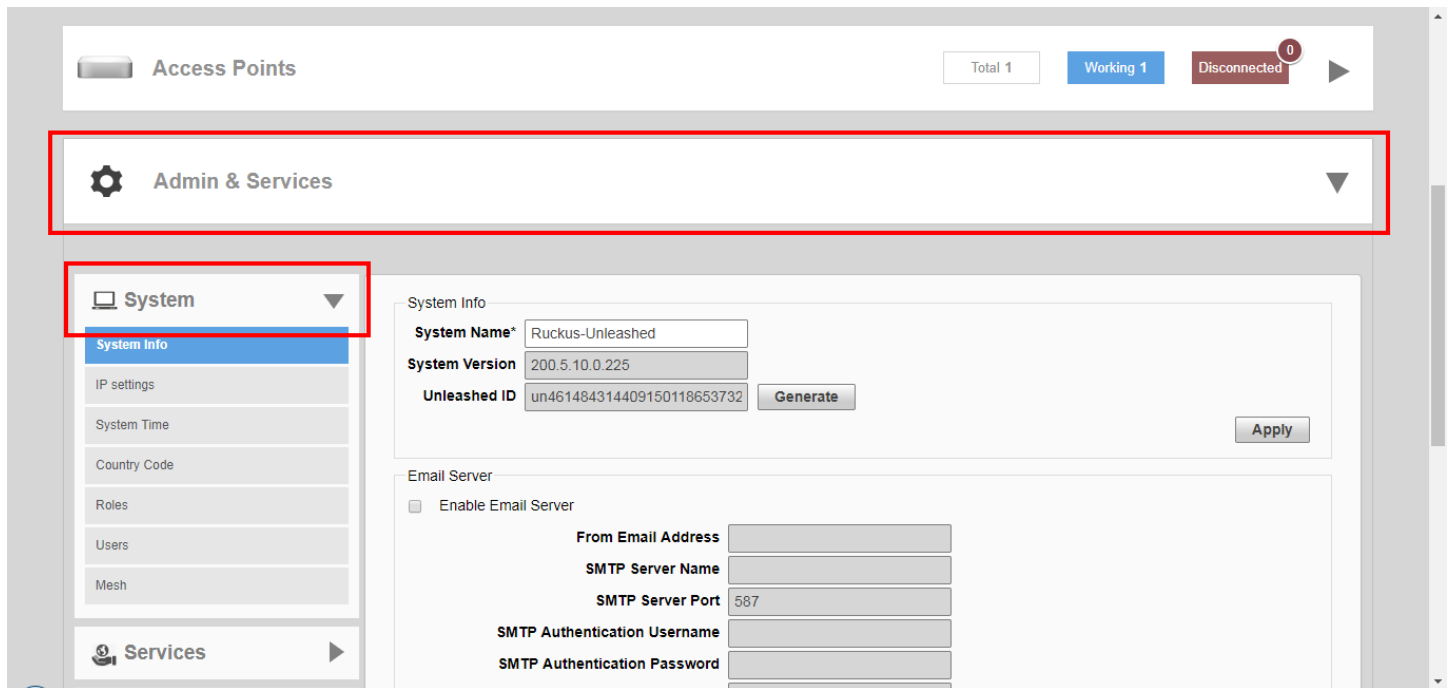
- [Configuring System Settings](#) on page 183
- [Services](#) on page 210
- [Administration Settings](#) on page 243

## Configuring System Settings

System settings include options for changing the system name, IP address, time zone, country code and internal database users.

To configure system settings, click **Admin & Services > System**. The menu expands to display additional options under the **System** tab.

**FIGURE 132** Click Admin & Services, and expand the System tab to configure system settings



## Changing the System Name

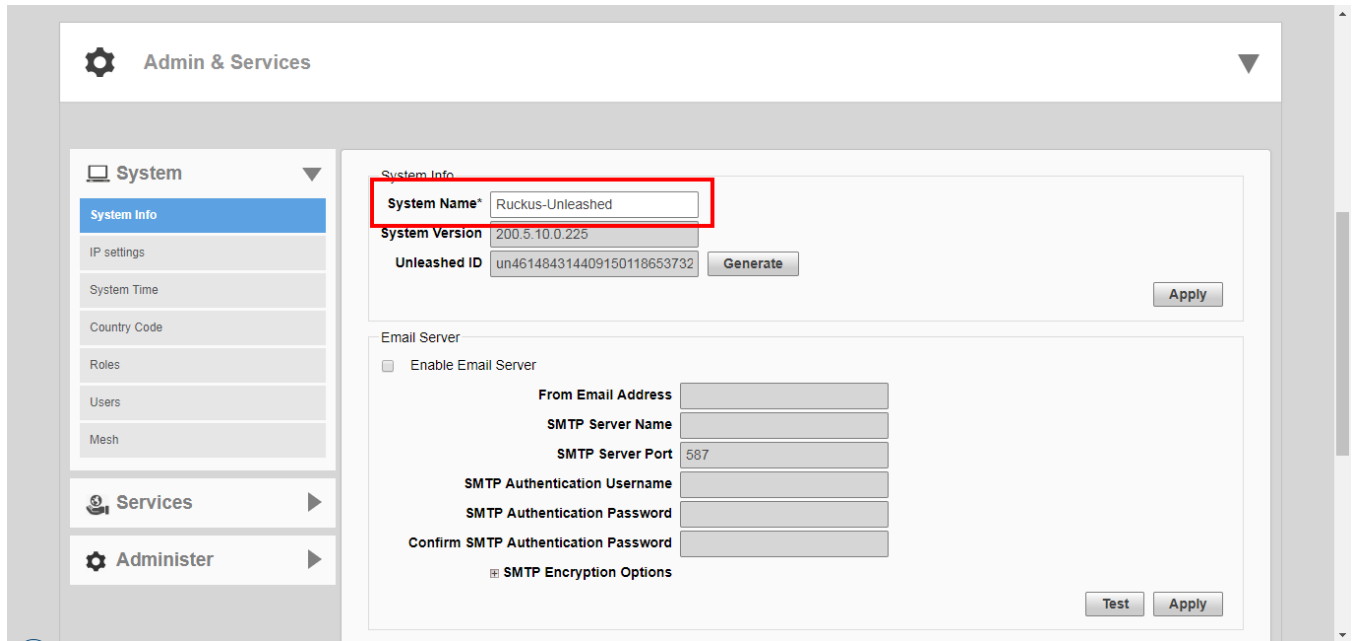
The **System Info** page displays the current system firmware version and provides an option to reconfigure the system name.

To change the system name:

1. Go to **Admin & Services > System > System Info**.
2. In **System Name**, delete the text, and then type a new name. The name should be between 1 and 32 characters in length, using letters, numbers, underscores (\_) and hyphens (-). Do not use spaces or other special characters. Do not start with a hyphen (-) or underscore (\_). System names are case sensitive.

3. Click **Apply** to save your settings. The change goes into effect immediately.

**FIGURE 133** The System Info page displays the firmware version and system name



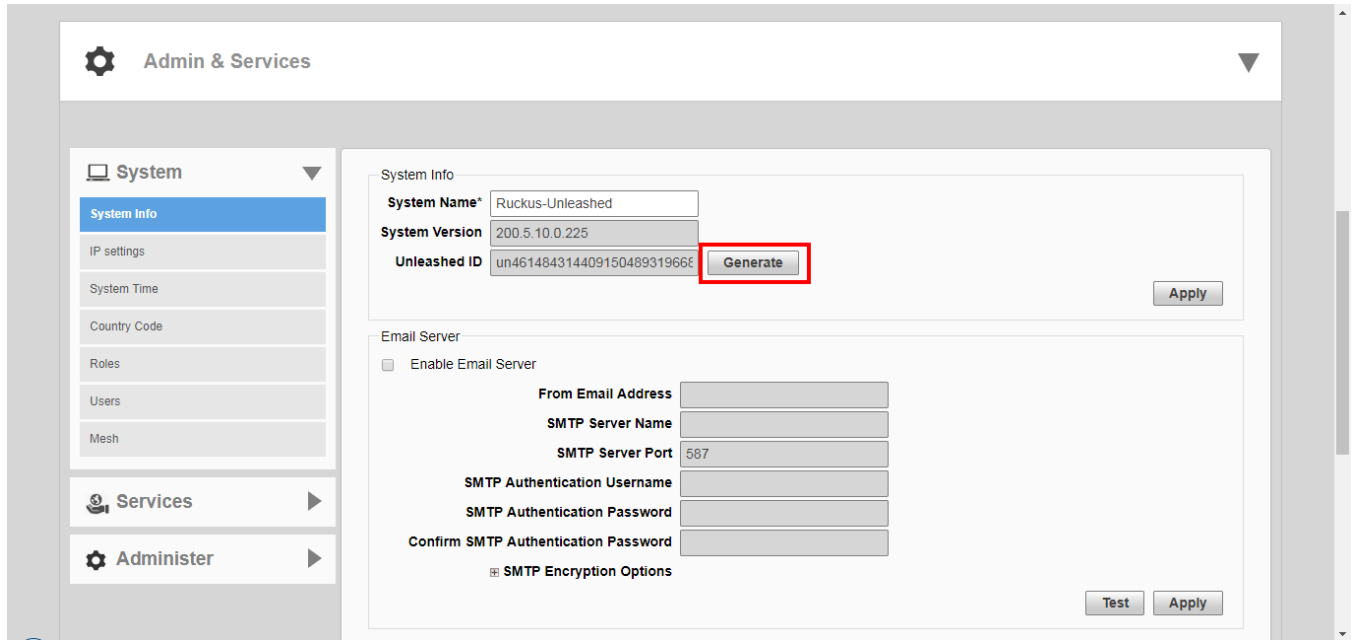
## Generating an Unleashed ID

The Unleashed ID uniquely identifies each Unleashed network for use in remote management via either the Unleashed Mobile App or the Unleashed Multi-Site Manager.

1. Go to *Admin & Services > System > System Info*.
2. Click the *Generate* button next to Unleashed ID.

3. A new ID number appears in the Unleashed ID field. You can now use this number for remote management of this Unleashed network using the Unleashed Mobile App or Unleashed Multi-Site Manager.

**FIGURE 134** Generating a new Unleashed ID for use in remote management



## Configuring Email and SMS Settings

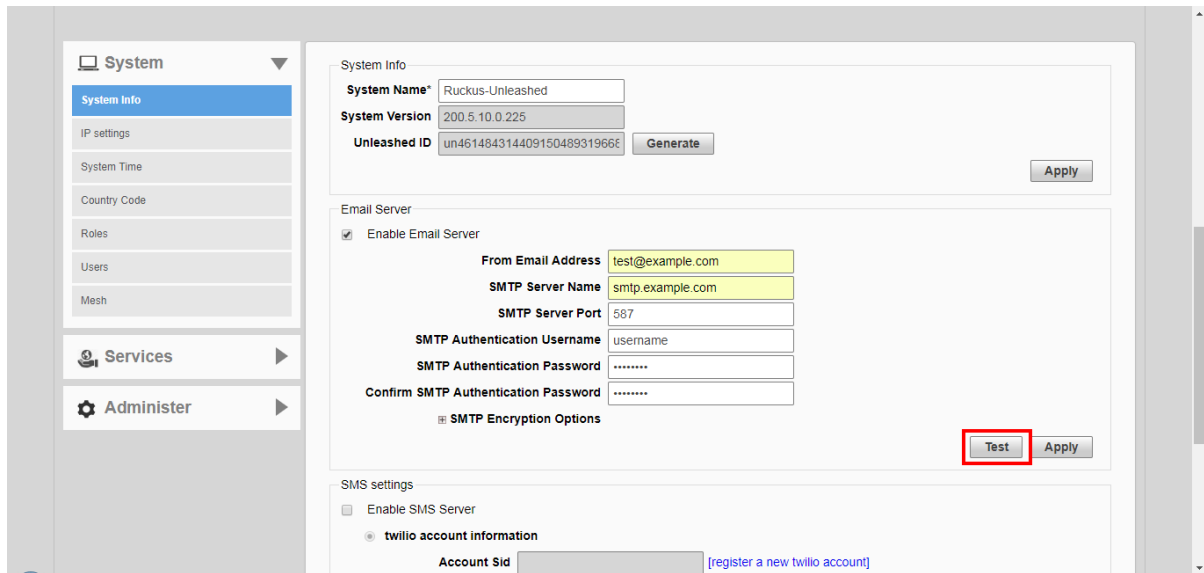
In order for Unleashed to send guest pass codes to guest users via email and/or SMS, it needs to have an email server or SMS server information configured.

To configure email and SMS server settings:

1. Go to **Admin & Services > Services > System Info**.
2. In the **Email** tab, enable the **Enable Email Server** check box, and then enter the following:
  - **From email address:** Type the email address from which Unleashed will send email messages.
  - **SMTP Server name:** Type the full name of the server provided by your ISP or mail administrator. Often, the SMTP server name is in the format smtp.company.com.
  - **SMTP Server port:** Type the SMTP port number provided by your ISP or mail administrator. Often, the SMTP port number is 25 or 587. The default SMTP port value is 587.
  - **SMTP Authentication username:** Type the user name provided by your ISP or mail administrator. This might be just the part of your email address before the @ symbol, or it might be your complete email address. If you are using a free email service (such as Hotmail or Gmail), you typically have to type your complete email address.
  - **SMTP Authentication password:** Type the password that is associated with the user name above.
  - **Confirm SMTP Authentication password:** Retype the password you typed above to confirm.
  - **SMTP Encryption Options:** If your mail server uses TLS encryption, click the SMTP Encryption Options link, and then select the TLS check box. Additionally, select the STARTTLS check box that appears after you select the TLS check box. Check with your ISP or mail administrator for the correct encryption settings that you need to set.

- To verify that Unleashed can send email messages using the SMTP settings you configured, click the **Test** button.
  - If Unleashed is able to send the test message, the message `Success!` appears at the bottom of the Email Notification page.
  - If Unleashed is unable to send the test message, the message `Failed!` appears at the bottom of the Email Notification page. Go back to the previous step, and then verify that the SMTP settings are correct.
- Click **Apply**. The email notification settings you configured become active immediately.

**FIGURE 135** Email Server settings



- Configure SMS delivery as described in *Delivering Guest Passes via SMS*.

## Configuring Device IP Address Settings

If you need to update the IP address and DNS server settings of your Unleashed Master AP, follow the steps outlined below.

### NOTE

As soon as the IP address has been changed (applied), you will be disconnected from your web interface connection to the Unleashed Master AP. You can log into the web interface again by using the new IP address in your web browser.

To change the IP address settings:

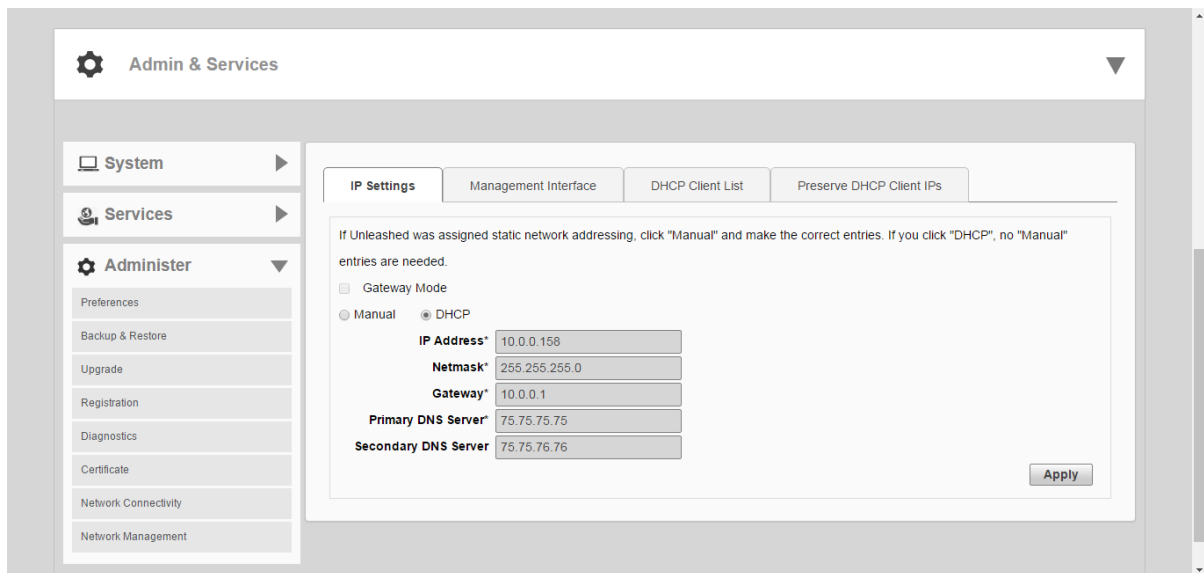
- Go to **Admin & Services > System > IP Settings**.
- Review the **IP Settings** options.

### NOTE

Gateway mode can only be enabled using the Setup Wizard. If you want to enable Gateway mode, you must factory reset the AP and enable it during the initial configuration. See [Gateway Mode](#) on page 188.

3. Select one of the following:
  - **Manual:** If you select Manual, enter the correct information in the now-active fields (IP Address, Netmask, and Gateway are required).
  - **DHCP:** If you select DHCP, no further information is required. The Unleashed Master will obtain an IP address automatically.
4. Click **Apply** to save your settings. You will lose connection to the Unleashed Master.
5. To log back into the web interface, use the newly assigned IP address in your web browser or use the UPnP application to rediscover the Unleashed Master AP.

**FIGURE 136** Configuring device IP address settings



## Gateway Mode

An Unleashed AP must have at least two Ethernet ports to support Gateway mode.

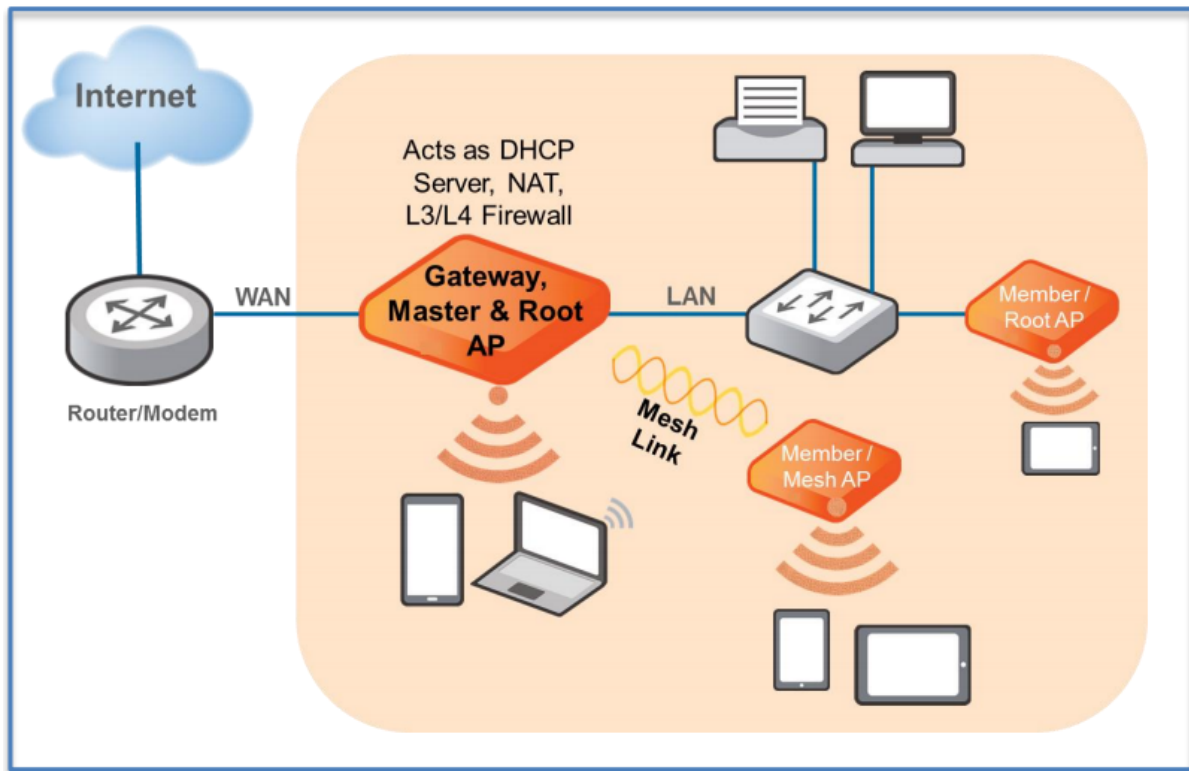
### NOTE

Gateway mode can only be configured during the initial Unleashed Master AP setup wizard process. Once enabled, it cannot be disabled without factory resetting the Master AP.

Gateway mode provides a solution for SMB customers who need to provide private addresses for clients and do not have an existing gateway router, or who connect to their ISP over PPPoE. Enable Gateway mode to provide Network Address Translation (NAT) and DHCP functionality to assign private IP addresses to member APs and clients.



**FIGURE 137** Gateway mode topology



Gateway functionality can be restored with minimum user intervention when a Gateway Master AP is out of service. If the Gateway Master AP goes down, simply replace it with one of the member APs and connect the uplink Ethernet cable to the WAN port, and the member AP will become the new gateway.

If the gateway recovery mechanism does not work, you can still access the new Master AP's web UI to configure it manually.

### Configuring Gateway Mode

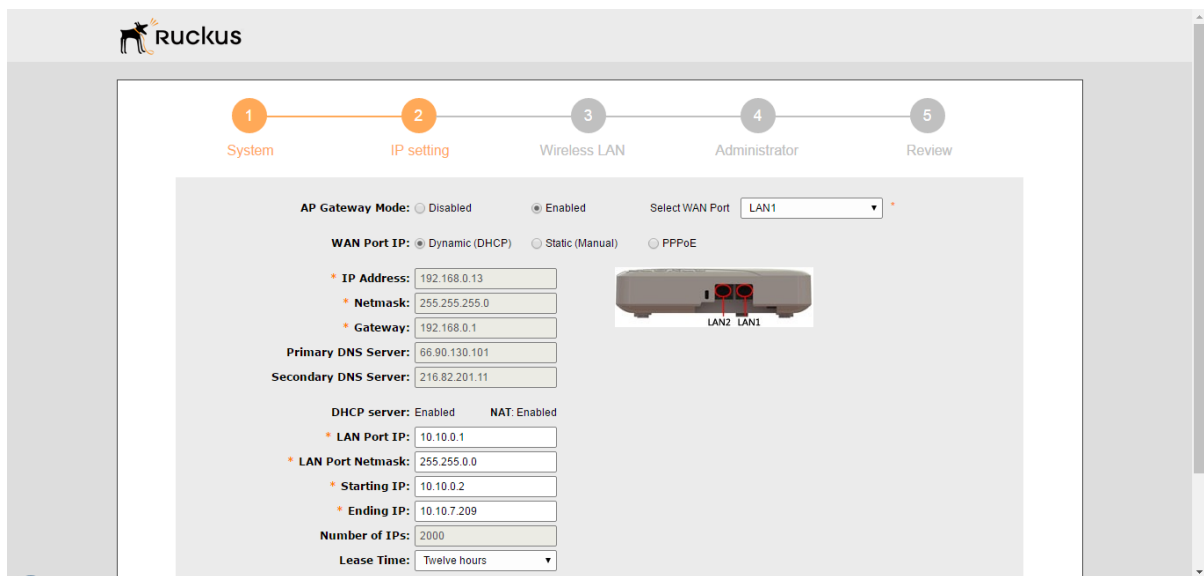
The Unleashed Master AP must be in factory default state to enable Gateway mode, and Gateway mode can only be configured during the Setup Wizard.

To configure the Unleashed Master AP as a Gateway:

1. In factory default state, connect to the Unleashed Master AP and perform the initial setup as described in [Step 2b: Setup Using a Web Browser](#) on page 77.
2. On the second wizard screen, **Management IP**, in **Gateway Mode**, select **Enabled**.
3. Designate which port will be the WAN (uplink) port. The Gateway AP must have at least two Ethernet ports. Use the AP illustration below to identify which port is LAN1 and LAN2 on the AP, and select the relevant port from the **Select WAN Port** list.

4. Configure how the WAN (uplink) port obtains its IP address:
  - **Dynamic (DHCP):** When Dynamic is selected, the WAN port is assigned an IP address automatically.
  - **Static (Manual):** When Static is selected, enter an **IP Address**, **Netmask** and **Gateway** address in the required fields, and optionally enter primary/secondary DNS server addresses.
  - **PPPoE:** When PPPoE is selected, enter the **PPPoE Username** and **PPPoE Password** in the fields provided.
5. Configure local subnet settings for the LAN port:
  - **LAN Port IP:** Enter the IP address for the LAN port.
  - **LAN Port Netmask:** Enter the Netmask.
  - **Starting IP:** Enter the first IP address that will be issued in this scope.
  - **Number of IPs:** Enter the total number of addresses in this scope.
  - **Lease Time:** Select a duration for IP address lease time from the list.
6. Click **Next**, and continue to complete the setup wizard. Once setup is complete, the gateway AP will begin providing DHCP and NAT service for clients, and clients will be assigned IP addresses from the DHCP scope that you configured.

FIGURE 138 Gateway mode



## Gateway Mode Limitations and Considerations

There are several important limitations and factors to consider when enabling Gateway mode.

- The Master AP acts as the Gateway for both wired and wireless clients.
- The Gateway AP provides IP addresses and performs NAT functions in addition to serving as the Unleashed Master and servicing wireless clients. For this reason, it is preferable to use an AP with higher CPU/memory resources, especially Wave 2 APs (e.g., R510 or R710) as the Gateway AP, if possible.
- All Unleashed AP models support Gateway mode. If your network's WAN bandwidth is higher than 100 Mbps, we recommend using our 802.11ac Wave 2 APs, such as R510, R610, R710, etc., to enjoy the fastest Internet access experience.
- No VLAN support.

- When Mesh functionality is enabled in Gateway mode, if the WAN IP address is obtained via PPPoE, the Master AP cannot support Mesh. Any member AP can be a Root AP or Mesh AP.
- The WAN and LAN IP addresses should be in different IP subnets, and the IP address ranges should not overlap.
- Bonjour Gateway is not supported in Gateway mode (no VLANs).
- If Gateway mode is enabled, redundancy is disabled. If the Master (Gateway) AP goes offline for any reason, a member AP will not be able to take over and become the new Master.

## DHCP Server

Unleashed provides a built-in DHCP server that you can enable to assign IP addresses to devices that are connected to the Unleashed network. The internal DHCP server will only assign addresses to devices that are on its own subnet and part of the same VLAN.

Note that before you can enable the built-in DHCP server, the Unleashed Master AP must be assigned a manual (static) IP address. If you configured Unleashed to obtain its IP address from another DHCP server on the network, the options for the built-in DHCP server will not be visible on the Services page.

To configure the built-in DHCP server:

1. Go to **Admin & Services > Services > DHCP Server**.
2. Select the **Enable DHCP Server** check box.
3. In **Starting IP**, type the first IP address that the built-in DHCP server will allocate to DHCP clients. The starting IP address must be on the same subnet as the IP address assigned to Unleashed. If the value that you typed is invalid, an error message appears and prompts you to let Unleashed automatically correct the value. Click **OK** to automatically correct the entry.
4. In **Number of IPs**, type the maximum number of IP addresses that you want to allocate to requesting clients. The built-in DHCP server can allocate up to 512 IP addresses including the one assigned to the Unleashed Master AP. The default value is 200.
5. In **Lease Time**, select a time period for which IP addresses will be allocated to DHCP clients. Options range from six hours to two weeks (default is one week).
6. Click **Apply**.

### NOTE

If you typed an invalid value in any of the text boxes, an error message appears and prompts you to let Unleashed automatically correct the value. Click **OK** to change it to a correct value.

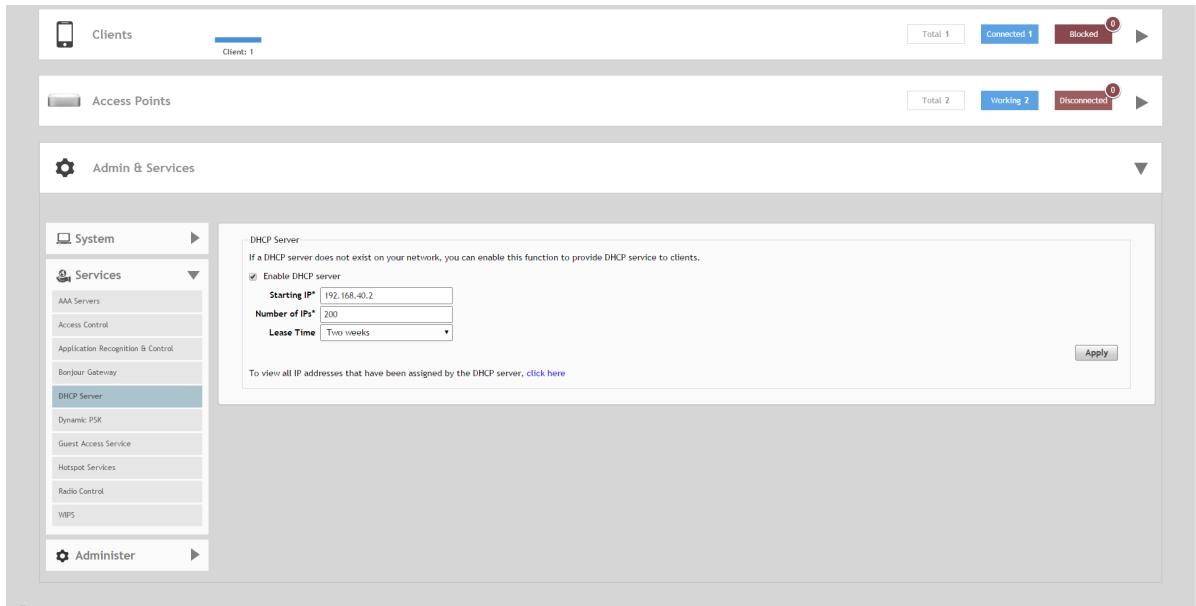
### NOTE

Ruckus recommends that you only enable the built-in DHCP server if there are no other DHCP servers on the network. If you enable the built-in DHCP server, Ruckus also recommends enabling the rogue DHCP server detector. For more information, refer to [Rogue DHCP Server Detection](#) on page 242.

### NOTE

Make sure the DHCP address pool is routable to the Internet and non-overlapping with other devices. Because Unleashed does not support NAT (Network Address Translation), this is important to avoid IP address conflicts. For example, if your router uses the 192.168.0.x subnet, you should use any subnet *other* than 192.168.0.x for your Unleashed DHCP subnet.

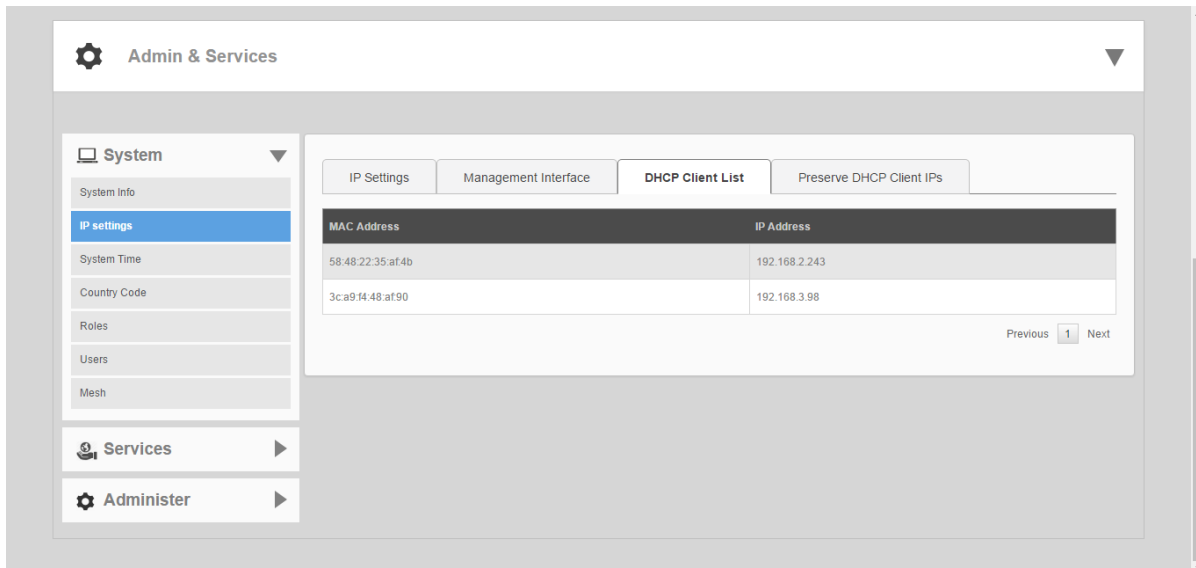
FIGURE 139 DHCP Server



### DHCP Client List

The **Admin & Services > System > IP Settings > DHCP Client List** page displays a list of IP addresses assigned to clients by the Unleashed Master AP.

FIGURE 140 DHCP Client List

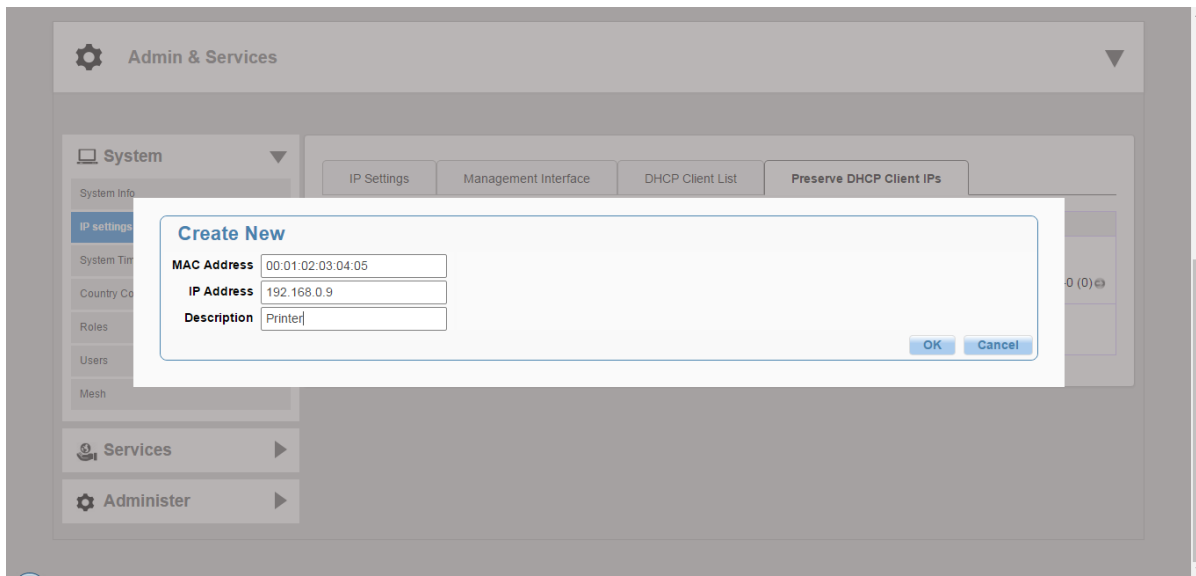


## Reserve DHCP Client IPs

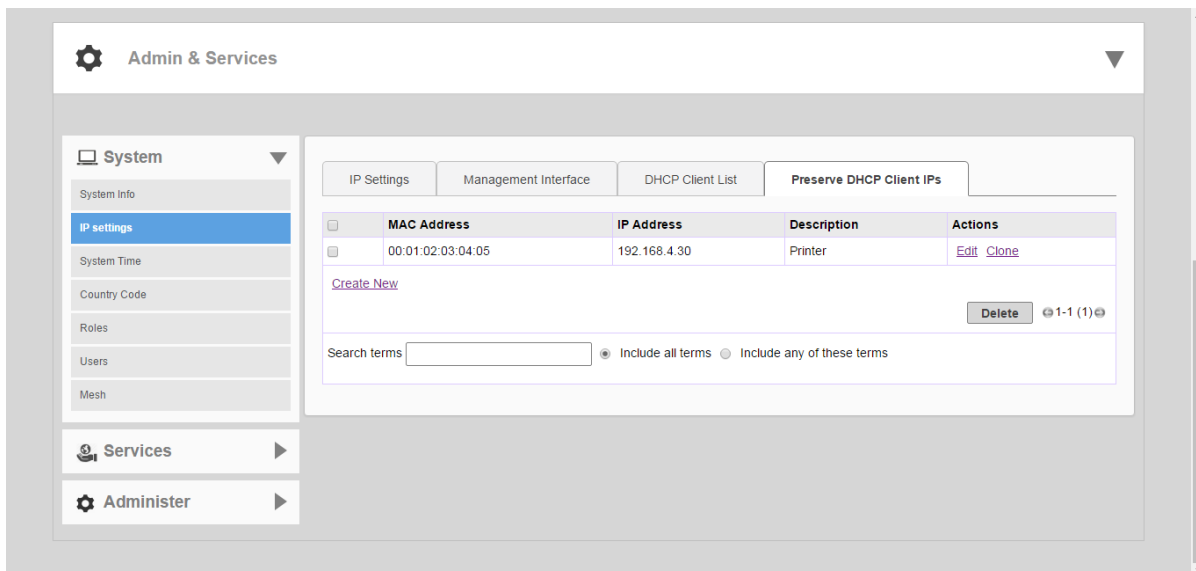
Use this page to create a list of reserved IP addresses bound to specific MAC addresses.

To create an entry, click **Create New**, and enter the client's **MAC Address**, the **IP Address** you want to reserve, and optionally a **Description** of the device.

**FIGURE 141** Create New Reserved IP Address



**FIGURE 142** Reserved IP Addresses



## Configuring a Management Interface

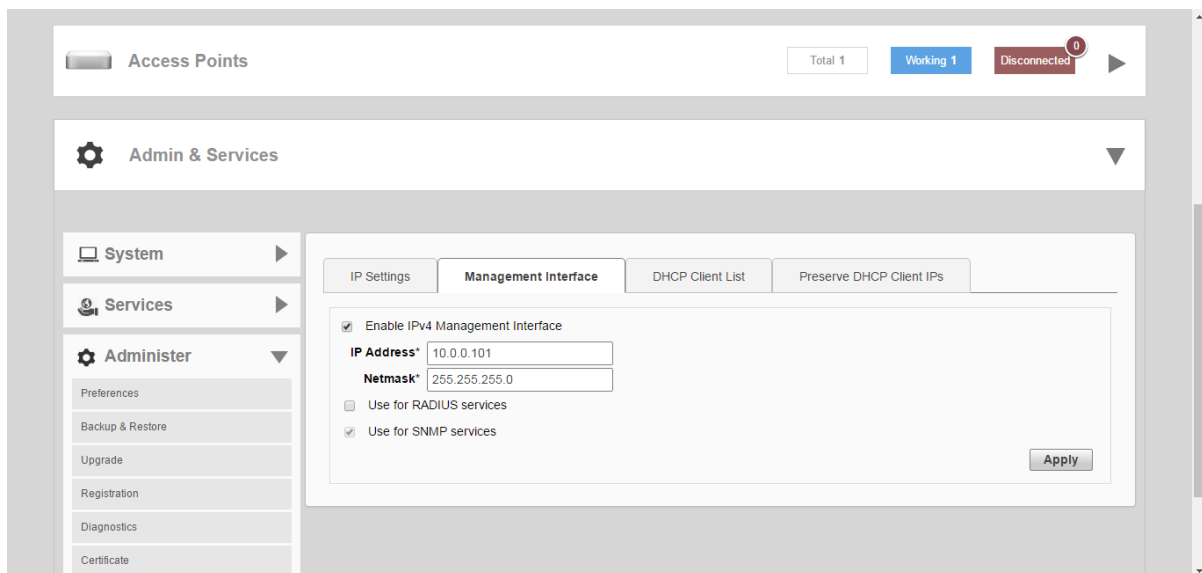
The Management IP address can be configured to allow an administrator to manage the Unleashed network from a single IP address, regardless of which Unleashed AP is currently the Unleashed Master AP.

The Management IP can be reached from anywhere on the network as long as it is routable via the default Gateway configured in **Device IP Settings**. Then, you only have to remember one IP address.

To configure a Management Interface:

1. Go to **Admin & Services > System > Device IP Settings**, and click the **Management Interface** tab.
2. Select the check box next to **Enable IPv4 Management Interface**.
3. Enter an **IP Address** and **Netmask**.
4. Optionally, enable the check box next to **Use for RADIUS services** to use this IP address for communication with a RADIUS authentication/accounting server. If enabled, the Master AP will send RADIUS packets through this management interface, and the RADIUS server only needs to record one IP address for the Unleashed network. Otherwise, it will record the addresses of all AP's.
5. The **Use for SNMP services** check box is automatically enabled when a Management Interface is enabled, and this address will be used for SNMP communications, if enabled.

**FIGURE 143** Management Interface



## Configuring the System Time

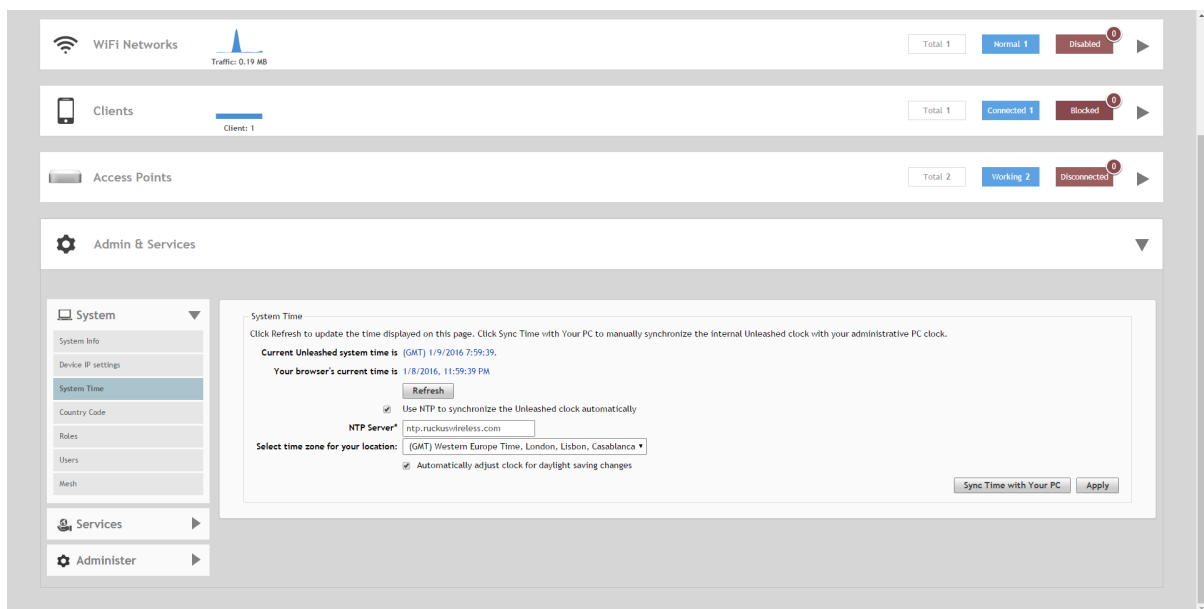
By default, the Unleashed network automatically updates its system time using the Network Time Protocol (NTP), which periodically polls an NTP server and synchronizes its time with the NTP server. You can also sync time with your PC to manually synchronize the internal clock with your admin PC's clock.

To configure the system time:

1. Go to **Admin & Services > System > System Time**.

2. The **System Time** page provides the following options:
  - **Refresh:** Click this to update the Unleashed time display (a static snapshot) from the internal clock.
  - **Use NTP Server** (Enabled by default): Clear this check box to disable this option.
  - **NTP Server:** The default NTP server is maintained by Ruckus, and is located at `ntp.ruckuswireless.com`. If you would like to use a different NTP server, enter the DNS name or IP address from which Unleashed will sync its clock.
  - **Select time zone for your location:** Choose your time zone from the dropdown menu. Setting the proper time zone ensures that timestamps on log files are in the proper time zone.
  - **Sync Time with your PC:** If needed, click this to update the internal clock with the current time settings from your administration PC.
3. Click **Apply** to save the results of any resynchronization or NTP server settings changes.

**FIGURE 144** System Time



## Setting the Country Code

Different countries and regions maintain different rules that govern which channels can be used for wireless communications. Setting the Country Code to the proper regulatory region ensures that your Unleashed network does not violate local and national regulatory restrictions.

Setting the Country Code for the Unleashed Master will also set the country code for all member APs under its control.

### NOTE

Changes to the country code are applied to all Access Points in the Unleashed network.

### NOTE

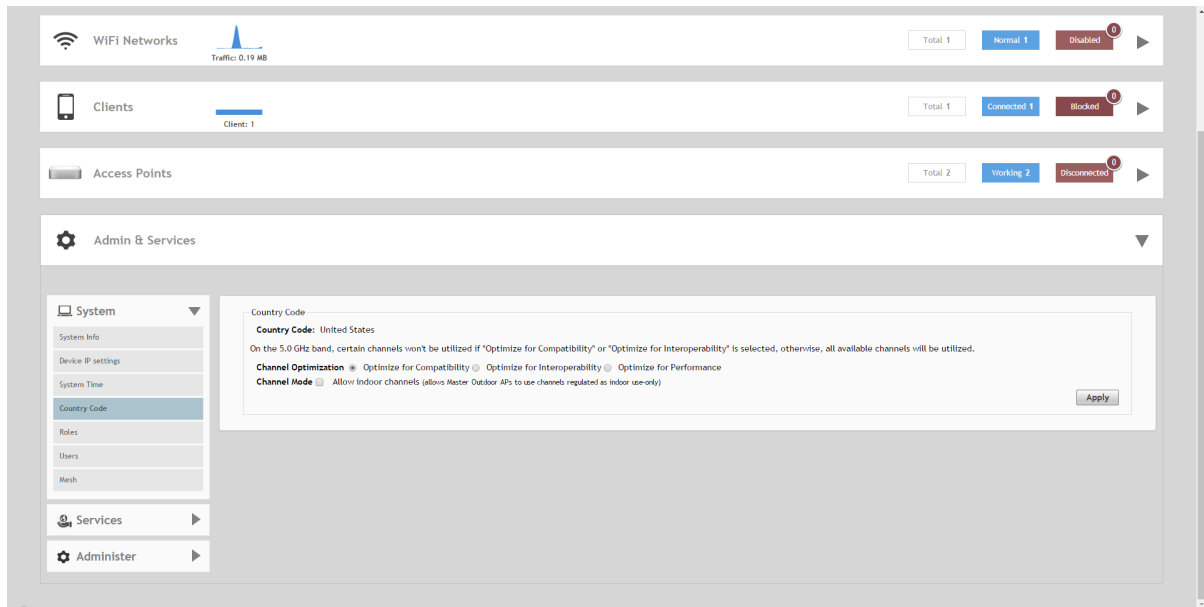
Unleashed APs sold in the United States are fixed to US country code, and cannot be changed.

To set the Country Code to the proper location:

1. Go to **Admin & Services > System > Country Code**.

2. Choose your location from the **Country Code** drop-down menu.
3. Click **Apply** to save your settings.

**FIGURE 145** The Country Code page



## Channel Optimization

If your Country Code is set to "United States," an additional configuration option, **Channel Optimization**, is shown. This feature allows you to choose whether additional DFS (Dynamic Frequency Selection) channels in the 5 GHz band should be available for use by your APs.

Note that these settings only affect Ruckus APs that support the extended DFS channel list. Channel Optimization settings are described in the following table.

The 5 GHz channels available for AP use are the following:

- **Optimize for Compatibility:** 36, 40, 44, 48, 149, 153, 157, 161, 165 (non-DFS channels).
- **Optimize for Interoperability:** non-DFS channels plus channels 52, 56, 58, 60.
- **Optimize for Performance:** all DFS + non-DFS channels: 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 149, 153, 157, 161.

**TABLE 17** Channel Optimization settings for US Country Code

Setting	Description	Use this setting when
Optimize for Compatibility	DFS-capable Unleashed APs are limited to the same channels as all other APs (non-DFS channels only).	You have a mixture of APs that support DFS channels and other Ruckus APs that do not support DFS channels in a Smart Mesh configuration.
Optimize for Interoperability	Unleashed APs are limited to non-DFS channels, plus four DFS channels supported by Centrino systems (may not be compatible with other wireless NICs).	You have only DFS-capable APs in your network, or Smart Mesh is not enabled, and you are confident that all wireless clients support DFS channels.



**TABLE 17 Channel Optimization settings for US Country Code (continued)**

Setting	Description	Use this setting when
Optimize for Performance	Unleashed APs can use all available DFS and non-DFS channels, without regard for compatibility or interoperability	You have only DFS-capable APs in your network, you are not concerned with DFS compatibility of client devices, and you want to make the maximum use of all possible available channels.

## Channel Mode

The Channel Mode option allows you to configure outdoor APs to use channels regulated as indoor-only.

Some countries restrict certain 5 GHz channels to indoor use only. For instance, Germany restricts channels in the 5.15 GHz to 5.25 GHz band to indoor use. When an Unleashed outdoor AP is set to a country code where these restrictions apply, the AP can no longer be set to an indoor-only channel and will no longer select from amongst a channel set that includes these indoor-only channels when SmartSelect or Auto Channel selection is used, unless the administrator configures the AP to allow use of these channels.

For instance, if the AP is installed in a challenging indoor environment such as a warehouse, the administrator may want to allow the AP to use an indoor-only channel. These channels can be enabled for use through the web interface by configuring the **Channel Mode** and checking **Allow indoor channels**. If you have an indoor AP functioning as a Root AP with outdoor APs functioning as Mesh APs, the mesh backhaul link must initially use a non-indoor-only channel. Your outdoor Mesh APs may fail to join if the mesh backhaul link is using a restricted indoor-only channel.

## Configuring User Roles

Unleashed provides a "Default" role that is automatically applied to all new user accounts.

This role links all users to the internal WLAN and permits access to all WLANs by default. As an alternative, you can create additional roles that you can assign to selected wireless network users, to limit their access to certain WLANs, to allow them to log in with non-standard client devices, or to grant permission to generate guest passes. (You can then edit the "default" role to disable the guest pass generation option.)

To create a new user Role:

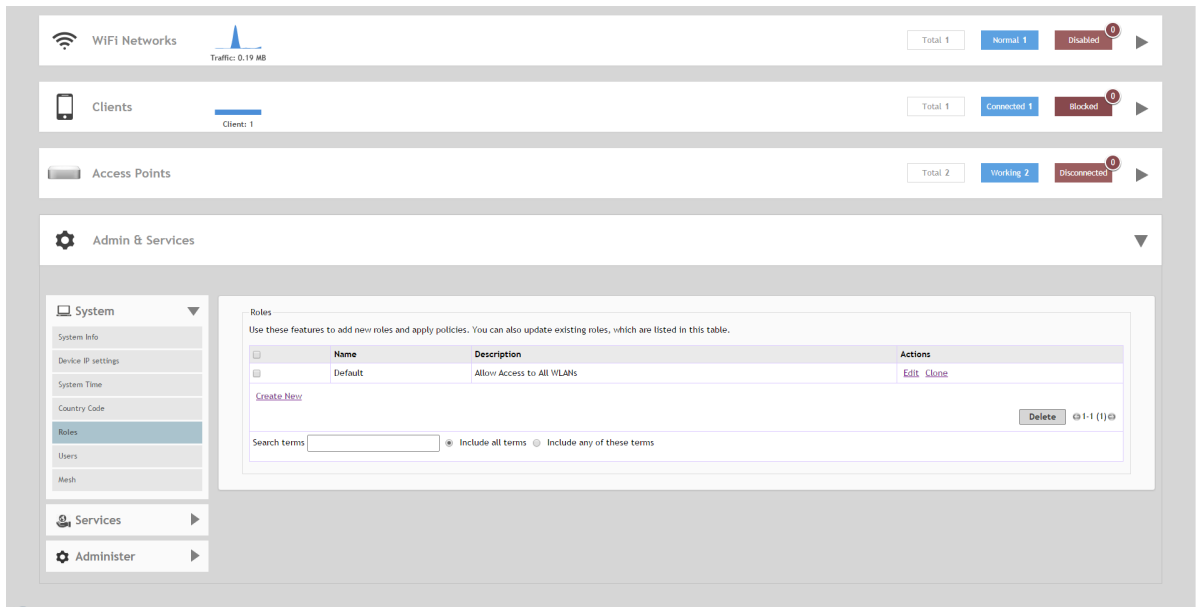
1. Go to **Admin & Services > System > Roles**. The **Roles** page appears, displaying a Default role in the **Roles** table.
2. Click **Create New**.
3. Enter a **Name** and a short **Description** for this role.
4. Choose the options for this role from the following:
  - **Group Attributes:** Fill in this field only if you are creating a user role based on Group attributes extracted from an Active Directory server. Enter the User Group name here. Active Directory/LDAP users with the same group attributes are automatically mapped to this user role.
  - **Allow All WLANs:** You have two options: (1) Allow Access to all WLANs, or (2) Specify WLAN Access. If you select the second option, you must specify the WLANs by clicking the check box next to each one.
  - **Guest Pass:** If you want users with this role to have the permission to generate guest passes, enable this option.

### NOTE

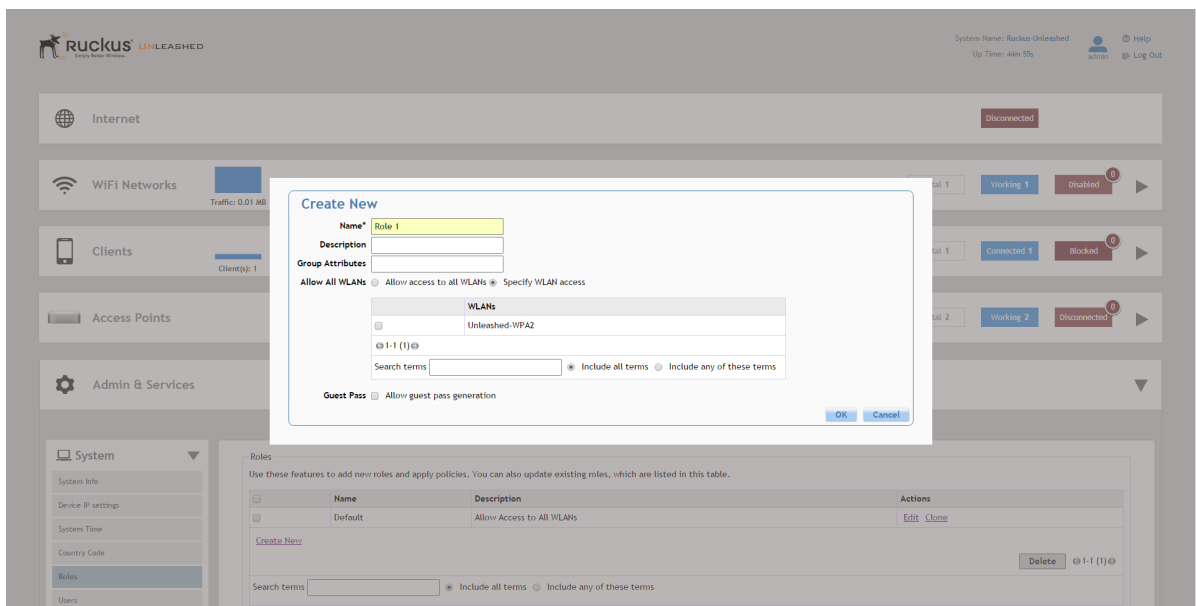
When creating a guest pass generator role, you must ensure that this role is given access to the guest WLAN/s. If you create a role and allow guest pass generation, but do not allow the role access the relevant WLANs, members of the "Guest Pass Generator" Role will be unable to generate guest passes for the guest WLAN.

5. When you finish, click **OK** to save your settings. This role is ready for assignment to authorized users.
6. If you want to create additional roles with different policies, repeat this procedure.

**FIGURE 146** Roles



**FIGURE 147** Creating a new user Role



## Adding New Users to the Local Database

Once your Unleashed wireless network is set up, you can choose to authenticate wireless users using an external authentication server (Active Directory or RADIUS server), or to authenticate users by referring to accounts that are stored in the system's internal user database.

This section describes the procedures for managing users using the internal user database. For authentication using an external AAA server, see [AAA Servers](#) on page 211.

To use the internal user database as the default authentication source and to create new user accounts in the internal database:

1. Go to **Admin & Services > System > Users**.
2. In the **Internal User Database** table, click **Create New**.
3. When the **Create New** form appears, fill in the text fields with the appropriate entries:
  - **User Name:** Enter a name for this user. User names must be 1-32 characters in length, using letters, numbers, underscores (\_) and periods (.). User names are case-sensitive and may not begin with a number.
  - **Full Name:** Enter the assigned user's first and last name. The user name can be up to 64 characters, including special characters and spaces.
  - **Password:** Enter a unique password for this user, 4-32 characters in length, using a combination of letters, numbers and special characters including characters from (!) (char 33) to (~) (char 126). Passwords are case-sensitive.
  - **Confirm Password:** Re-enter the same password for this user.
4. If you have created roles that enable non-standard client logins or that gather staff members into workgroups, select the appropriate role for this user from the **Roles** drop-down menu. For more information on roles and their application, see [Configuring User Roles](#) on page 197.
5. Click **OK** to save your settings. Be sure to communicate the user name and password to the appropriate end user.

FIGURE 148 The Users page

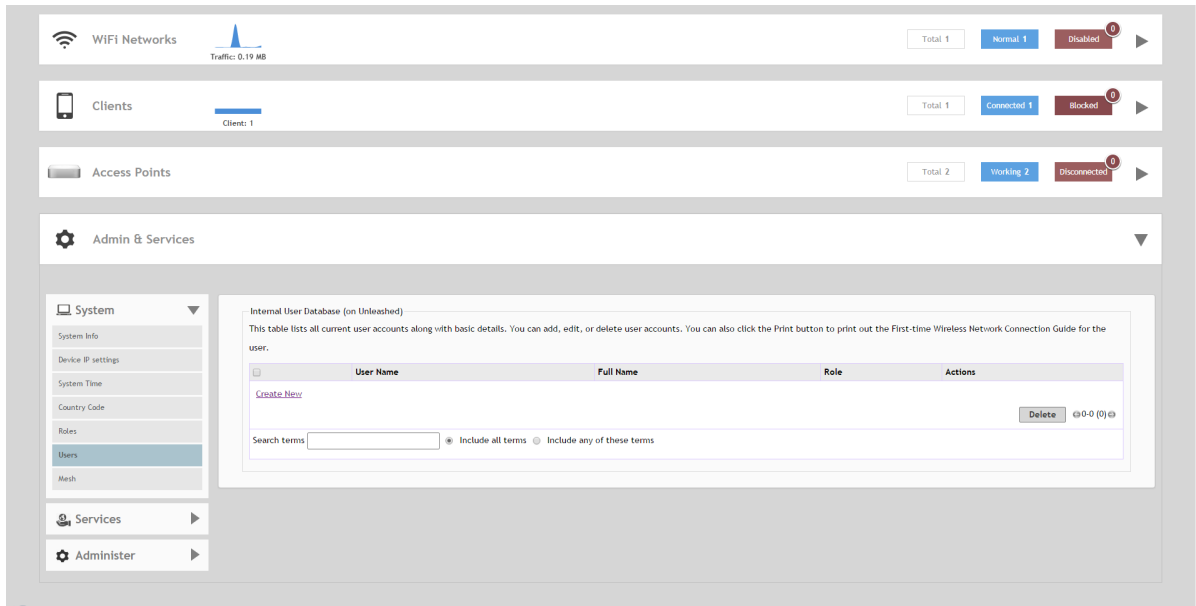
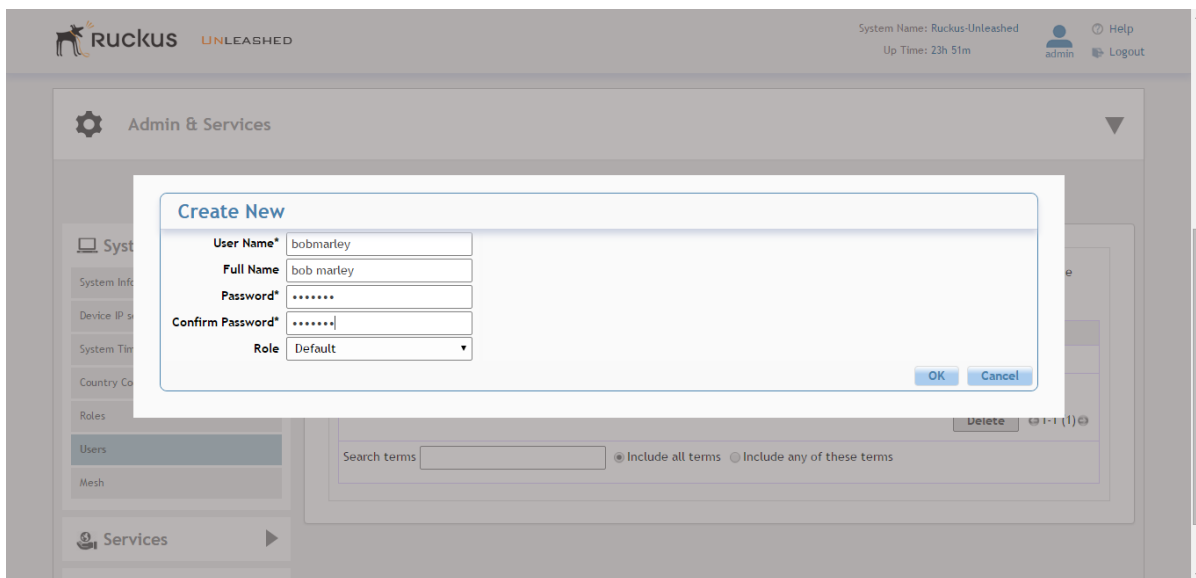


FIGURE 149 Creating a new User on the internal database



## Changing an Existing User Account

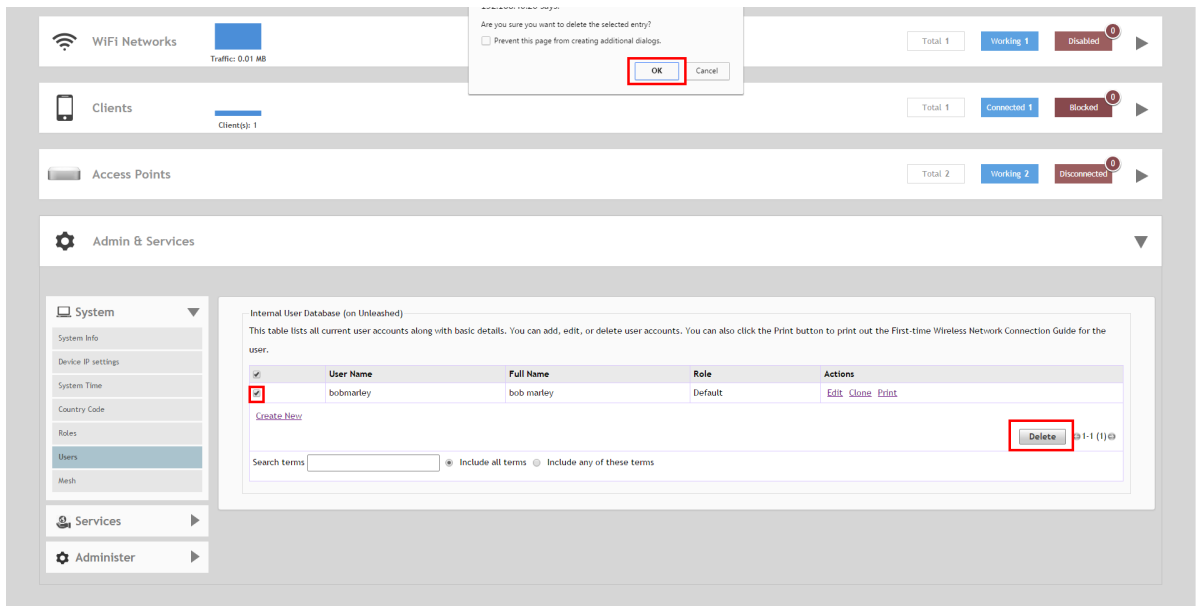
1. Go to **Admin & Services > System > Users**.
2. When the **Users** features appear, locate the specific user account in the **Internal User Database** table, and then click **Edit**.
3. When the **Editing [user name]** form appears, make the needed changes.

4. If a role must be replaced, select a new **Role** for this user. (For more information, see [Configuring User Roles](#) on page 197.)
5. Click **OK** to save your changes. Be sure to communicate the relevant changes to the appropriate end user.

## Deleting a User Record

1. Go to **Admin & Services > System > Users**.
2. Review the **Internal User Database** table.
3. To delete one or more records, click the check boxes next to those account records, and click the **Delete** button.
4. When the confirmation dialog box appears, click **OK** to save your settings. The records are removed from the internal user database.

**FIGURE 150** Deleting a user from the internal database



# Mesh Networking

## Overview of Smart Mesh Networking

A Smart Mesh network is a peer-to-peer, multi-hop wireless network wherein participant nodes cooperate to route packets.

In a Ruckus Smart Mesh network, the routing nodes (that is, the access points forming the network), or "mesh nodes," form the network's backbone. Clients (for example, laptops and other mobile devices) connect to the mesh nodes and use the backbone to communicate with one another, and, if permitted, with nodes on the internet. The mesh network enables clients to reach other systems by creating a path that 'hops' between nodes.

Smart Mesh networking offers many advantages:

- Smart Mesh networks are self-healing: If any one of the nodes fails, the nodes note the blockage and re-route data.

- Smart Mesh networks are self-organizing: When a new node appears, it becomes assimilated into the mesh network.

In the Ruckus Smart Mesh network, all traffic going through the mesh links is encrypted. A passphrase is shared between mesh nodes to securely pass traffic. When deployed as a mesh network, Unleashed member APs communicate with the Unleashed Master AP either through a wired Ethernet connection (Root APs) or through the wireless connection using the 5 GHz radio (Mesh APs).

## Smart Mesh Networking Terms

Before you begin deploying your Smart Mesh network, Ruckus recommends getting familiar with the following terms that are used in this document to describe wireless mesh networks.

**TABLE 18** Mesh networking terms

Term	Definition
Mesh Node	A Ruckus Unleashed AP with mesh capability enabled.
Root AP (RAP)	A mesh node that communicates with the Unleashed Master AP through its Ethernet (wired) interface. The Unleashed Master AP itself must also be a Root AP.
Mesh AP (MAP)	A mesh node that communicates with the Unleashed Master AP through its wireless interface via a Root AP.
Ethernet-Linked Mesh AP (eMAP)	An eMAP is a mesh node that is connected to its uplink AP through a wired Ethernet cable, rather than wirelessly. eMAP nodes are used to bridge wireless LAN segments together.
Mesh Tree	Each Mesh AP can have exactly one uplink to a Root AP or another Mesh AP, and each Root AP or Mesh AP can have multiple Mesh APs connected to it, resulting in a tree-like topology. A single Unleashed Master AP can manage more than one mesh tree. There is no limit on the number of mesh trees per Unleashed Master. For example, an Unleashed network can consist of 1 mesh tree of 6 APs, 2 mesh trees of 3 APs each, or 3 mesh trees of 2 APs each.
Hop	The number of wireless mesh links a data packet takes from one Mesh AP to the Root AP. For example, if the Root AP is the uplink of Mesh AP 1, then Mesh AP 1 is one hop away from the Root AP. In the same scenario, if Mesh AP 1 is the uplink of Mesh AP 2, then Mesh AP 2 is two hops away from the Root AP. A maximum of 8 hops is supported.

See [Supported Mesh Topologies](#) on page 206 for more information.

## Configuring Mesh Settings

You can configure Mesh settings from the **Admin & Services > System > Mesh** page.

To configure Mesh settings, select the check box next to **Enable Mesh**. Optionally, you can change the **Mesh Name (ESSID)** and the **Mesh Passphrase**, or click **Generate** to generate a new random Mesh passphrase.

### NOTE

Once you have enabled Mesh, you cannot disable it again without resetting the Unleashed Master AP to factory defaults (see [Restore to Factory Settings](#) on page 246).

### NOTE

If you enabled Mesh during the Setup Wizard process, you do not need to configure it again here.

### NOTE

The Unleashed Master AP cannot be a Mesh AP. The Unleashed Master can only be a Root AP in a Mesh topology.

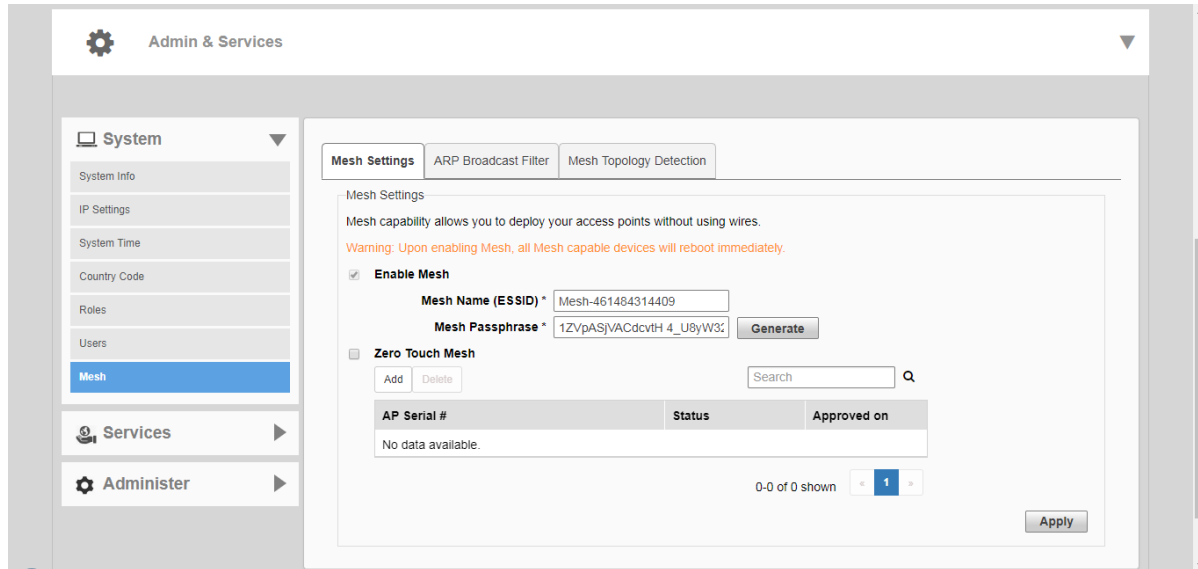
### NOTE

Unleashed R310 does not support Mesh.

**NOTE**

Unleashed H320 does not support Mesh.

**FIGURE 151** Mesh settings



**Zero Touch Mesh**

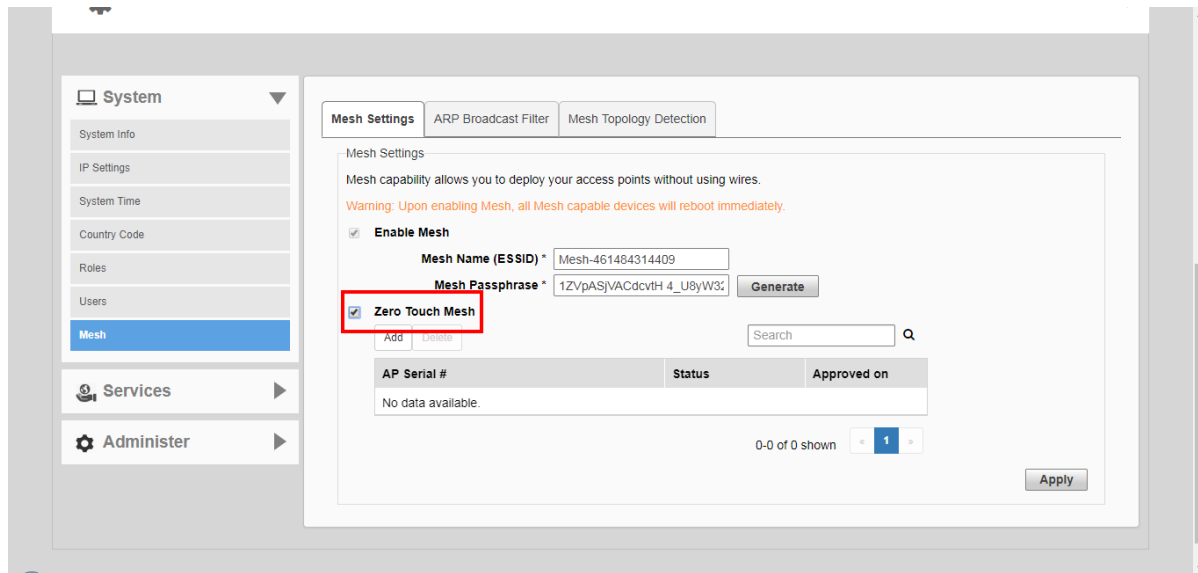
Zero Touch Mesh allows customers to skip the mesh configuration priming process, enabling Mesh APs already installed in their permanent locations to auto-discover, auto-provision and auto-form a mesh network without priming.

In most installations, Unleashed APs that are destined to become Mesh APs need to first be primed prior to deployment. They are first manually connected to the controller (Unleashed Master AP) via Ethernet to receive the provisioning parameters (Mesh SSID and PSK passphrase), and then unplugged from Ethernet and installed at their desired location.

Once installed, Mesh APs perform network discovery and associate to another Mesh AP (RAP, MAP or eMAP) that is beaconing the provisioned Mesh SSID.

This manual procedure can be skipped using the Zero Touch Mesh feature.

FIGURE 152 Enabling Zero Touch Mesh



### Onboarding Mesh APs with Zero Touch Mesh

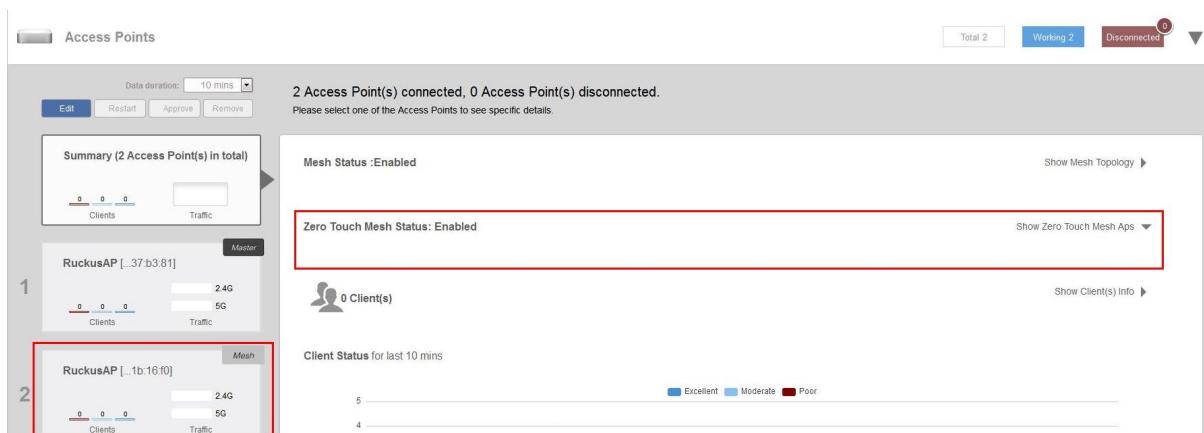
To allow Unleashed Mesh APs to join the Mesh network without first connecting them via Ethernet, use the following procedure:

1. Go to **Admin & Services > System > Mesh**.
2. Select the check box to enable **Zero Touch Mesh**.
3. Click **Apply**.

The changes to the mesh settings will propagate through the mesh network.

4. Go to **Access Points > Summary > Show Zero Touch Mesh APs**.

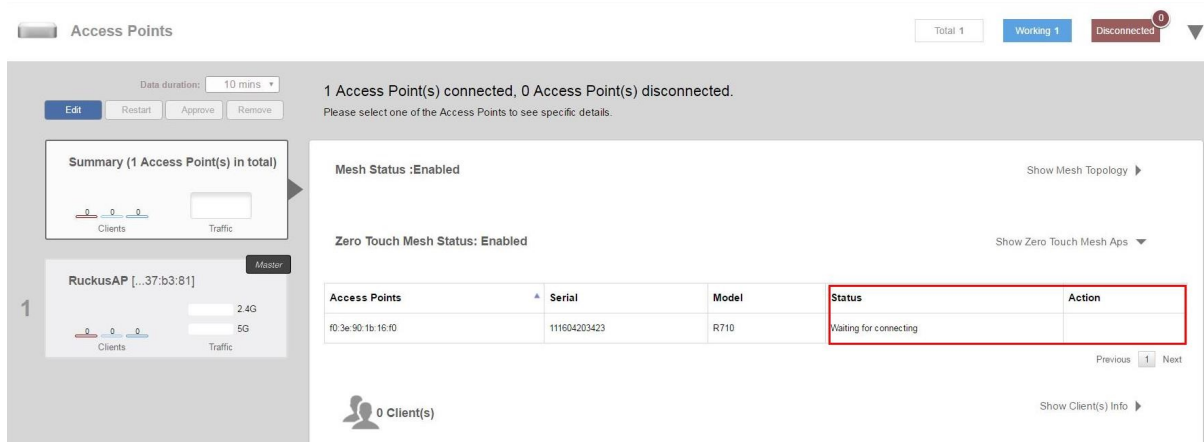
FIGURE 153 Show Zero Touch Mesh APs



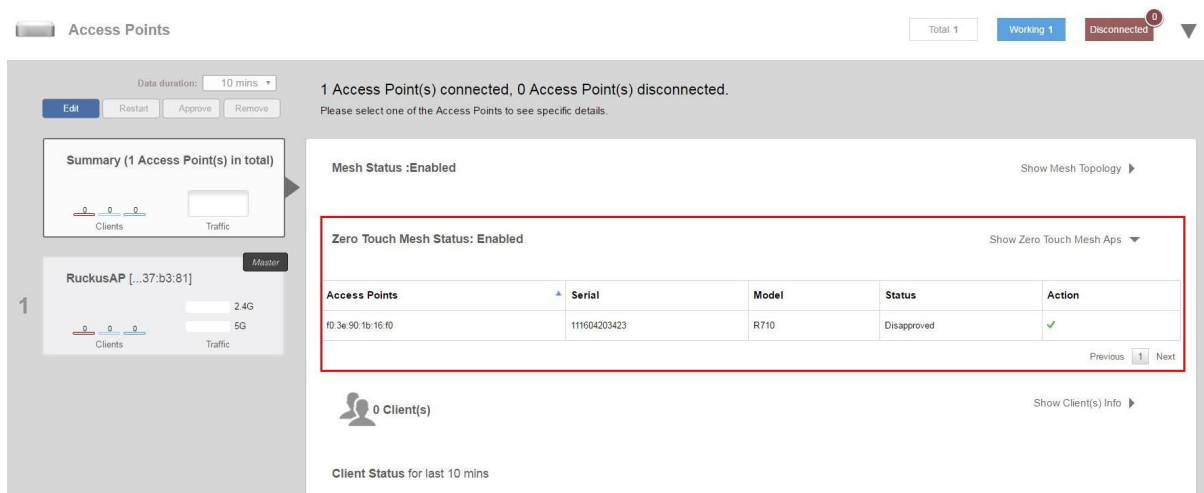


- When a supported AP attempts to join, it will appear in the *Zero Touch Mesh AP* table. Click the **Approve** button to approve the AP.

**FIGURE 154** Waiting for connection



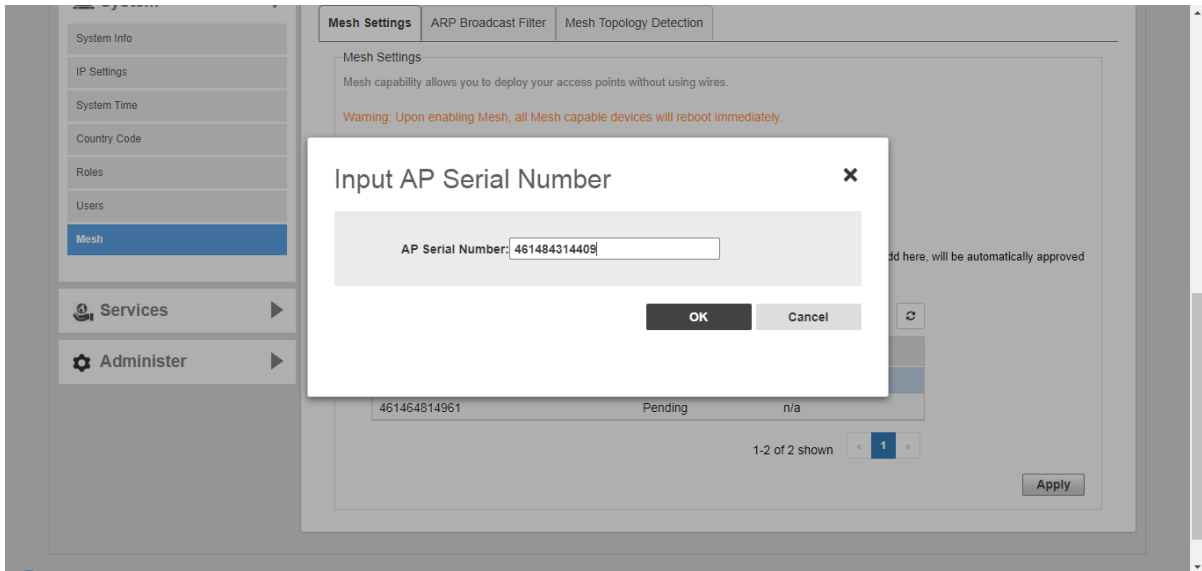
**FIGURE 155** Click Approve to allow the AP to join



- To pre-approve APs by serial number, go to **Admin & Services > System > Mesh > Zero Touch Mesh**, and locate the *Pre-Approved Zero Touch Mesh* section.
- In the same section, click the **Add** button to add a new AP to the list of pre-approved Zero Touch Mesh APs. The *Input AP Serial* window appears.

8. Enter the **AP Serial Number** of the AP to autoprovision, and click **OK**.

**FIGURE 156** Add AP serial number



The AP's serial number is added to the list.

9. Repeat for additional mesh APs.
10. Click **Apply**.

A message box appears notifying you that the process may take several minutes for the changes to propagate through the mesh network.

11. When the listed APs in factory default state come online, they will begin performing network discovery, auto-provisioning and finally association to another upstream AP the Unleashed network.

## Supported Mesh Topologies

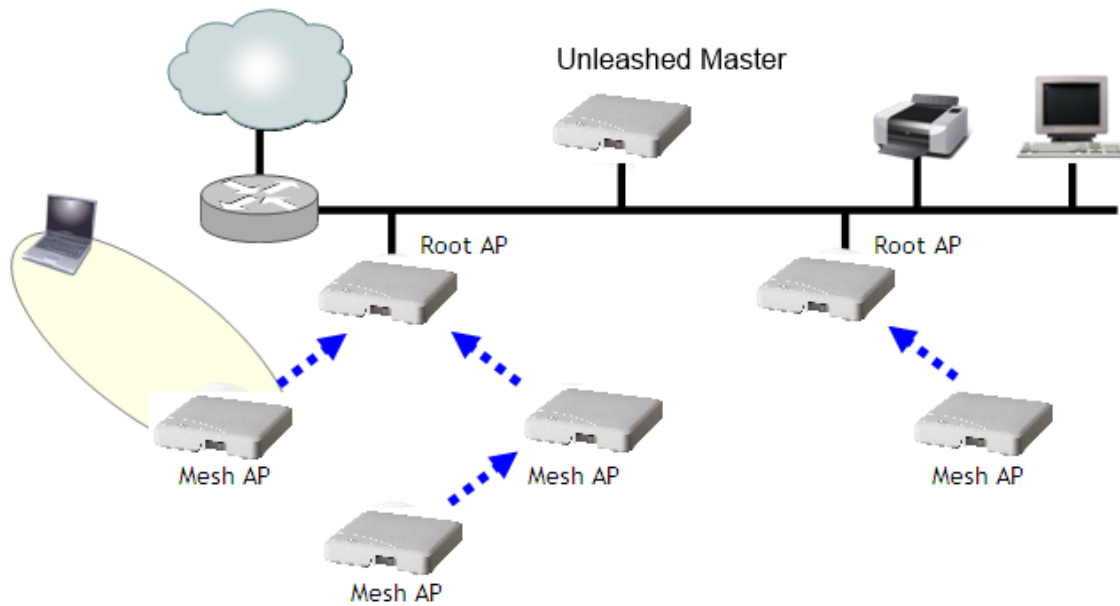
Smart Mesh networks can be deployed in three types of topologies:

- Standard Topology
- Wireless Bridge Topology
- Hybrid Mesh Topology

### Standard Topology

The standard Smart Mesh topology consists of the Unleashed Master AP and a number of Root APs and Mesh APs. In this topology, the Unleashed Master and the upstream router are connected to the same wired LAN segment. You can extend the reach of your wireless network by forming and connecting multiple mesh trees to the wired LAN segment. In this topology, all APs connected to the wired LAN are considered "Root APs," and any AP not connected to the wired LAN is considered a "Mesh AP."

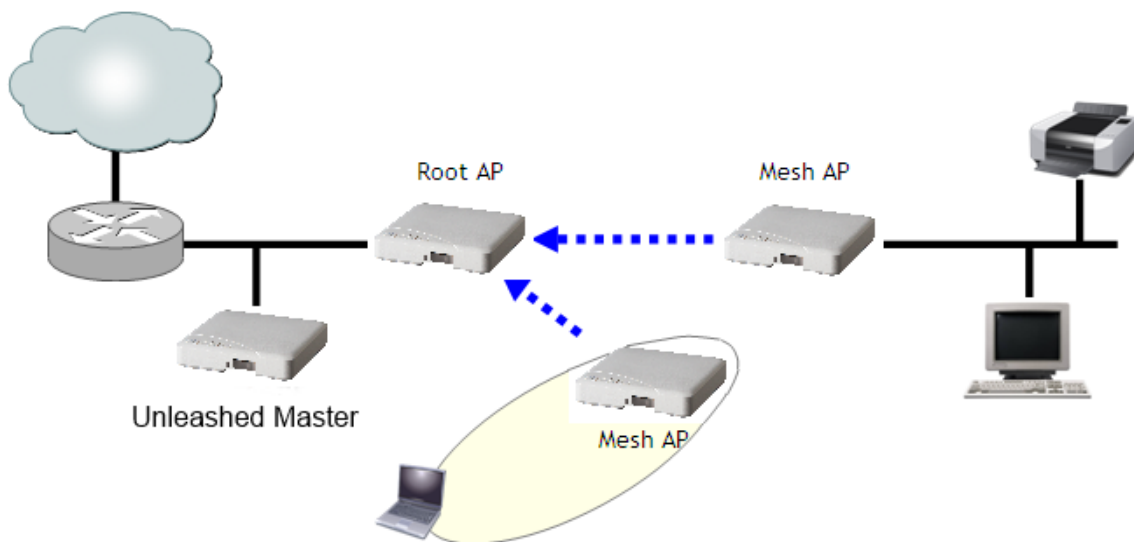
**FIGURE 157** Mesh - standard topology



### **Wireless Bridge Topology**

If you need to bridge isolated wired LAN segments, you can set up a mesh network using the wireless bridge topology. In this topology, the Unleashed Master and the upstream router are on the primary wired LAN segment, and another isolated wired segment exists that needs to be bridged to the primary LAN segment. You can bridge these two wired LAN segments by forming a wireless mesh link between the two wired segments, as shown in the figure below.

**FIGURE 158** Mesh - wireless bridge topology



## Hybrid Mesh Topology

A third type of network topology can be configured using the Hybrid Mesh concept.

Ethernet-connected Mesh APs (eMAP) enable the extension of wireless mesh functionality to a wired LAN segment. An eMAP is a special kind of Mesh AP that uses a wired Ethernet link as its uplink rather than wireless. An eMAP is not considered a Root AP, despite the fact that it discovers the Unleashed Master through its Ethernet port.

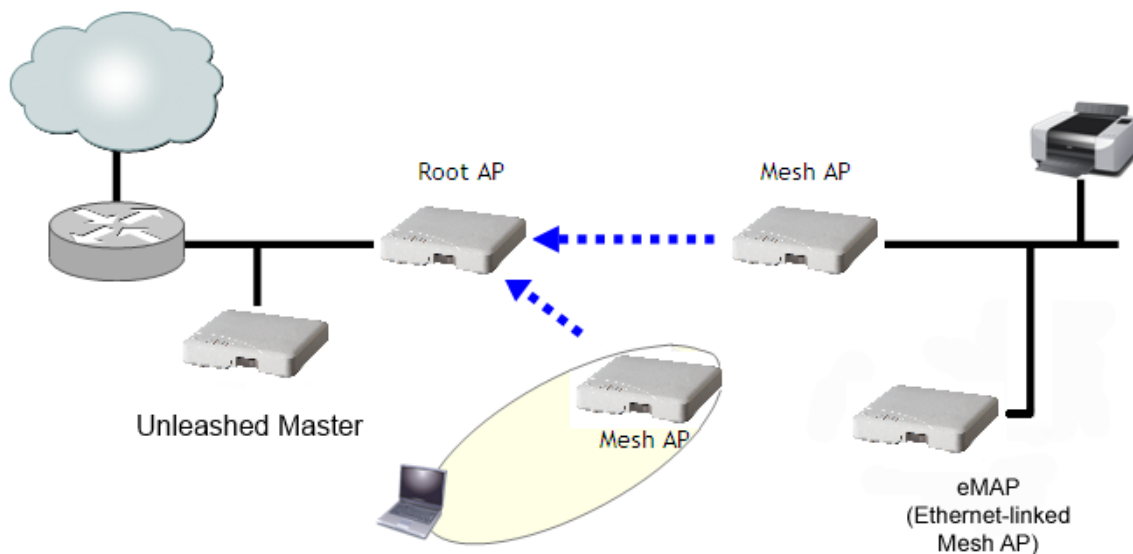
Multiple eMAPs can be connected to a single Mesh AP to, for example, bridge a wired LAN segment inside a building to a wireless mesh outdoors.

In designing a mesh network, connecting an eMAP to a Mesh AP extends the Smart Mesh network without expending a wireless hop, and can be set on a different channel to take advantage of spectrum reuse.

### NOTE

The Unleashed Master AP cannot also be an Ethernet-Linked Mesh AP.

**FIGURE 159** eMAP - Hybrid Mesh topology



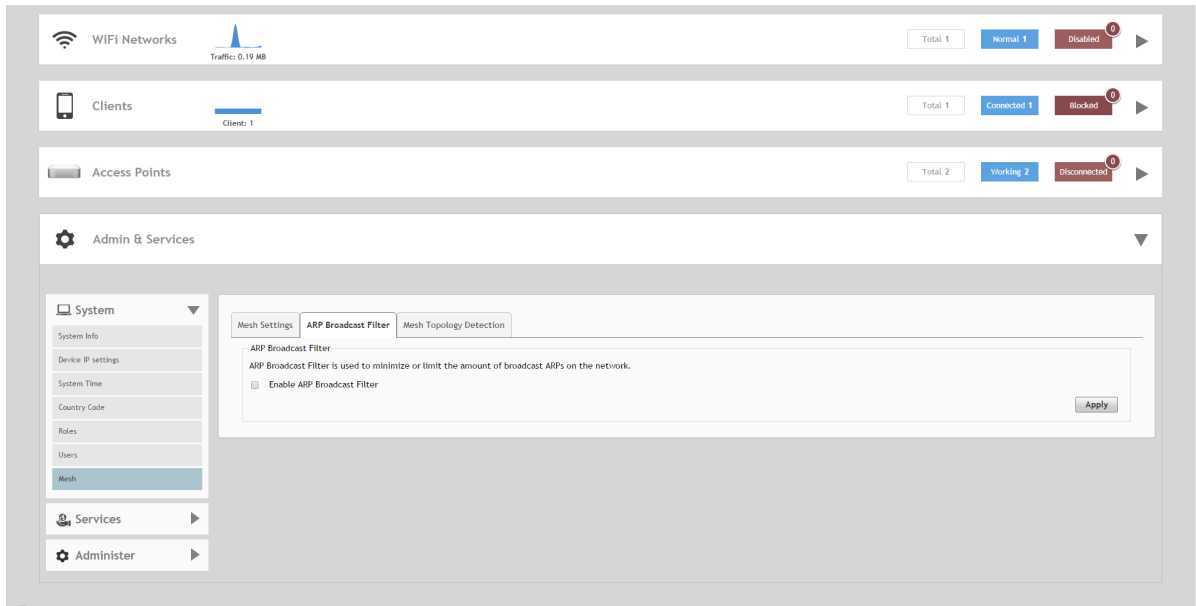
## ARP Broadcast Filter

The ARP Broadcast Filter is used to minimize or limit the amount of broadcast ARP (Address Resolution Protocol) packets on the network.

The ARP Broadcast filter is designed to reduce IPv4 ARP broadcasts over the air. Once enabled, access points will sniff ARP responses and maintain a table of IP addresses to MAC address entries. When the AP receives an ARP broadcast request from a known host, the AP converts the broadcast request packet into a unicast request by replacing the broadcast address with the MAC address.

To enable ARP Broadcast Filter, select the check box and click **Apply**.

**FIGURE 160 ARP Broadcast Filter**



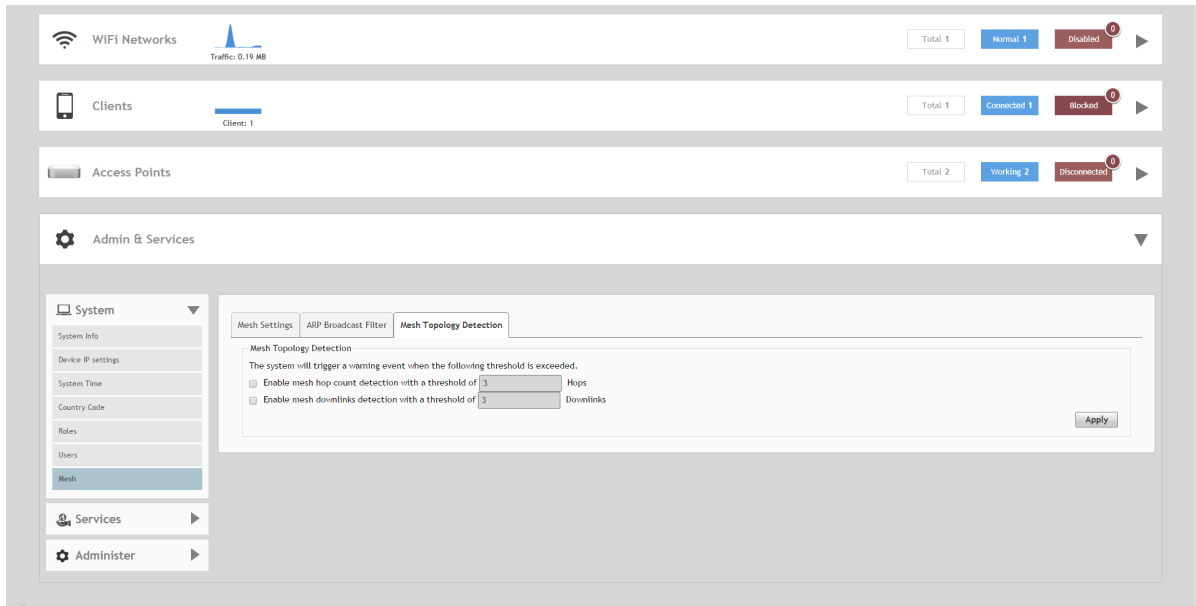
## Mesh Topology Detection

The Mesh Topology Detection feature allows you to set the number of mesh hops and mesh downlinks after which Unleashed will trigger a warning message.

For example, if you enable both options with a threshold value of 5 for each, Unleashed will trigger a warning event message when either of the following events occurs:

- A Mesh AP with 6 or more hops from a Root AP is detected.
- A Root AP with 6 or more downlink Mesh APs connected to it is detected .

FIGURE 161 Mesh Topology Detection

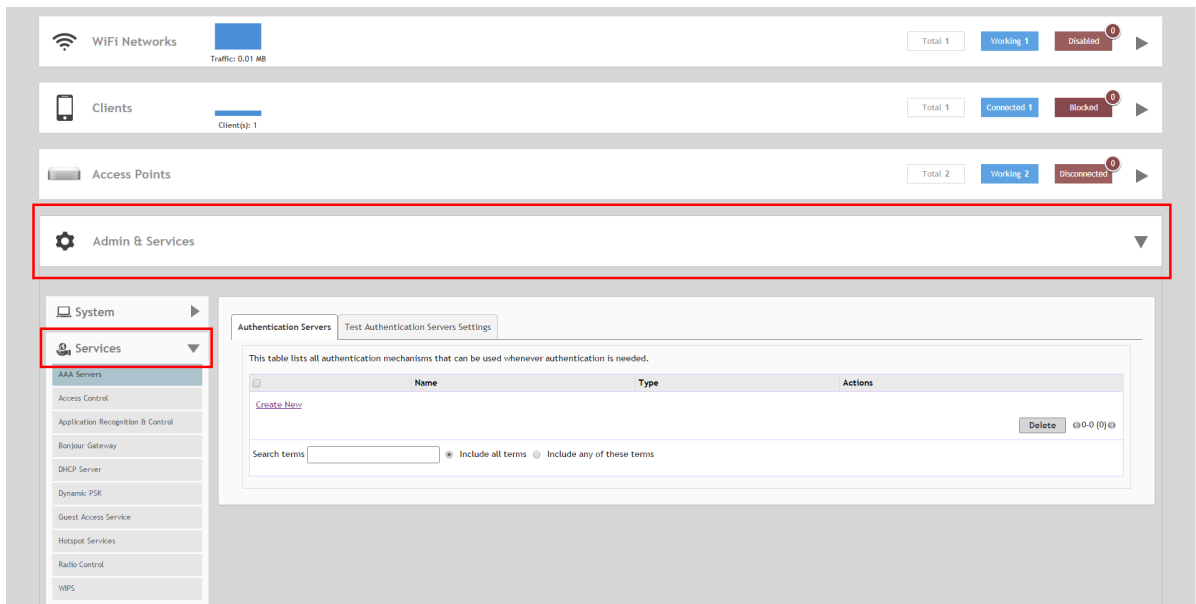


## Services

The Services pages include options for configuring system services such as Application Recognition and Control, Bonjour Gateway, DHCP server, Hotspot service and Guest Access services.

To configure system WiFi services, go to **Admin & Services > Services**.

FIGURE 162 The Admin & Services > Services page



## AAA Servers

If you want to authenticate users against an external Authentication, Authorization and Accounting (AAA) server, you will need to first configure your AAA server, then point Unleashed to the AAA server so that requests will be passed through Unleashed before access is granted. This section describes the tasks that you need to perform on the Unleashed web interface to ensure your Unleashed APs can communicate with your AAA server.

For specific instructions on AAA server configuration, refer to the documentation that is supplied with your server.

Unleashed supports two types of AAA server:

- Microsoft Active Directory
- RADIUS

A maximum of 32 AAA server entries can be created, regardless of server type.

### Configuring AAA Servers

To configure Unleashed to authenticate users against an external Active Directory or RADIUS authentication server:

1. Go to **Admin & Services > Services > AAA Servers**.
2. In **Authentication Servers**, click **Create New**.
3. Select the server type:
  - **Active Directory:** If you use a Microsoft AD server, configure the following settings:
    - **Global Catalog:** Enable Global Catalog for multi-domain AD authentication. If this option is enabled, you must also enter an Admin DN and Password so that Unleashed can query the Global Catalog.
    - **Encryption:** select Enable TLS encryption if you want to encrypt all authentication traffic between the client and the Active Directory server. The AD server must support TLS1.0/TLS1.1/TLS1.2.
    - **IP Address:** Enter the IP address of the AD server.
    - **Port:** The default port number (3268, or 636 if you have enabled TLS encryption) should not be changed unless you have configured your AD server to use a different port.
    - **Windows Domain Name:** Enter a domain name for single domain authentication, or leave blank for multi-domain authentication.
  - **RADIUS:** If your authentication server is a RADIUS server, configure the following settings:
    - **Encryption:** If you want to enable encryption of RADIUS packets using Transport Layer Security (TLS), select the Enable TLS encryption check box. This allows RADIUS authentication and accounting data to be passed safely across insecure networks such as the Internet.
    - **Auth Method:** Choose PAP or CHAP according to the authentication protocol used by your RADIUS server.
    - **Backup RADIUS:** If a backup RADIUS or RADIUS Accounting server is available, enable the check box next to Backup RADIUS and additional fields appear. Enter the relevant information for the backup server and click OK. When you have configured both a primary and backup RADIUS server, an additional option will be available in the Test Authentication Settings section to choose to test against the primary or the backup RADIUS server.
    - **IP Address:** Enter the IP address of the RADIUS server (and backup RADIUS server, if enabled).
    - **Port:** The default port (1812) should not be changed unless you have configured your RADIUS server to use a different port.
    - **Shared Secret:** Enter a password for communication between Unleashed and the RADIUS server.
    - **Confirm Secret:** Repeat the shared secret.
    - **Retry Policy:** Enter a Request Timeout value (in seconds) and a Max Number of Retries value in the relevant fields.
4. Click **OK** to save your AAA server entry.

FIGURE 163 The AAA Servers page

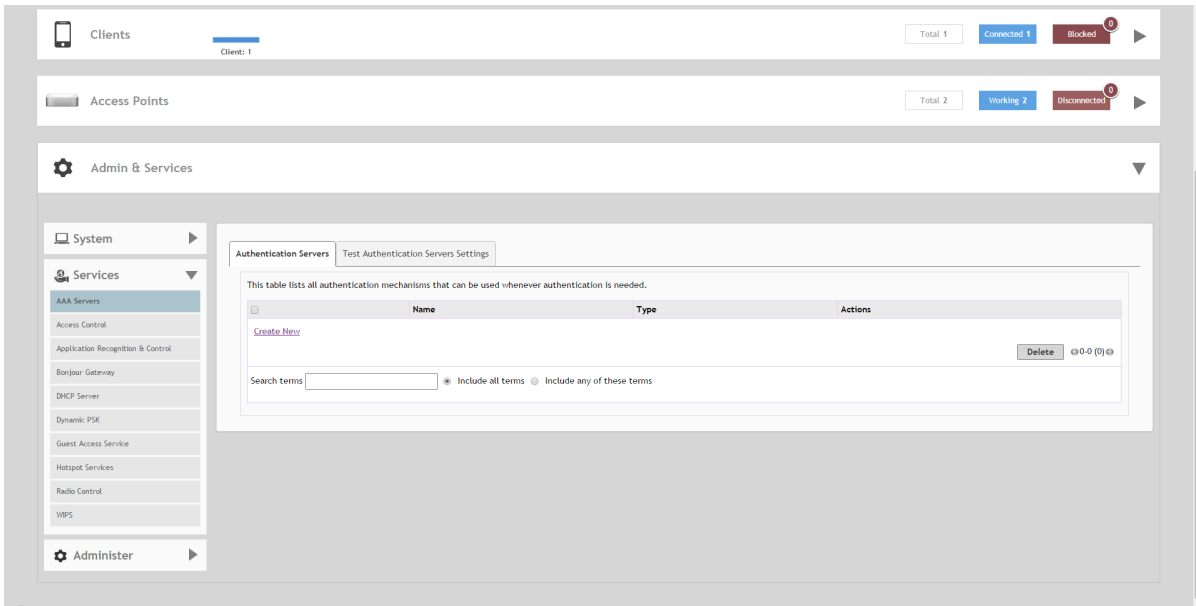
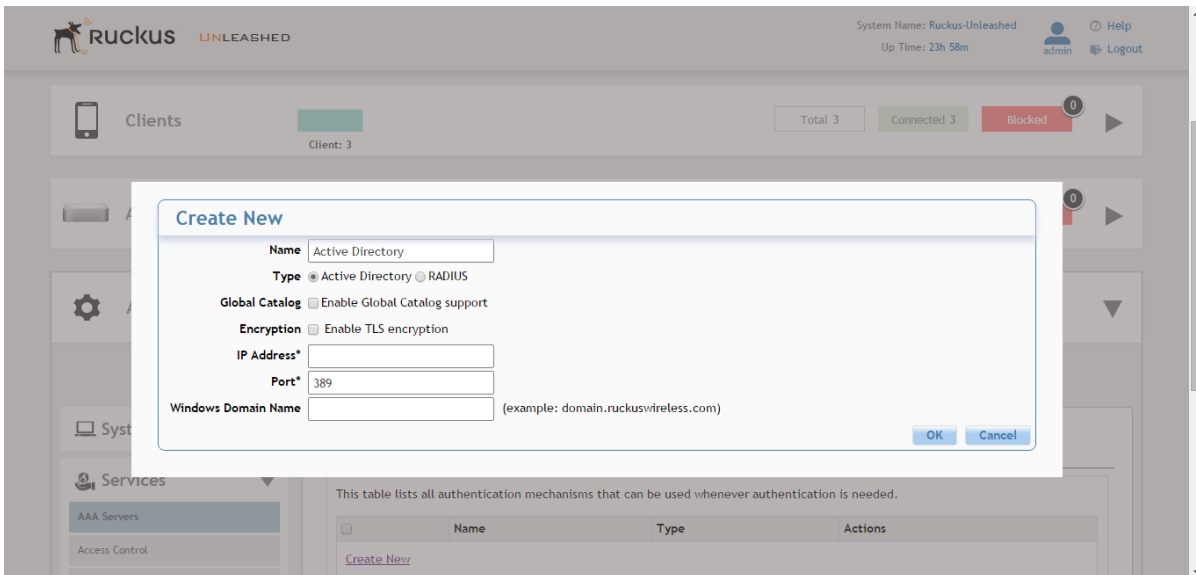
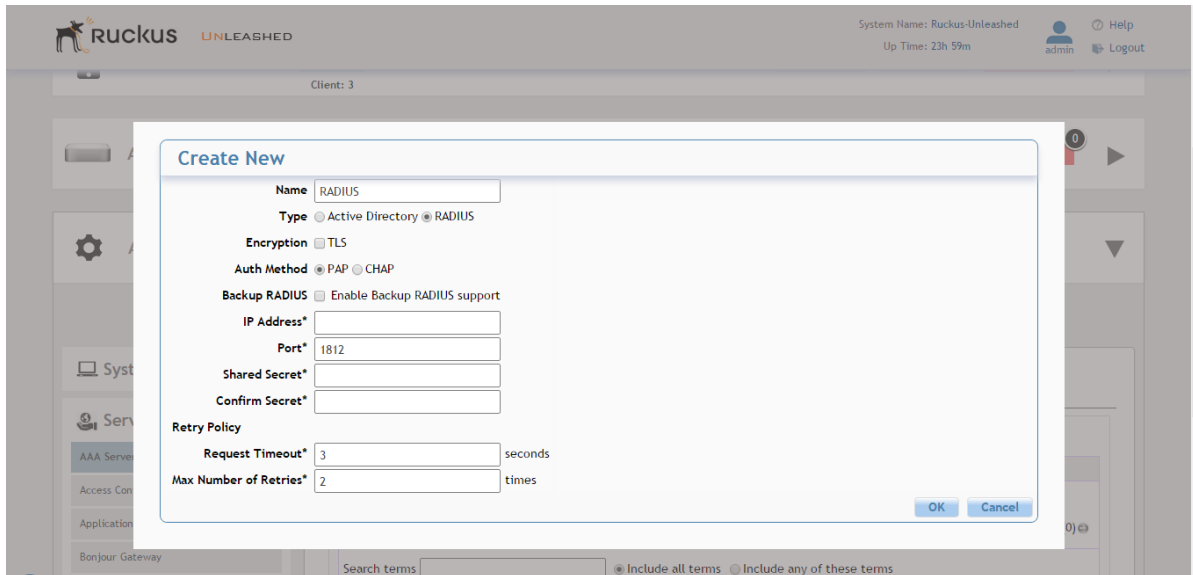


FIGURE 164 Microsoft Active Directory server configuration





**FIGURE 165** RADIUS server configuration



## Testing Authentication Settings

The **Test Authentication Settings** feature allows you to query an AAA server for a known authorized user, and return Groups associated with the user that can be used for configuring Roles within Unleashed.

After you have configured one or more authentication servers in Unleashed, perform this task to ensure that Unleashed can connect to the authentication server and retrieve the groups/attributes that you have configured for each user account.

To test the connection to the auth server:

1. Go to **Admin & Services > Services > AAA Servers > Test Authentication Servers Settings**.
2. Select the authentication server that you want to use from the **Test Against** drop-down menu.
3. In **User Name** and **Password**, enter an Active Directory or RADIUS user name and password.
4. Click **Test**.

If Unleashed was able to connect to the authentication server and retrieve the configured groups/attributes, the information appears at the bottom of the page. The following is an example of the message that will appear when Unleashed authenticates successfully with the server:

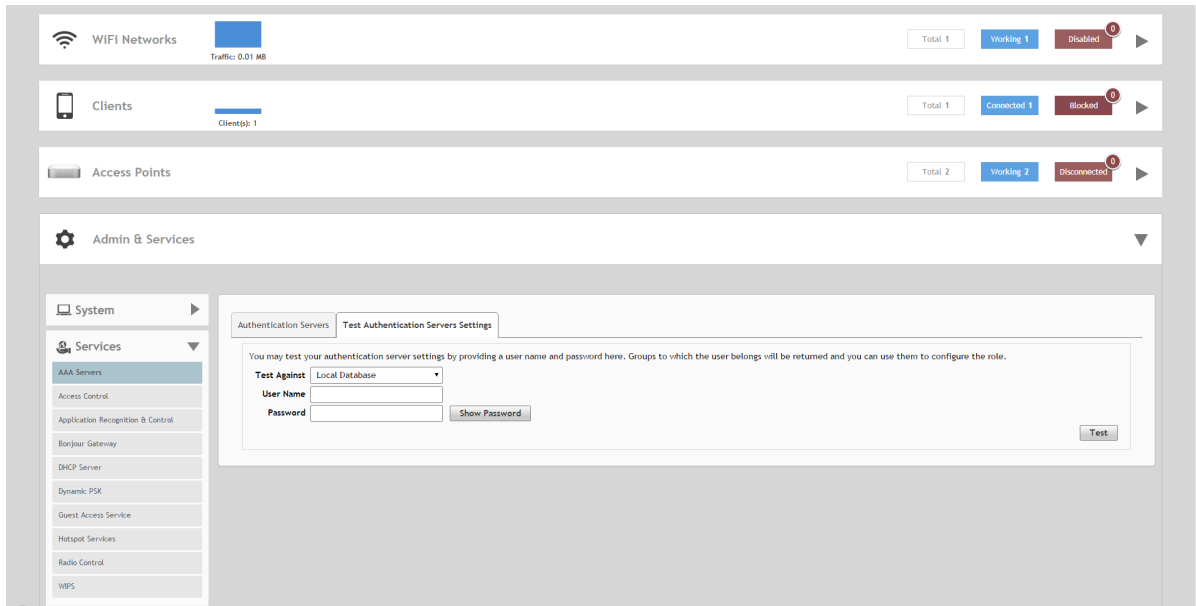
```
Success! Groups associated with this user are "{group_name}". This user will be assigned a role of {role}.
```

If the test was unsuccessful, there are three possible results (other than success) that will be displayed to inform you if you have entered information incorrectly:

- Admin invalid
- User name or password invalid
- Search filter syntax invalid (LDAP only)

These results can be used to troubleshoot the reasons for failure to authenticate users to an AAA server.

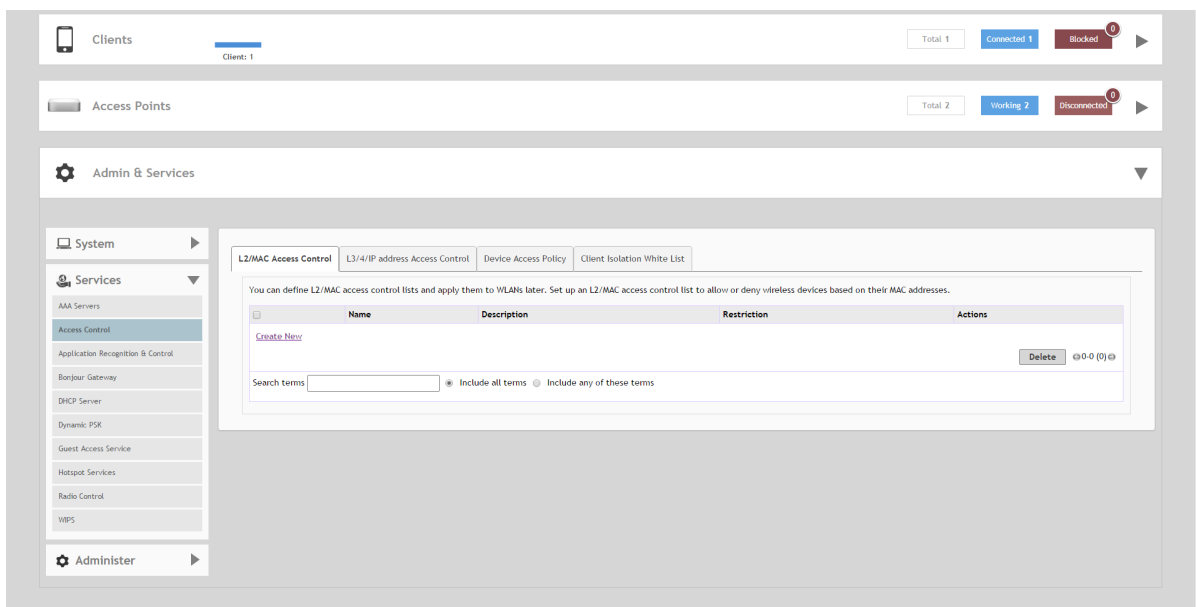
FIGURE 166 Testing authentication server settings



## Access Control

Unleashed provides several options for controlling access to your networks, including Layer 2/MAC address level Access Control Lists (ACLs), Layer 3/Layer 4/IP Address ACLs, Device Access Policies to control clients by OS type, and Client Isolation Whitelists, which are necessary when Wireless Client Isolation is enabled on a WLAN.

FIGURE 167 Configuring Access Controls



## Creating a Layer 2/MAC Address Access Control List

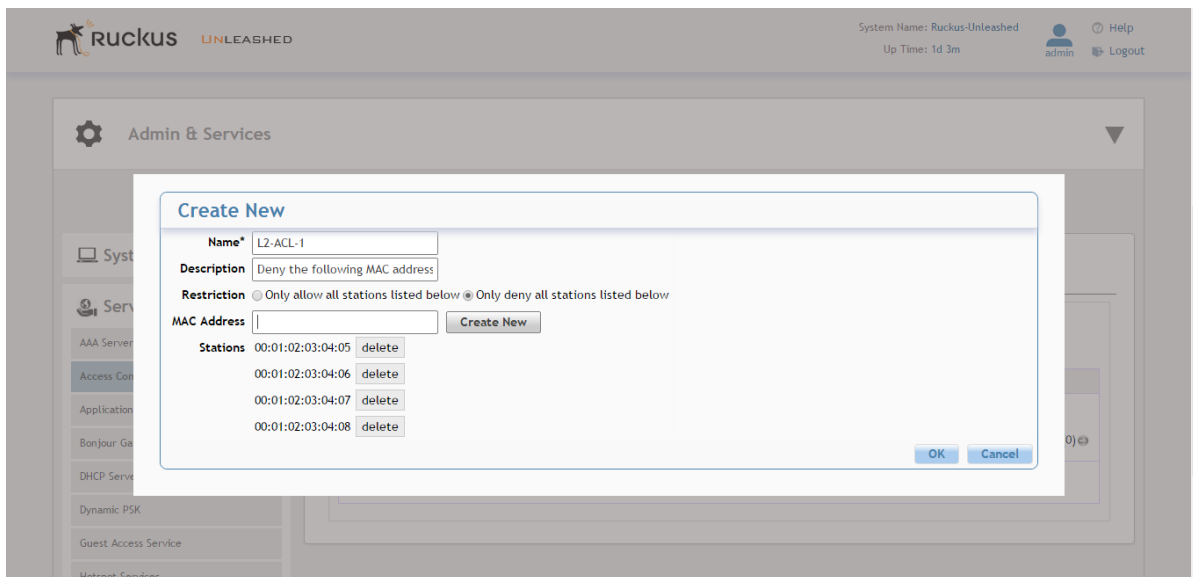
Using the Access Controls configuration options, you can define Layer 2/MAC address ACLs, which can then be applied to one or more WLANs (upon WLAN creation or edit). ACLs are either allow-only or deny-only; that is, an ACL can be set up to allow only specified clients or to deny only specified clients. MAC addresses that are in the deny list are blocked at the AP, not necessarily at the Unleashed Master AP.

To configure an L2/MAC ACL:

1. Go to **Admin & Services > Services > Access Control > L2/MAC Access Control**.
2. Click **Create New**. The ACL **Create New** form appears.
3. Type a **Name** for the ACL, and optionally, a **Description** of the ACL.
4. Select the **Restriction** mode as either allow or deny.
5. Type a MAC address in the **MAC Address** text box, and then click **Create New** to save the address. The new MAC address that you added appears next to the Stations field. You can enter up to 128 MAC addresses per ACL.
6. Click **OK** to save the L2/MAC based ACL.

You can create up to 32 L2/MAC ACL rules and each rule can contain up to 128 MAC addresses. Each WLAN can be configured with one L2 ACL.

**FIGURE 168** Creating a Layer 2 ACL to deny specific MAC addresses



## Creating a Layer 3/Layer 4/IP Address Access Control List

In addition to L2/MAC based ACLs, Unleashed also provides access control options at Layer 3 and Layer 4.

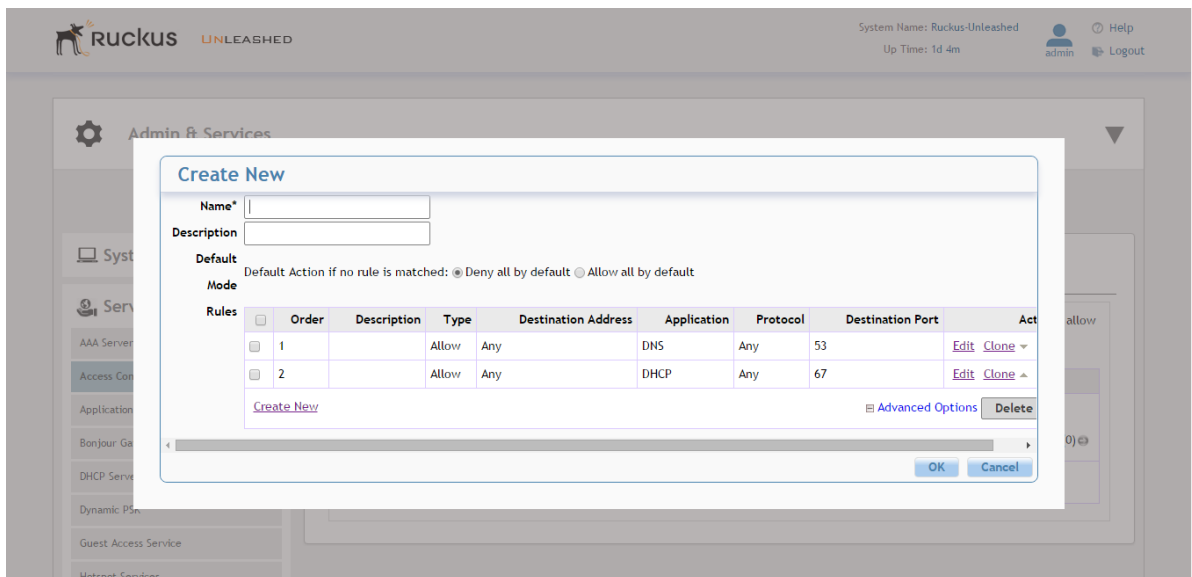
This means that you can configure the access control options based on a set of criteria, including:

- Destination IP Address
- Application
- Protocol
- Destination Port

To create an L3/L4/IP address based ACL:

1. Go to **Admin & Services > Services > Access Control > L3/4/IP Address Access Control**.
2. Click **Create New**. The ACL **Create New** form appears.
3. Type a **Name** for the ACL, and optionally, a **Description** of the ACL.
4. In **Default Mode**, set the default access privilege (allow all or deny all) that you want to grant all users by default.
5. In **Rules**, click **Create New** or click **Edit** to edit an existing rule.
6. Define each access policy by configuring a combination of the following:
  - **Type:** The access privilege (allow or deny) that this policy grants.
  - **Destination Address:** Enter an IP subnet and netmask of the network target to which you want to allow or deny access. (IP address must be in the format A.B.C.D/M, where M is the subnet mask.) Otherwise, select Any. For example, if you enter 192.168.0.1/24, the rule would allow or deny the entire Class C subnet. To allow/deny a single host, use /32 as the netmask.
  - **Application:** If you select a specific application from the menu, the Protocol and Destination Port options are automatically filled with the relevant values and are not configurable.
  - **Protocol:** Enter a network protocol number (0-254), as defined by the IANA (<http://www.iana.org/assignments/protocol-numbers/protocolnumbers.xhtml>) to allow or deny. Otherwise, select Any.
  - **Destination Port:** Enter a valid port number (1-65534) or port range (e.g., 80-443).
7. Click **OK** to save the ACL.
8. Repeat these steps to create up to 32 L3/L4/IP address-based access control rules.

**FIGURE 169** Configuring a Layer 3/4/IP address-based ACL



## Configuring Device Access Policies

In response to the ever-growing numbers of personally owned mobile devices such as smart phones and tablets being brought into the network, IT departments are requiring more sophisticated control over how devices connect, what types of devices can connect, and what they are allowed to do once connected.

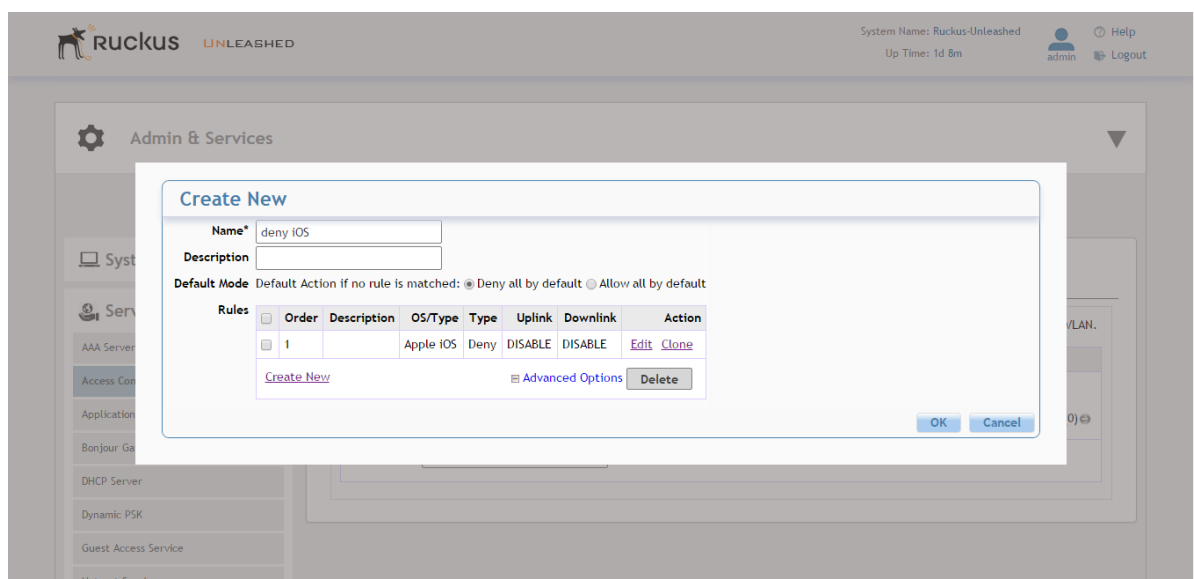
Using the **Device Access Policy** settings, the Unleashed system can identify the type of client attempting to connect, and perform control actions such as permit/deny and rate limiting based on the device type.

Once a Device Access Policy has been created, you can apply the policy to any WLANs for which you want to control access by device type. You could, for example, allow only Apple OS devices on one WLAN and only Linux devices on another.

To create a Device Access Policy:

1. Go to **Admin & Services > Services > Access Control > Device Access Policy**.
2. Click **Create New**.
3. Enter a **Name** and optionally a **Description** for the access policy.
4. In **Default Mode**, select **Deny all by default** or **Allow all by default**.
5. In **Rules**, you can create multiple OS-specific rules for each access policy.
  - **Description:** Description of the rule.
  - **OS/Type:** Select from any of the supported client types.
  - **Type:** Select rule type (allow or deny).
  - **Uplink/Downlink:** Set rate limiting for this client type.
6. Click **Save** to save the rule you created. You can create up to nine rules per access policy (one for each OS/Type).
7. To change the order in which rules are implemented, click the up or down arrows in the **Action** column. You can also **Edit** or **Clone** rules from the **Action** column.
8. To delete a rule, select the box next to the rule and click **Delete**.
9. Click **OK** to save the access policy. You can create up to 32 access policies (one access policy per WLAN).

**FIGURE 170** Creating a Device Access Policy



## Configuring Client Isolation White Lists

When Wireless Client Isolation is enabled on a WLAN, all communication between clients and other local devices is blocked at the Access Point.

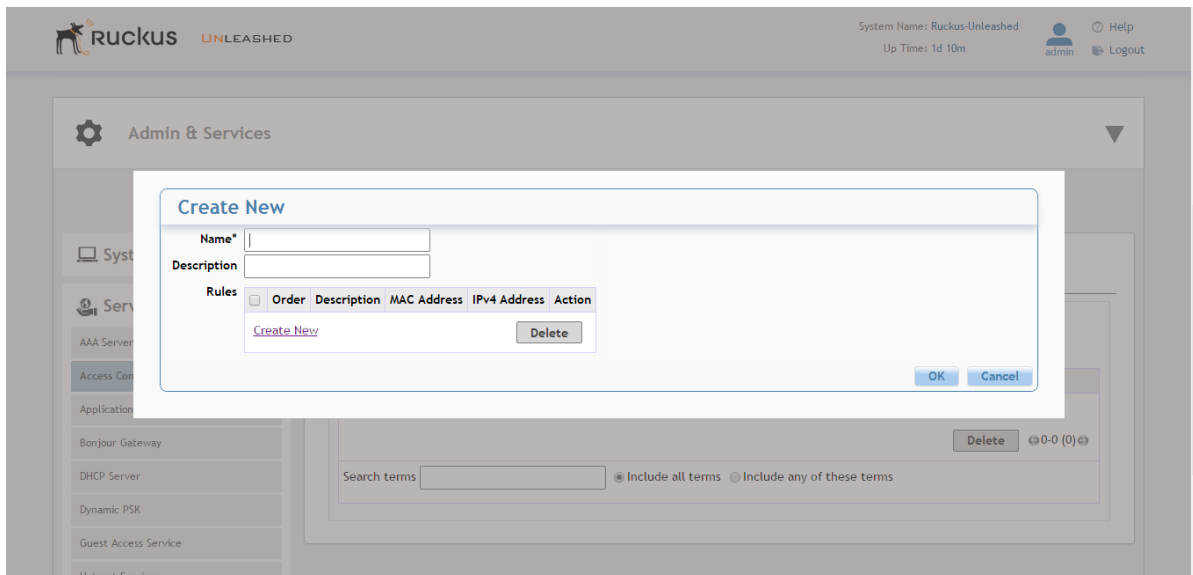
To prevent clients from communicating with other nodes, the Access Point drops all ARP packets from stations on the WLAN where client isolation is enabled and which are destined to IP addresses that are not part of a per-WLAN white list.

You can create exceptions to client isolation (such as allowing access to a local printer, for example) by creating Client Isolation White Lists.

To create a Client Isolation White List:

1. Go to **Admin & Services > Services > Access Control > Client Isolation White List**.
2. Click **Create New**.
3. Enter a **Name** and optionally a description for the whitelist policy.
4. In **Rules**, you can create multiple device-specific rules for each device to be white listed.
  - **Description:** Description of the device.
  - **MAC Address:** Enter the MAC address of the device.
  - **IPv4 Address:** Enter the IP address of the device.
5. Click **Save** to save the rule you created.
6. To change the order in which rules are implemented, select the order from the drop-down menu in the Order column. You can also **Edit** or **Clone** rules from the **Action** column. To delete a rule, select the box next to the rule and click **Delete**.
7. Click **OK** to save the white list.

FIGURE 171 Creating a Client Isolation White List



## Application Recognition and Control

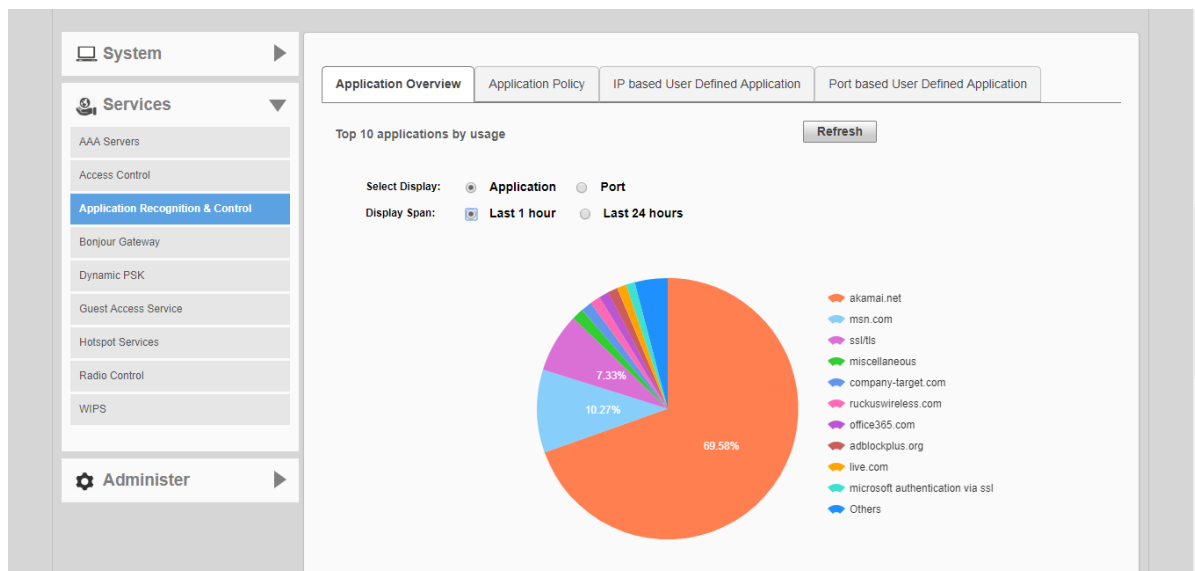
The Application Recognition and Control (ARC) features enable administrators to monitor which applications are generating the most wireless traffic, to apply filtering policies to prevent users from accessing certain applications or to rate limit certain applications, and to enhance the built-in application recognition capabilities with custom applications and port mappings.

### Application Overview

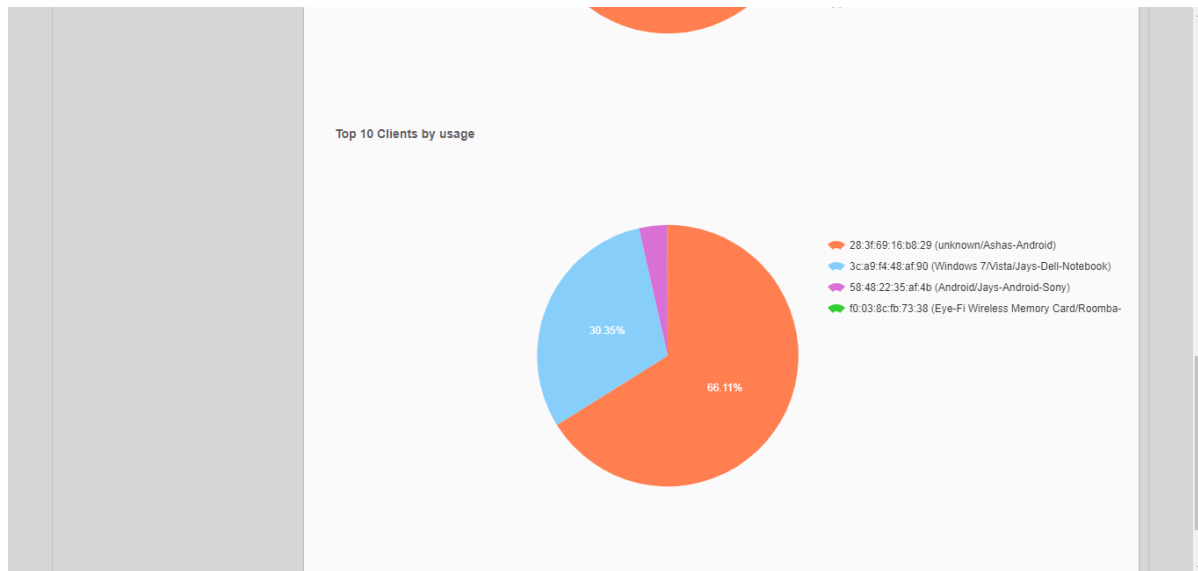
The Application Overview page displays the top 10 applications and the top 10 clients by usage for the last 1 hour or 24 hour time period.

You can choose to display applications by their application name, or by port number. The Top 10 clients chart also shows the client's MAC address and percentage of total traffic for this client when you hover over the pie chart.

**FIGURE 172** Application Overview page



**FIGURE 173** Top 10 clients by usage



## Application Policy

Application Policies can be configured to control access to applications or to control traffic generated by applications.

### NOTE

For more information on Application Policies, see [Application Policies](#) on page 150.

In addition to creating an Application Policy directly from the WLAN advanced options configuration screens, you can also create multiple policies from the **Admin & Services > Services > Application Recognition and Control > Application Policy** page, and then apply them to your WLANs one by one from the WLAN advanced options.

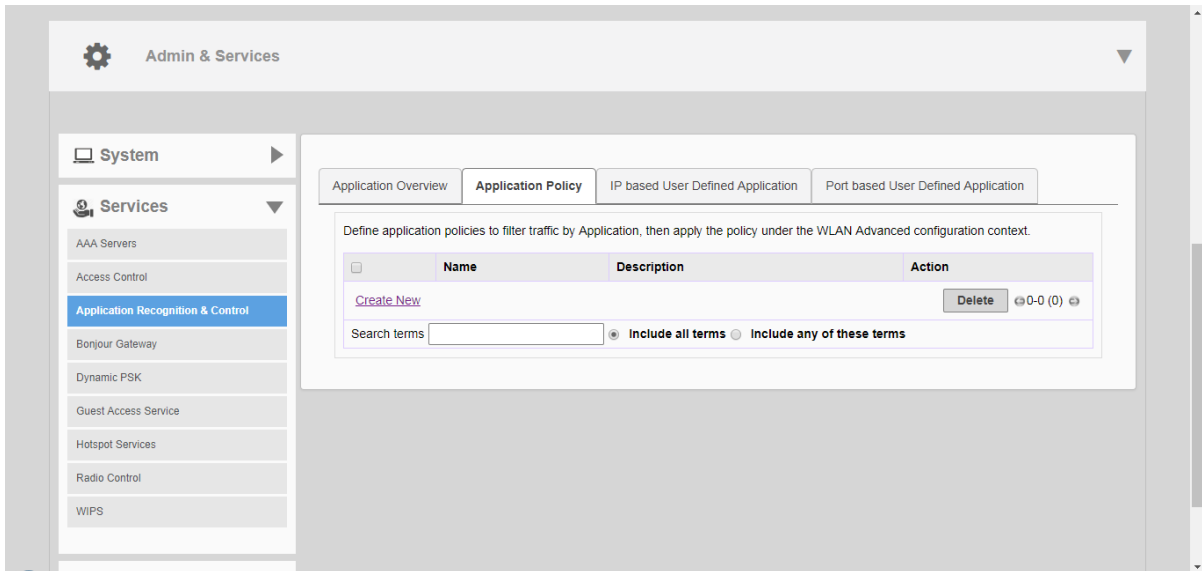
To create an Application Policy:

1. Go to **Admin & Services > Services > Application Recognition and Control**, and click the **Application Policy** tab.
2. Click **Create New** to create a new policy.
3. Enter a **Name** and optionally a **Description** for the policy.
4. In **Rules**, click **Create New** to create a new rule for this policy.
5. In **Rule Type**, select the type of application control policy to enforce:
  - **Denial Policy**: Block the application completely.
  - **Rate Limiting**: Limit traffic volume consumed by the application.
  - **QoS**: Apply QoS prioritization rules to the application.
6. In **Application Type**, Select **HTTP Domain Name** or **Port**.
  - **System Defined**: Choose from a number of built-in categories.
  - **IP Based User Defined Application**: Choose from user-defined applications.
  - **Port Based User Defined Application**: Choose from user-defined applications.
  - **Application Name Based User Defined Application**: Enter an application name or URL (e.g., "google.com").
7. If Rate Limiting or QoS rule type is selected, configure the uplink and downlink speeds for rate limiting or the QoS marking and priority rules for QoS rules.

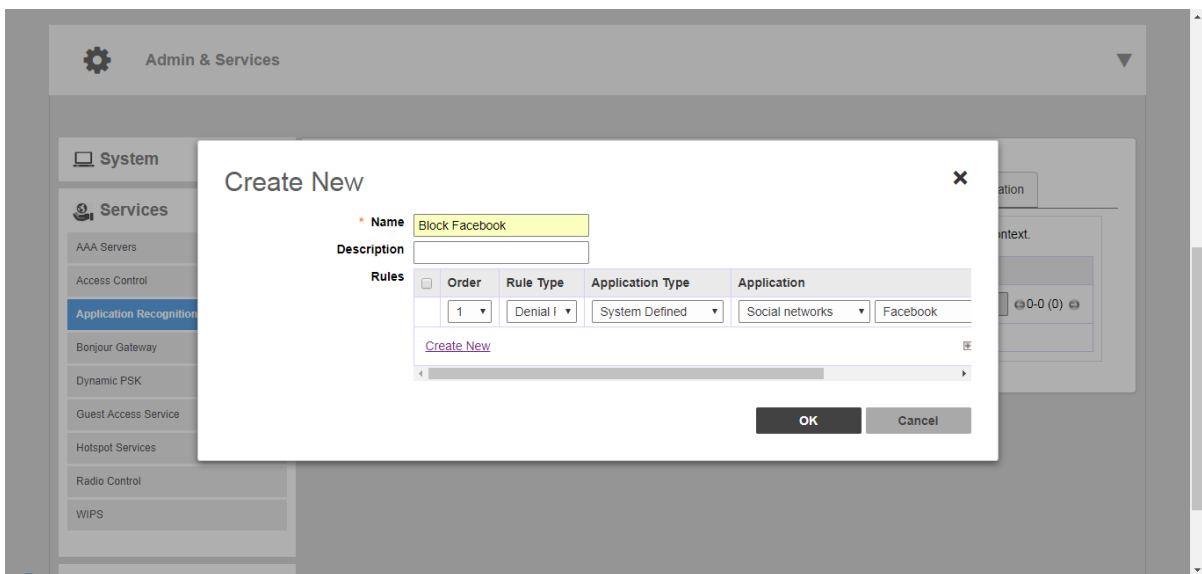


- Click **Save** to save the rule, and click **OK** to save the policy.

**FIGURE 174** Application Policy



**FIGURE 175** Creating a new Application Denial Policy



### **Applying an Application Policy to a WLAN**

For instructions on applying an application policy to a WLAN, see [Advanced WLAN Options](#) on page 143.

## User Defined Applications

When an application is unrecognized and generically (or incorrectly) categorized, you can configure an explicit application identification policy by IP Address/Mask, Port and Protocol. Wireless traffic that matches the configured policy will be displayed using the policy's name on the **Application Overview** page.

Unleashed provides two methods to create new user-defined applications:

- IP-based User Defined Applications
- Port based User Defined Applications

Application identification policies are implemented according to the following priority order:

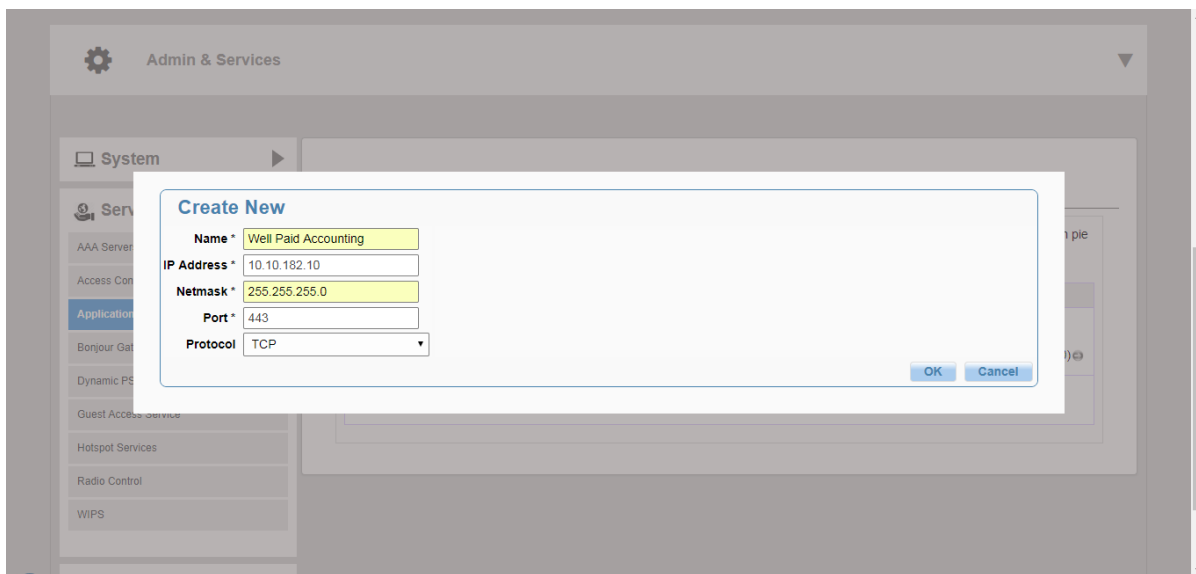
1. IP-based user defined applications
2. System defined applications
3. Port-based user defined applications

### IP Based User Defined Applications

The following figure shows how to configure an IP-based user defined application policy to identify a corporate accounting application.

Unleashed identifies wireless traffic matching this policy as "Well Paid Accounting" and displays this name in the application recognition pie charts and tables.

**FIGURE 176** Create new IP based User Defined Application



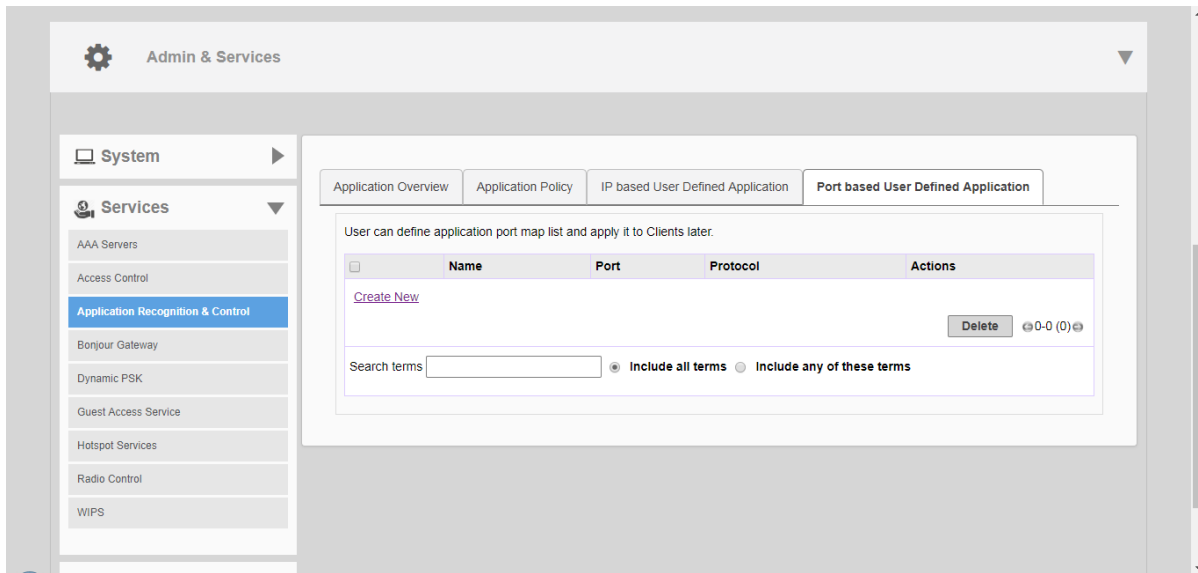
### Port Based User Defined Applications

When an application is unrecognized and generically (or incorrectly) categorized you can configure an application identification policy by IP Port and Protocol.

Wireless traffic that matches a configured policy will be displayed using the policy's Description text in the Application Recognition pie charts. You can create new port-to-application name mappings individually using the *Port based User Defined Application* tab.

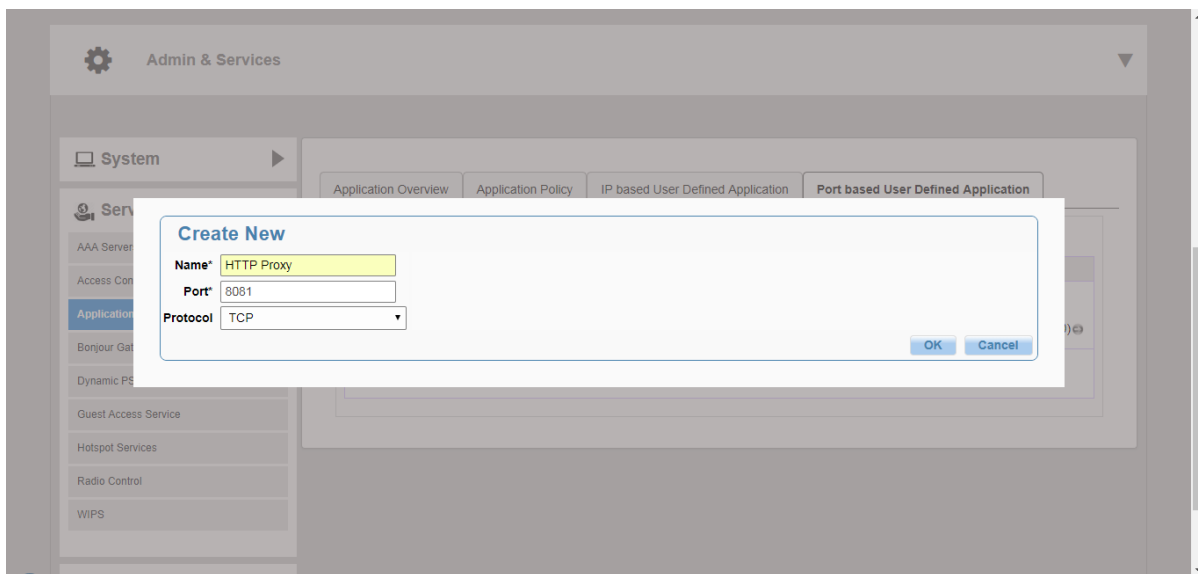
This type of application categorization is the least granular in configuration and hence it has the lowest priority as a means of application identification. If for example you configure a port-based user-defined Application for port 80/TCP, any such matching wireless traffic not identified by either an IP-based application or the default embedded applications will be identified as belonging to this application.

**FIGURE 177** Application Port Mapping



**FIGURE 178** Create new port based user-defined application

The following figure shows how a port-based user-defined application policy could be used to identify all port 8081 wireless traffic as "HTTP Proxy" traffic and display this name in application recognition pie charts and tables.



## Bonjour Gateway

Bonjour is Apple's implementation of a zero-configuration networking protocol for Apple devices over IP.

It allows OS X and iOS devices to locate other devices such as printers, file servers and other clients on the same broadcast domain and use the services offered without any network configuration required.

Multicast applications such as Bonjour require special consideration when being deployed over wireless networks. Bonjour only works within a single broadcast domain, which is usually a small area. This is by design to prevent flooding a large network with multicast traffic. However, in some situations, a user may want to offer Bonjour services from one VLAN to another.

The Bonjour Gateway feature addresses this requirement by providing an mDNS proxy service configurable from the web interface to allow administrators to specify which types of Bonjour services can be accessed from/to which VLANs.

In order for the Bonjour Gateway to function, the following network configuration requirements must be met:

- The target networks must be segmented into VLANs.
- VLANs must be mapped to different WLANs.
- The controller must be connected to a VLAN trunk port.

Additionally, if the VLANs to be bridged by the gateway are on separate subnets the network has to be configured to route traffic between them.

### Creating a Bonjour Gateway Service

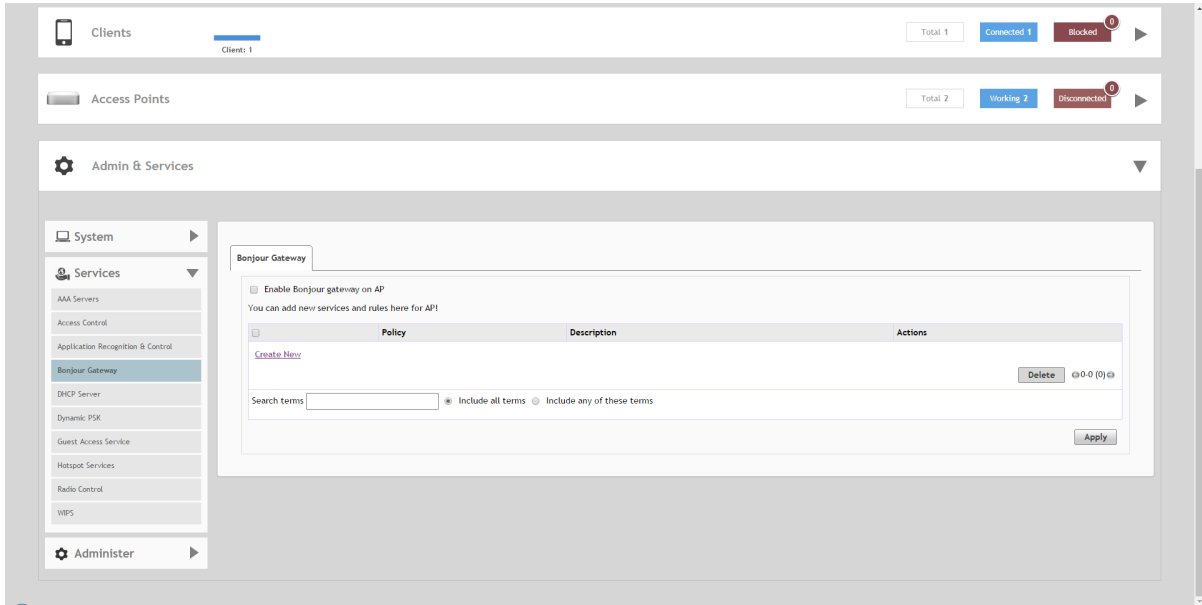
The Bonjour Gateway service is essentially a list of rules for mapping services from one VLAN to another. Using the Bonjour Gateway feature, the Unleashed AP serves as the Bonjour proxy for forwarding Bonjour packets to the designated VLANs.

To configure rules for bridging Bonjour services across VLANs:

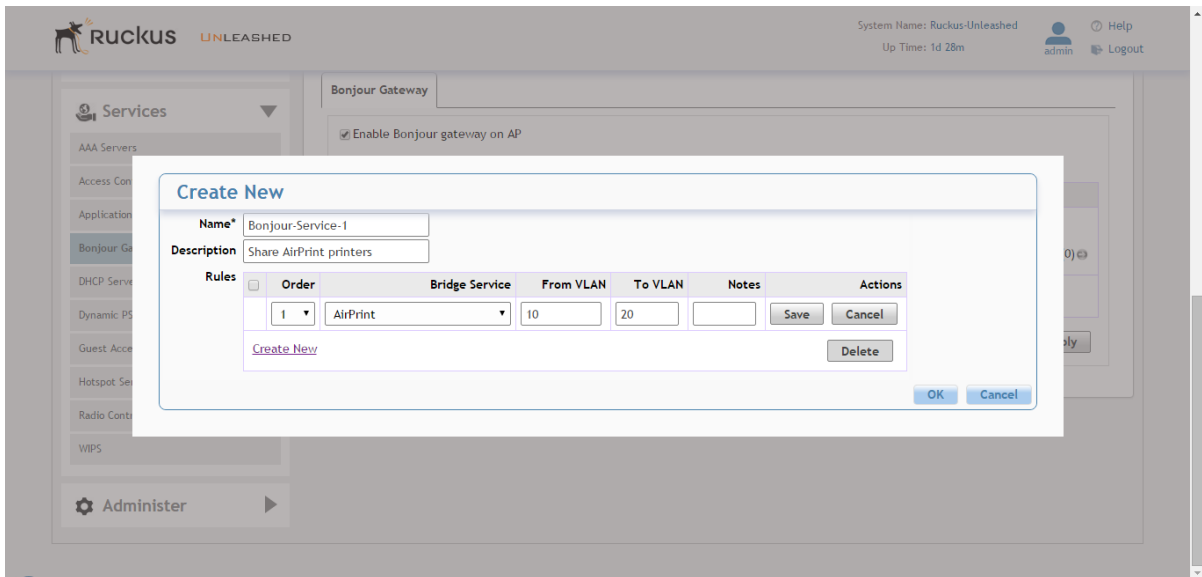
1. Go to **Admin & Services > Services > Bonjour Gateway**.
2. Enable the check box next to **Enable Bonjour gateway on AP**.
3. Click **Create New** to create a new Bonjour service.
4. Enter a **Name** and optionally a **Description** for the service.
5. Click **Create New** to create a new rule.
6. In the **Create New** form, configure the following options:
  - **Bridge Service:** Select the Bonjour service from the list.
    - Selecting "Other" allows you to create custom rules, for example, creating a rule for "\_googlecast.\_tcp" would allow you to bridge Chromecast services across VLANs.
  - **From VLAN:** Select the VLAN from which the Bonjour service will be advertised.
  - **To VLAN:** Select the VLAN to which the service should be made available.
  - **Notes:** Add optional notes for this rule.
7. Click **OK** to save your changes.
8. Repeat for any additional rules.

- Click **Apply** to save the Bonjour Service.

**FIGURE 179** Bonjour Gateway configuration



**FIGURE 180** Create new Bonjour service



## Deploying a Bonjour Service to an AP

Once a Bonjour Service has been created, you can select it from any Unleashed AP's configuration page to deploy the Bonjour bridging service from that AP.

### NOTE

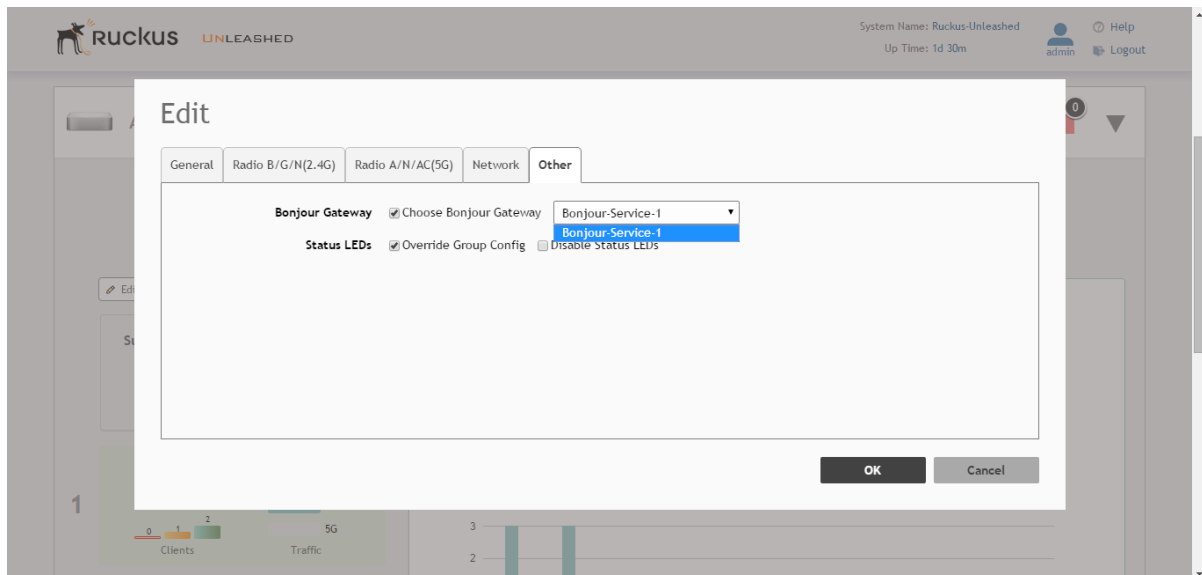
Bonjour services can consume significant memory and CPU resources (especially when a large number of rules is created). Therefore, Ruckus recommends deploying the Bonjour services to an AP that is not the Unleashed Master AP.

### NOTE

It is only necessary to configure Bonjour service on one AP in the Unleashed network.

1. From the **Dashboard**, go to **Access Points > [select an AP] > Edit > Other**.
2. Enable the **Choose Bonjour Gateway** box, and select the service you created from the drop-down menu.
3. Click **OK** to save your changes.

**FIGURE 181** Select Bonjour service to be deployed on an AP



## Dynamic PSK

Use this page to batch generate multiple DPSKs using a csv file that can be edited in a spreadsheet program (such as Microsoft Excel).

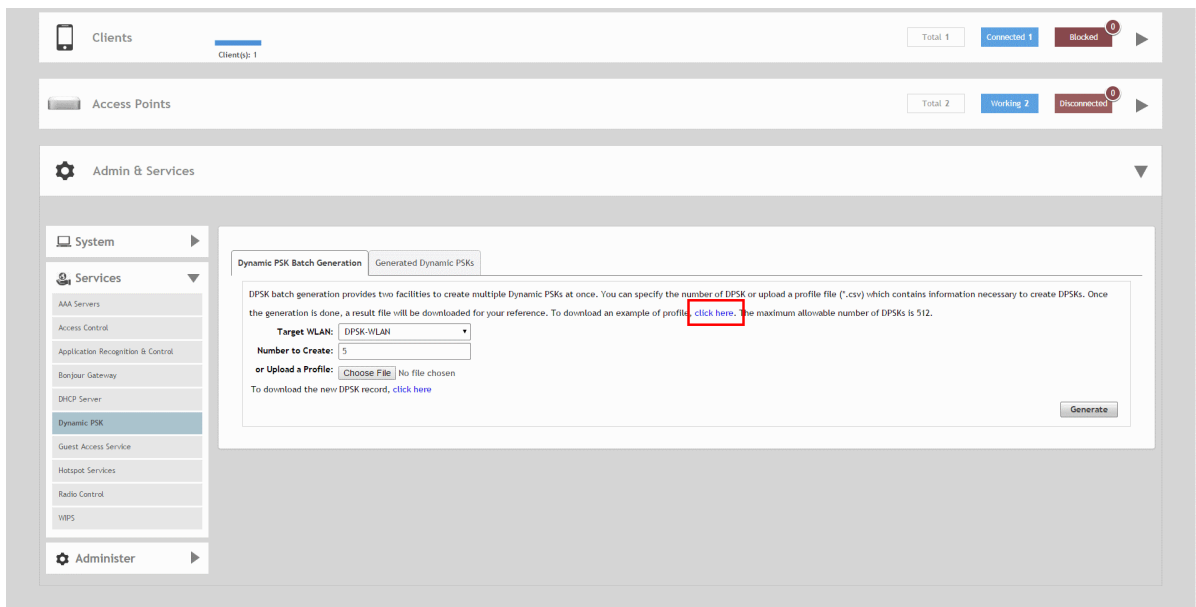
Creating a DPSK batch generation profile is useful if you want to customize the user names that will be used for accessing the DPSK WLAN, as opposed to user names such as "BatchDPSK\_User\_1," etc.

1. Go to **Admin & Services > Services > Dynamic PSK**.
2. In the **Dynamic PSK Batch Generation** tab, look for the following message: *To download an example of profile,click here*.
3. Click the **click here** link to download a sample profile.
4. Save the sample batch DPSK profile (in CSV format) to your computer.

5. Using a spreadsheet application, open the CSV file and edit the batch dynamic PSK profile by filling out the following columns:
  - **User Name:** (Required) Type the name of the user (one name per row).
  - **MAC Address:** (Optional) If you know the MAC address of the device that the user will be using, type it here.
6. Go back to the **Dynamic PSK Batch Generation** screen, and click the **Choose File** button to upload the CSV file you edited.
7. Select the **Target WLAN** and **Number to Create**.
8. Click **Generate** to generate the custom DPSKs that you modified.

After the DPSKs have been generated, you can download the same file (with the passphrases filled in) by clicking the **Click Here** link at the end of the "To download the generated DPSK record, **click here**" sentence.

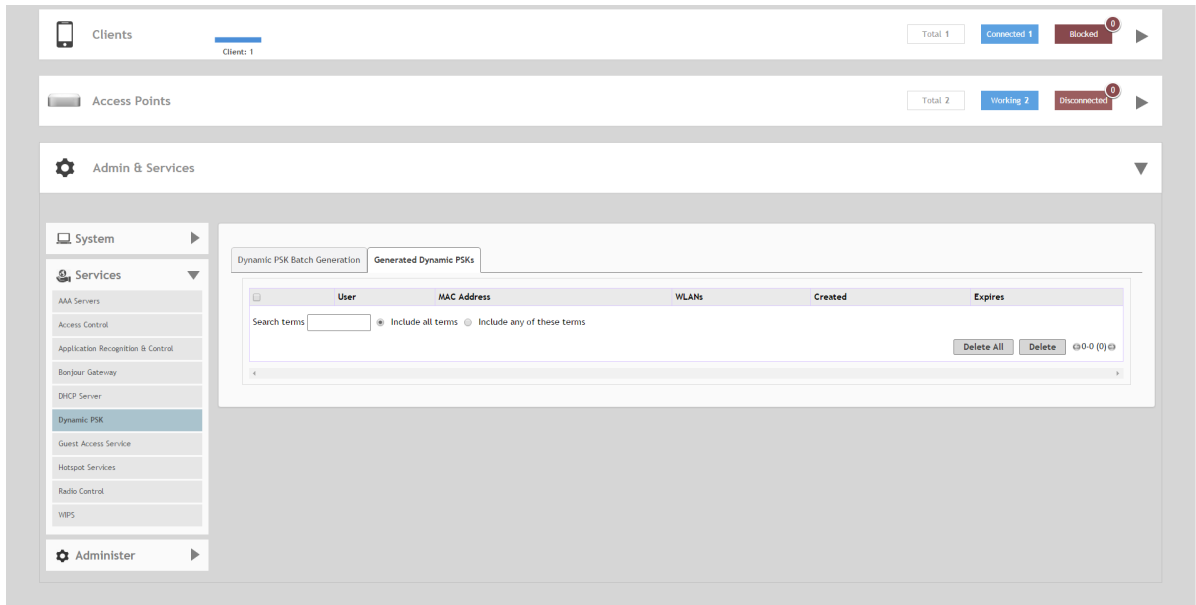
**FIGURE 182** Dynamic PSK batch generation



## Viewing Generated DPSKs

In addition to downloading the generated DPSK record in CSV format, you can also view the DPSKs that have been generated from the Generated Dynamic PSKs tab.

FIGURE 183 Viewing generated DPSKs



## Hotspot Services

A Hotspot Service is required to deploy a Hotspot (WISPr 1.0) WLAN.

You can create a Hotspot service when creating a new WLAN (by clicking **Create New** after you select Hotspot Service as the WLAN type), or you can create multiple Hotspot services from the Administration settings and then deploy them to your Hotspot WLANs afterwards.

Additionally, you can use the **Admin & Services** pages to edit or reconfigure Hotspot service policy settings after WLAN creation.

### Creating a Hotspot Service

The **Admin & Services > Services > Hotspot Services** page can be used to configure a WISPr Hotspot service to provide public access to users. In addition to the Unleashed APs, you will need the following to deploy a Hotspot:

- **Captive Portal:** A special web page, typically a login page, to which users that have associated with your Hotspot will be redirected for authentication purposes. Users will need to enter a valid user name and password before they are allowed access to the Internet through the Hotspot. Open source captive portal packages, such as Chillispot, are available on the Internet. For a list of open source and commercial captive portal software, visit [https://en.wikipedia.org/wiki/Captive\\_portal#Software\\_Captive\\_Portals](https://en.wikipedia.org/wiki/Captive_portal#Software_Captive_Portals), and
- **RADIUS Server:** A Remote Authentication Dial-In User Service (RADIUS) server through which users can authenticate.

For installation and configuration instructions for the captive portal and RADIUS server software, refer to the documentation that was provided with them. After completing the steps below, you will need to edit the WLAN(s) for which you want to enable Hotspot service, as described in Assigning a WLAN to Provide Hotspot Service.



Unleashed supports up to 32 WISPr Hotspot service entries, each of which can be assigned to multiple WLANs.

To create a Hotspot service:

1. Go to **Admin & Services > Services > Hotspot Service**. Alternatively, you can create a new Hotspot service from the WLAN creation page (**Dashboard > Wi-Fi Networks > Create > Hotspot > Hotspot Services > Create New**).
2. Click **Create New**. The **Create New** form appears.
3. From the **General** tab, in **Name**, enter a name for this Hotspot service.
4. In **WISPr Smart Client Support**, select whether to allow WISPr Smart Client support:
  - **None**: (default).
  - **Enabled**: Enable Smart Client support.

**NOTE**

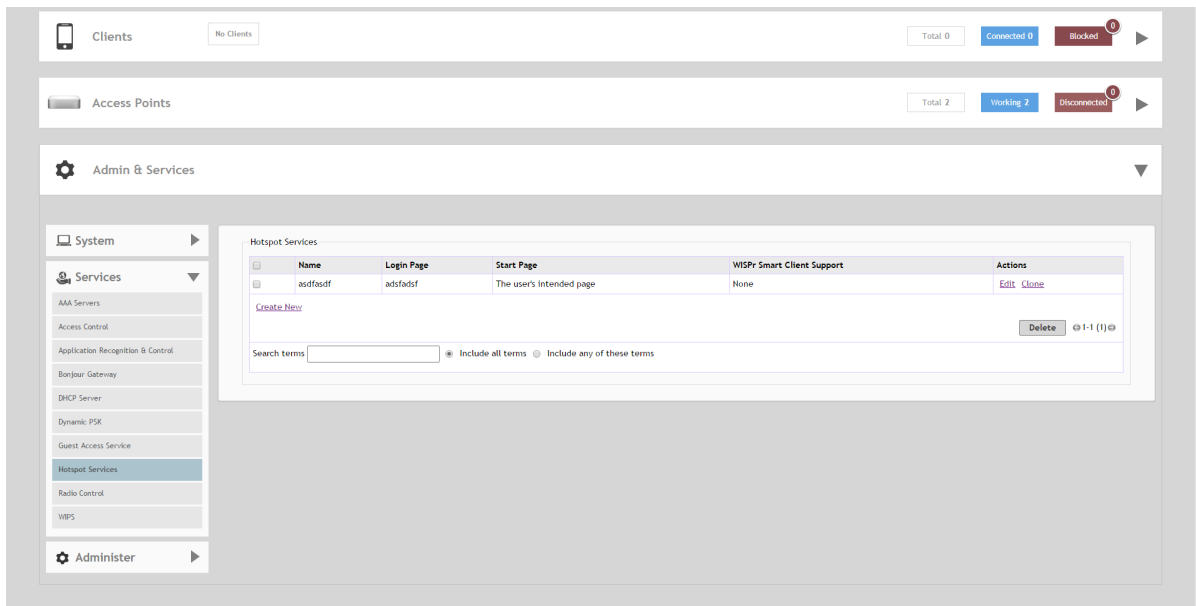
The WISPr Smart Client is not provided by Ruckus - you will need to provide Smart Client software/hardware to your users if you select this option.

- **Only WISPr Smart Client allowed**: Choose this option to allow only clients that support WISPr Smart Client login to access this Hotspot. If this option is selected, a field appears in which you can enter instructions for clients attempting to log in using the Smart Client application.
  - **Smart Client HTTP Secure**: If Smart Client is enabled, choose whether to authenticate users over HTTP or HTTPS.
5. In **Login Page**, type the URL of the captive portal (the page where Hotspot users can log in to access the service).
  6. Configure optional settings as preferred:
    - In **Start Page**, configure where users will be redirected after successful login. You could redirect them to the page that they want to visit, or you could set a different page where users will be redirected (for example, your company website).
    - In **User Session**, configure session timeout and grace period, both disabled by default.
      - **Session Timeout**: Specify a time limit after which users will be disconnected and required to log in again.
      - **Grace Period**: Allow disconnected users a grace period after disconnection, during which clients will not need to re-authenticate. Enter a number in minutes, between 1 and 144,000.
  7. In the **Authentication** tab, select the AAA server that you want to use to authenticate users from the **Authentication Server** drop-down menu.
    - Options include Local Database and any AAA servers that you configured on the **Configure > AAA Servers** page. If a RADIUS server is selected, an additional option appears: **Enable MAC authentication bypass (no redirection)**. Enabling this option allows users with registered MAC addresses to be transparently authorized without having to log in. A user entry on the RADIUS server needs to be created using the client MAC address as both the user name and password. The MAC address format can be configured in one of the formats listed in MAC Authentication with an External RADIUS Server.
  8. In **Accounting Server** (if you have an accounting server set up), select the server from the list and configure the frequency (in minutes) at which accounting data will be retrieved.
  9. In **Wireless Client Isolation**, choose whether clients connected to this Hotspot WLAN should be allowed to communicate with one another locally. See [Advanced WLAN Options](#) on page 143 for a description of the same feature for non-Hotspot WLANs.

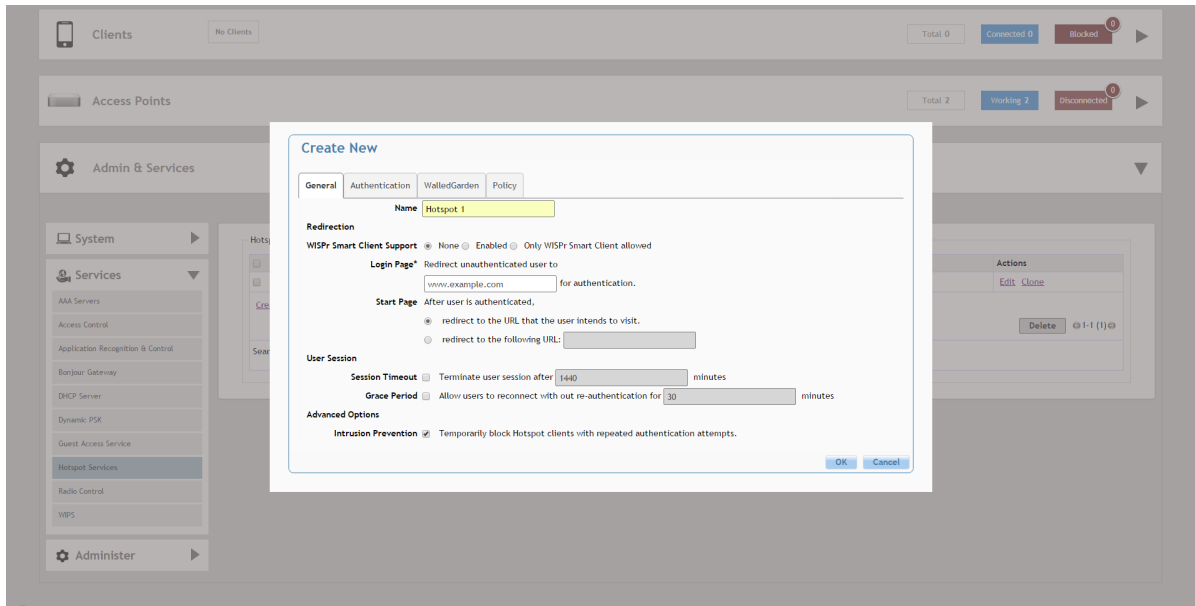
10. On the **Walled Garden** and **Policy** tabs, configure optional settings as preferred:
  - In **Location Information**, enter Location ID and Location Name WISPr attributes, as specified by the Wi-Fi Alliance.
  - In **Walled Garden**, enter network destinations (URL or IP address) that users can access without going through authentication. A Walled Garden is a limited environment to which an unauthenticated user is given access for the purpose of setting up an account. After the account is established, the user is allowed out of the Walled Garden.
  - In **Restricted Subnet**, define L3/4 IP address access control rules for the Hotspot service to allow or deny wireless devices based on their IP addresses.
  - Under **Advanced Options**, enable **Intrusion Prevention** to temporarily block Hotspot clients that fail repeated authentication attempts. When this option is enabled, if the same station attempts to authenticate 10 times unsuccessfully within 600 seconds, the station will be blocked for 600 seconds. If the same user unsuccessfully attempts to authenticate 30 times within the same time period, the user will be blocked for 600 seconds.
11. Click **OK** to save the Hotspot settings.

The page refreshes and the Hotspot service you created appears in the list. You may now assign this Hotspot service to the WLANs that you want to provide Hotspot Internet access, as described in [Assigning a WLAN to Provide Hotspot Service](#) on page 231.

**FIGURE 184** The Hotspot Services page



**FIGURE 185** Creating a new Hotspot service



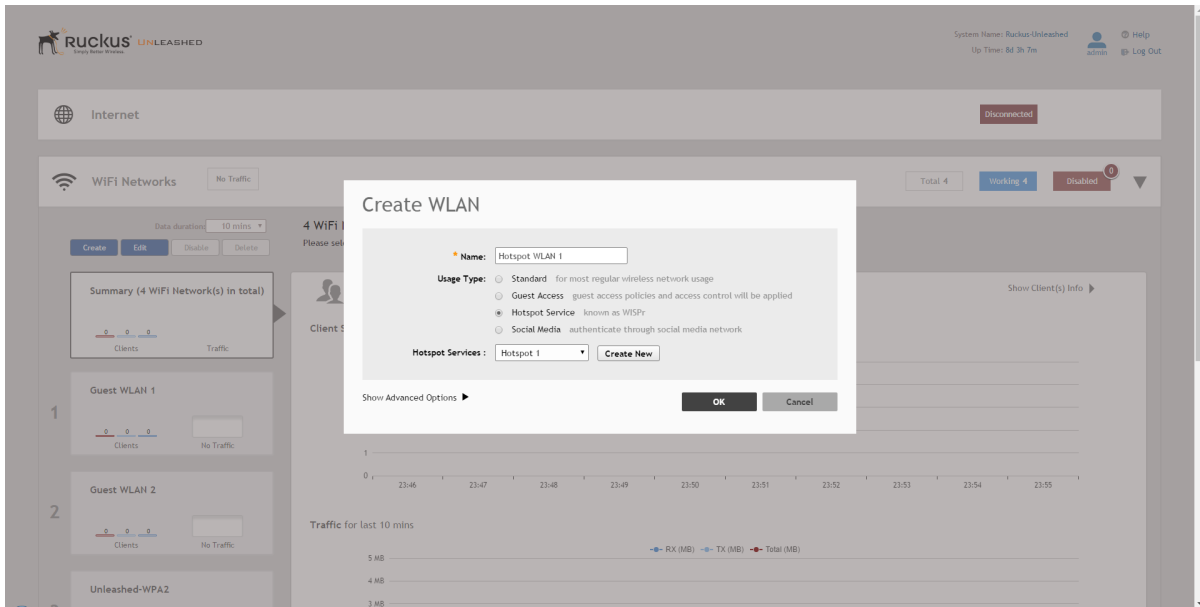
### **Assigning a WLAN to Provide Hotspot Service**

Once you have created a Hotspot service, you need to specify the WLANs to which you want to deploy the Hotspot configuration. To configure an existing WLAN to provide Hotspot service, do the following:

1. Go to **Dashboard > Wi-Fi Networks > [WLAN name] > Edit**.
2. In **Usage Type**, select **Hotspot Service**.
3. In **Hotspot Services**, select a Hotspot service from the list if you have already created one, or click **Create New** to begin creating a new Hotspot service for this WLAN. (See [Creating a Hotspot Service](#) on page 228).

4. Click **OK** to save your changes.

**FIGURE 186** Assigning a Hotspot service to a Hotspot WLAN



## Radio Control

The Radio Control options include settings for automatic radio channel selection using Background Scanning or ChannelFly, client Load Balancing, Band Balancing and Radar Avoidance Pre-Scanning.

### Self Healing

Unleashed uses built-in network "self healing" diagnostics and tuning tools to maximize wireless network performance.

### Automatically Adjust AP Radio Power

Unleashed provides a feature to automatically adjust AP radio power to optimize coverage when interference is present. This feature is designed to turn down the power of an access point if the following conditions are met:

- The power is set to Auto in the AP configuration.
- The AP can hear another AP that is on the same channel and same Unleashed network.
- The AP can hear the other AP at a minimum of 50dB which means the Access Points are very close to each other.

Note that the 2.4G and 5G radio bands are considered independently. If all conditions are met, the AP will reduce its power by half. The other AP may or may not necessarily reduce its power simultaneously.

#### NOTE

In general, Ruckus does NOT recommend enabling this feature as it can lead to non-optimal AP power levels. With BeamFlex access points, Ruckus' general guidelines are to run access points at full power to maximize the throughput and SINR levels, thus maximizing data rates and performance.

## Automatically Adjust 2.4GHz/5GHz Radio Channels Using Background Scanning

Using Background Scanning, the Unleashed Master AP regularly samples the activity in all Access Points to assess RF usage, to detect rogue APs and to determine the optimal channel for automatic channel selection.

These scans sample one channel at a time in each AP so as not to interfere with network use. You can, if you prefer, customize the automatic scanning of RF activity, deactivate it if you feel it's not helpful, or adjust the frequency, if you want scans at greater or fewer intervals (see [Background Scanning](#) on page 234).

### NOTE

Background Scanning must be enabled to detect rogue APs on the network.

## Automatically Adjust 2.4GHz/5GHz Radio Channels Using ChannelFly

The main difference between ChannelFly and Background Scanning is that ChannelFly determines the optimal channel based on real-time statistical analysis of actual throughput measurements, while Background Scanning uses channel measurement and other techniques to estimate the impact of interference on Wi-Fi capacity based on progressive scans of all available channels.

### NOTE

If you enable ChannelFly, Background Scanning can still be used for adjusting radio power and rogue detection while ChannelFly manages the channel assignment. Both cannot be used at the same time for channel management.

## Benefits of ChannelFly

With ChannelFly, the AP intelligently samples different channels while using them for service. ChannelFly assesses channel capacity every 15 seconds and changes channel when, based on historical data, a different channel is likely to offer higher capacity than the current channel. Each AP makes channel decisions based on this historical data and maintains an internal log of channel performance individually.

When ChannelFly changes channels, it utilizes 802.11h channel change announcements to seamlessly change channels with no packet loss and minimal impact to performance. The 802.11h channel change announcements affect both wireless clients and Ruckus mesh nodes in the 2.4 GHz and/or 5 GHz bands.

Initially (in the first 30-60 minutes) there will be more frequent channel changes as ChannelFly learns the environment. However, once an AP has learned about the environment and which channels are most likely to offer the best throughput potential, channel changes will occur less frequently unless a large measured drop in throughput occurs.

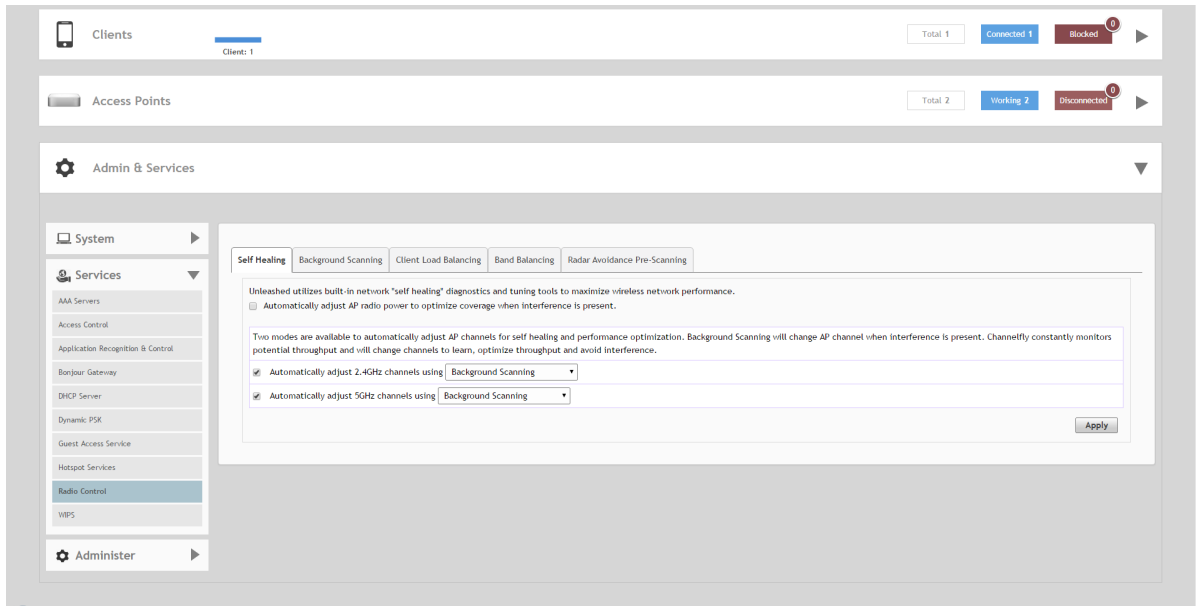
ChannelFly can react to large measured drops in throughput capacity in as little as 15 seconds, while smaller drops in capacity may take longer to react to.

## Disadvantages of ChannelFly

Compared to Background Scanning, ChannelFly takes considerably longer for the network to settle down. If you will be adding and removing APs to your network frequently, Background Scanning may be preferable. Additionally, if you have clients that do not support the 802.11h standard, ChannelFly may cause significant connectivity issues during the initial capacity assessment stage.

You can enable/disable ChannelFly per band. If you have 2.4 GHz clients that do not support 802.11h, Ruckus recommends disabling ChannelFly for 2.4 GHz but leaving it enabled for the 5 GHz band.

FIGURE 187 Self Healing



## Background Scanning

Scanning intervals can be configured on the 2.4 GHz and 5 GHz radios independently.

- **Run a background scan on the 2.4 GHz radio every [ ]:** Select this check box enter the time interval (1~65535 seconds, default is 20) that you want to set between each scan.
- **Run a background scan on the 5 GHz radio every [ ]:** Select this check box enter the time interval (1~65535 seconds, default is 20) that you want to set between each scan.

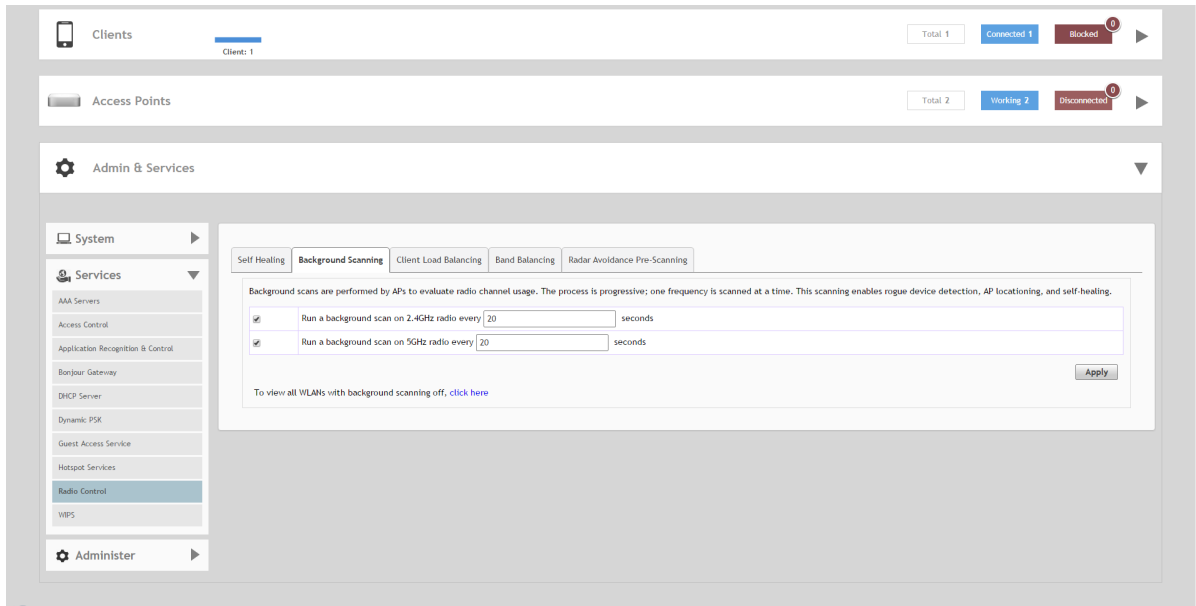
### NOTE

If you want to disable Background Scanning, clear the check box; this should result in a minor increase in AP performance, but removes the detection of rogue APs. You can also decrease the scan frequency, as less frequent scanning improves overall AP performance.

### NOTE

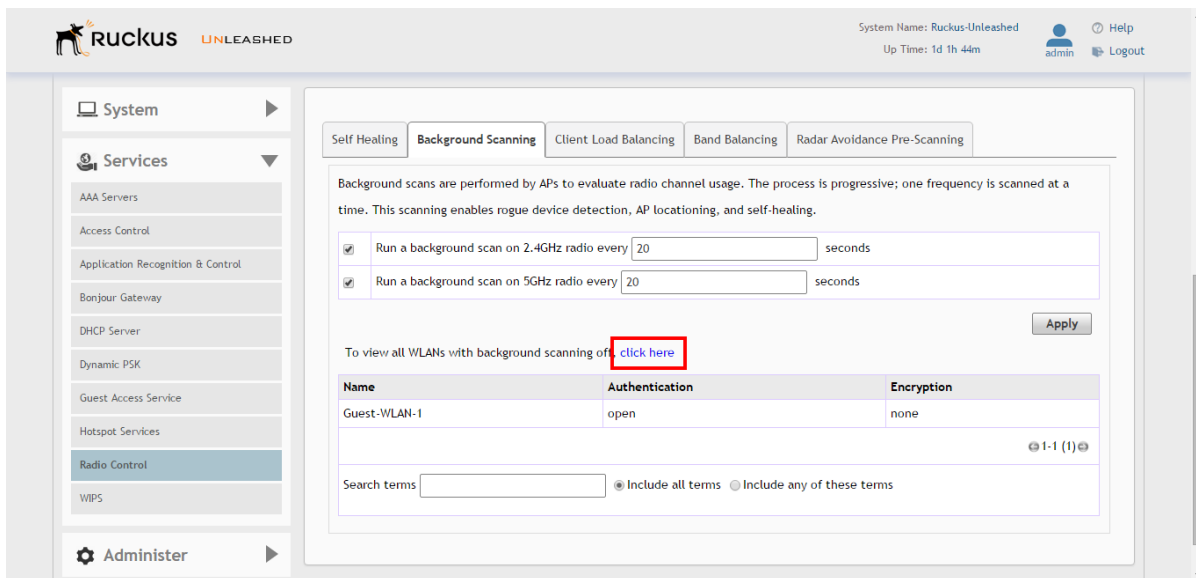
You can also disable Background Scanning on a per-WLAN basis from the **Dashboard > Wi-Fi Networks** screen. To disable scanning for a particular WLAN, click the **Edit** link next to the WLAN for which you want to disable scanning, open **Advanced Options**, select the **Radio Control** tab, and click the check box next to **Disable Background Scanning**.

**FIGURE 188** Background Scanning



To see whether Background Scanning is enabled or disabled for a particular WLAN, click the **click here** link at the bottom of the page.

**FIGURE 189** Viewing the WLANs with Background Scanning disabled



## Client Load Balancing

Enabling load balancing can improve WLAN performance by helping to spread the client load between nearby access points, so that one AP does not get overloaded while another sits idle. The load balancing feature can be controlled from within the Unleashed web interface to balance the number of clients per radio on adjacent APs. "Adjacent APs" are determined at startup by measuring the RSSI during channel scans. After startup, Unleashed uses subsequent scans to update the list of adjacent radios periodically and when a new AP sends its first scan report. When an AP leaves, Unleashed immediately updates the list of adjacent radios and refreshes the client limits at each affected AP.

Once Unleashed is aware of which APs are adjacent to each other, it begins managing the client load by sending desired client limits to the APs. These limits are "soft values" that can be exceeded in several scenarios, including: (1) when a client's signal is so weak that it may not be able to support a link with another AP, and (2) when a client's signal is so strong that it really belongs on this AP.

The APs maintain these desired client limits and enforce them once they reach the limits by withholding probe responses and authentication responses on any radio that has reached its limit.

Key points on load balancing:

- Load balancing does not disassociate clients already connected.
- Load balancing takes action before a client association request, reducing the chance of client misbehavior.
- The process does not require any time-critical interaction between APs.
- Provides control of adjacent AP distance with safeguards against abandoning clients.
- Can be disabled on a per-WLAN basis; for instance, in a voice WLAN, load balancing may not be desired due to voice roaming considerations.
- Background scanning must be enabled on the WLAN for load balancing to work.

## Enabling Load Balancing Globally

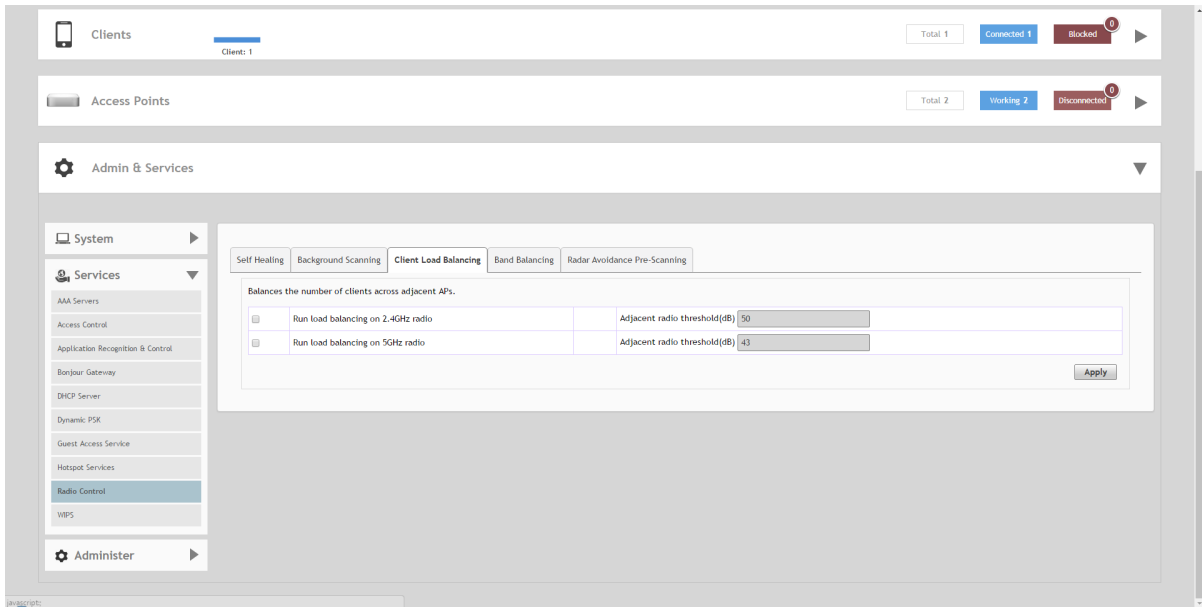
To enable Load Balancing globally:

1. Go to **Admin & Services > Services > Radio Control > Client Load Balancing**.
2. Enable the check box next to **Run load balancing on 2.4 GHz radio** or **Run load balancing on 5 GHz radio**, or both.



3. Enter **Adjacent Radio Threshold** (in dB), and click **Apply**.

**FIGURE 190** Client Load Balancing



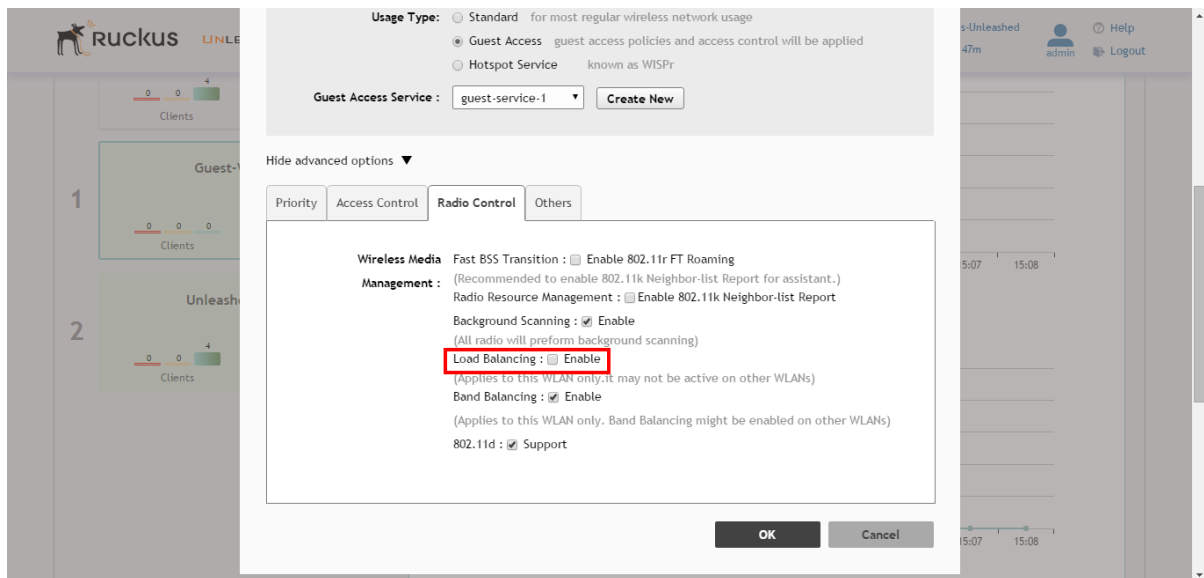
### Disabling Load Balancing for a WLAN

To disable Load Balancing on a per-WLAN basis:

1. Go to **Wi-Fi Networks > Edit > Show advanced options > Radio Control**, and deselect the check box next to **Load Balancing**.

2. Click **OK** to save your changes.

**FIGURE 191** Disable Load Balancing for a WLAN



## **Band Balancing**

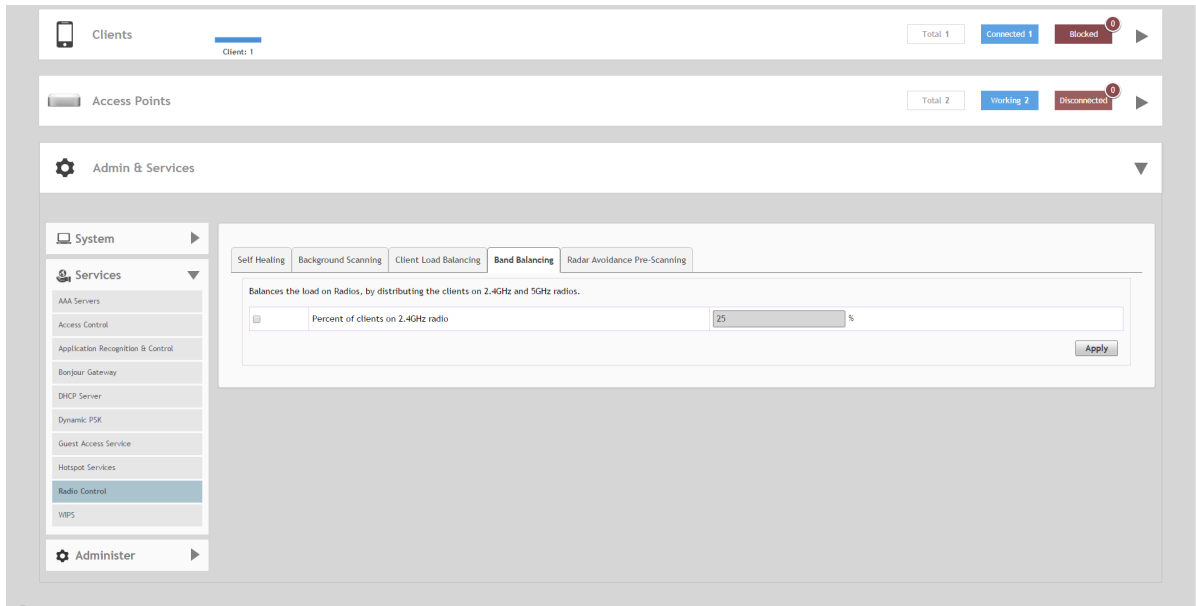
Band balancing attempts to balance the client load on radios by distributing clients between the 2.4 GHz and 5 GHz radios. This feature is disabled by default. To balance the number of clients connecting to the two radios on an AP, the AP encourages dual-band clients to connect to the 5 GHz band when the configured percentage threshold is reached.

To enable Band Balancing, select the check box next to **Percent of clients on 2.4 GHz radio**, and enter a value in the **%** field, which denotes the threshold above which dual-band clients will be encouraged to connect to the 5 GHz radio rather than the 2.4 GHz radio.

### **NOTE**

When enabled globally here, this feature will be applied to all WLANs by default. To disable Band Balancing for a specific WLAN, edit the [Radio Control Settings](#) on page 152 for the WLAN using the WLAN Advanced Options.

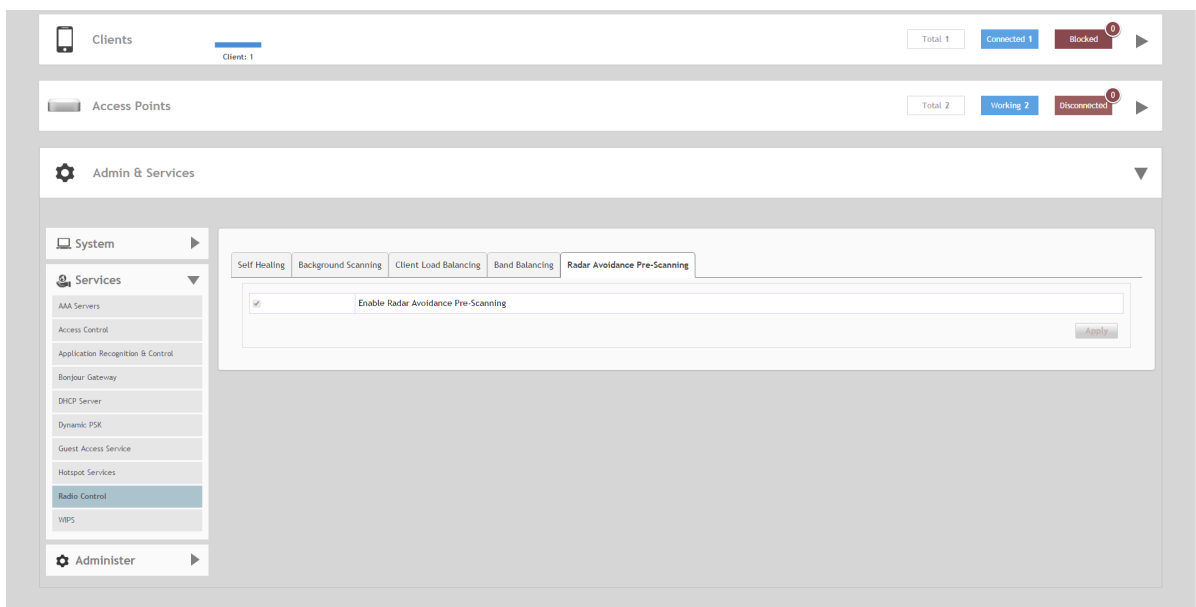
**FIGURE 192 Band Balancing**



### **Radar Avoidance Pre-Scanning**

The Radar Avoidance Pre-Scanning (RAPS) setting allows pre-scanning of DFS channels in the 5 GHz band to ensure the channel is clear of radar signals prior to transmitting on the channel. This setting affects select outdoor dual band 802.11n/ac AP models only and has no impact on APs that do not support the feature. The option will also only be available if the Country Code settings are configured to allow use of DFS channels (see [Setting the Country Code](#) on page 195).

**FIGURE 193 Radar Avoidance Pre-Scanning**



## WIPS

Unleashed provides several built-in intrusion prevention features designed to protect the wireless network from security threats such as Denial of Service (DoS) attacks and intrusion attempts. These features, called Wireless Intrusion Prevention Services (WIPS), allow you to customize the actions to take and the notifications you would like to receive when each of the different threat types is detected.

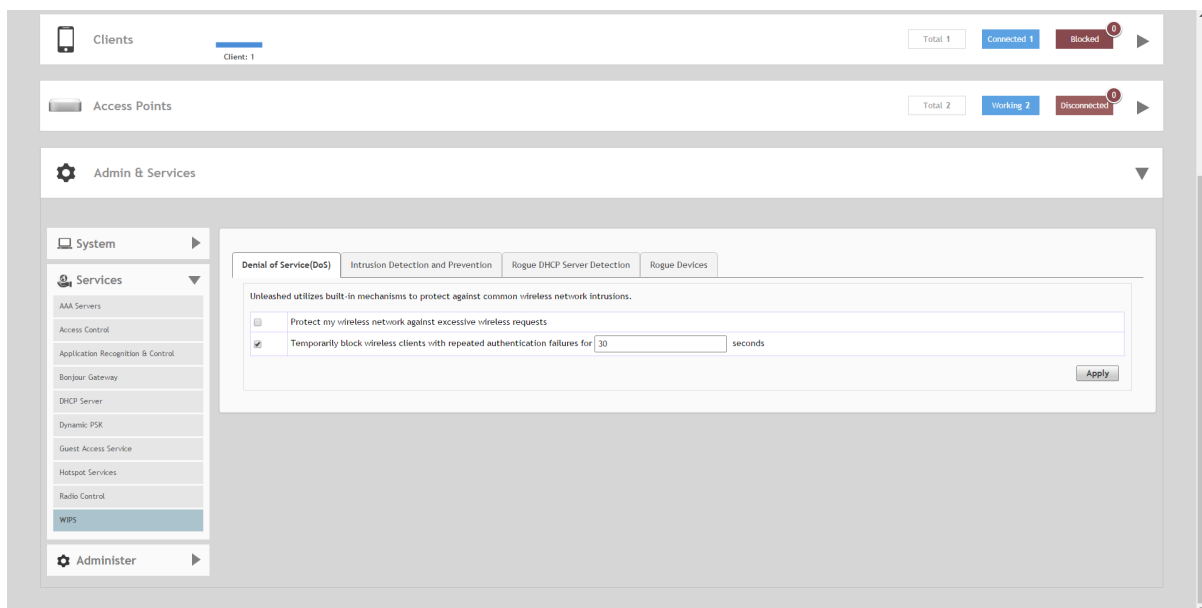
### Denial of Service (DoS)

Two options are provided to protect the wireless network from Denial of Service attacks.

To configure the DoS protection options:

1. Go to **Admin & Services > Services > WIPS > Denial of Service (DoS)**.
2. Configure the following settings:
  - **Protect my wireless network against excessive wireless requests:** If this capability is activated, excessive 802.11 probe request frames and management frames launched by malicious attackers will be discarded.
  - **Temporarily block wireless clients with repeated authentication failures for [ ] seconds:** If this capability is activated, any clients that repeatedly fail in attempting authentication will be temporarily blocked for a period of time (10~1200 seconds, default is 30).
3. Click **Apply** to save your changes.

FIGURE 194 Denial of Service (DoS)



### Intrusion Detection and Prevention

Intrusion detection and prevention features rely on background scanning results to detect rogue access points connected to the network and optionally, prevent clients from connecting to malicious rogue APs.

## Rogue Access Points

A "Rogue Access Point" is any access point detected by an Unleashed access point that is not part of the Unleashed network. Rogue devices are detected during off channel scans (background scanning) and are simply other access points that are not part of the Unleashed network (e.g., an access point at a nearby coffee shop, a neighbor's apartment or shopping mall).

Typically, rogue access points are not a threat, however there are certain types that do pose a threat that will be automatically identified as "malicious rogue APs." The three automatically identified malicious access point categories are as follows:

- **WLAN-Spoofing:** These are rogue access points that are beaconing the same WLAN name as an Unleashed access point. They pose a threat as someone may be attempting to use them as a honey pot to attract your clients into their network to attempt hacking or man-in-the-middle attacks to exploit passwords and other sensitive data.
- **Same-Network:** These are rogue access points that are detected by other access points as transmitting traffic on your internal network. They are detected by Unleashed access points seeing packets coming from a 'similar' MAC address to one of those detected from an over the air rogue AP. Similar MAC addresses are +5 MAC addresses lower or higher than the detected over the air MAC address.
- **MAC-spoofing:** These are rogue access points that are beaconing the same MAC address as an Unleashed access point. They pose a threat as someone may be attempting to use them as a honey pot to attract your clients into their network to attempt hacking or man-in-the-middle attacks to exploit passwords and other sensitive data.

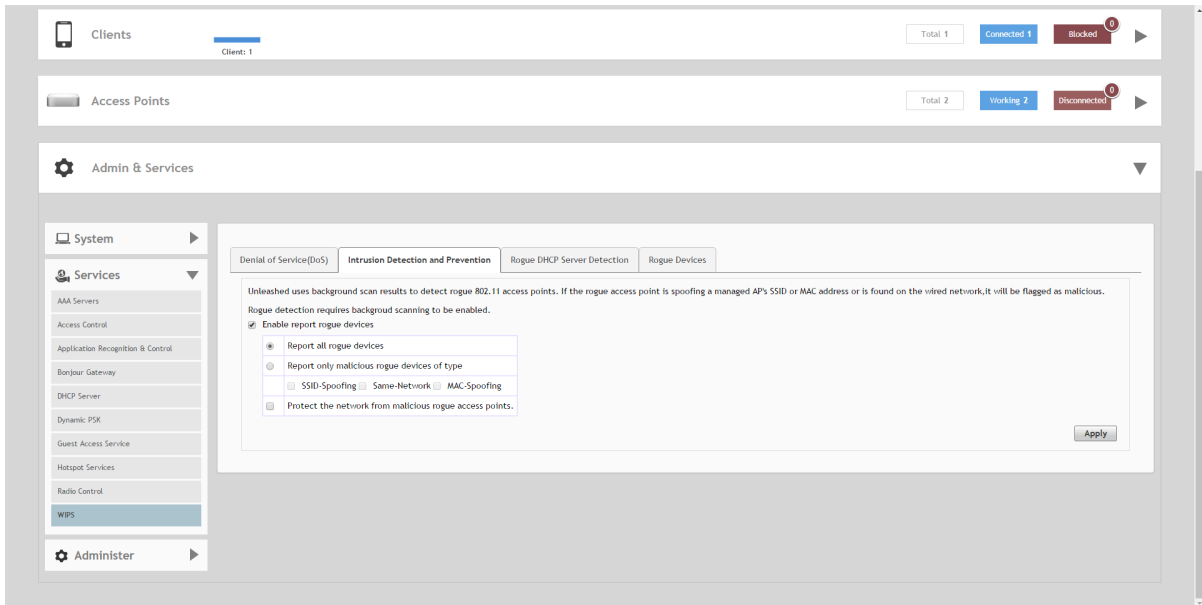
## Enabling/Disabling Rogue AP Detection

To enable/disable and configure Rogue Access Point detection:

1. Go to **Admin & Services > Services > WIPS > Intrusion Detection and Prevention.**
2. Configure the following settings:
  - **Enable report rogue devices:** Enable this check box to include rogue device detection in logs and email alarm event notifications.
    - **Report all rogue devices:** Send alerts for all rogue AP events.
    - **Report only malicious rogue devices of type:** Select which event types to report.
  - **Protect the network from malicious rogue access points:** Enable this feature to automatically protect your network from network connected rogue APs, WLAN-spoofing APs and MAC-spoofing APs. When one of these rogue APs is detected (and this check box is enabled), the Ruckus AP automatically begins sending broadcast de-authentication messages spoofing the rogue's BWLAN (MAC) to prevent wireless clients from connecting to the malicious rogue AP. This option is disabled by default.

3. Click **Apply** to save your changes.

**FIGURE 195** Intrusion Detection and Prevention

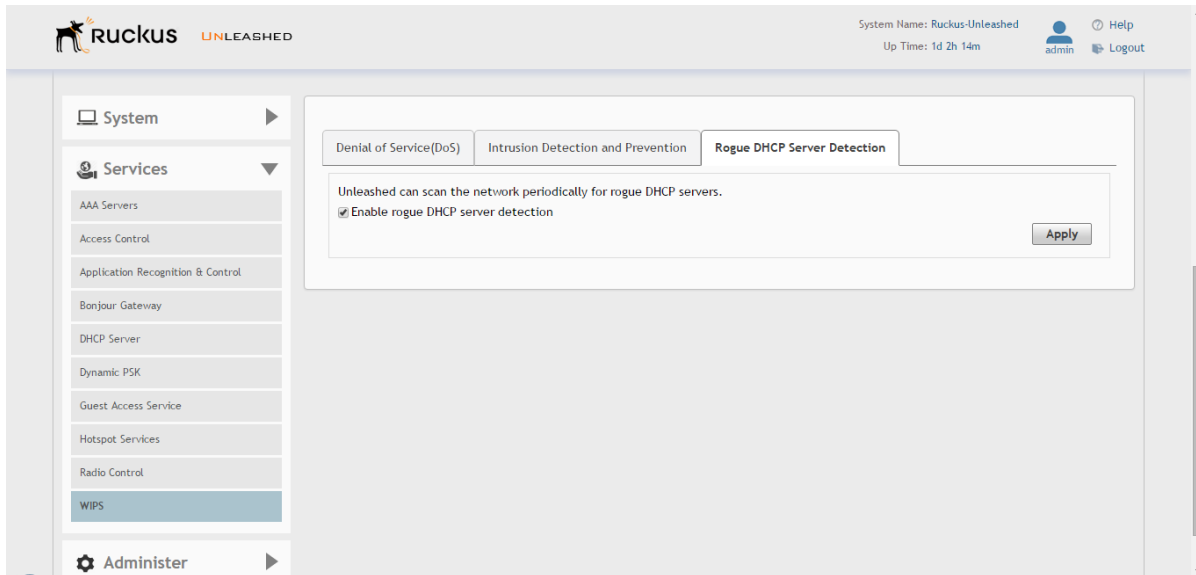


### **Rogue DHCP Server Detection**

A rogue DHCP server is a DHCP server that is not under the control of network administrators and is therefore unauthorized. When a rogue DHCP server is introduced to the network, it could start assigning invalid IP addresses, disrupting network connections or preventing client devices from accessing network services. It could also be used by hackers to compromise network security.

Typically, rogue DHCP servers are network devices (such as routers) with built-in DHCP server capability that has been enabled (often, unknowingly) by users. The rogue DHCP server detection feature can help you prevent connectivity and security issues that rogue DHCP servers may cause. When this feature is enabled, Unleashed scans the network every five seconds for unauthorized DHCP servers and generates an event every time it detects a rogue DHCP server.

FIGURE 196 Rogue DHCP Server Detection



## Administration Settings

Administration settings that can be configured from the **Admin & Services > Administer** page include admin name/password, system backup and restore, upgrade, diagnostics and network management pages.

## Preferences

Use the **Administer > Preferences** page to set the user interface language and to change the Admin login name and password.

Configure the following administrator preferences settings and click **Apply** to apply your changes:

- **Language:** Choose the web interface language.
- **Administrator Name/Password:** Change the current admin name and password.
- **Setup Password Recovery:** Select this option, and enter a Security email, Security Question and Security Answer that can be used to recover the admin password in the event that the password is lost.

FIGURE 197 Configuring administrator preferences

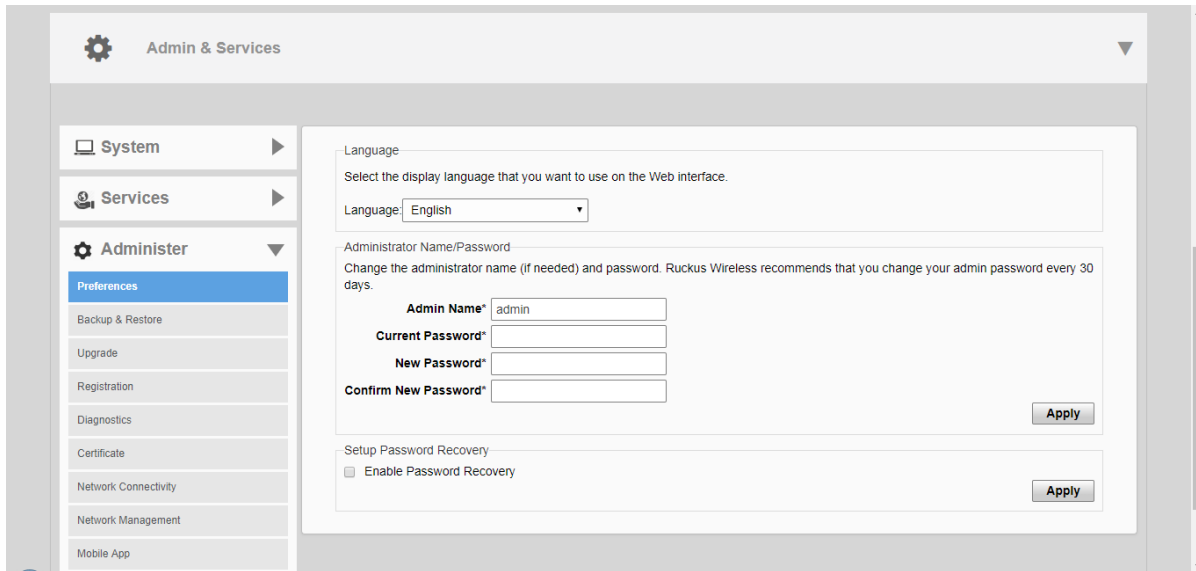
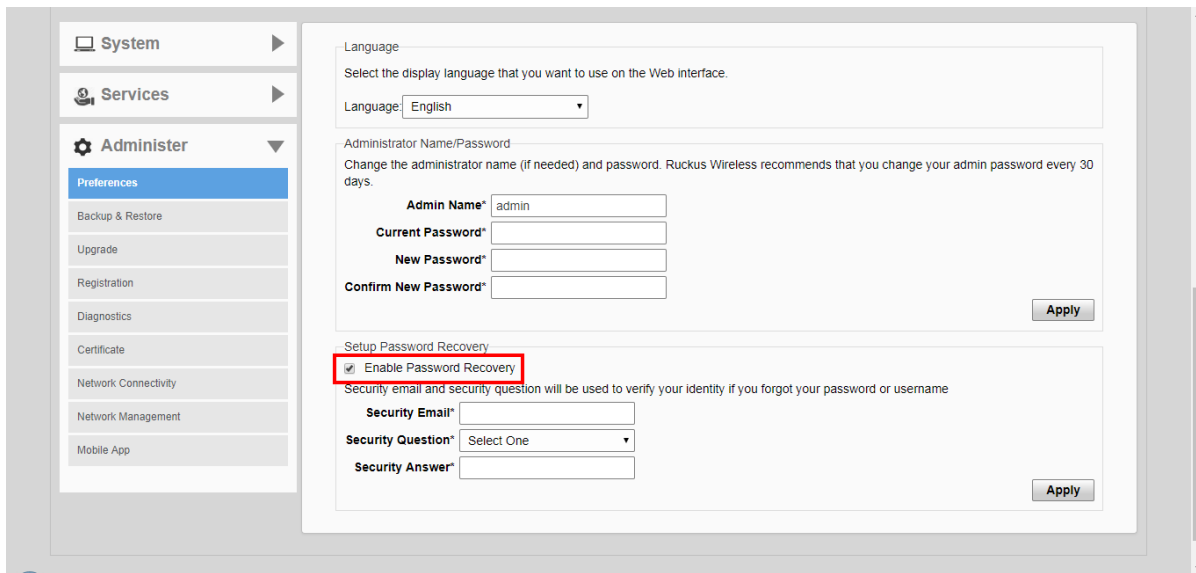


FIGURE 198 Enabling password recovery



## Backup and Restore

The **Backup & Restore** page provides options for backing up your current configuration, restoring the configuration from a previous backup file, or restoring the Unleashed Master AP to factory settings.

### NOTE

The backup is a small encrypted file with a .bak extension saved to the location of your choosing.

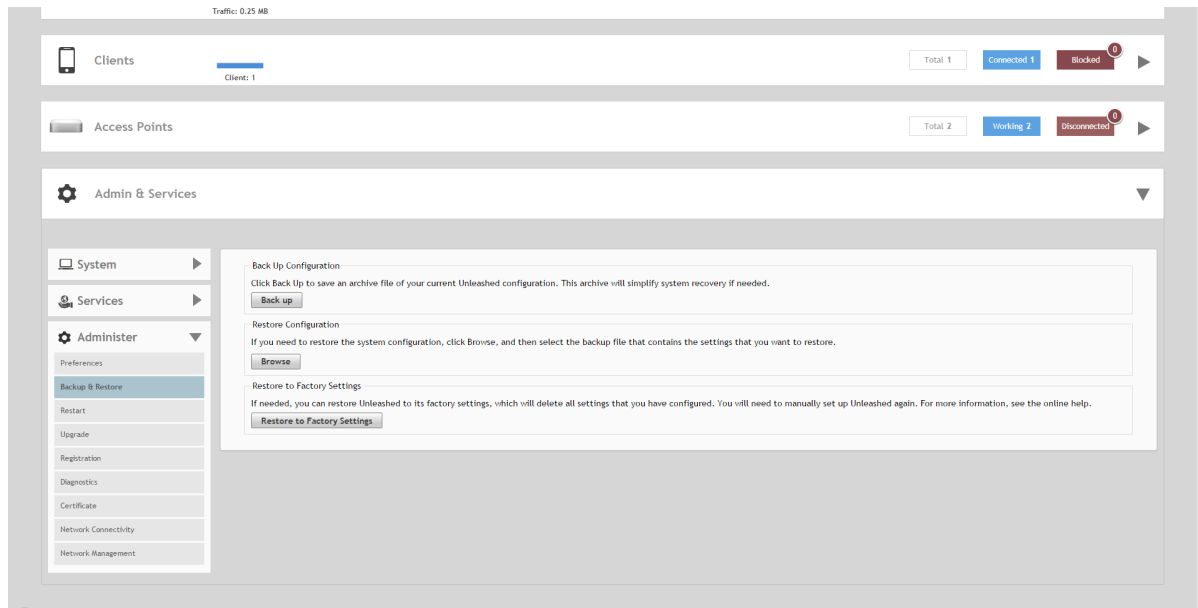
To restore settings from a backup file, click **Browse**, then select your backup file, and click **Open**. Once the .bak file has been uploaded to Unleashed, select one of three restore options for your Unleashed network.



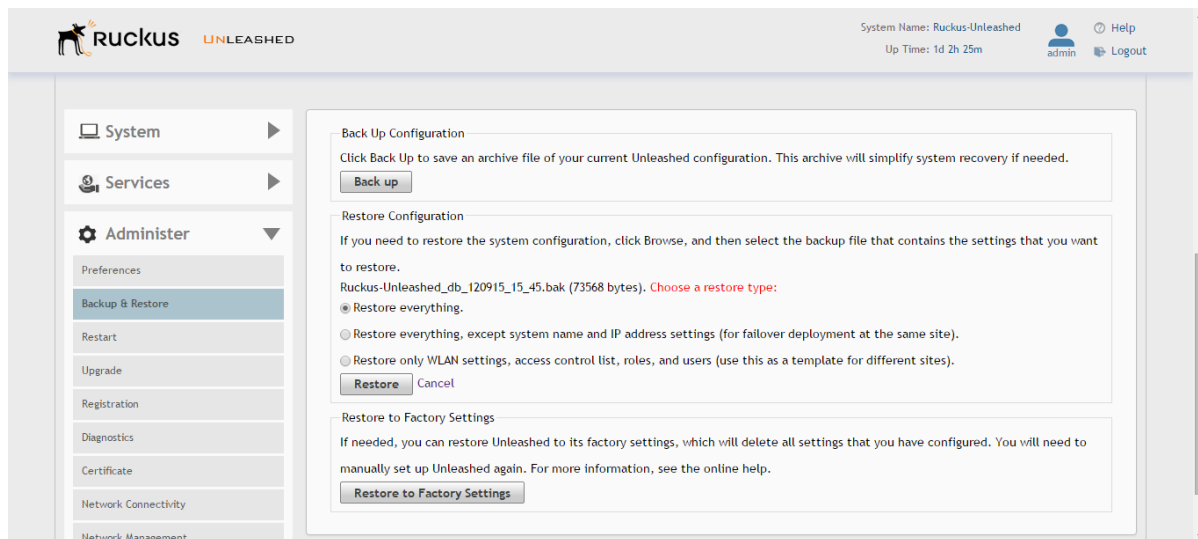
Options include:

- Restore Everything
- Restore Everything except system name and IP address
- Restore only WLAN settings, ACLs, roles and users

**FIGURE 199 Backup and Restore**



**FIGURE 200 Choose a Restore type**



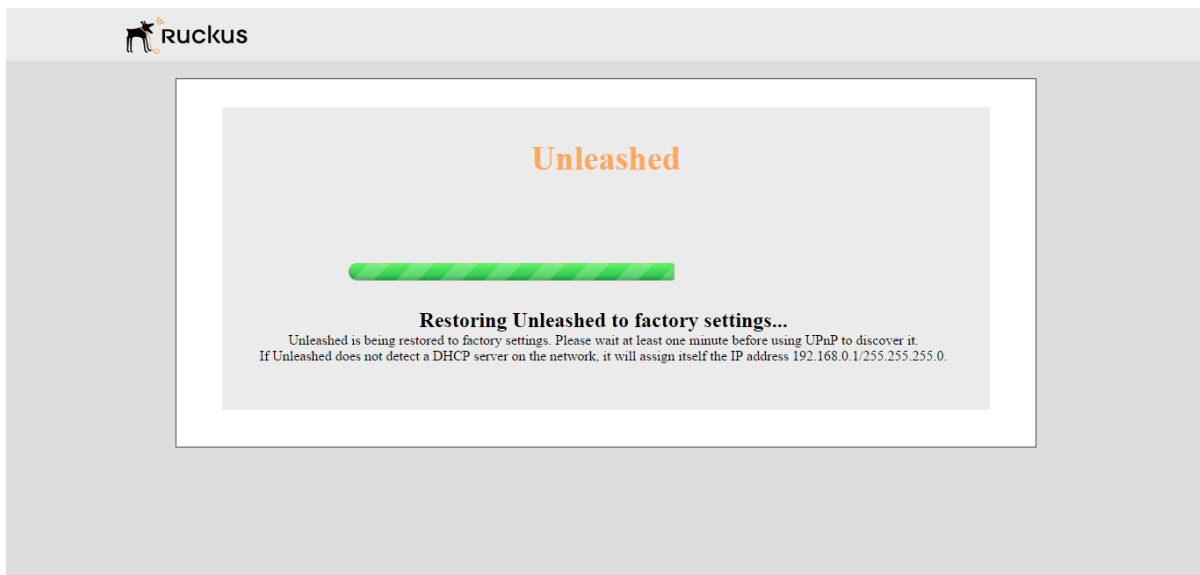
## Restore to Factory Settings

In certain extreme conditions, you may want to re-initialize your Unleashed Master AP and reset it to factory default state. Once the Unleashed Master has been reset to factory default state, all AP logs, client logs, application data and other records, wireless networks, user accounts, and any other configuration settings will need to be reconfigured.

To reset your Unleashed Master AP to factory default settings:

1. Go to **Admin & Services > Administer > Backup & Restore**.
2. Click **Restore to Factory Settings**.
3. Click **OK** to confirm.
4. The **Restoring Unleashed to factory settings** progress screen appears. Wait for this progress screen to finish before attempting to login again.
5. Repeat the setup initial setup and configuration procedures as described in [Setting Up an Unleashed Wi-Fi Network](#) on page 73.

**FIGURE 201** Restore Factory Settings progress screen



## Alternate Factory Default Reset Method

If you are unable to complete a software-based resetting of Unleashed, you can do the following "hard" restore:

### NOTE

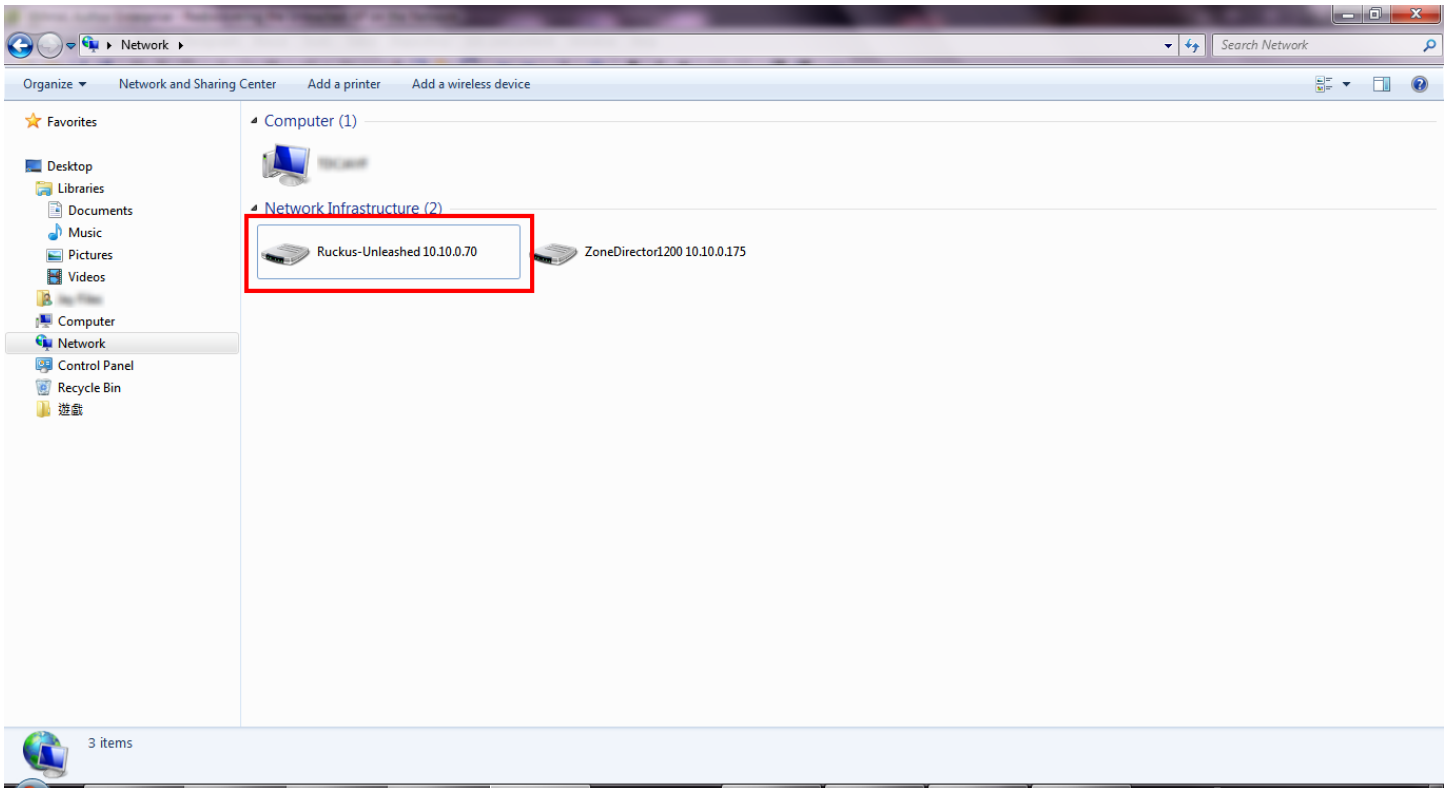
Do not disconnect the Unleashed Master AP from its power source until this procedure is complete.

1. Locate the **Reset** pin hole on the rear panel of the Unleashed Master AP.
2. Insert a straightened paper clip in the hole and press for at least 6 seconds.
3. After the reset is complete, the PWR LED will initially be solid red, indicating bootup in process, then blinks green, indicating that the system is in factory default state.
4. After you complete the Setup Wizard, the PWR LED will be steady green.

## Rediscovering the Unleashed AP on the Network

If you do not know the IP address, you can rediscover an Unleashed AP on the network using UPnP or Bonjour service discovery. To discover an Unleashed AP using UPnP (Windows clients only), go to the **Network** section of Windows Explorer (**Start > Network** or **Start > Computer > Network**). Locate the Unleashed device in the *Network Infrastructure* section. Double-click the icon to launch the web UI, or right-click and select **View device webpage**, or type the address displayed into your browser's navigation bar.

FIGURE 202 Discovering Unleashed using UPnP in Windows



Additionally, Unleashed also supports Bonjour service discovery. Bonjour discovery allows devices running operating systems other than Windows (such as iOS and Android) to discover the Unleashed Master AP. This allows mobile clients to manage the system using the Unleashed Mobile App in addition to via web browser.

## Upgrade

The **Upgrade** page displays the current firmware version and provides an **Upgrade** button which can be used to download the latest firmware and perform an upgrade of the entire Unleashed network.

Unleashed provides two methods of upgrading the firmware:

- [Online Upgrade](#) on page 248
- [Local Upgrade](#) on page 250

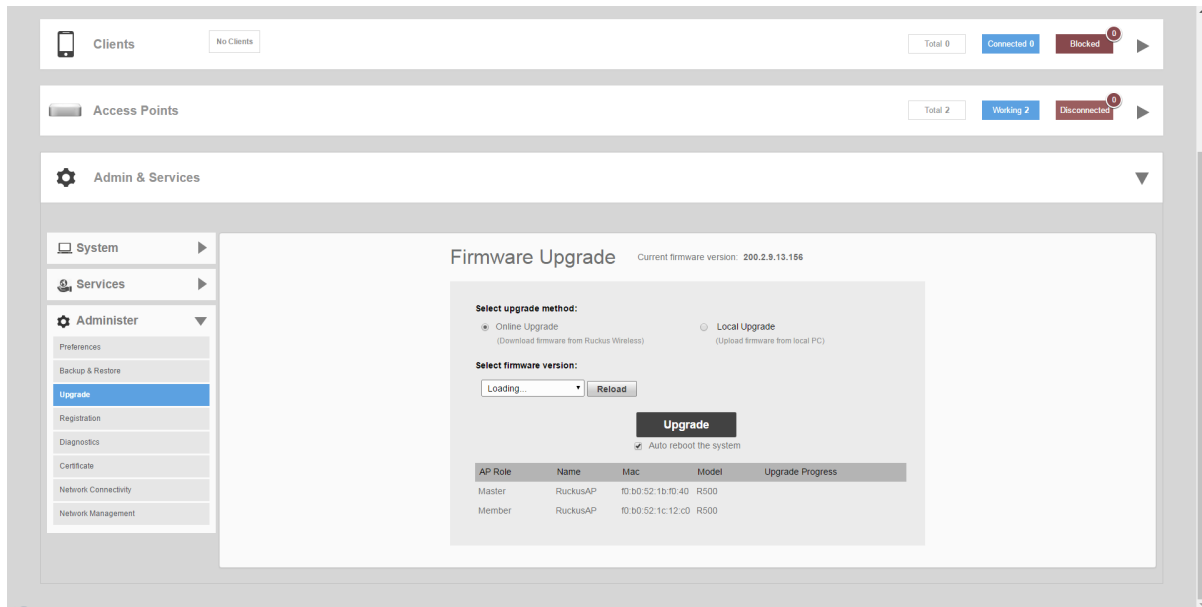
## Online Upgrade

Use the Online Upgrade method to upgrade your Unleashed network with the latest firmware available from the Ruckus Unleashed firmware server.

To upgrade the Unleashed Master AP and all connected Unleashed member APs using the Online Upgrade method, use the following procedure:

1. Go to **Admin & Services > Administer > Upgrade**.

**FIGURE 203** The Upgrade page



2. Select **Online Upgrade**.
3. Select one of the available firmware versions from the **Select firmware version** drop-down menu.

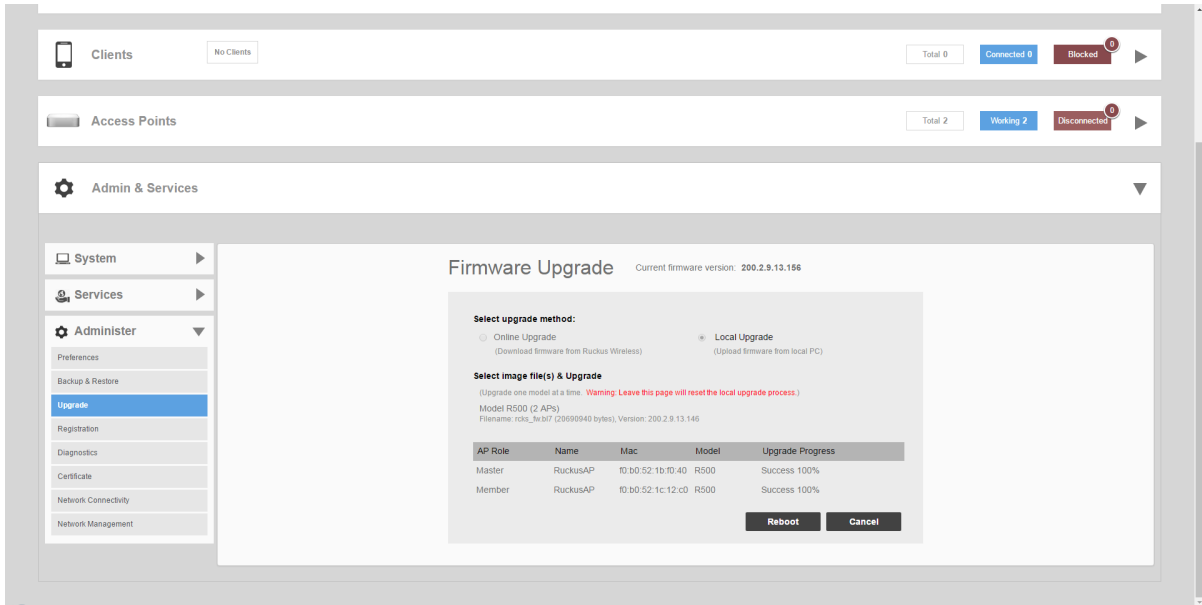
### NOTE

Optionally, select **Auto reboot the system** to automatically reboot each AP after the firmware has been deployed to the AP. By default this option is *enabled*. You may want to disable this option if you would prefer to wait until all APs have the new firmware before rebooting them all at once (i.e., if you have multiple Unleashed AP models that require different firmware image files, you can choose to reboot all Unleashed R710 APs as soon as the firmware is loaded and then move on to R500 APs, or you could choose to wait and reboot all models at once at the end.)

4. Click **Upgrade** to begin upgrading the Unleashed APs shown in the list.

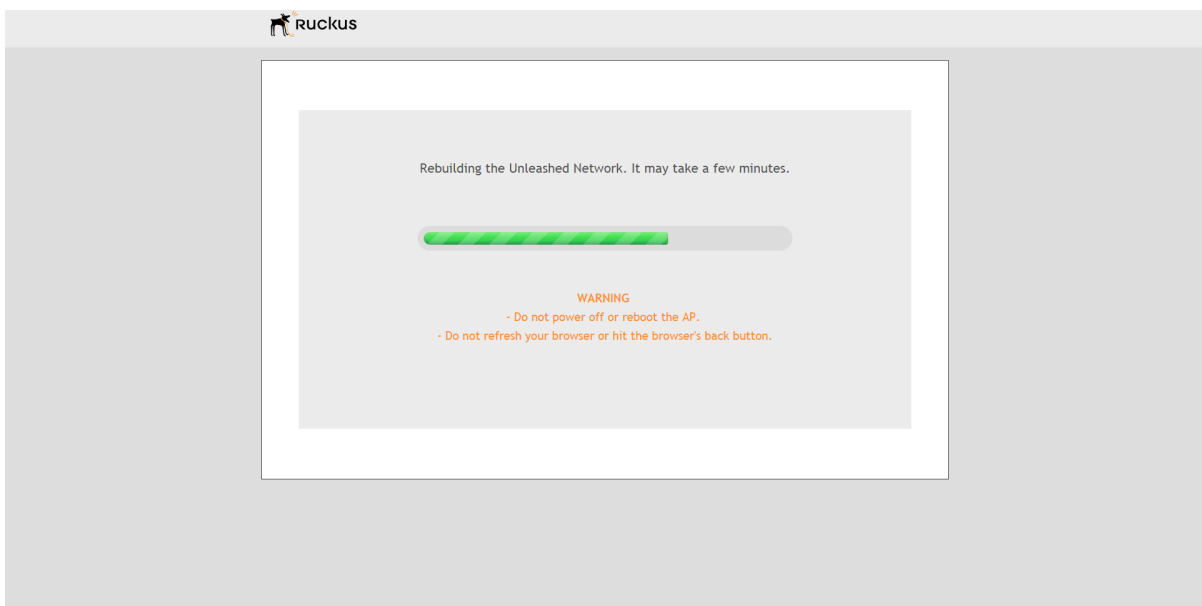
- The **Upgrade Progress** column displays the progress for each AP. Once completed, the column will display **"Success 100%"** next to each AP for which the upgrade was successful.

**FIGURE 204** Upgrade successful, click Reboot to reboot the APs and apply the new firmware



- When all of the APs in the list are displayed as **"Success 100%"** in the **Upgrade Progress** column, click **Reboot**. A **"Rebuilding the Unleashed Network"** progress screen appears. Wait until the process completes.

**FIGURE 205** "Rebuilding the Unleashed Network" progress screen



- Once complete, you will be redirected to the Unleashed login page.

8. Log in and go to **Admin & Services > System > System Info** to confirm the new software build number.

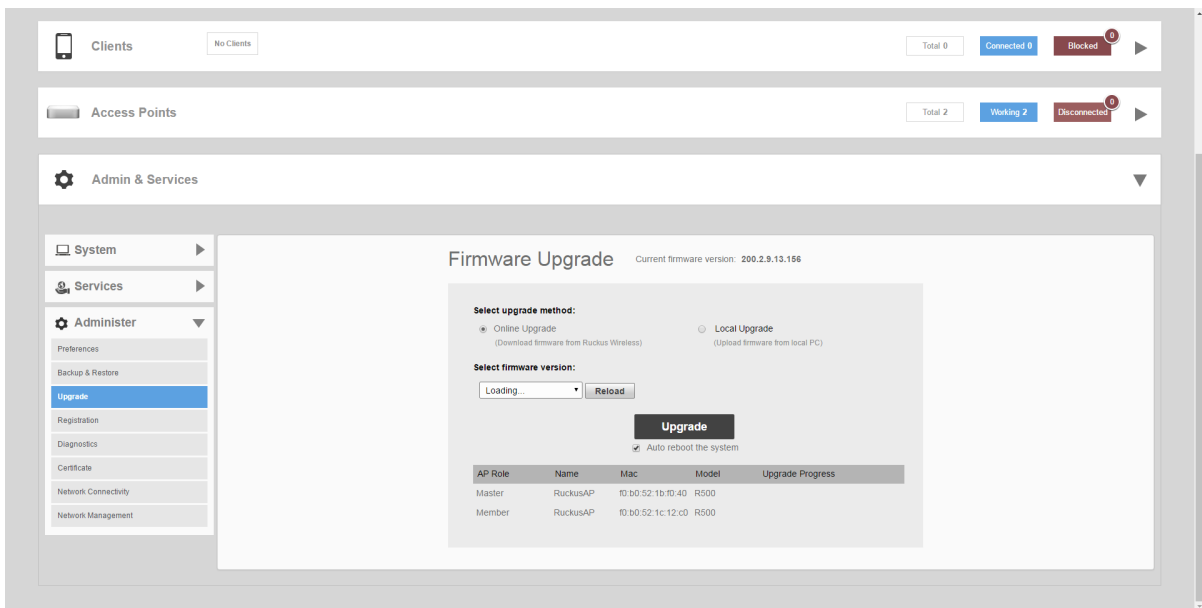
## Local Upgrade

Use the Local Upgrade method to upgrade your Unleashed network using firmware files that you have downloaded from the Ruckus Support site.

To upgrade the Unleashed Master AP and all connected Unleashed member APs using the Local Upgrade method, use the following procedure:

1. Go to **Admin & Services > Administer > Upgrade**.

**FIGURE 206** The Upgrade page



2. Select **Local Upgrade** as the upgrade method.

- Click **Browse** to locate the Unleashed firmware image file on your local computer. Unleashed will perform a check to make sure it is the proper image for the AP model before proceeding.

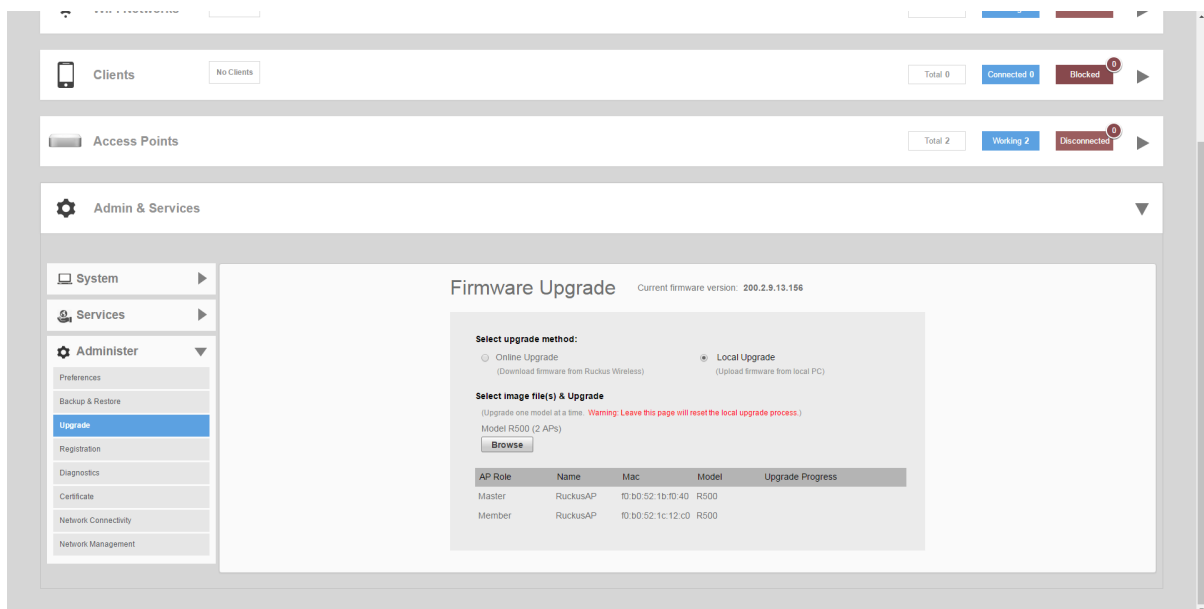
**NOTE**

Each Unleashed AP model has a different firmware image file that must be loaded onto the Unleashed Master and then distributed to member APs, model by model. So, for example, if you have a mix of Unleashed R500 and R710 APs, you could upgrade all of the R500s first and then the R710s, or the other way around, but you cannot simultaneously upgrade R500 and R710 APs. You have to upgrade each model one at a time.

**NOTE**

While the upgrade process will check to make sure you do not try to upgrade an Unleashed R710 using Unleashed R500 firmware, there is no check to ensure that you do not upgrade/downgrade an Unleashed AP to a ZoneFlex (standalone AP) firmware image. If you do this, the AP will no longer function as an Unleashed AP (until Unleashed firmware is re-loaded onto it).

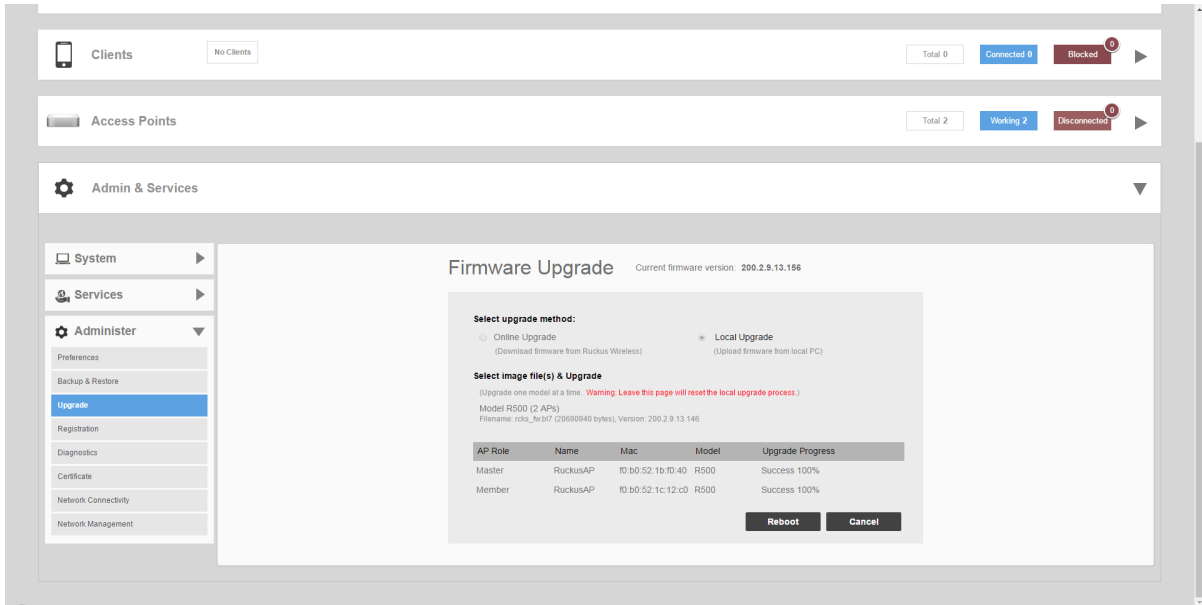
**FIGURE 207** Local Upgrade



- Click **Upgrade** to begin upgrading the Unleashed APs shown in the list.

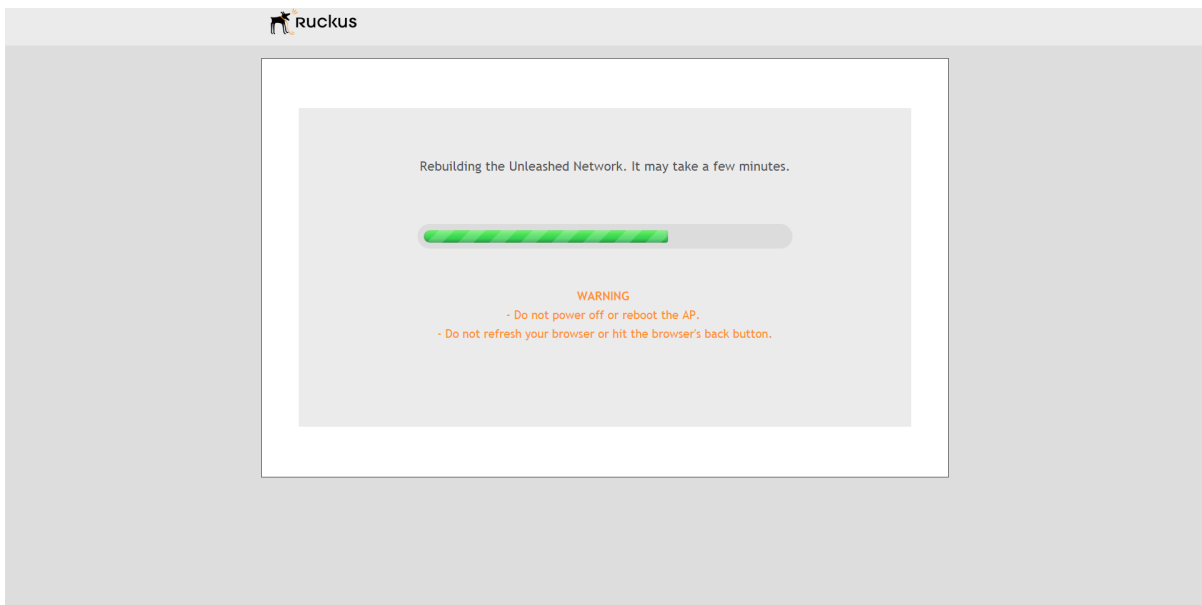
- The **Upgrade Progress** column displays the progress for each AP. Once completed, the column will display **"Success 100%"** next to each AP for which the upgrade was successful.

**FIGURE 208** Upgrade successful, click Reboot to reboot the APs and apply the new firmware



- Repeat steps 3-5 for any additional Unleashed AP models.
- When all of the APs in the list are displayed as **"Success 100%"** in the **Upgrade Progress** column, click **Reboot**. A **"Rebuilding the Unleashed Network"** progress screen appears. Wait until the process completes.

**FIGURE 209** "Rebuilding the Unleashed Network" progress screen





- Once complete, you will be redirected to the Unleashed login page.
- Log in and go to **Admin & Services > System > System Info** to confirm the new software build number.

## Registration

Ruckus encourages you to register your Unleashed products to receive updates and important notifications, and to make it easier to receive support in case you need to contact Ruckus for customer assistance. You can register your Unleashed Master AP along with all connected member APs in one step using the Registration page.

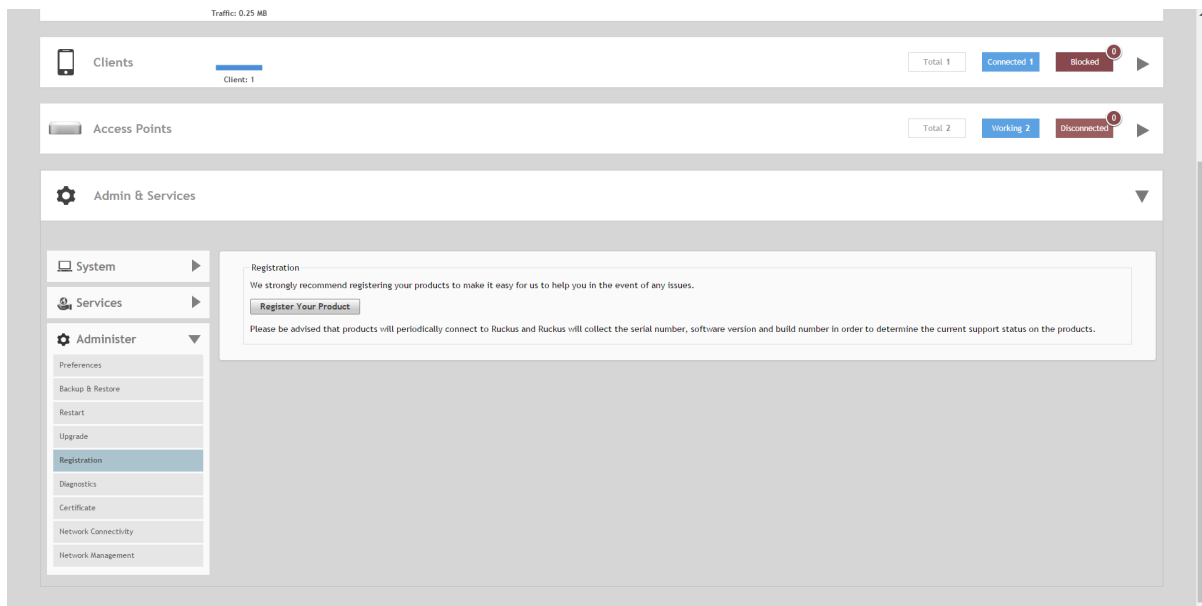
### NOTE

To ensure that all registration information for all of your APs is included, be sure to register after all APs have been installed. If you register the Unleashed Master AP before installing the other member APs, the registration will not include the other member APs' information.

To register your Unleashed network:

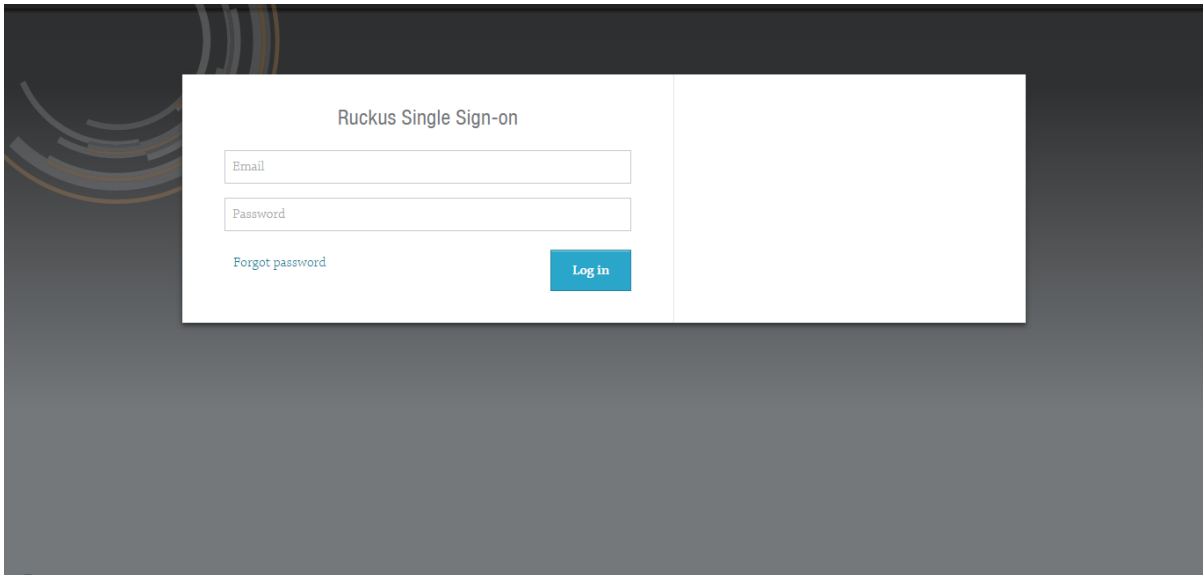
- Go to **Admin & Services > Administer > Registration**.
- Click **Register Your Product**. You will be redirected to the Ruckus registration website, where you will need to enter your login details and Sales Purchase Agreement code (if known).

**FIGURE 210** The Registration page



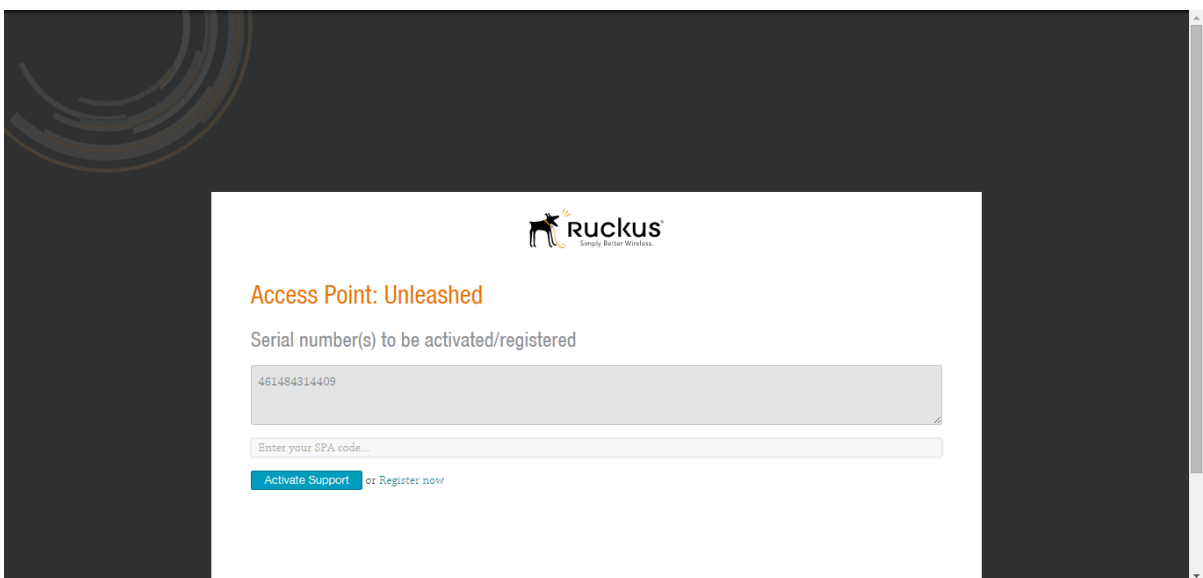
3. If you do not already have a Ruckus Support portal account, you will first need to create one. Go to [https://support.ruckuswireless.com/get\\_access\\_now](https://support.ruckuswireless.com/get_access_now) to create a support account, and then go back to the Unleashed web interface and click the **Register Your Product** button (again) to associate your product serial numbers to your Ruckus Support account.

**FIGURE 211** Ruckus Support portal login



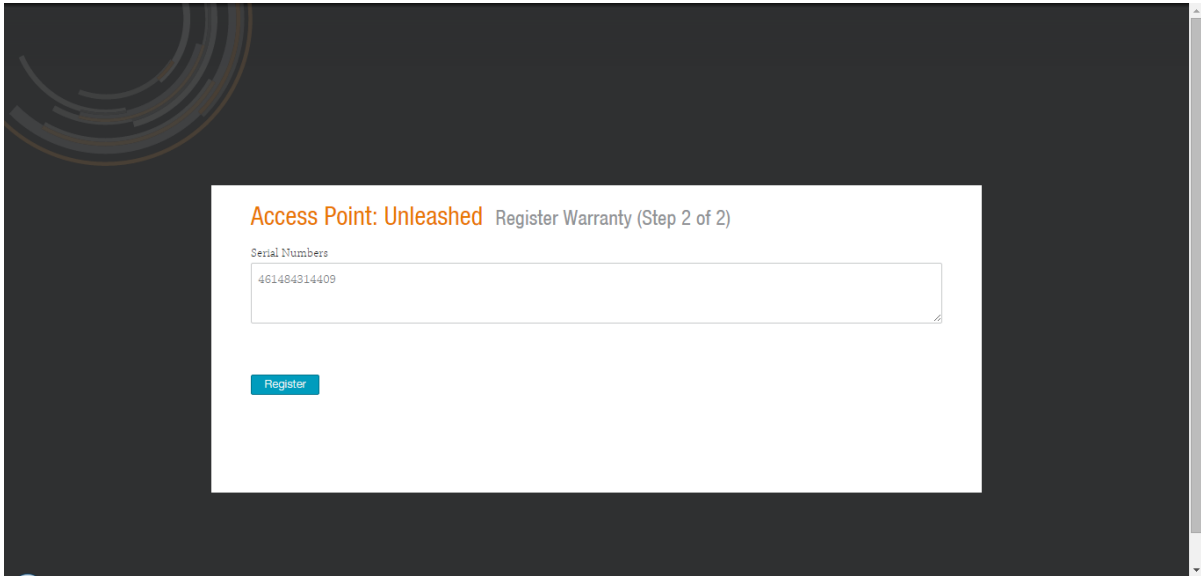
4. The Ruckus product registration system automatically retrieves a list of your connected device serial numbers and displays them on the page.
5. Click **Activate Support** to activate product support for your Unleashed APs.

**FIGURE 212** Activate Support



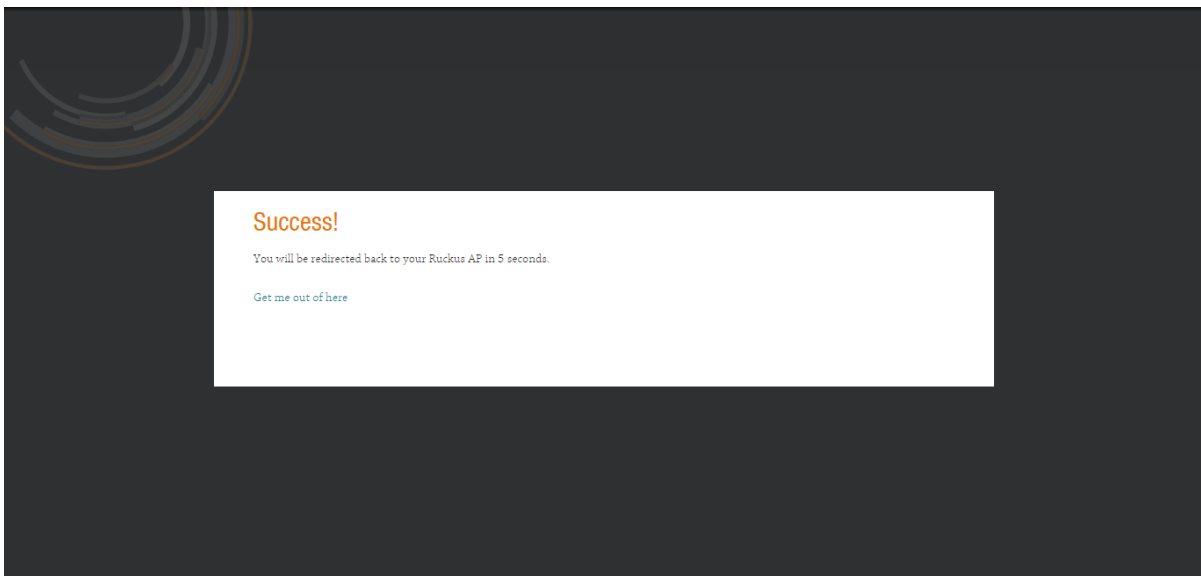
6. Click **Register** to register your Unleashed AP warranty.

**FIGURE 213** Register Warranty (Step 2 of 2)



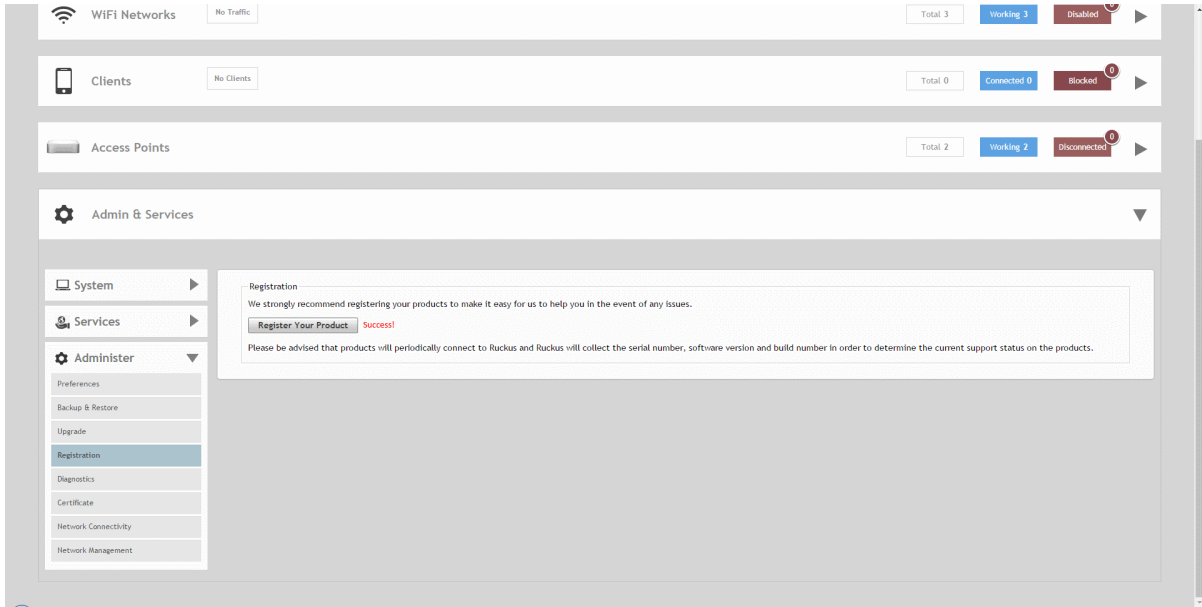
7. The "**Success!**" page is displayed. You will be redirected back to your Unleashed web interface in a few seconds. If you prefer not to wait, click **Get me out of here** to be redirected immediately.

**FIGURE 214** Success - Support activation successful



- The screen refreshes to display your Unleashed Master AP's Registration page, with a "Success" message indicating successful product support registration.

**FIGURE 215** Success - Unleashed Registration page

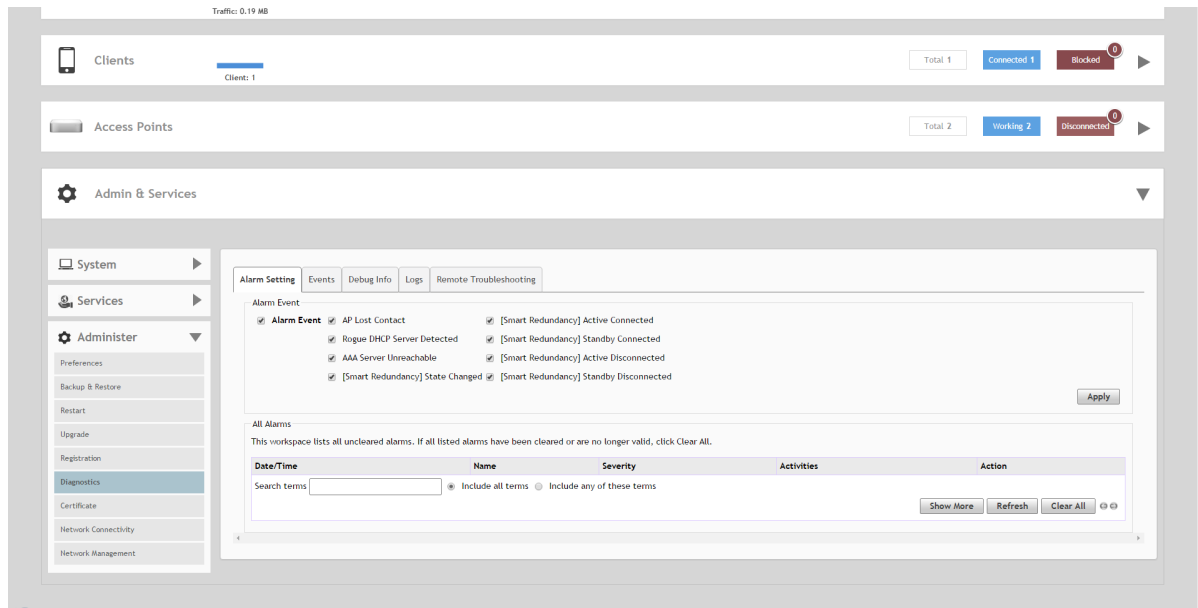


Your Unleashed access points are now registered with Ruckus.

## Diagnostics

The Diagnostics pages provide options for troubleshooting and diagnostics, including configuration settings for alarms, viewing system event log messages, configuring which debug info is to be collected in log files, saving the current logs to your local computer, and an option to begin a remote troubleshooting session (for Ruckus Support remote assistance).

**FIGURE 216** Diagnostics



## Viewing Alarms and Configuring Alarm Settings

The Alarm Settings page displays all recent alarms and allows you to configure which events will trigger an alarm. Alarms include important events such as when an AP loses contact with the Unleashed Master AP, or an authentication server becomes unreachable, or when an Unleashed Master/Member role change is detected.

To configure alarm settings:

1. Go to **Admin & Services > Administer > Diagnostics > Alarm Settings**.
2. Select the boxes for the alarm message categories that you want Unleashed to report.
3. Click **Apply**.

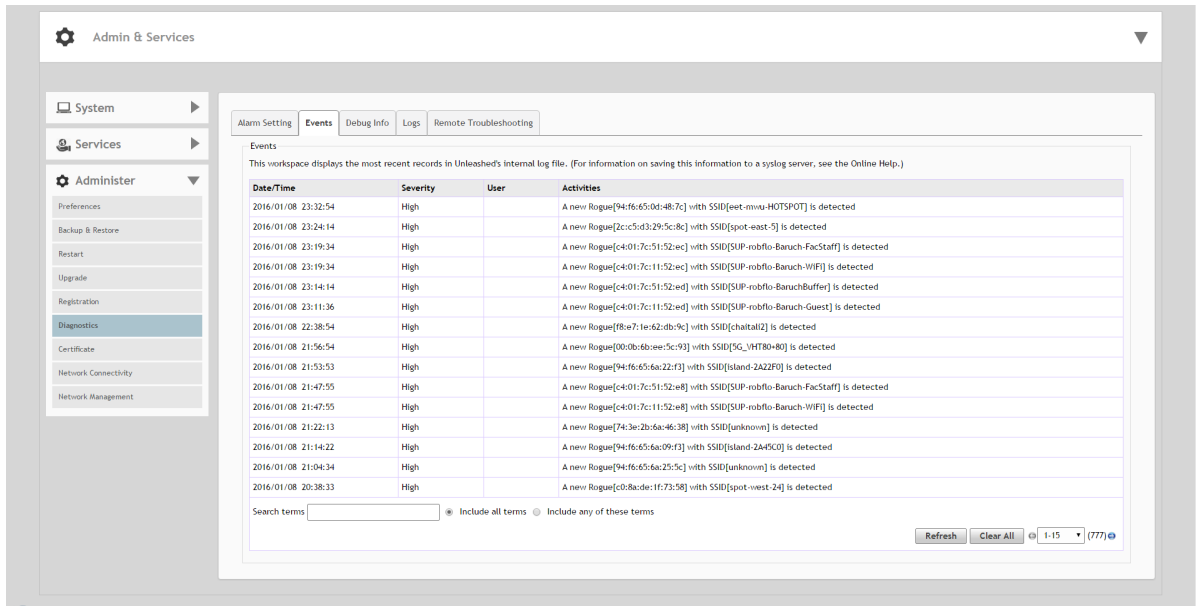
Once your changes have been applied, the list of events in the **All Alarms** table will thereafter include only the categories you selected.

## Viewing System Event Messages

The **Diagnostics > Events** page displays the most recent records in the Unleashed Master AP's internal log file. Compared to Alarms, Events include less critical messages - such as when a rogue AP is detected, an AP changes channel, a configuration sync is performed, a new client joins the network, etc.

The contents that the **Events** page displays can be customized using the **Debug Logs** page, as described in [Configuring Debug Logs](#) on page 258.

FIGURE 217 The Events page



## Configuring Debug Logs

You can use the **Diagnostics > Debug Info** page to configure which debug components to include in log files and on the **Events** page.

### NOTE

Check the box **Debug log per APs or clients MAC address** and enter AP/Client info to filter debug output for a specific AP or client.

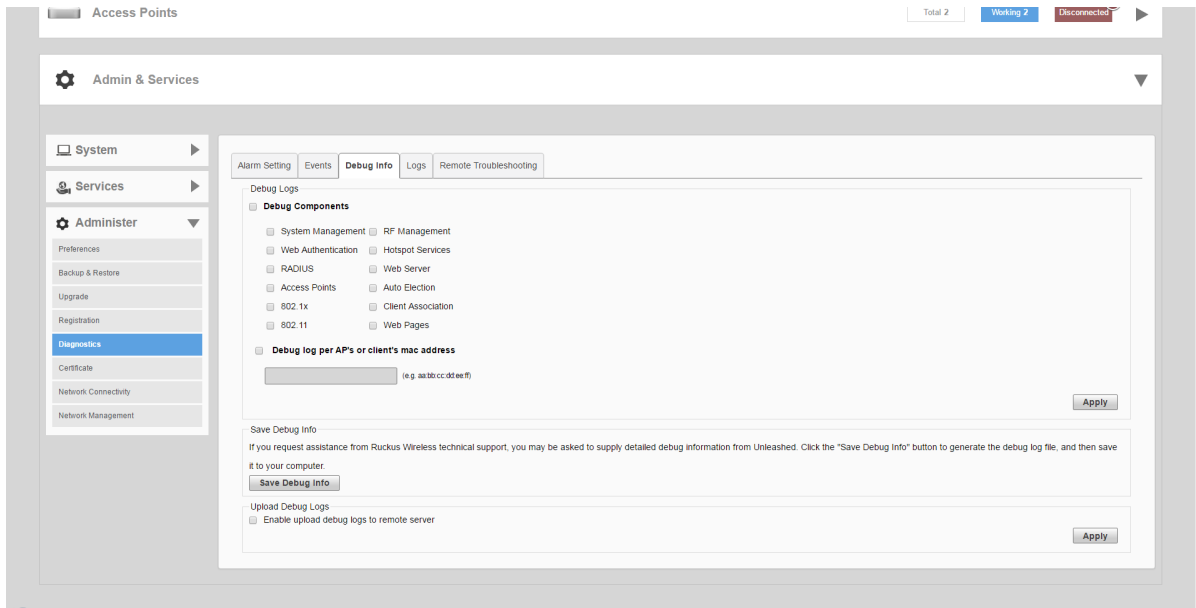
You can also save the log files using the **Save Debug Info** button. If you request assistance from Ruckus technical support, you may be asked to supply detailed debug information from Unleashed. Click the **Save Debug Info** button, and then save the file to your computer. You can then email this file to Ruckus Support to assist with troubleshooting.

### NOTE

As of release 200.2, the Unleashed Master AP's log files also contain all of the member APs' support info.

You can also allow the Unleashed Master to automatically save log files to a specified FTP or TFTP server in the event of a controller process failure. By default, this feature is disabled. When enabled, the Unleashed Master will send the core, dump, and debug files to an FTP/TFTP server before restart. This information can be very useful in debugging controller reboot issues. To enable this feature, select the check box next to **Enable upload debug logs to remote server**, select **FTP** or **TFTP**, and enter the server address only (for TFTP) or **Host, Port, Username** and **Password** (for FTP).

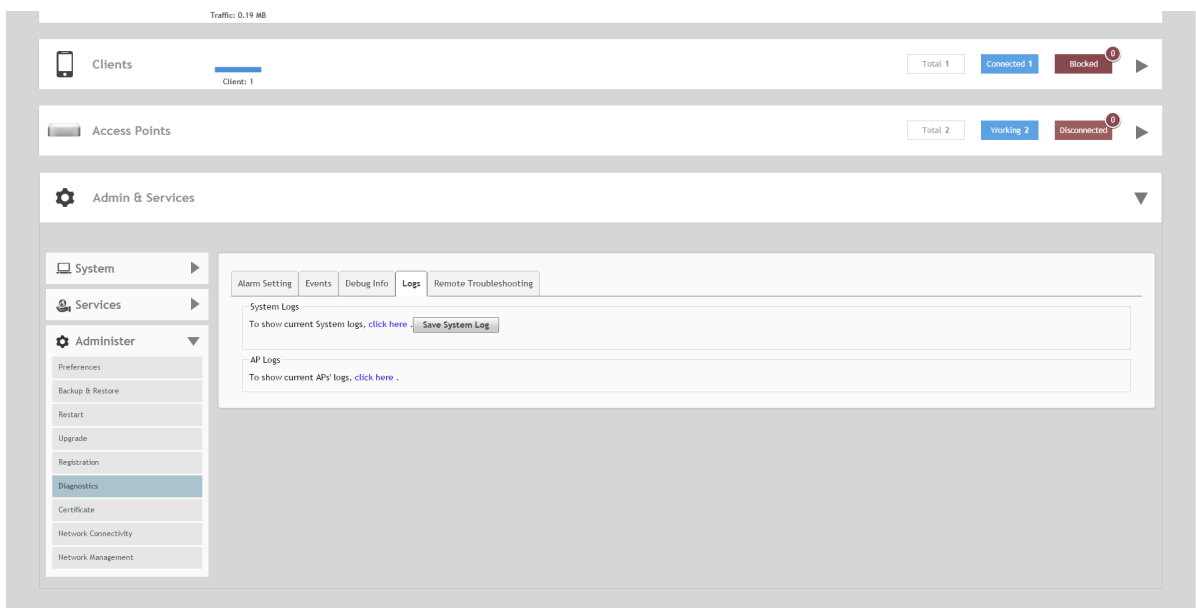
FIGURE 218 The Debug Info page



### *Saving System Logs to Your Computer*

The **Diagnostics > Logs** page provides an option to view the AP's current system logs, and an option to save the current log file as a .tar file.

FIGURE 219 The Logs page



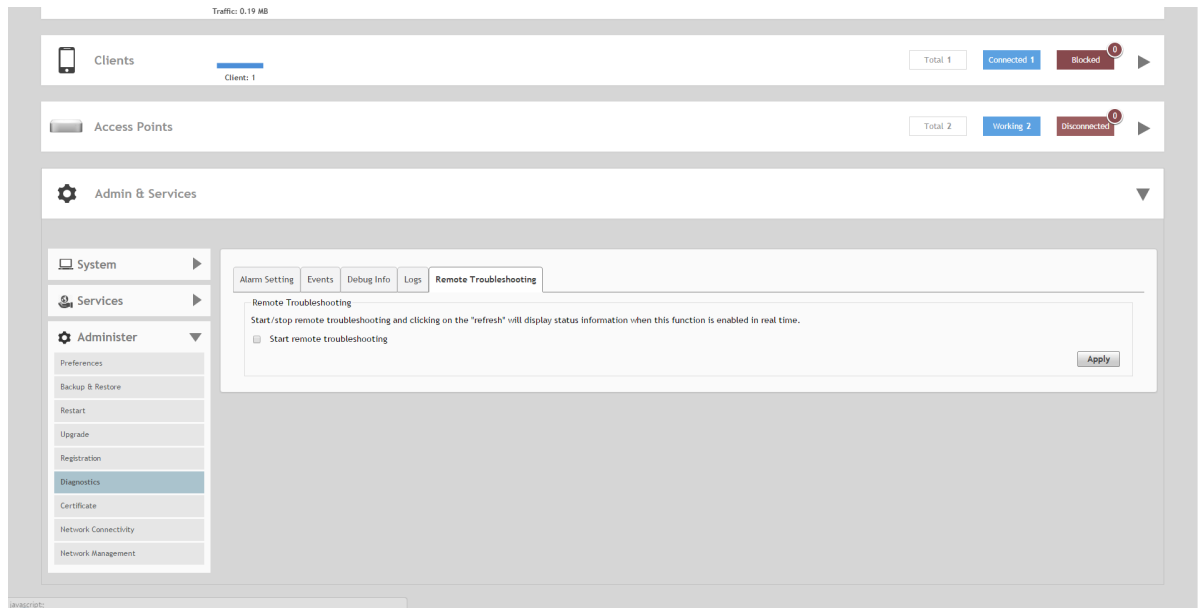
## Enabling Remote Troubleshooting

The Remote Troubleshooting feature allows Ruckus support personnel to connect directly to an Unleashed network deployed at a customer's site for troubleshooting purposes.

### NOTE

Do not enable this feature unless instructed to do so by Ruckus Support.

FIGURE 220 Remote Troubleshooting



## Working with SSL Certificates

SSL certificates enable device or user identification, as well as secure communications.

Unleashed captive portal services and the web UI use an SSL certificate when establishing HTTPS connections.

The default SSL certificate that is installed on the Unleashed AP is self-signed and therefore not trusted by any web browser. This is the reason why the SSL security warnings appear when establishing an HTTPS connection to the Unleashed web interface.

To eliminate the security warnings, administrators may purchase a trusted SSL certificate from a public Certificate Authority (CA) and install it on the Unleashed Master AP.

The basic certificate installation process is as follows:

1. Generate a Certificate Signing Request (CSR) with the required requester information.
2. Submit the CSR to a public CA for signing.
3. Receive a signed certificate from the CA.
4. Import the signed certificate into Unleashed.



## Generating a Certificate Signing Request

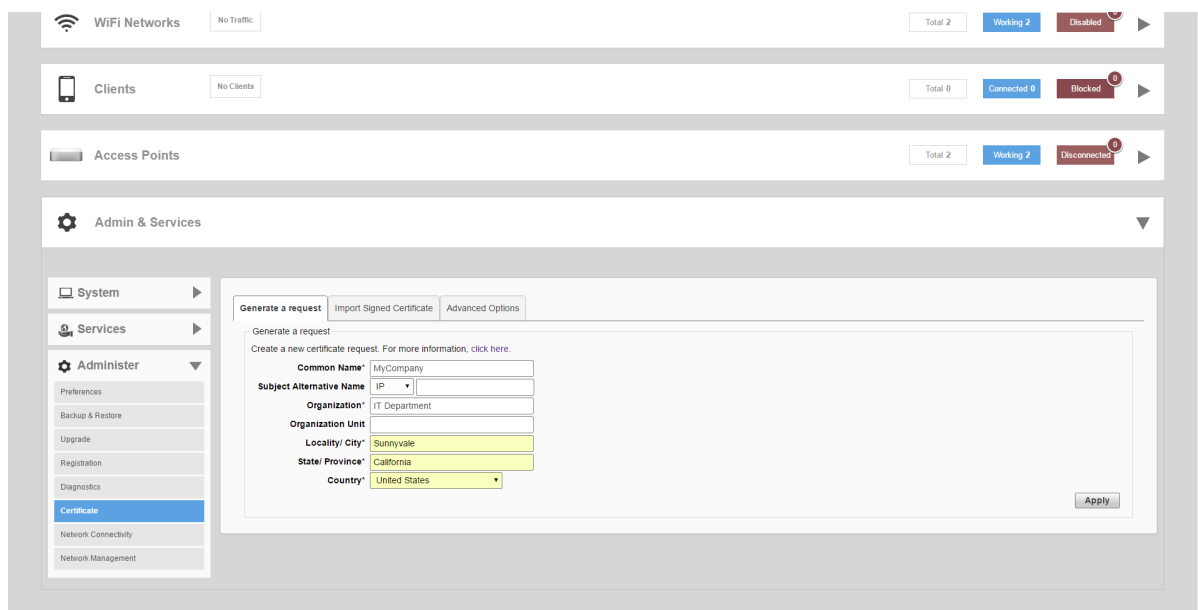
If you do not have an existing SSL certificate, you will need to create a certificate signing request (CSR) file and send it to a certificate authority (CA) to purchase an SSL certificate.

The Unleashed web interface provides a form that you can use to create the CSR file. Fields with an asterisk (\*) are required entries. Those without an asterisk are optional.

The **Admin & Services > Administer > Certificate** pages allow you to perform the following actions:

- Generate a certificate signing request.
- Import a signed certificate.
- View the currently installed certificate.
- Advanced Options link displays additional options
- Restore the default private key and certificate.
- Backup private key and certificate.
- Generate a new private key.

**FIGURE 221** SSL certificate screens



## Creating a Certificate Request File

To create a certificate request file (CSR):

1. Go to **Admin & Services > Administer > Certificate**.

2. In the **Generate a Request** form, complete the following options:

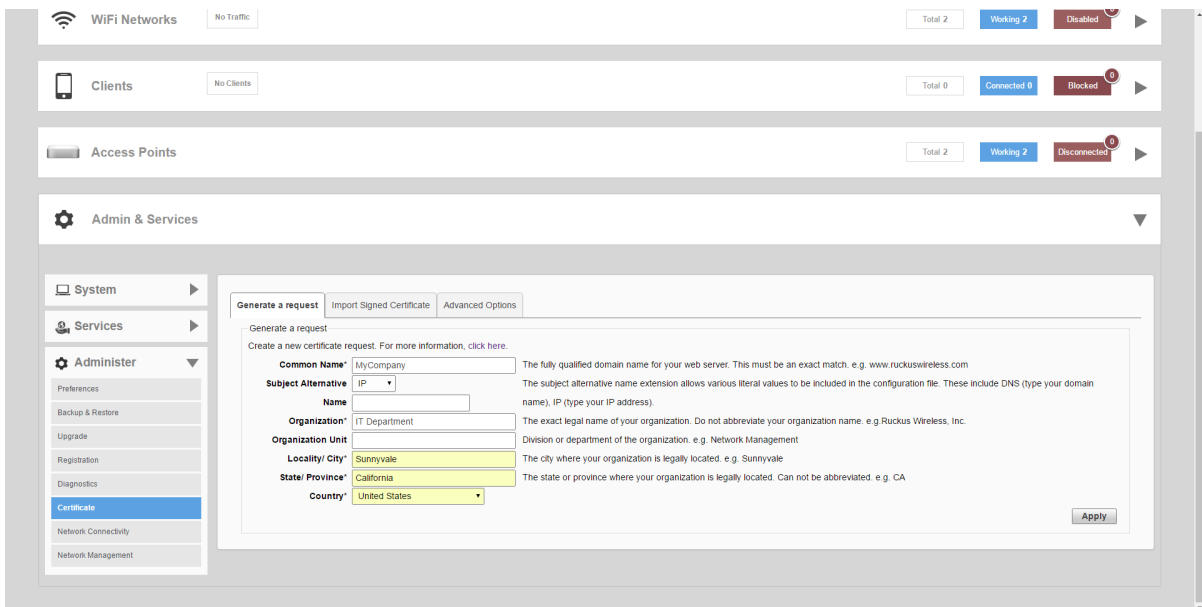
- **Common Name\***: Enter your company's Fully Qualified Domain Name (FQDN). Typically, this will be "unleashed.[your company].com". You can also enter the Unleashed Master AP's IP address (e.g., "192.168.0.2"), or a familiar name by which the Unleashed web UI will be accessed in your browser (e.g., by device name such as "Unleashed").

**NOTE**

Ruckus recommends using the FQDN as the Common Name if possible. If your network does not have a DNS server, you may use the Unleashed Master AP's IP address instead. However, note that some CA's may not allow this.

- If you wish to access the Unleashed web UI from a public network via the internet you must use a Fully Qualified Domain Name (FQDN).
  - In all cases when using a familiar name there must be an appropriate private or public DNS entry to resolve the familiar name to the Unleashed AP's IP address.
  - If you use a familiar name, this name will be shown in the browser's URL whenever accessing the Unleashed web interfaces (i.e., administrator interface, standard captive portal and guest access captive portal).
- **Subject Alternative Name:** (Optional) Select either IP or DNS from the menu and enter either alternative IP addresses or alternate DNS names.
  - **Organization\***: Type the complete legal name of your organization. Do not abbreviate your organization name.
  - **Organization Unit:** Division or department of the organization (for example, Network Management).
  - **Locality/City\***: Type the city where your organization is legally located (for example, Sunnyvale).
  - **State/Province\***: Type the state or province where your organization is legally located (for example, California). Do not abbreviate the state or province name.
  - **Country\***: Select your country or region from the pull-down menu.
3. Click **Apply**. A dialog box appears and prompts you to save the CSR file (myreq.csr) that you have just created.
4. Save the file to your computer.

**FIGURE 222** Generating a CSR file



5. Go to a certificate authority's web site and follow the instructions for purchasing an SSL certificate.
6. When you are prompted for the certificate signing request, copy and paste the content of the text file that you saved to your local computer, and then complete the certificate purchase.

After the certificate authority approves your CSR, you will receive the SSL certificate via email. The following is an example of a signed certificate that you will receive from a certificate authority:

```
-----BEGIN CERTIFICATE-----
MIIFVjCCBD6gAwIBAgIQLfAGuqKukMumWhbVf5v4vDANBgkqhkiG9w0B
AQUFADCBsDELMAkGA1UEBhMCVVMxFTAVBgNVBAoTDlZlcmlTaWduLCBJ
bmMuMR8wHQYDVQQLBgEFBQcBAQRtMGswJAYIKwYBBQUHMAGGGGh0dHA6
Ly9vY3NwLnZlcmlzaWduLmNvbTBDBGgrBgEFBQcwoAY3aHR0cDovL1NW
U1N1Y3VyZS1haWEudmVyaXNpZ24uY29tL1NWU1N1Y3VyZTIwMDUtYWlh
LmN1c2JBUmNvbGgrBgEFBQcBDARiMGChXqBcMFowWDBWFglpbWFnZS9naWYw
ITAfMAcGBSsOAwIaBBRLa7kolgYMu9BSOJsprEsHiyEFGDAmFiRodHRw
Oi8vbG9nb3Y2ZlZj21nbi5jb20vdnNsb2dvMS5naWYwDQYJKoZIhvcN
AQEFBQADggEBAI/S2dmm/kgPeVAlsiHmx-
751o4oq8+fwehRDBmQDaKiBvVXGZ5ZMnoc3DMYDjx0SrI91kPsn223CV
3UVBZo385g1T4iKwXgcQ7WF6QcUYOE6HK+4ZGcHermFf3fv3C1-
FoCjq+zEu8ZboUf3fWbGprGRA+MR/dDI1dTPtSUG7/zWjXO5jC//
0pykSldW/q8hg08kq30S8JzCwkqrXJfQ050N4TJtgb/
YC4gwh3BuB9wqpRjUahTiK1V1-
ju9bHB+bFkMwIIMIXc1Js62JC1WzFgaGUS2DLE8xICQ3wU1ez8RUPGn
wSxAYtZ2N7zDxYDP2tEiO5j2cXY7O8mR3ni0C30=
-----END CERTIFICATE-----
```

7. Copy the content of the signed certificate, and then paste it into a text file. Save the file.

You may now import the signed certificate into Unleashed. Refer to [Importing an SSL Certificate](#) on page 263 for instructions.

## Importing an SSL Certificate

After you receive the signed certificate from the Certificate Authority, you must import it into Unleashed.

To import a signed certificate:

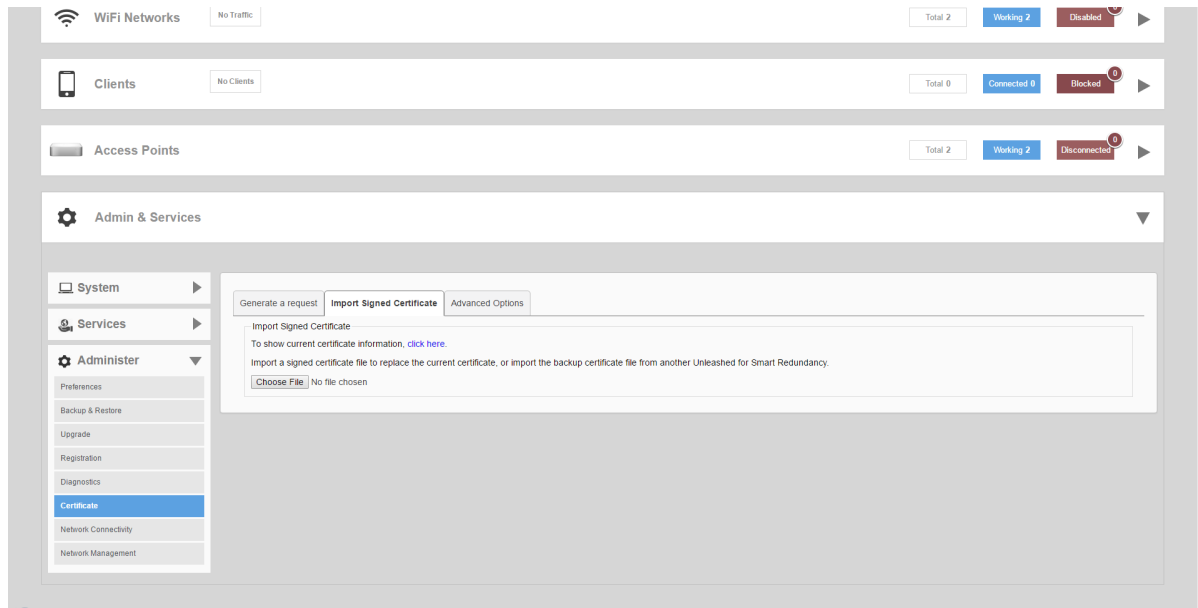
1. Click the **Browse** button and select the file that contains the certificate (in PEM format) to upload it.
2. If there are no intermediate CA certificates, then click the **Import** button to install the uploaded certificate.

### NOTE

If the certificate does not match the currently installed private key you will be prompted to upload the correct private key.

3. If your Unleashed certificate was issued by an intermediate CA, then you must also import the intermediate CA's certificate (as well as all other intermediate CA certificates in the path to the root CA). In that event, you would receive intermediate CA certificate download instructions from the certificate vendor. To import an intermediate certificate:
  - a) After selecting the end certificate, click on the intermediate certificate import option.
  - b) Click the **Import** button to display the **Import Intermediate Certificates** form.
  - c) Click the **Browse** button and select the file containing the intermediate certificate (PEM format) to upload it.
  - d) If there are no additional intermediate certificates, click the **Import** button to install the uploaded certificate.
4. Alternatively, you can simplify this process by appending the intermediate CA certificate(s) to the Unleashed certificate file. Then, you just need to import a single file. The intermediate certificate(s) will be imported automatically. In this case, you will see multiple ---BEGIN CERTIFICATE--- and ---END CERTIFICATE--- pairs in the file.

FIGURE 223 Import signed certificate



## SSL Certificate Advanced Options

The **Advanced Options** section allows you to perform additional certificate management functions.

These include the following:

- **Restore to Default Certificate/Private Key:** This deletes any certificate and private key that has been imported, and restores the factory default certificate/private key after restore and reboot.

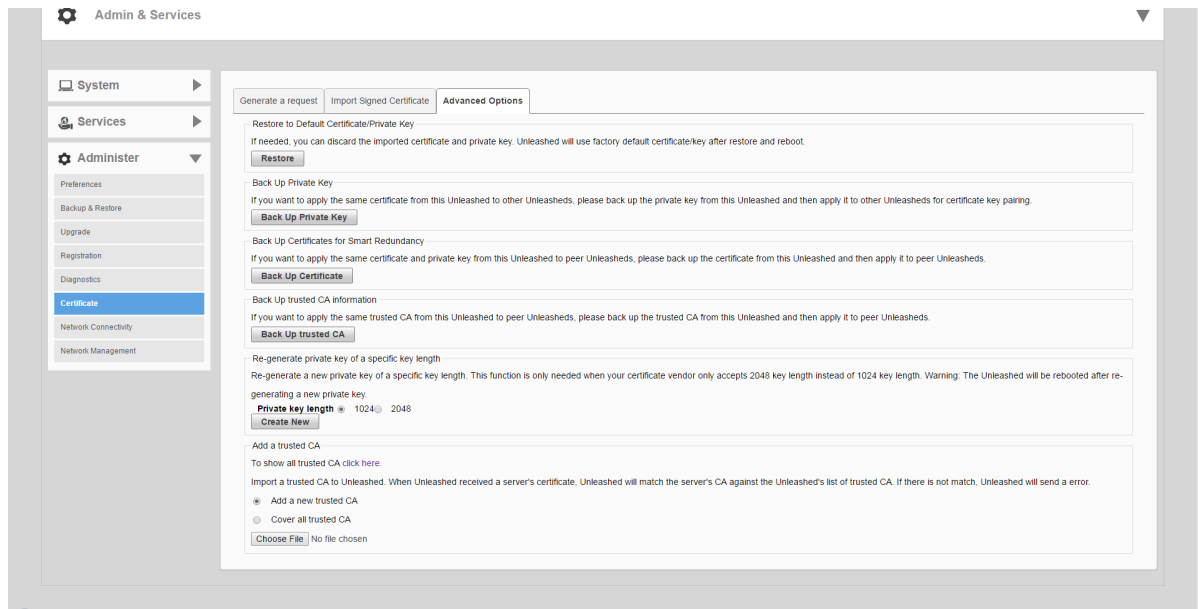
### NOTE

Restoring Unleashed to factory default state does not remove imported SSL certificates. Use this option to remove any imported certificates and revert to the factory default state.

- **Back Up Private Key:** Back up the current private key by downloading it for disaster recovery or for use on another Unleashed AP. If your Unleashed AP is replaced due to an RMA, you will need to restore the private key if you have installed a public certificate. Ensure that the private key is kept secure because the security of your SSL communications depends on it.
- **Back up certificates for Smart Redundancy:** If you have more than one Unleashed AP, you can install the same SSL certificate/private key pair on both devices. In this way, you can access the shared virtual management interface advertised in DNS for the same FQDN without seeing the security warning.
- **Back Up Trusted CA Information:** Use this option to apply the same trusted CA from this Unleashed AP to peer Unleashed APs. The file is output as a .tar.gz file containing all trusted Certificate Authority information currently installed on this Unleashed AP. This compressed file must be decompressed and the files imported into the peer Unleashed AP using the Add a Trusted CA feature described below.
- **Re-Generate Private Key of a Specific Key Length:** Use this option if your previous private key has been compromised or you need to use a stronger key (either 1024 or 2048 bits). Note that a new certificate must be generated and installed afterwards.
- **Add a Trusted CA:** Use this option to import CA information. Click the **Click Here** link to display all of the current trusted CA information, with each trusted CA separated by a string of number symbols ("#####"). Options include:

- **Add a new trusted CA:** Import a single CA file.
- **Cover all trusted CA:** Use the new trusted CA file to cover all existing trusted CA files

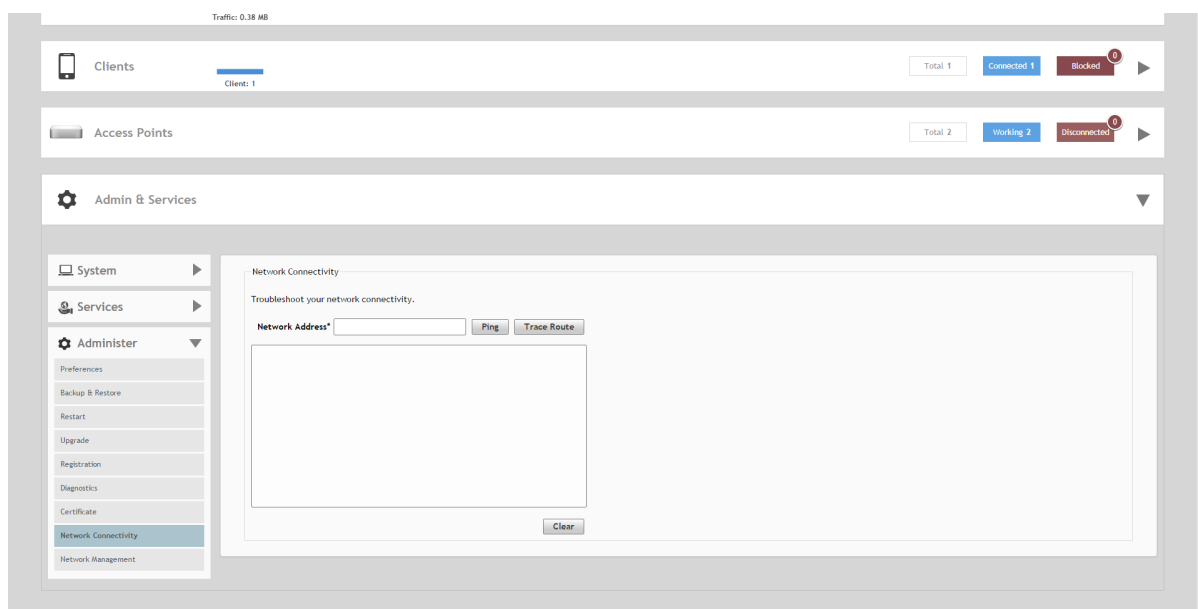
FIGURE 224 SSL Certificate Advanced Options



## Testing Network Connectivity

The Unleashed web interface provides two common tools used to diagnose connectivity issues. The Network Connectivity tools - **Ping** and **Traceroute** - can be accessed from the **Admin & Services > Administer > Network Connectivity** page.

FIGURE 225 Pinging www.google.com to test network connectivity



## Network Management

Unleashed provides support for Simple Network Management Protocol (SNMP v2 and v3), which allows you to query system information such as system status, AP status, AP Ethernet port status, etc.

You can also enable SNMP traps to receive immediate notifications for possible AP and client issues.

### NOTE

By default, all traps are disabled. If you need to enable a trap, you can do so using an SNMP SET command under the scalar MIB nodes: `ruckusUnleashedEventTrapSwitchCmd`.

The procedure for enabling the internal SNMP agent depends on whether your network is using SNMPv2 or SNMPv3. SNMPv3 mainly provides security enhancements over the earlier version, and therefore requires you to enter authorization passwords and encryption settings instead of simple clear text community strings.

Both SNMPv2 and SNMPv3 can be enabled at the same time. The SNMPv3 framework provides backward compatibility for SNMPv1 and SNMPv2c management applications so that existing management applications can still be used to manage Unleashed with SNMPv3 enabled.

### NOTE

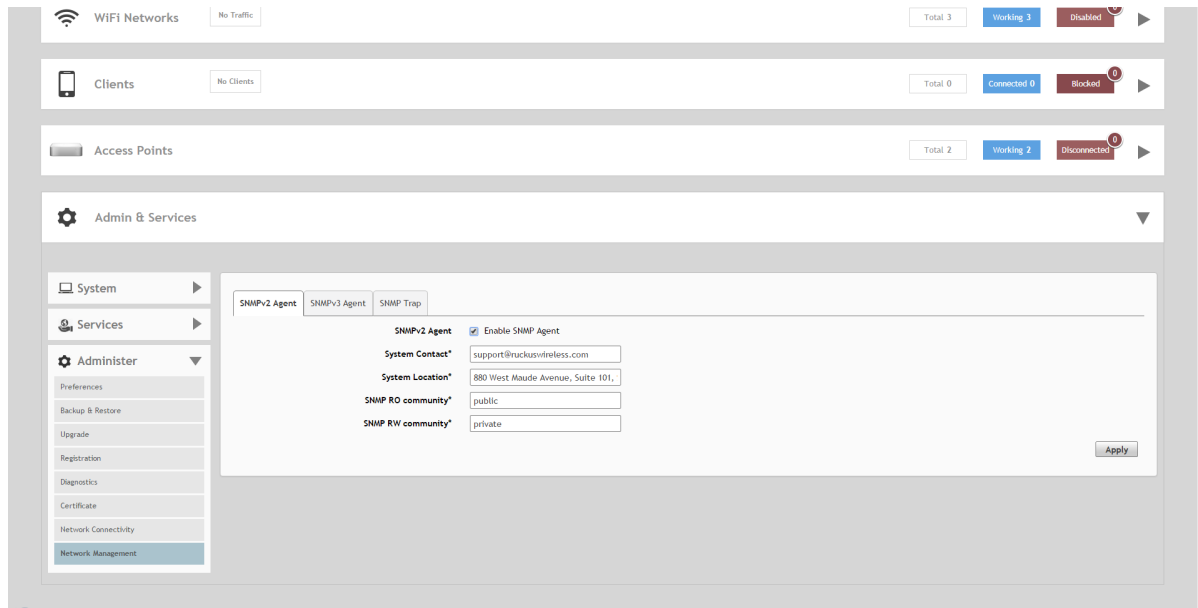
For a list of the MIB variables that you can get and set using SNMP, check the related SNMP documentation on the Ruckus Support website at <http://support.ruckuswireless.com/documents>.

## SNMPv2

If your network uses SNMPv2:

1. Go to **Admin & Services > Administer > Network Management**.
2. On the **SNMPv2 Agent** tab, select the **Enable SNMP Agent** check box.
3. Enter the following information:
  - In **System Contact**, type your email address (optional).
  - In **System Location**, type the location of the ZoneDirector device (optional).
  - In **SNMP RO community** (required), set the read-only community string. Applications that send SNMP Get-Requests to Unleashed (to retrieve information) will need to send this string along with the request before they will be allowed access. The default value is public.
  - In **SNMP RW community** (required), set the read-write community string. Applications that send SNMP Set-Requests to Unleashed (to set certain SNMP MIB variables) will need to send this string along with the request before they will be allowed access. The default value is private.
4. Click **Apply** to save your changes.

FIGURE 226 SNMPv2 Agent

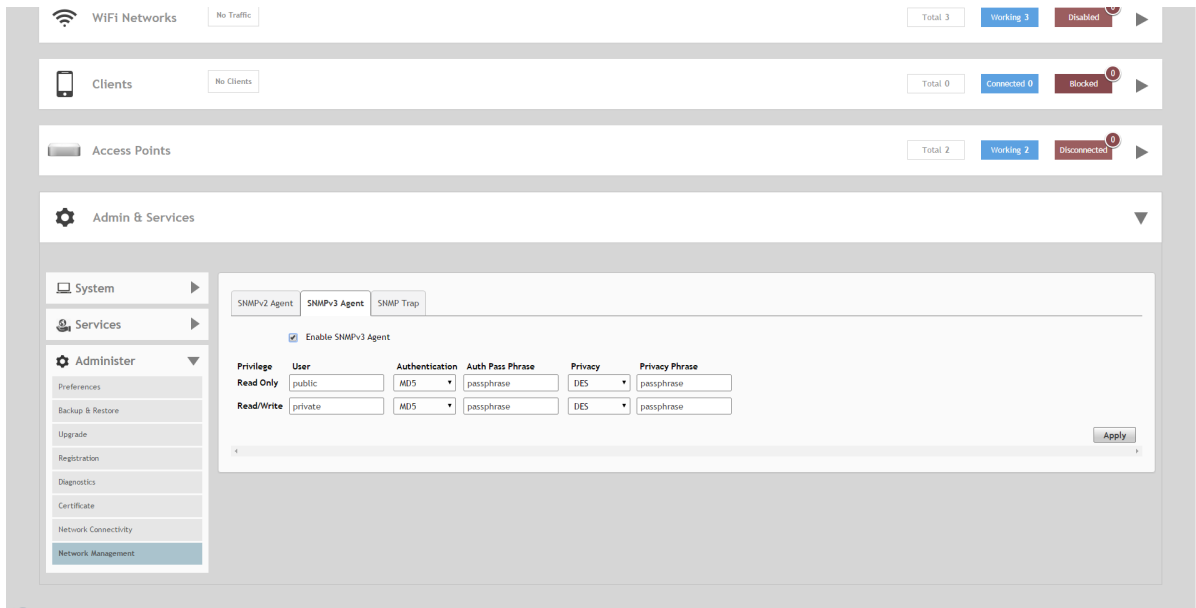


## SNMPv3

If your network uses SNMPv3:

1. Go to **Admin & Services > Administer > Network Management**.
2. On the **SNMPv3 Agent** tab, select the **Enable SNMPv3 Agent** check box.
3. Enter the following information for both the **Read Only** and **Read-Write** privileges:
  - **User:** Enter a user name between 1 and 31 characters.
  - **Authentication:** Choose MD5 or SHA authentication method (default is MD5).
  - **MD5:** Message-Digest algorithm 5, message hash function with 128-bit output.
  - **SHA:** Secure Hash Algorithm, message hash function with 160-bit output.
  - **Auth Pass Phrase:** Enter a passphrase between 8 and 32 characters in length.
  - **Privacy:** Choose DES, AES or None.
  - **DES:** Data Encryption Standard, data block cipher.
  - **AES:** Advanced Encryption Standard, data block cipher.
  - **None:** No Privacy passphrase is required.
  - **Privacy Phrase:** If either DES or AES is selected, enter a Privacy phrase between 8 and 32 characters in length.
4. Click **Apply** to save your changes.

FIGURE 227 SNMPv3 Agent



### Enabling SNMP Trap Notifications

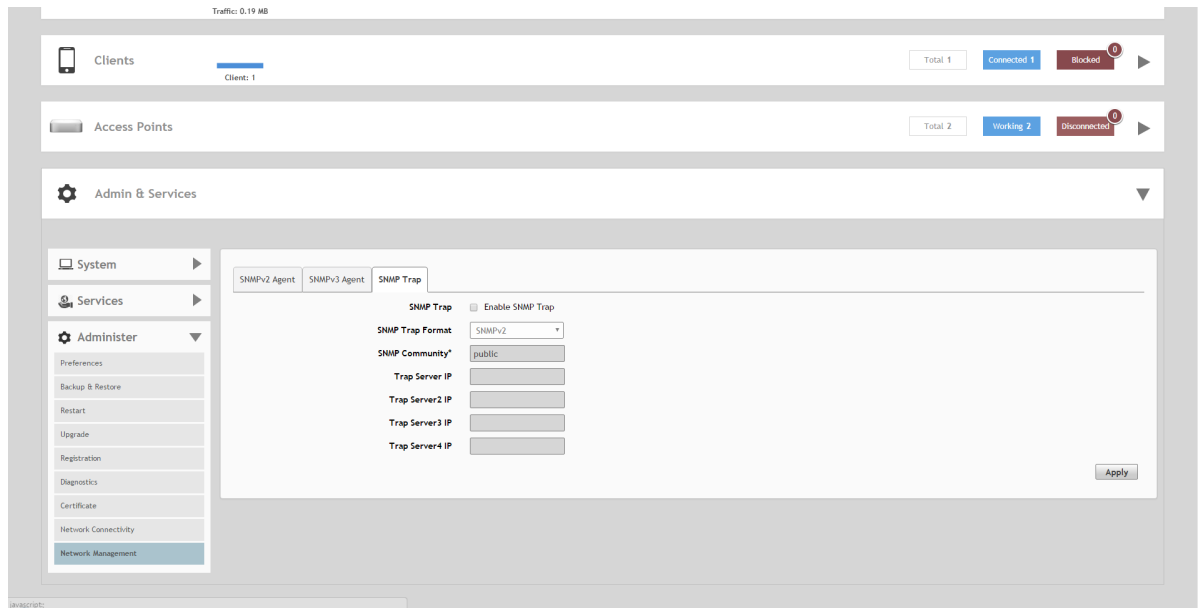
If you have an SNMP trap receiver on the network, you can configure Unleashed to send SNMP trap notifications to the server. Enable this feature if you want to automatically receive notifications for AP and client events that indicate possible network issues.

To enable SNMP trap notifications:

1. Go to **Admin & Services > Administer > Network Management**.
2. On the **SNMP Trap** tab, select the **Enable SNMP Trap** check box.
3. In **SNMP Trap format**, select either **SNMPv2** or **SNMPv3**. You can select only one type of trap receiver. If you select SNMPv2, you only need to enter the IP addresses of up to four SNMP trap receivers on your network. If you select SNMPv3, enter up to four trap receiver IP addresses along with authentication method passphrase and privacy (encryption) settings.
4. Click **Apply** to save your changes.



**FIGURE 228** SNMP Trap



### Enabling Management via Unleashed Multi-Site Manager

If you have a Ruckus Unleashed Multi-Site Manager (UMM) server installed on the network, you can enable Unleashed Multi-Site Manager management to centralize monitoring and administration of your remote Unleashed deployments.

The Unleashed Multi-Site Manager allows customers to manage up to 300 Unleashed networks from a central location, enabling remote administration of multiple Unleashed deployments using a single admin user name and password.

The Unleashed Multi-Site Manager provides the following critical centralized network management functions:

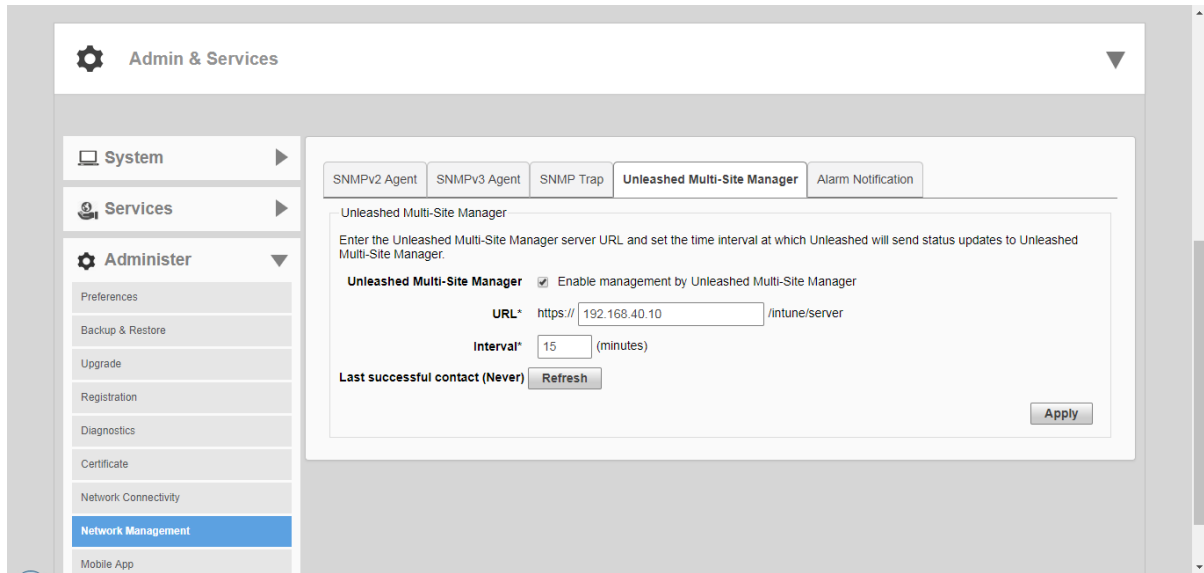
- **Monitoring:** Provides the ability to view the overall health status of all Unleashed networks, events and alarms, placement of APs on a world map, and connected client information from the dashboard.
- **Reporting:** Detailed statistics reports are available including device inventories, client associations, resource monitoring, throughput capacity, etc.
- **Management:** Enables several management activities from a central location, including scheduled software upgrades, backup and restore tasks, and the ability to create cookie-cutter configuration templates for deployment at multiple sites.

To enable Unleashed Multi-Site Manager administration:

1. Go to **Admin & Services > Administer > Network Management**, and click the **Unleashed Multi-Site Manager Management** tab.
2. Under *Unleashed Multi-Site Manager Management*, select the **Enable management by Unleashed Multi-Site Manager** check box.
3. In **URL**, type the Unleashed Multi-Site Manager DNS host name or IP address of the Unleashed Multi-Site Manager server.
4. In **Interval**, type the time interval (in minutes) at which Unleashed will send status updates to the Unleashed Multi-Site Manager server. The default interval is 15 minutes.

5. Click **Apply**. The message *Setting Applied* appears. You have completed enabling Unleashed Multi-Site Manager management. For more information on how to configure and manage your Unleashed deployment from the Unleashed Multi-Site Manager web interface, refer to the Unleashed Multi-Site Manager documentation.

**FIGURE 229** Enabling Unleashed Multi-Site Manager management



### Configuring Alarm Event Notification Settings

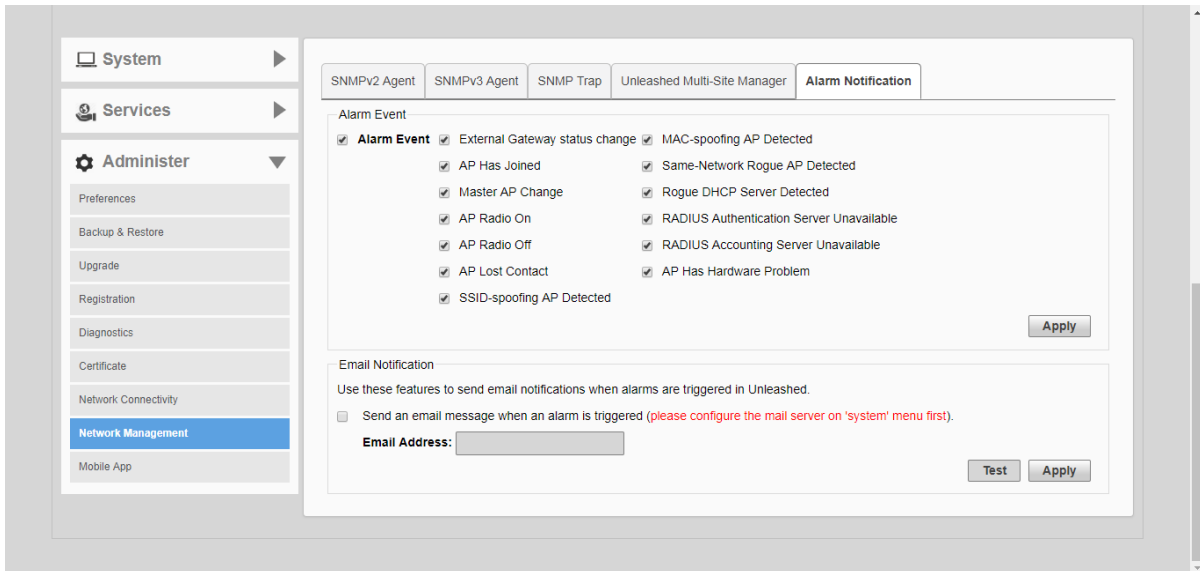
The Unleashed web interface allows you to customize the content and delivery for a wide range of alarm events. When a matching event occurs, admins can be notified either via email or mobile app.

To configure alarm event notifications and email/mobile app delivery:

1. Go to *Admin & Services > Administer > Network Management > Alarm Notification*.
2. In *Alarm Event*, select/deselect the event categories for which notifications will be delivered.
3. Click **Apply** to save your changes.
4. In *Email Address*, enable the check box and enter the destination address for alarm notifications. An email server must first have been configured from the *System > System Info* screen.

5. Click **Test** to test email delivery. Click **Apply** to save your changes.

**FIGURE 230** Alarm Notification settings



### **Enabling Mobile App Remote Management**

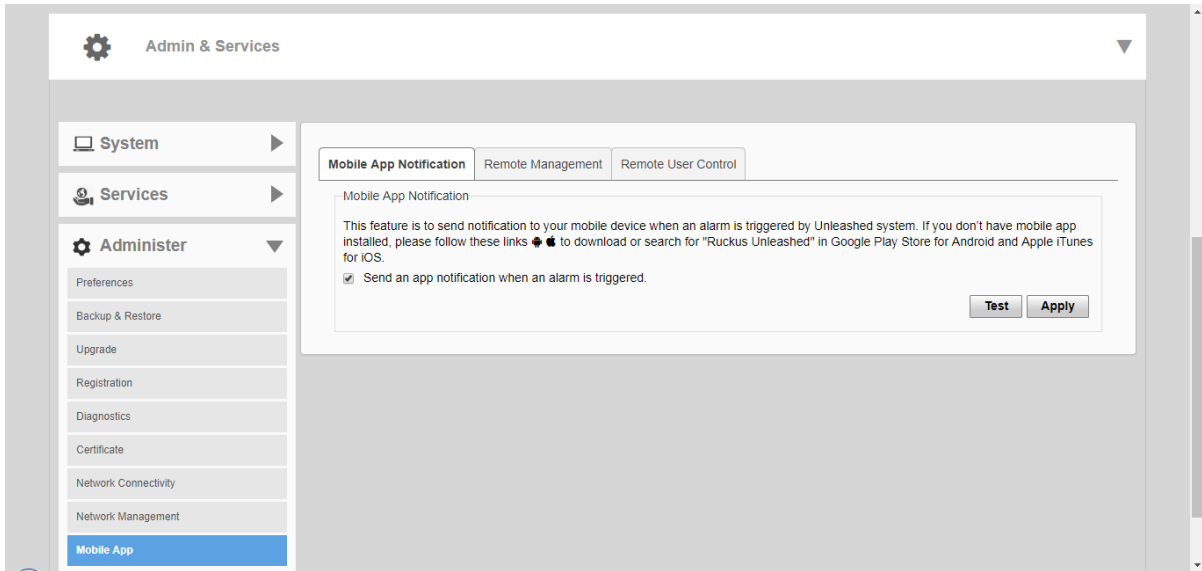
The Unleashed mobile app provides another way to manage your Unleashed network from an Android or iOS client.

To enable mobile app remote management:

1. Go to **Admin & Services > Administer > Mobile App**.

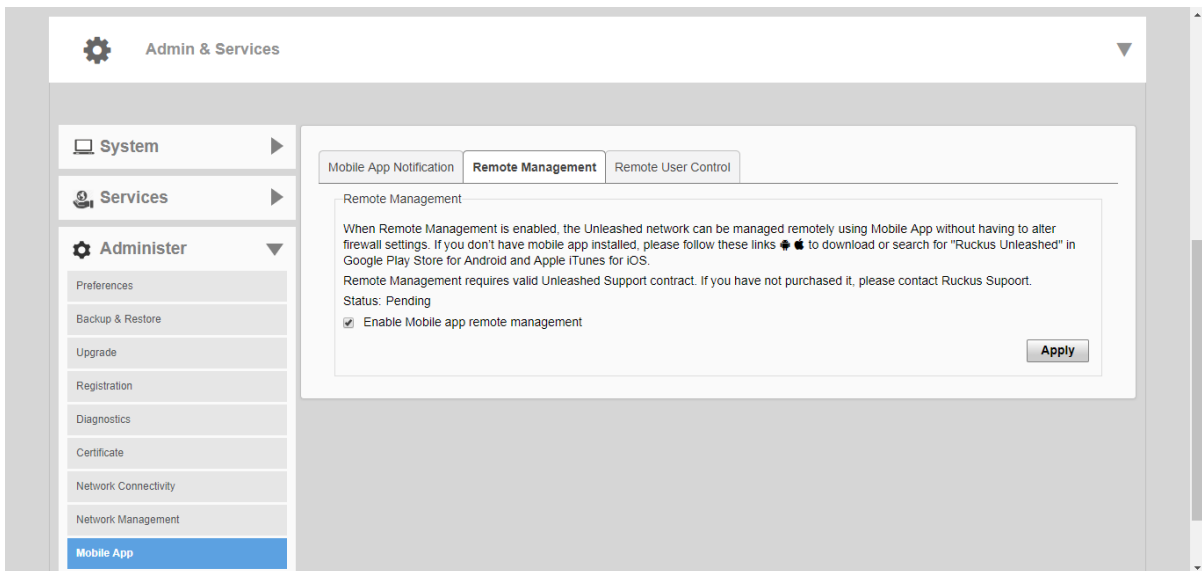
2. On the **Mobile App Notification** tab, select whether to send a notification to the app when an alarm is triggered. Click **Test** to send a test notification, and click **Apply** to save your changes.

**FIGURE 231** Enabling mobile app remote management



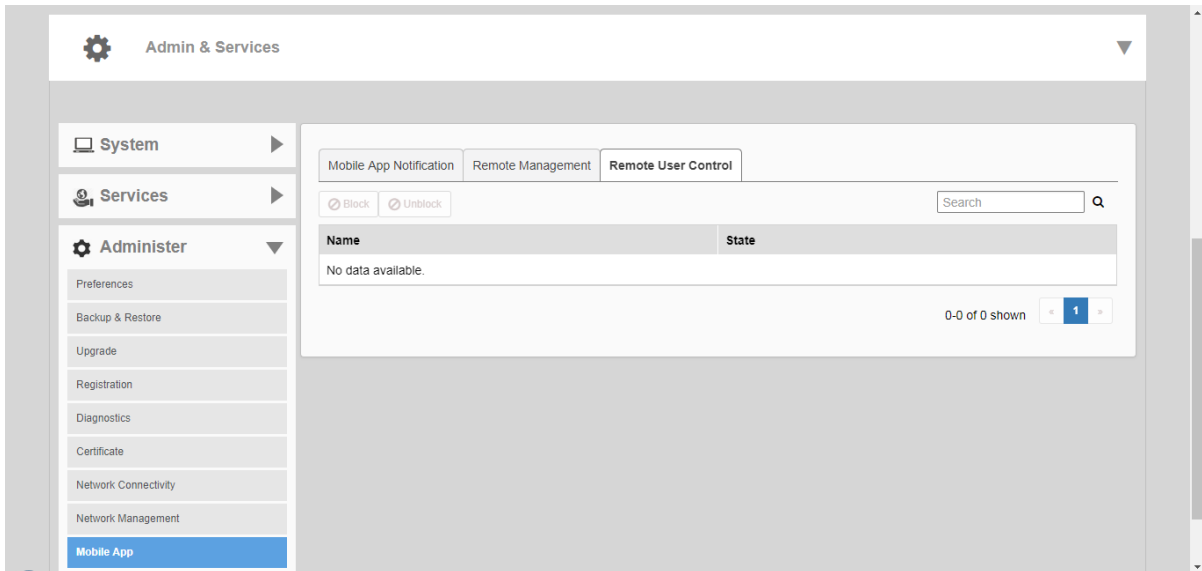
3. On the **Remote Management** tab, enable the check box next to **Enable Mobile app remote management**, and click **Apply**.

**FIGURE 232** Remote Management



4. On the *Remote User Control* tab, you can view mobile app connections and block or unblock mobile app clients.

**FIGURE 233** Remote user control





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