



The Neutron Series

Distributed Network Management Solution

Today's Networks Must Be -

Flexible, robust and as **effective** as the organizations they serve.

They Often Comprise:

- ✓ Different Buildings
- ✓ Business Units
- ✓ Infrastructures
- ✓ Sizes & Topologies



These **distributed networks** can place an **enormous burden** on in-house IT staff or managed service providers to support a potentially vast collection of Switches and Access Points through

- ✓ Installation
- ✓ Configuration
- ✓ Provisioning
- ✓ Managing
- ✓ Monitoring
- ✓ Upgrading

The Answer: The Neutron Series Distributed Network Management Solution

The Neutron Series

Distributed Network Management Solution

Flexible, Scalable, Enterprise-Class Management Solution for Both Large and Small Networks

- Simplified Configuration & Management
- Enterprise-Class Performance
- Feature-Rich Access Points & WLAN Controller Switches
- **ezMaster™** Centralized Network Management
- NO AP Licensing, Subscription or Tech Support Fees

Best of
INTEROP
2015 Finalist



**ezMaster™ Network
Management Software**



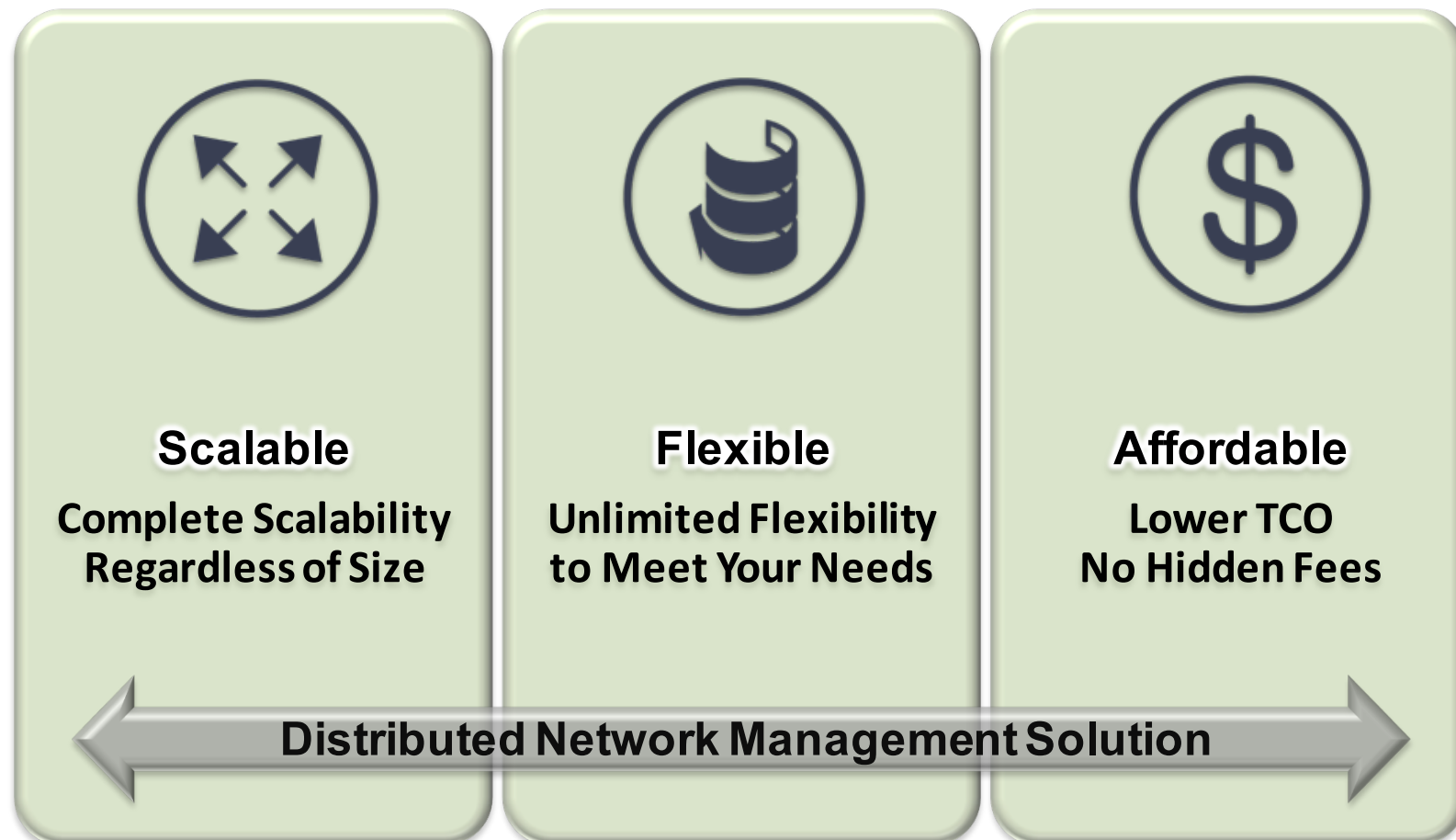
**WLAN Controller
Switches**



**Managed
Access Points**

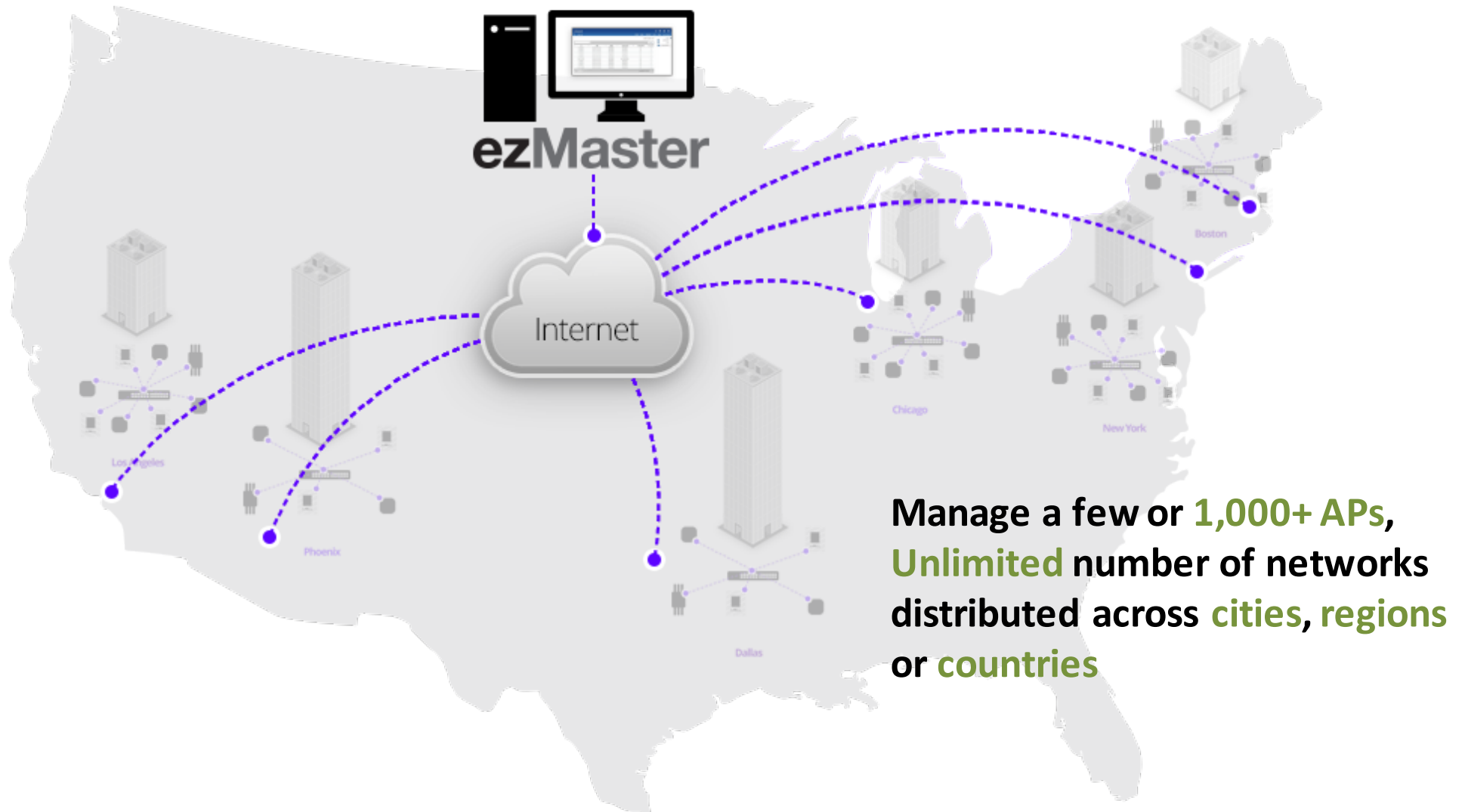
Neutron Series

Distributed Network Management Solution



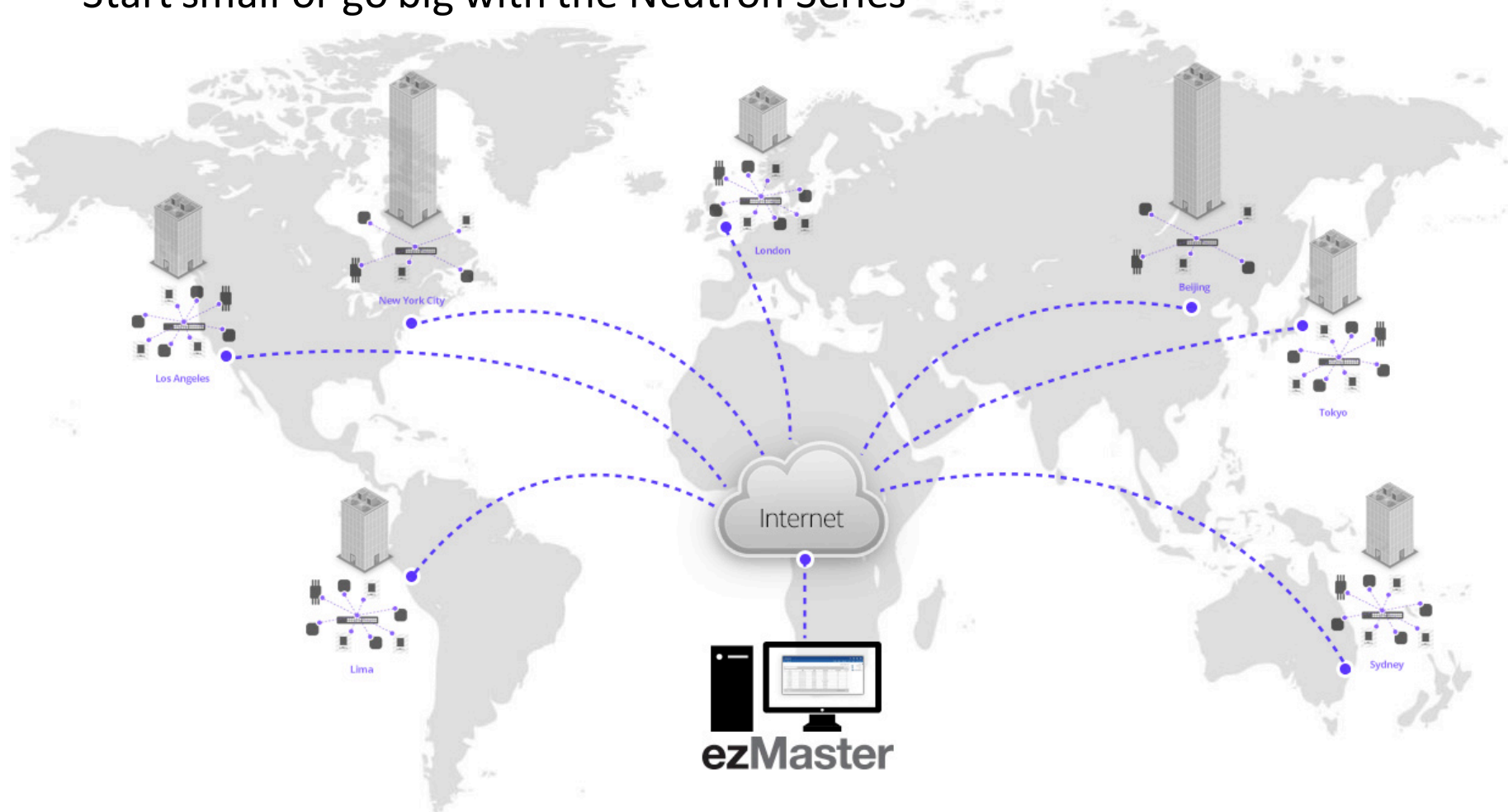
Complete **Scalability** Regardless of Size

Start small or go big with the Neutron Series



Complete **Scalability** Regardless of Size

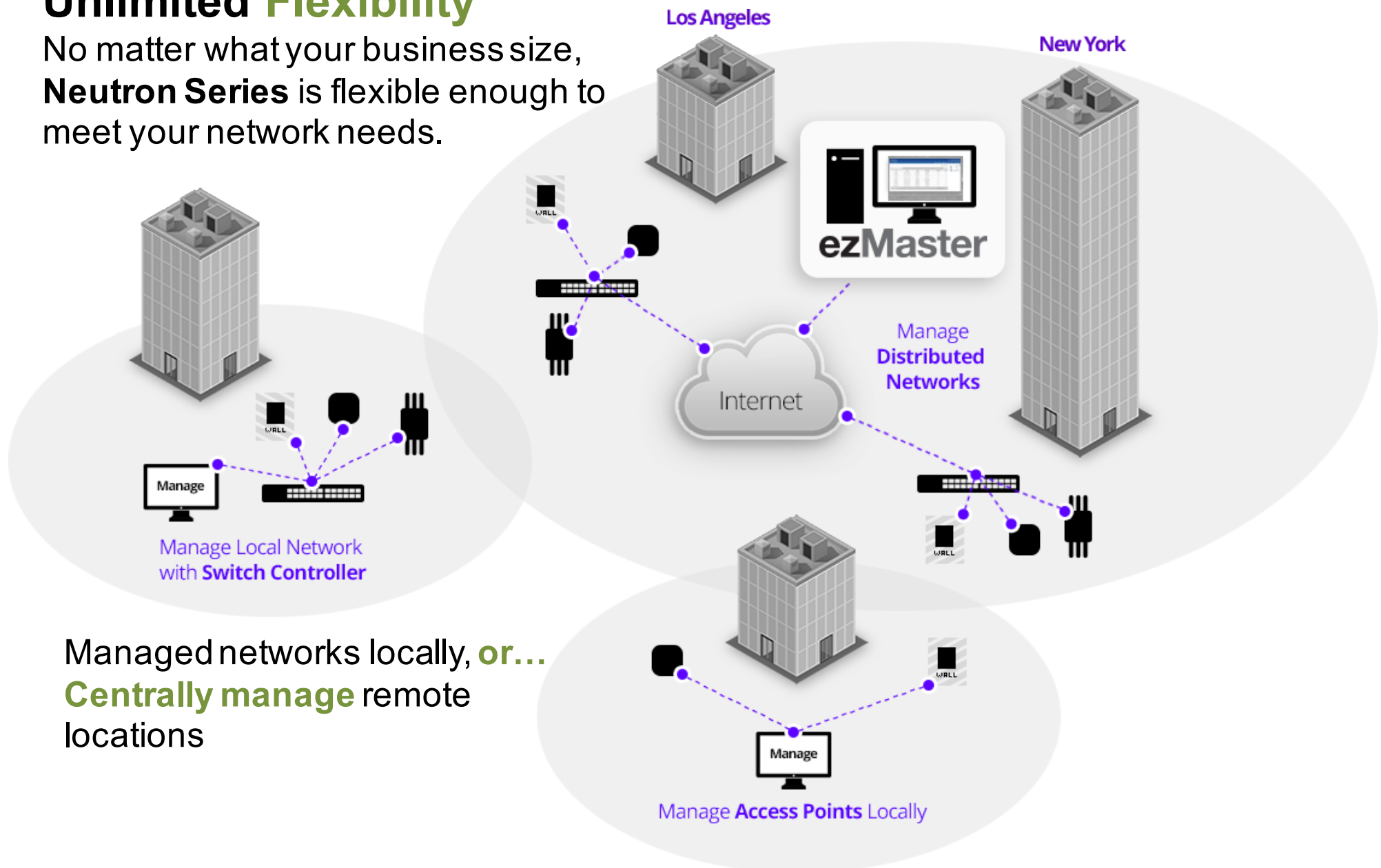
Start small or go big with the Neutron Series



Manage a few or **1,000+ APs**, **Unlimited** number of networks distributed across **cities, regions or countries**

Unlimited Flexibility

No matter what your business size, **Neutron Series** is flexible enough to meet your network needs.



Managed networks locally, **or...**
Centrally manage remote locations

Enjoy Greater **Affordability**

Many competing solutions require costly hardware, per AP licensing and annual subscription fees, not so with Neutron Series. Enjoy **affordable**, **predictable costs** – and a **lower TCO** per deployment.

The Price Paid over One Year for 25 APs

Compare	EnGenius Hybrid Solution	Controller-based Vendor	Cloud-based Vendor
Access Points	11ac 3x3 : 3 Streams EWS360AP \$599	11ac 3x3 : 3 Streams \$795	11ac 3x3 : 3 Streams \$1,399
HW Controller	0	1	0
Subscription	0	0	\$3,750 per year
License	0	\$4,000	0
Firmware Upgrade	0	\$3,600	0
Total Cost (USD)	\$14,975	\$27,475	\$38,725

MSRP October 2015 – Not including cost of power sources and Ethernet switch.

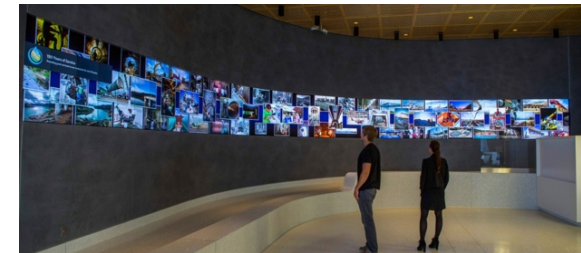


Target Audience, Solution Features & Benefits

Target Audience

Neutron Series Is Ideal for Deployment in Expandable Environments:

- Large, geographically diverse organizations
- Managed Service Providers (MSPs)
- Healthcare Facilities
- Hotels & Resorts
- School Districts & Campuses
- Public Sector
- ProAV Installations

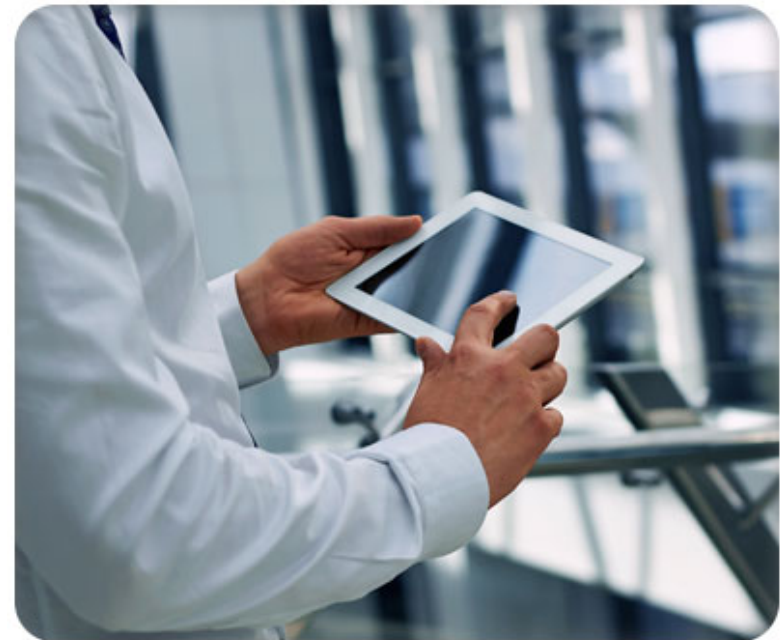


Features & Benefits

The **Neutron Series** delivers enterprise-class features that **simplify deployment and management**, maximizing wireless performance for any size network, no matter where it's located.

Optimized Wireless Performance

- ✓ Background Scanning
- ✓ Auto-Transmit Power
- ✓ Auto-Channel Allocation
- ✓ Fast Roaming
- ✓ Band Steering
- ✓ Band Balancing



ezMaster™ makes **centralized network management easy** through bulk configuration, provisioning and monitoring; rich analytics, reporting and much more.



Distributed Control, Centralized Management with ezMaster

- ✓ Unlimited Distributed Networks
- ✓ At-A-Glance Dashboard
- ✓ Manage 1,000+ APs & Switches
- ✓ Manage 10,000+ Concurrent Users
- ✓ Monitor with or without Onsite Switch
- ✓ Deploy on a Local or Remote Server or via a Cloud-Based* Service

Save Time & Resources

The Neutron Series is **easy to deploy, manage and operate**, so you'll spend less on administrative overhead, travel costs and training.

Simplified Deployment & Provisioning

- ✓ Easy-to-Use Web Interface
- ✓ Simplified Management
- ✓ One-Click Updates
- ✓ Automated AP Provisioning
- ✓ Intuitive Configuration Tools
- ✓ No Extensive Learning Curve



A powerful, **full-featured platform**, **Neutron Controller Switches** support up to **50 Access Points** and **provide for future expandability** for broader device connectivity and management.



Neutron Controller Switches, A Full-Featured WLAN Platform

- ✓ Manage up to 50 Neutron APs
- ✓ Power-over-Ethernet Support
- ✓ Redundant AP Management with SmartSync Redundancy*
- ✓ Future Expandability
- ✓ Wireless Controller
- ✓ Array of Layer 2 Management Tools

*Feature available through future firmware updates

Versatile AP Portfolio Features High-Capacity 11AC

Neutron Series' **versatile** line of **high-performance**, **Managed Access Points** features **high-capacity 11ac** Indoor and Outdoor APs.

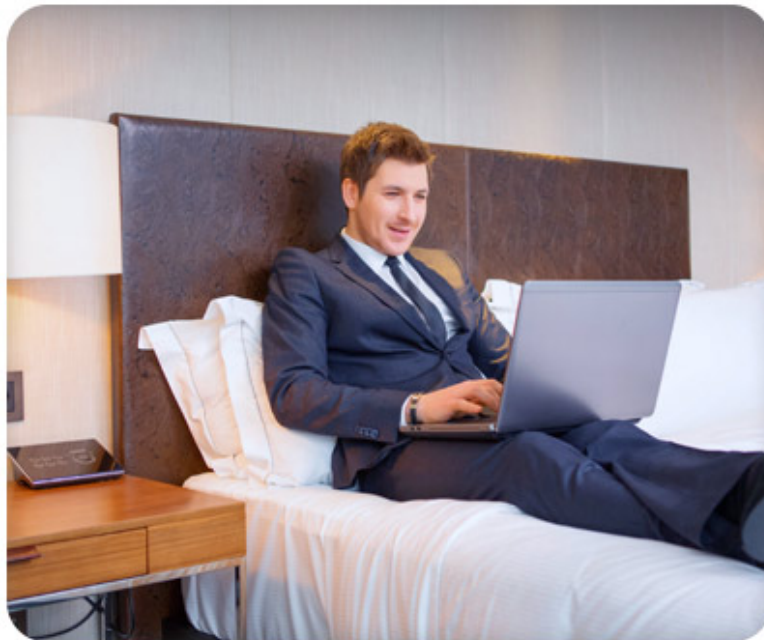
Versatile AP Portfolio

- ✓ Indoor Ceiling-Mount
- ✓ Outdoor Ruggedized
- ✓ Single-Band 11n models to
- ✓ 3x3 Dual-Band 11ac versions
- ✓ PoE Convenience
- ✓ Standalone Devices or
- ✓ Managed via Switch or ezMaster



Increased Security, Reliability & Bandwidth Conservation

Organizations that offer Internet access to patrons or visitors - notably hotels, retail shops and restaurants - will appreciate Neutron's **Captive Portal** and **Guest Network** capabilities.



Create Secure, Branded Captive Portals & Guest Networks

- ✓ Offer Secure, Regulated Web Usage
- ✓ Authentication Database
- ✓ Customizable Branded Splash Pages
- ✓ Provide Promotional Content
- ✓ Acceptable Guest Usage Policies
- ✓ Block Access to Corporate Network
- ✓ Create Separate VLANs

With the Neutron Series, your **network is protected** from attacks at multiple levels through **advanced wireless encryption** standards and **threat detection**.

Comprehensive Network Protection

- ✓ Wi-Fi Protected Access Encryption
- ✓ Authentication Database
- ✓ 802.1X with Radius Server
- ✓ Rogue AP Detection
- ✓ Email Alerts
- ✓ Real-Time Wireless Invasion Monitoring



Neutron provides **centralized network visibility** and a wealth of invaluable **reporting, analytics** and **real-time monitoring tools**, with **email alerts**, giving IT managers insight into system efficiencies and issues.



Rich Reporting & Analytics

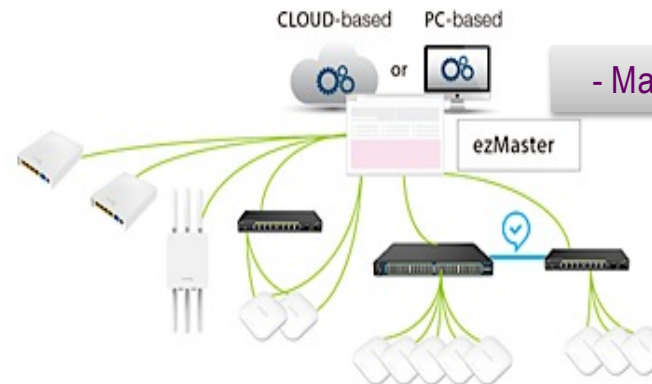
- ✓ Email Alerts
- ✓ Wireless Client Monitoring
- ✓ Traffic & Usage Statistics
- ✓ Centralized Network Visibility
- ✓ View Statistics
- ✓ Network Topology View
- ✓ Floor Plan & Google® Map Views



Competitive Information

AP & Switch Management

EnGenius®



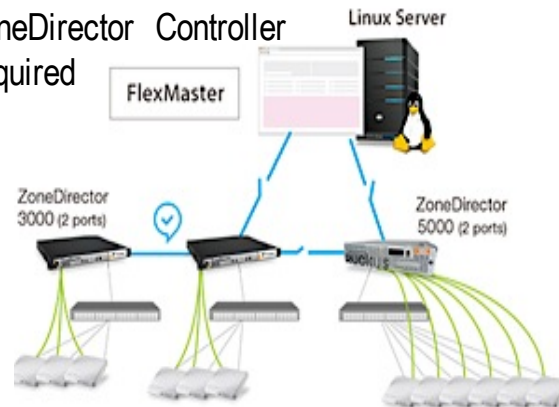
- Manage by both Switches & ezMaster

- Redundancy between Switch & ezMaster = SmartSync Redundancy*
- AND between **any** Neutron Switch = ezRedundancy*

ruckus®

Simply Better Wireless.

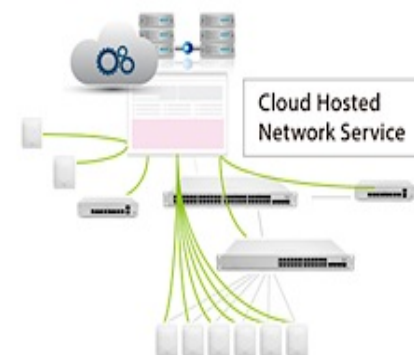
- Manage by ZoneDirector Controller
- License fee required



- No redundancy between FlexMaster & ZoneDirector
- Only between two of the **same** ZoneDirector Controllers

cisco Meraki

CLOUD-based



- Directly manage by Meraki Cloud datacenters built around the world

*Feature available through future firmware updates

Competitive High Level Matrix – Neutron vs. Competition

	EnGenius	Ruckus	Meraki
Management	Hybrid (Cloud or Controller)	Controller-based	Cloud-based
AP License/Subscriptions	None	✓	✓
Auto Channel Selection	✓	✓	✓
Auto TX Power	✓	✓	✓
Background Scanning	✓	✓	✓
Captive Portal	✓	✓	✓
One Click Update	✓	✓	✓
Auto Migration	✓	✓	✓
Comprehensive Monitoring	✓	✓	✓
Remote Management	✓	✓	✓
1,000+ APs	✓	✓	✓

EnGenius competes head to head with other major competitors

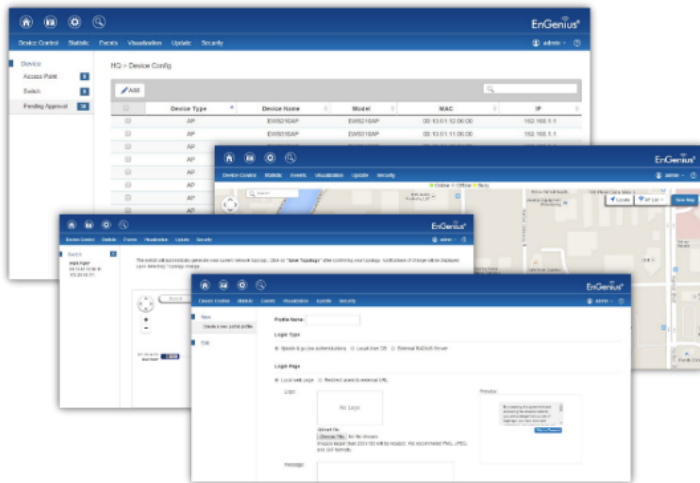


ezMaster Network Management Software

ezMaster Network Management Software expands the **flexibility** and **scalability** of Neutron Series Managed Access Points and WLAN Controller Switches.

Best of
INTEROP
2015 Finalist

ezMaster™



Flexible Distributed Network Management

- ✓ Unlimited Distributed Networks
- ✓ Powerful, Scalable Options
- ✓ Simplified Device Management
- ✓ Deploy on a Local or Remote Server or via a Cloud-Based* Service

*Feature available through future firmware updates

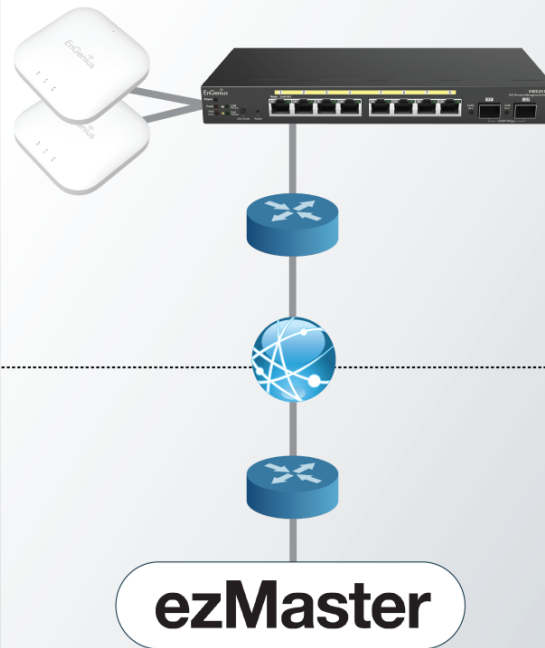
1

Manage Local Network



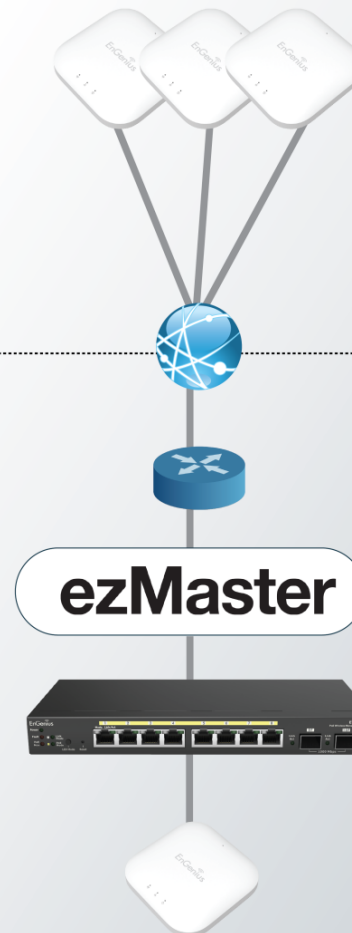
2

Manage Remote Network



3

Manage Local and Remote Networks



Remote Network

Local Network

ezMaster™ Software Feature List

Centralized Management

- Configure, manage and monitor thousands of Neutron devices
- Cross-Network AP Management
- AP Group Configuration

AP Config & Management

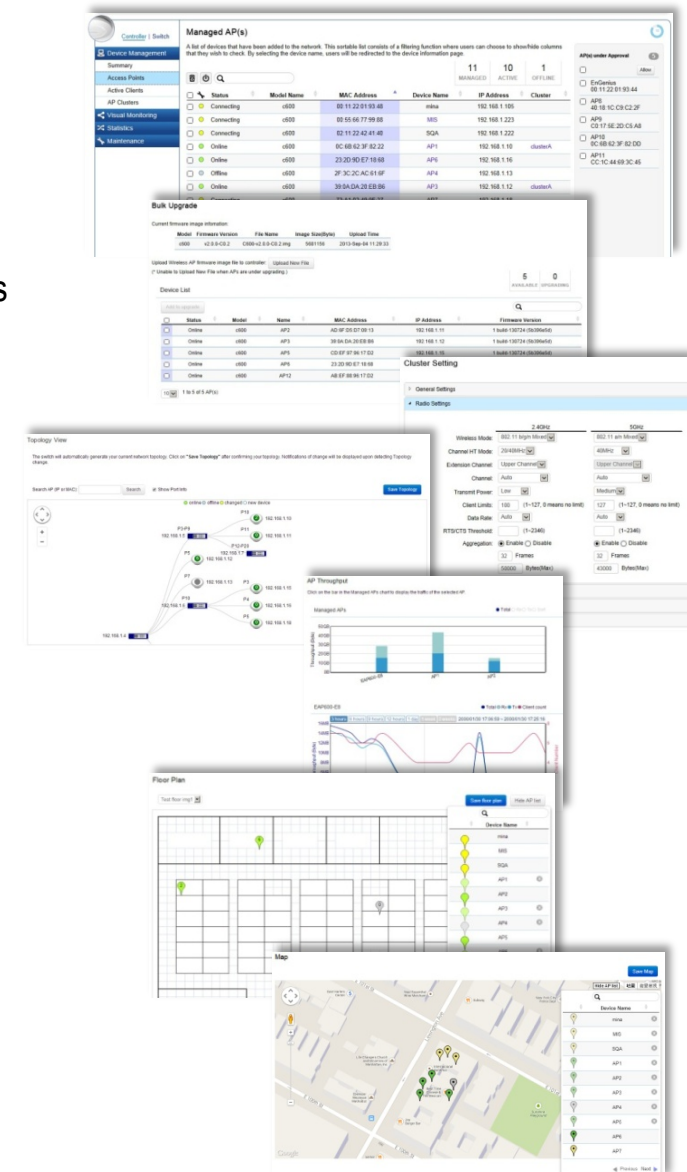
- Auto Channel Selection
- Auto Tx Power
- Client Limiting
- Client Isolation
- L2 Isolation
- VLAN Isolation
- VLAN Tag
- Traffic Shaping
- Fast Roaming
- Band Steering
- RSSI Threshold
- Multiple SSID
- Secure Guest Network
- LED On/Off Control
- Background Scanning

Comprehensive Monitoring

- System Status Monitoring
- Device Status Monitoring
- Wireless Client Monitoring
- Wireless Traffic and Usage Statistics
- Visual Topology View
- Floor Plan View
- Wireless Coverage Display
- Map View
- Rogue AP Detection

Management & Maintenance

- Kick/Ban Clients
- Captive Portal
- Seamless Migration
- One-Click Update
- Bulk Firmware Upgrade
- WiFi Scheduling*
- Syslog
- Remote Logging
- E-Mail Alert
- SmartSync Redundancy*
- ezRedundancy* (N+1)



*Available through future software upgrade.

ezMaster System Requirements

Recommended environment for managing up to 500 APs

- CPU: Intel i3 3.6GHz dual core or above
- RAM: 4GB minimum
- HDD: 500GB (actual requirement depending on log size)
- OS: Microsoft Windows 7 or later + VirtualBox 4.3.30 (or similar virtualization products)

Recommended environment for managing up to 1000 APs

- CPU: Intel i5 3.2GHz quad core or above
- RAM: 4GB minimum
- HDD: 500GB (actual requirement depending on log size)
- OS: Microsoft Windows 7 or later + VirtualBox 4.3.30 (or similar virtualization products)

Network Topology Requirements

- At sites where APs are deployed: a DHCP enabled network for APs to obtain IP address



Neutron Series Hardware





Neutron Series WLAN Controller Switches

NEW EWS2910P 8-Port Gigabit PoE+ L2 Wireless Management Switch/Controller with 2 Dual-Speed SFP ports; **61w**

NEW EWS2910P-KIT-300 WLAN Starter Kit (1) EWS2910P, (2) EWS300APs






EWS5912FP 8-Port Gigabit PoE+ L2 Wireless Management Switch with 2 GbE Ports and 2 Dual-Speed SFP; **130w**

EWS7928P 24-Port Gigabit PoE+ L2 Wireless Management Switch with 4 Dual-Speed SFP; **185w**

EWS7928FP 24-Port Gigabit PoE+ L2 Wireless Management Switch with 4 Dual-Speed SFP; **370w/740w** (with RPS)

EWS7952FP 48-Port Gigabit PoE+ L2 Wireless Management Switch with 4 Dual-Speed SFP; **740w**

Model	Max APs Supported	RJ45	SFP	PoE Standard	PoE Ports	PoE Budget	Housing
EWS2910P	20	8	2	af	8	61.6w	1U 9.45" Desktop
EWS5912FP	50	10	2	af/at	8	130w	1U 13" Rack-mountable
EWS7928P	50	24	4	af/at	24	185w	1U 19" Rack-mountable
EWS7928FP	50	24	4	af/at	24	370w/740w	1U 19" Rack-mountable
EWS7952FP	50	48	4	af/at	48	740w	1U 19" Rack-mountable







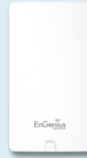

				
EWS2910P	EWS5912FP	EWS7928P	EWS7928FP	EWS7952FP
Manage 20 APs	Manage 50 APs			
8 GbE Ports	10 GbE Ports	24 GbE Ports		48 GbE Ports
2 x 1G SFP Uplink		4 x 1G SFP Uplink		
8P PoE af (61.6W)	8P PoE af/at (130W)	24P PoE af/at (185W)	24P PoE af/at (370W)	24P PoE af/at (740W)
20 Gbps switching	24 Gbps switching	56 Gbps switching		104 Gbps switching
Desktop	13" 1U Rackmount	19" 1U Rackmount		

Neutron Series' **versatile** line of **high-performance**,
Managed Access Points features **5 new APs**.

- ✓ EWS300AP
- ✓ EWS350AP
- ✓ EWS500AP
- ✓ EWS510AP
- ✓ EWS650AP



Product No.	Wireless Standard	Product Description
EWS300AP	802.11b/g/n	Single-Band 11n 2x2:2 2.4 GHz Ceiling-Mount Wireless Managed Indoor AP
EWS310AP	802.11a/b/g/n	Dual-Band 11n 2x2:2 Ceiling-Mount Wireless Managed Indoor AP
EWS320AP	802.11a/b/g/n	Dual-Band 11n 3x3:3 Ceiling-Mount Wireless Managed Indoor AP
EWS350AP	802.11a/b/g/n/ac	Dual-Band 11ac 2x2:2 Ceiling-Mount Wireless Indoor AP
EWS360AP	802.11a/b/g/n/ac	Dual-Band 11ac 3x3:3 Ceiling-Mount Wireless Managed Indoor AP
EWS500AP	802.11b/g/n	Single-Band 11n 2x2:2 Wall Plate Wireless Managed Indoor AP
EWS510AP	802.11a/b/g/n	Dual-Band 11n 2x2:2 Wall Plate Wireless Managed Indoor AP
EWS650AP	802.11	Dual-Band 11ac 2x2:2 Wireless Managed Outdoor AP; IP55
EWS660AP	802.11a/b/g/n/ac	Dual-Band 11ac 3x3:3 Wireless Managed Outdoor AP; IP55
EWS860AP	802.11a/b/g/n/ac	Dual-Band 11ac 3x3:3 Wireless Ruggedized Managed Outdoor AP; IP68

							
EWS300AP	EWS310AP	EWS320AP	EWS350AP	EWS360AP	EWS650AP	EWS660AP	EWS860AP
Indoor					Outdoor IP55		Outdoor IP68
Single Band	Dual Band 802.11n		Dual Band 802.11n/ac				
Internal Antenna							Ext.Antenna
2 x 2 : 2 300 Mbps High Power	2 x 2 : 2 300 + 300 Mbps High Power	3 x 3 : 3 450 + 450 Mbps High Power	2 x 2 : 2 300 + 867 Mbps High Power	3 x 3 : 3 450 + 1300 Mbps High Power	2 x 2 : 2 300 + 867 Mbps High Power	3 x 3 : 3 450 + 1300 Mbps High Power	
1 x GbE Uplink					1 x GbE Uplink 1 x GbE LAN		1 x GbE Uplink 1 x GbE LAN(PSE)
Support 802.3af/at PoE		Support 802.3at PoE					
0 to 40° C					-20 to 60° C		



EWS500AP



EWS510AP

Indoor

Single Band

Dual Band 802.11n

Internal Antenna

2 x 2 : 2
300 Mbps

2 x 2 : 2
300 + 300 Mbps

1 x GE Uplink
4 x FE LAN (1 x PoE Out)

Support 802.3af/at PoE

0 to 40° C



Total Networking Solution Provider



APPENDIX A: FEATURE HIGHLIGHTS



1

Device Registration

Enter registration information for one or more devices (one per row) using the following format: **MAC Address; Check Code; Description**
 For example,
 88:DC:96:11:11:11;123456;Lobby AP
 88:DC:96:22:22:22;123456;Main Office AP

88:DC:96:0C:95:62;7ff67f81;Tony_Desktop_2

[Register](#)

Claim AP using MAC Address + Check Code

2

demo project > Device Config

[Add](#)

<input checked="" type="checkbox"/>	Device Type	Model Name	MAC Address
<input checked="" type="checkbox"/>	AP	EWS310AP	88:DC:96:0C:95:62

25 1 to 1 of 1 Device(s)

Add claimed AP to Profile

3

demo project > Device Config

[Remove](#) [Reboot](#)

<input type="checkbox"/>	Status	MAC Address
<input type="checkbox"/>	Online	00:13:51:00:06:00
<input type="checkbox"/>	Online	00:13:51:00:08:00
<input type="checkbox"/>	Online	00:13:51:00:09:00
<input type="checkbox"/>	Online	88:DC:96:0C:95:62
<input type="checkbox"/>	Online	88:DC:96:22:02:27
<input type="checkbox"/>	Online	88:DC:96:32:90:AD
<input type="checkbox"/>	Online	88:DC:96:32:90:B9
<input type="checkbox"/>	Online	88:DC:96:36:CF:54
<input type="checkbox"/>	Online	88:DC:96:36:CF:5D

25 1 to 9 of 9 Device(s)

General Settings

Device Name: (1-32 characters)

Administrator Username: (1-12 characters)

New Password: (1-12 characters)

Verify Password:

Auto Configuration: ☒ DHCP ☐ Static

IP Address:

Subnet Mask:

Default Gateway:

Primary DNS Server:

Secondary DNS Server:

Wireless Radio Settings

WLAN Settings - 2.4GHz

WLAN Settings - 5GHz

Start managing and configuring your APs!

Where to find the Check Code?

In order to register the Neutron device with the ezMaster for remote management, the Check Code and MAC Address of the device must be entered. The Check Code can be found:

- On the device label at the bottom of each device (shipped after Oct 2015)
- In the *Summary* or *Status* page in the device user interface
- Using the *Generate Check Code* feature on the EWS Switch (*Maintenance > Check Code*)
- Along with every EWS AP/Switch shipment, HQ sales will provide a list of SN, MAC Address, Check Code

Register ezMaster to the ezReg server in order manage remote Access Points.

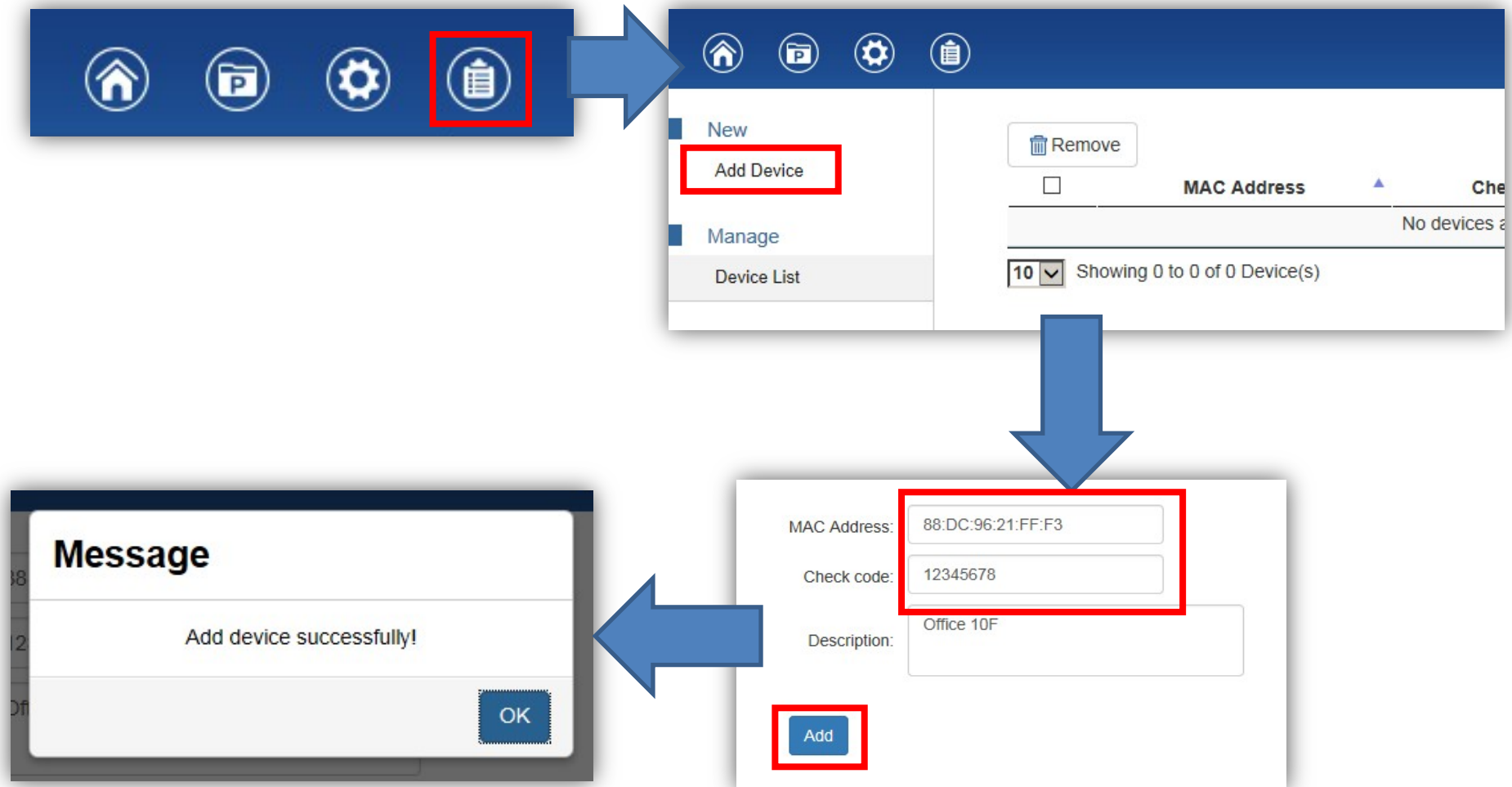
The diagram illustrates the navigation steps to reach the EzReg Registration page. It starts with a top navigation bar containing four icons: Home, Files, Settings (highlighted with a red box), and Reports. A large blue arrow points from the Settings icon to the EzReg Registration page. This page has a sidebar menu with 'Account', 'Account Setting', 'EzReg', and 'EzReg Registration' (highlighted with a red box). The main content area contains registration details: User Name: admin, Password: Leave blank if unchanged, Verify Password: Leave blank if unchanged, Email Address: admin@senao.com (highlighted with a red box), and Description: default admin user. A note states: 'Note: the email address is necessary to register/re-register devices for management. Please fill your data correctly.' An 'Apply' button is at the bottom.

Enter email to register

This screenshot shows the 'EzReg Registration' page after navigation. The main content area displays a message: 'This EzMaster is unregistered. Please click register button to register to EzCom.' Below this, it lists 'EzCom URL: ezreg.engeniusnetworks.com' and 'EzCom Port Number: 80'. A 'Register' button is highlighted with a red box.

This screenshot shows a 'Message' dialog box with the text 'Register to EzCom successfully!' and an 'OK' button.

After registering with ezReg server, you can start adding AP into your inventory.



Enter MAC and check code

The screenshot illustrates the steps to add an AP to a profile in the EnGenius web interface. It shows a navigation bar with icons for Home, Profile, Settings, and Reports. The Profile icon is highlighted with a red box. An arrow points to a search results box for the 'demo' profile, which is also highlighted with a red box. A large blue arrow points down to the 'demo > Device Config' page. On the left sidebar, the 'Pending Approval' section is highlighted with a red box. In the main content area, the 'Add' button is highlighted with a red box. Below it is a table of devices with columns for Device Type, Device Name, Model, MAC, IP, and Firmware Version. The first row shows an AP named EWS310AP with MAC 88:DC:96:21:FF:F6 and IP 211.23.68.199. The checkbox for this device is highlighted with a red box. At the bottom, there is a pagination control showing '1 to 1 of 1 Device(s)' and 'Previous', '1', 'Next' buttons.

demo > Device Config

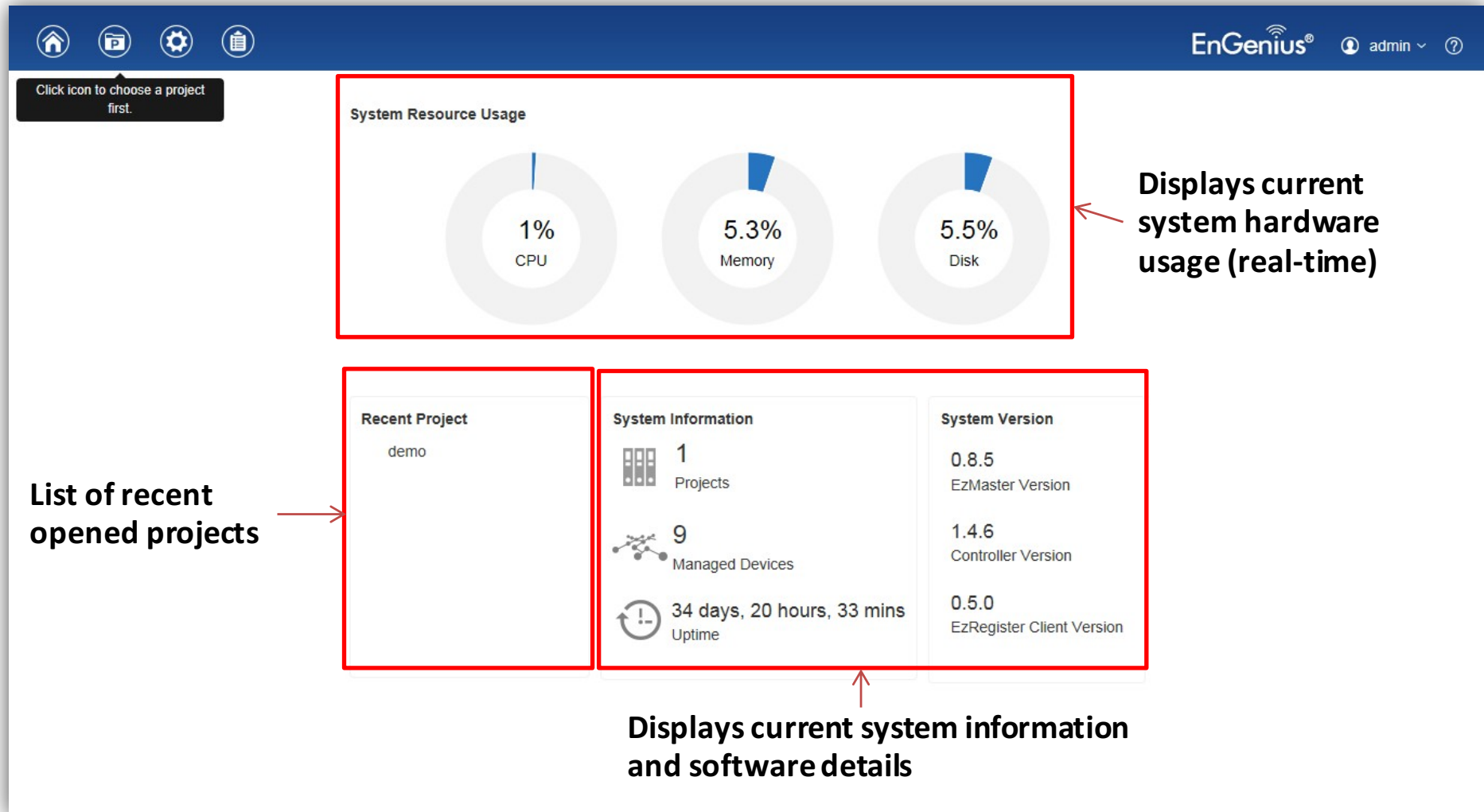
☐ Add

<input type="checkbox"/>	Device Type	Device Name	Model	MAC	IP	Firmware Version
<input type="checkbox"/>	AP	EWS310AP	EWS310AP	88:DC:96:21:FF:F6	211.23.68.199	v2.0.0-c1.4.0

10 1 to 1 of 1 Device(s) Previous 1 Next

Under to 'Pending Approval' list, select the AP(s) you wish to manage and click 'Add'

ezMaster™



**Home Button**

Return to main dashboard

**Projects**

Create, delete or manage project. A 'project' is similar to a 'profile' which can be used to classify/represent different sites or floors of your deployment.

**Settings**

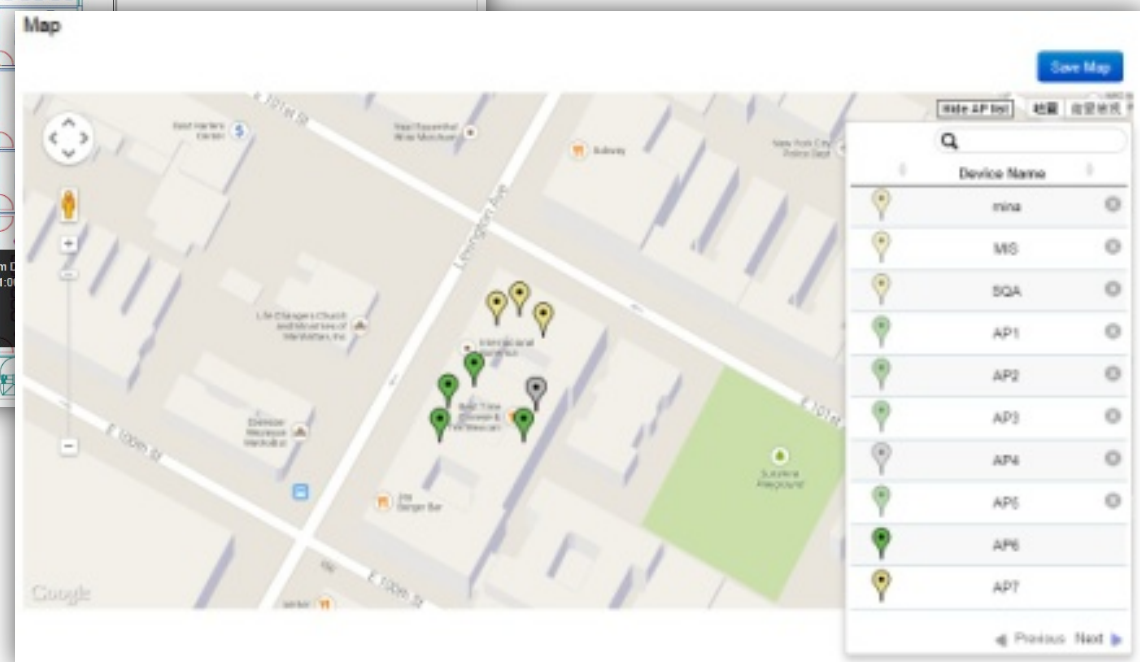
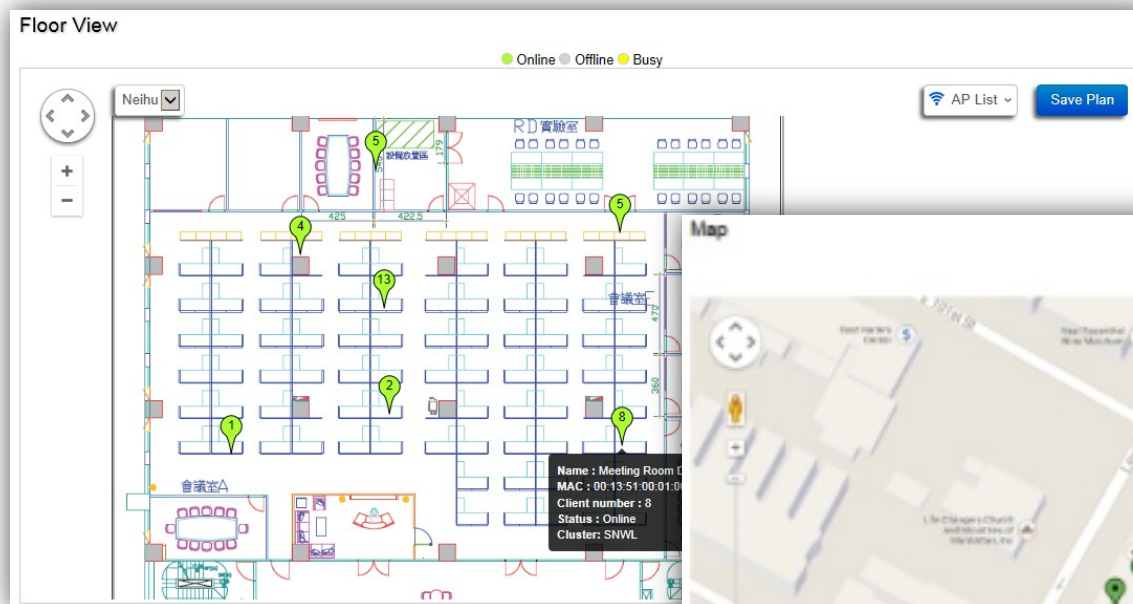
System settings including registering user account with ezMaster server

**Inventory**

- Register new devices with ezMaster
- Manage registered devices

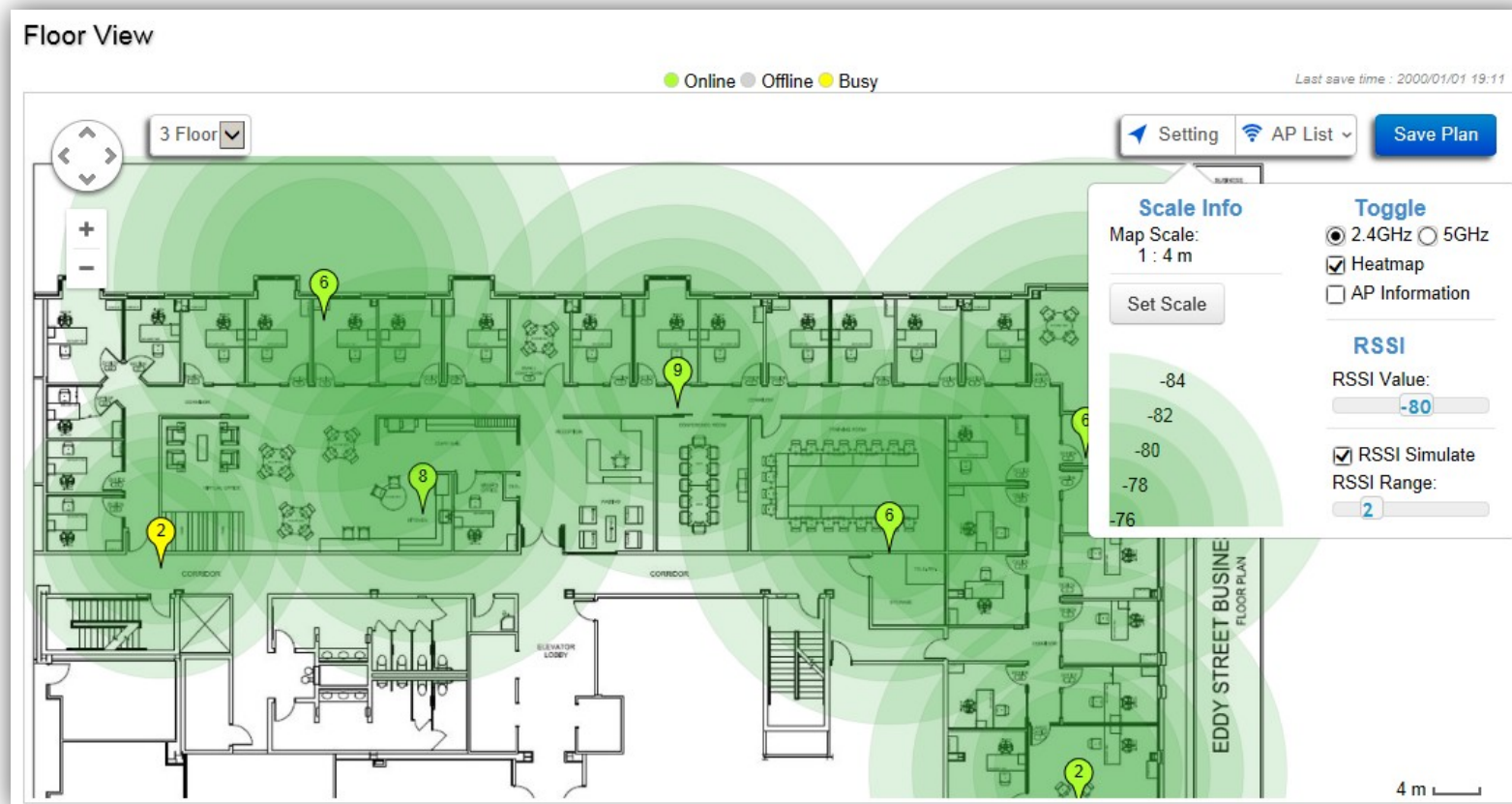
Google Map & Floor Plan View

Allows for quickly locating deployed APs, a useful feature for multi-site large scale AP deployments.



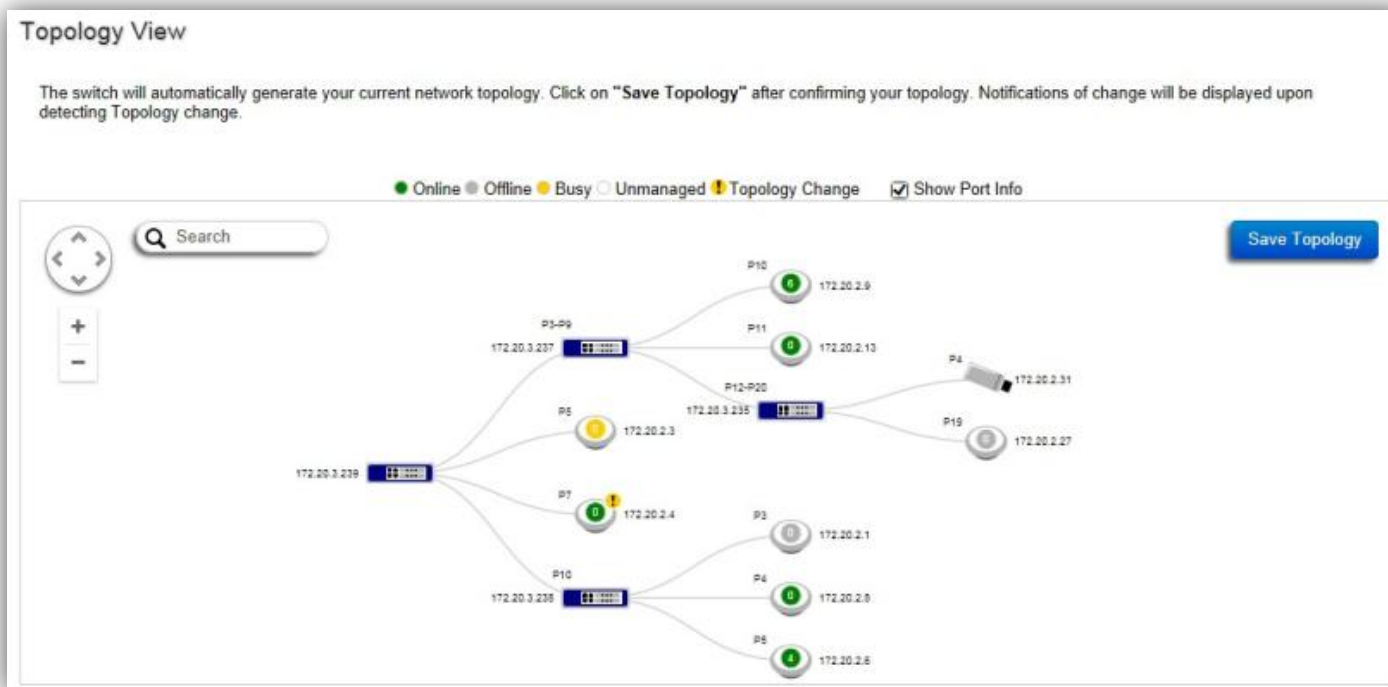
Wireless Coverage Display

Wireless coverage display can be toggled in Floor Plan to indicate the coverage range of each EWS Access Point so IT managers can easily and accurately plan and deploy wireless networks in any indoor environment.



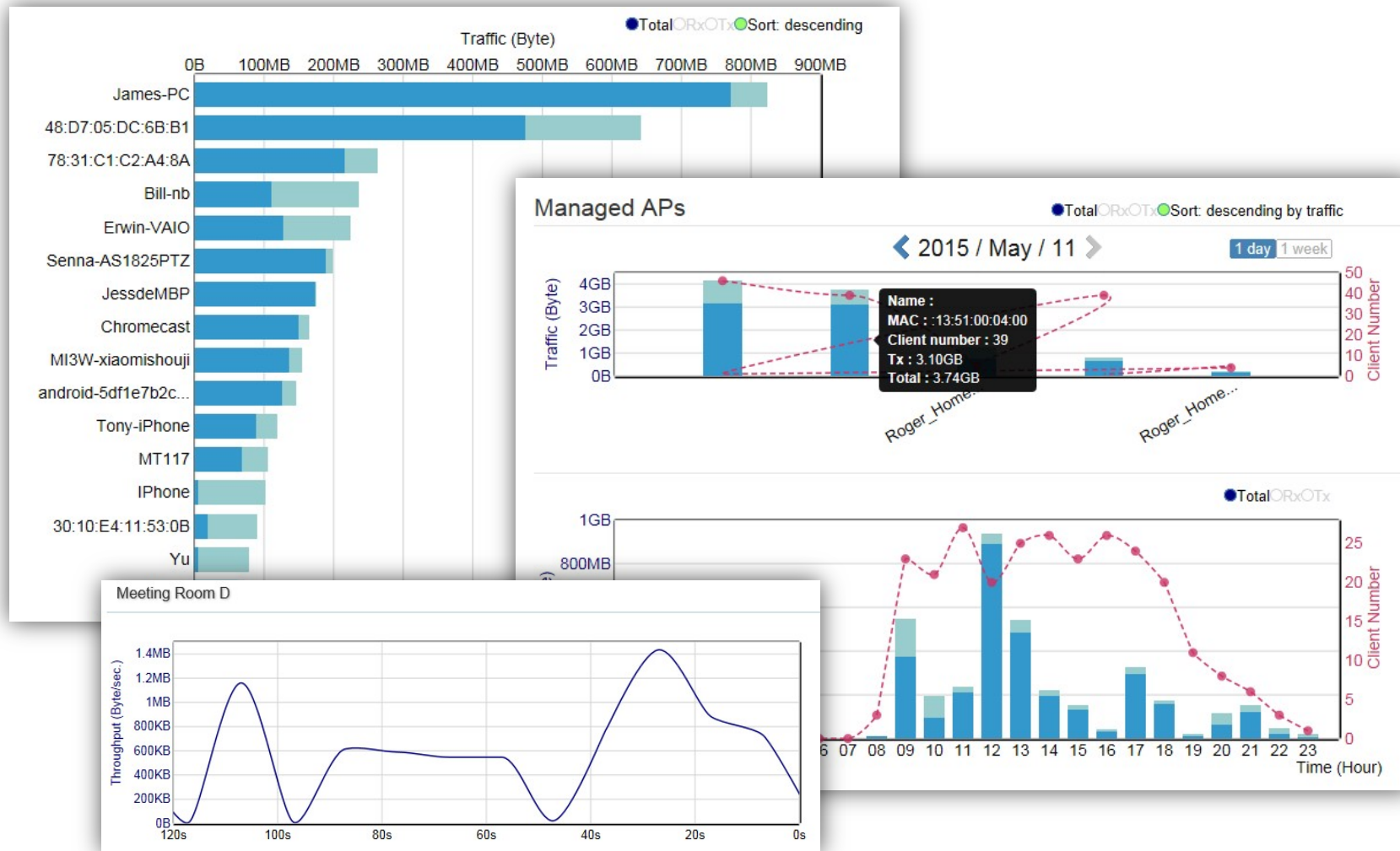
Topology View

Automatically maps your network deployment and displays the device relationships across your network infrastructure. A innovative and useful feature for troubleshooting network issues that would otherwise require manual mapping, overlay monitoring software, or manually keeping track of MAC address tables.



Note: An EWS Switch is required in the network for the topology to generate. EGS L2 Series, EGS Smart v2 Series, EnGenius IP Cameras can be displayed in the topology.

Graphical Statistics: Quick Overview on Network Usage

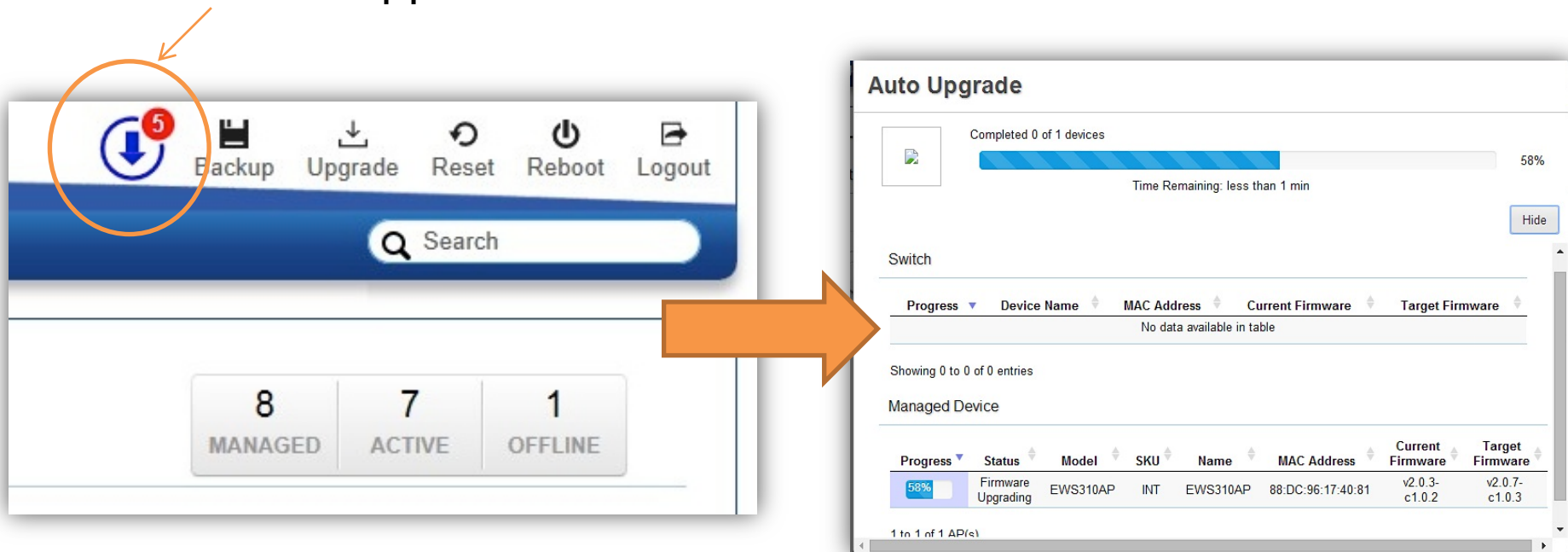


Automatically organizes and visualizes the network traffic in clear and easy-to-read graphs.

One-Click Update

Receive new firmware notifications in GUI so users can conveniently check that the current firmware on their APs is the most up-to-date version.

Notification will appear when new firmware is available.



The image shows two screenshots of the EnGenius GUI. The left screenshot shows the main dashboard with a notification icon (a blue circle with a white arrow pointing down and a red '5') circled in orange. Below the notification icon are buttons for Backup, Upgrade, Reset, Reboot, and Logout. At the bottom, there are three status boxes: 8 MANAGED, 7 ACTIVE, and 1 OFFLINE. An orange arrow points from the notification icon to the right screenshot. The right screenshot shows the 'Auto Upgrade' screen. It displays a progress bar for 'Completed 0 of 1 devices' at 58%, with a 'Time Remaining: less than 1 min'. Below this is a 'Switch' section with a table showing 'No data available in table'. Further down is a 'Managed Device' section with a table showing one device in progress.

Progress	Status	Model	SKU	Name	MAC Address	Current Firmware	Target Firmware
58%	Firmware Upgrading	EWS310AP	INT	EWS310AP	88:DC:96:17:40:81	v2.0.3-c1.0.2	v2.0.7-c1.0.3

Bulk Firmware Upgrade

Upgrade firmware for managed APs: **Single** or **multiple units** to save time, and avoid repeating the process over and over again.

Bulk Upgrade

Current firmware image information:

Model	Firmware Version	File Name	Image Size(Byte)	Upload Time
c600	v2.0.0-C0.2	C600-v2.0.0-C0.2.img	5681156	2013-Sep-04 11:29:33

Upload Wireless AP firmware image file to controller:

(* Unable to Upload New File when APs are under upgrading.)

5

0

AVAILABLE

UPGRADING

Device List

<input type="checkbox"/>	Status	Model	Name	MAC Address	IP Address	Firmware Version
<input checked="" type="checkbox"/>	Online	c600	AP2	AD:6F:D5:D7:09:13	192.168.1.11	1 build-130724 (5b396e5d)
<input type="checkbox"/>	Online	c600	AP3	39:0A:DA:20:EB:B6	192.168.1.12	1 build-130724 (5b396e5d)
<input type="checkbox"/>	Online	c600	AP5	CD:EF:97:96:17:D2	192.168.1.15	1 build-130724 (5b396e5d)
<input type="checkbox"/>	Online	c600	AP6	23:2D:9D:E7:18:68	192.168.1.16	1 build-130724 (5b396e5d)
<input type="checkbox"/>	Online	c600	AP12	AB:EF:88:96:17:D2	192.168.1.15	1 build-130724 (5b396e5d)

10

1 to 5 of 5 AP(s)

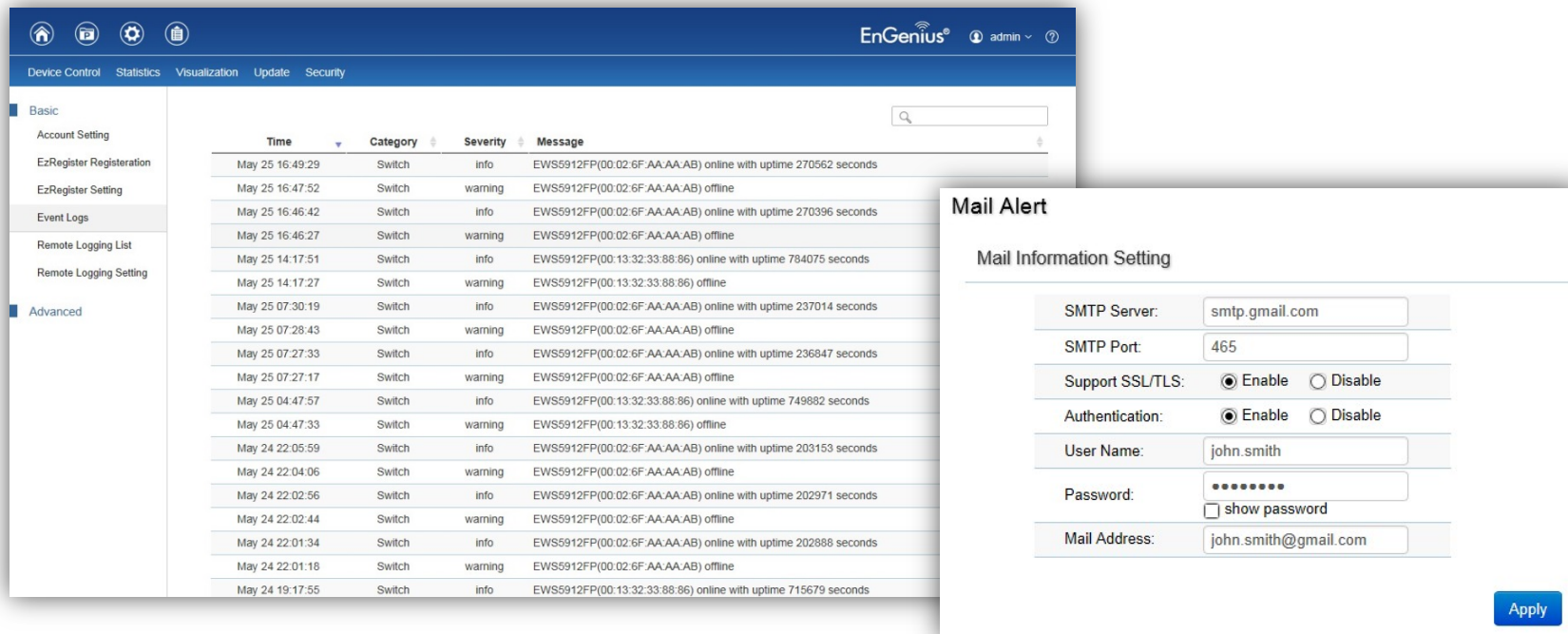
Previous

Next

E-mail Alert

ezMaster's event log is designed to monitor the operation of both the system and the APs by recording the network event messages it generates during normal operation. These events may provide vital information about system activity that can help in the identification and solutions of system problems.

When an alarm event is detected, ezMaster will record it in the events log, and if configured, will send an email warning.



The screenshot displays the EnGenius ezMaster web interface. The left sidebar shows the navigation menu with options like Basic, Account Setting, EzRegister Registration, EzRegister Setting, Event Logs, Remote Logging List, Remote Logging Setting, and Advanced. The main content area shows the Event Logs table, which lists various system events with columns for Time, Category, Severity, and Message. A 'Mail Alert' dialog box is overlaid on the right, showing the 'Mail Information Setting' configuration. The dialog includes fields for SMTP Server, SMTP Port, Support SSL/TLS, Authentication, User Name, Password, and Mail Address, along with an 'Apply' button.

Time	Category	Severity	Message
May 25 16:49:29	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 270562 seconds
May 25 16:47:52	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 25 16:46:42	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 270396 seconds
May 25 16:46:27	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 25 14:17:51	Switch	info	EWS5912FP(00:13:32:33:88:86) online with uptime 784075 seconds
May 25 14:17:27	Switch	warning	EWS5912FP(00:13:32:33:88:86) offline
May 25 07:30:19	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 237014 seconds
May 25 07:28:43	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 25 07:27:33	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 236847 seconds
May 25 07:27:17	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 25 04:47:57	Switch	info	EWS5912FP(00:13:32:33:88:86) online with uptime 749882 seconds
May 25 04:47:33	Switch	warning	EWS5912FP(00:13:32:33:88:86) offline
May 24 22:05:59	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 203153 seconds
May 24 22:04:06	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 24 22:02:56	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 202971 seconds
May 24 22:02:44	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 24 22:01:34	Switch	info	EWS5912FP(00:02:6F:AA:AA:AB) online with uptime 202888 seconds
May 24 22:01:18	Switch	warning	EWS5912FP(00:02:6F:AA:AA:AB) offline
May 24 19:17:55	Switch	info	EWS5912FP(00:13:32:33:88:86) online with uptime 715679 seconds

Mail Alert

Mail Information Setting

SMTP Server:

SMTP Port:

Support SSL/TLS: ☒ Enable ☐ Disable

Authentication: ☒ Enable ☐ Disable

User Name:

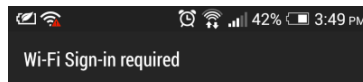
Password:
☐ show password

Mail Address:

Captive Portal

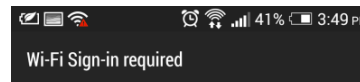
Supports:

1. Internal Authentication (Local Database) with Internal/External Login Page
2. External Authentication (RADIUS) with Internal/External Login Page
3. 3rd party cloud captive portal integration, i.e. Cloud4Wi



CANCEL

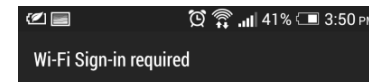
After SSID authentication

The login form features the EnGenius logo at the top. Below it are two input fields: "User Name" and "Password". To the right of the "Password" field is a blue "Login" button. Below the input fields is a scrollable area containing a terms of service agreement. At the bottom of the form is a grey "CANCEL" button.

Enter your username and password to connect to this network.

CANCEL

Splash page login



Login Success!

FINISH

Login successful

Profile Information

Profile Name: test

Login Type

☐ Splash & go (no authentication)

☒ Local User DB

☐ External RADIUS Server

Create different captive portal profiles and apply directly to SSID

Splash & Go: No authentication required. Users can access the network as soon as they associate.

Local User DB: Authenticate users using local user database. Users must enter a username and password before being allowed on the network.

External RADIUS Server: Authenticate users using an external RADIUS server. Users must enter a username and password before being allowed on the network.

Login Page

- ☐ Redirect users to external URL
☒ Local web page

Choose to use **user defined (external URL)** splash page or **built-in internal splash page**

Logo:



Upload custom logo for internal splash page

Upload file:



Images larger than 200x100 will be resized. We recommend PNG, JPEG, and GIF formats.

Message:

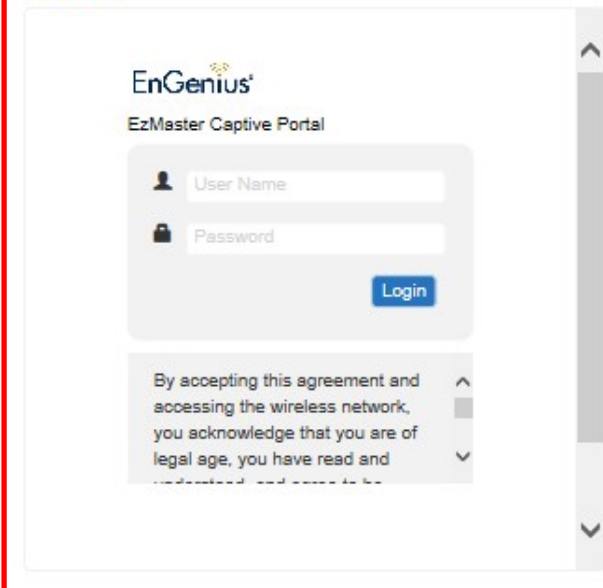
EzMaster Captive Portal

Term of Use:

☒ Enable

By accepting this agreement and accessing the wireless network, you acknowledge that you are of legal age, you have read and understood, and agree to be bound by this agreement. (*) The wireless network service is provided by

Preview:



Preview of internal splash page

Enter custom message or terms of use if desired

Redirect Behavior

- ☒ Redirect to the URL that the user was trying to visit.
☐ Redirect to a different URL:

http://

Option to allow users to continue to the original URL they intend to visit or force the user to visit a specified URL after a successful authentication.

User Session

- ☒ Enable Session Timeout: minutes
☒ Enable Idle Timeout: minutes

Option to disconnect user based on:
a. Session time
b. Idle time

Walled Garden

- ☐ Enable (Manually specify an IP range users can access prior to sign-on. Engenius' splash page is automatically included in your walled garden.)

Specify your walled garden by entering space separated addresses and ranges using CIDR notation. Example: 192.168.1.1/24 192.168.37.10/32

Manually specify an IP range users can access prior to sign-on. When you are operating the hotspot in a hotel, for example, you can include the hotel's Web site in the walled garden. A walled garden for a corporate office, on the other hand, can include Web pages that show the office directory, emergency information or building maps.

Fast Roaming

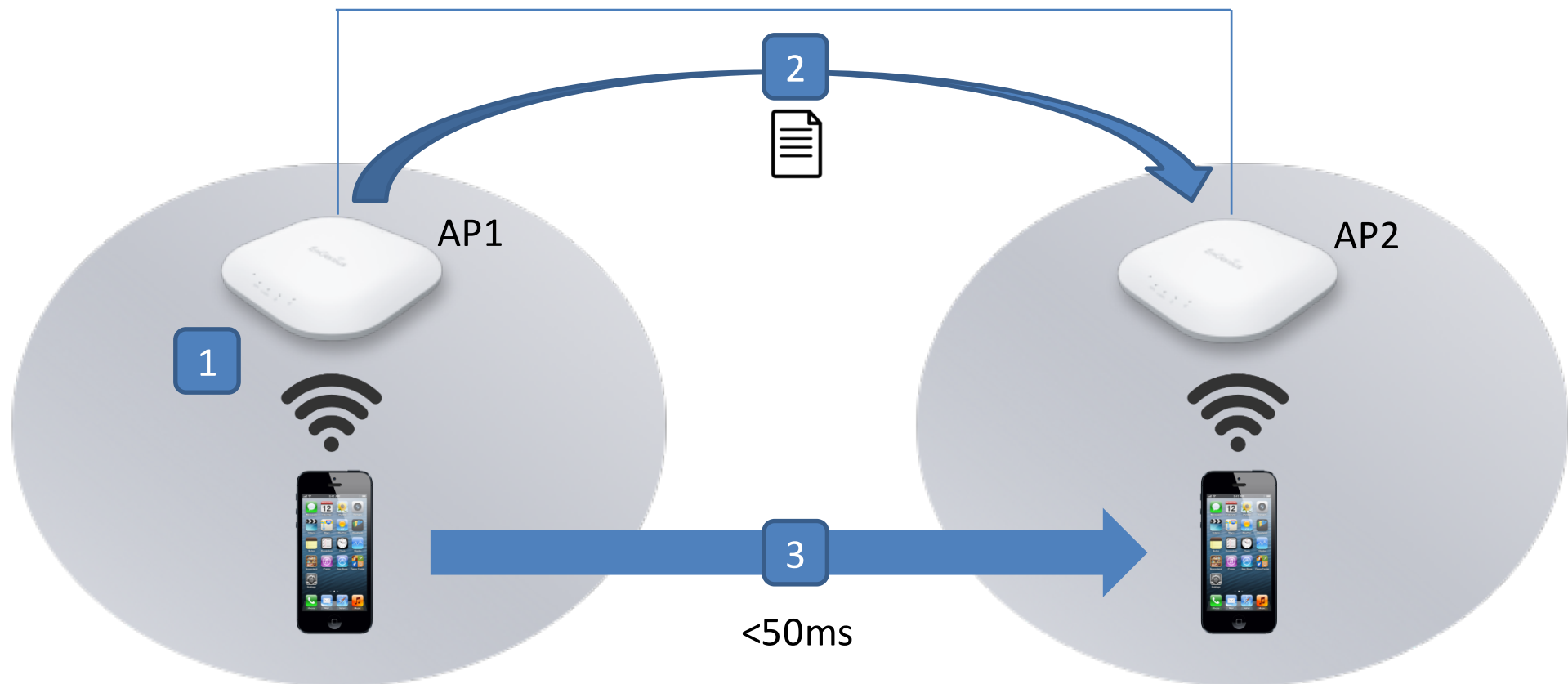
Fast roaming uses protocols defined in 802.11r to allow continuous connectivity for wireless devices in motion, with fast and secure roaming from one AP to another. Coupled with 802.11k, wireless devices are able to quickly identify nearby APs that are available for roaming and once the signal strength of the current AP weakens and your device needs to roam to a new AP, it will already know which AP is the best to connect with.

Note that not every wireless client supports 802.11k and 802.11r. Both the SSID and security options must be the same for this fast roaming to work.

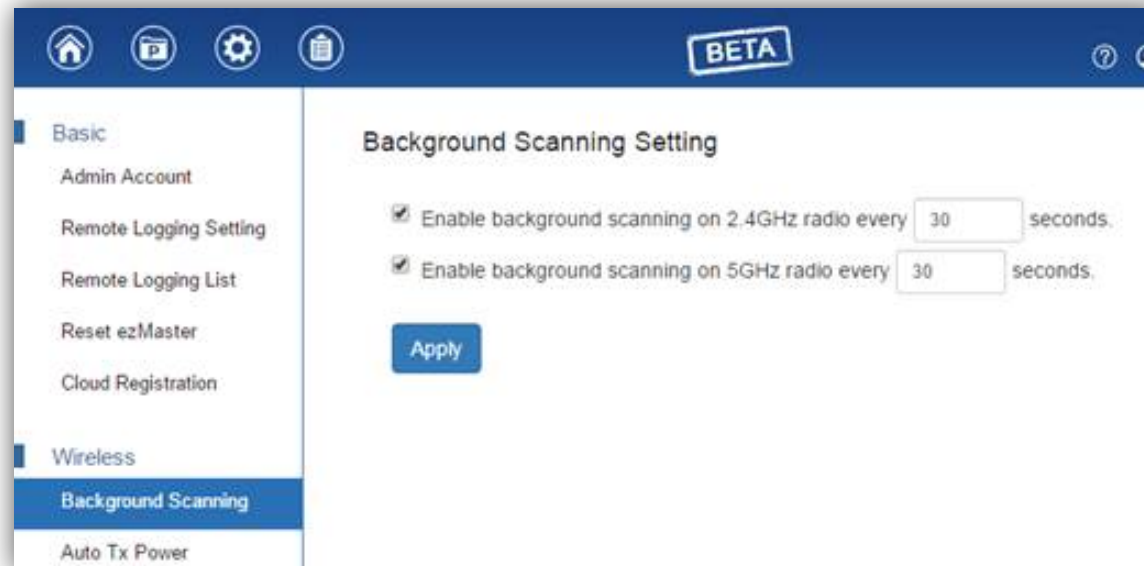
Fast Roaming is available when using the security methods listed below:

- RADIUS Authentication Required:
WPA2-Enterprise, WPA-Mixed Enterprise
- No RADIUS Authentication Required:
WPA2-PSK, WPA-Mixed

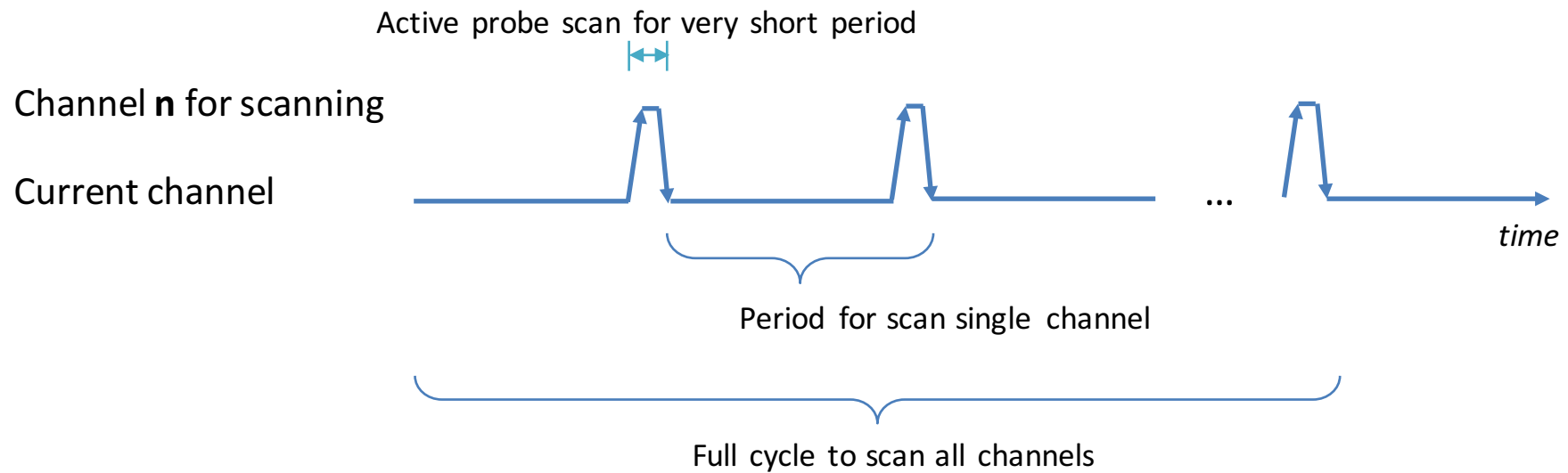
Fast Roaming

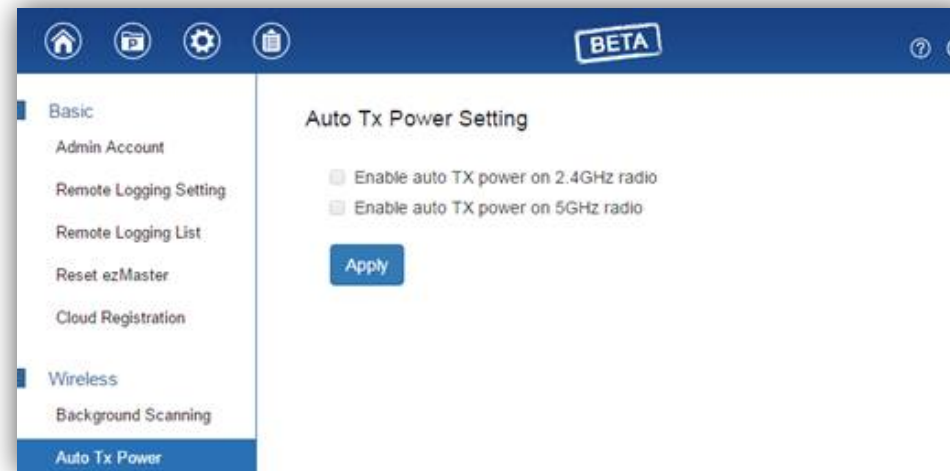


1. Client logs on AP1
2. The access key of the client is passed on to all connected APs in the network
3. When the client moves between AP1 to AP2, the roaming procedure takes place.



- AP periodically executes channel hopping to obtain channel utilization statistics and detects surrounding devices, including neighboring APs and rogue devices in all available channels.
- Scans one channel at a time, minimize throughput impact.
- Background scanning is the basis of Auto Channel, Auto Tx Power and Rogue AP detection, and must be enabled for these features to operate.
- For latency-sensitive applications such as VoIP, it is recommended to set the background scan interval to a higher value, e.g. 5 or 10 minutes.
- For regular application, the recommended value is 30 seconds. This value will also be directly related on how long it takes for the AP to scan for rogue devices.





- Using the information collected by Background Scanning, APs can automatically adjust their transmit power to optimize coverage.
- When enabled, APs will optimize their transmit power based on the time interval configured for Background Scanning.
- Background Scanning must be enable for this feature to operate.
- This feature is designed to operate when all the following conditions below are met:
 1. Transmit Power of the AP is set to Auto.
 2. The APs are managed by the same ezMaster.
 - 3a. The AP will reduce its transmit power by half when the AP detects that the RSSI of a co-channel APs is stronger than **-50dBm** meaning that they are very close to each other.
 - 3b. The AP will recover its transmit power to 100% when the AP detects that the RSSI of co-channel APs is lower than **-85dBm** or no longer exist.
- EnGenius does NOT recommend enabling this feature as it may lead to a non-optimized wireless network.


Wireless Radio Settings


Country: Taiwan ▼

	2.4GHz	5GHz
Wireless Mode:	802.11 b/g/n Mixed ▼	802.11 a/n Mixed ▼
Channel HT Mode:	20MHz ▼	40MHz ▼
Extension Channel:	Upper Channel ▼	Upper Channel ▼
Channel:	Auto ▼	Auto ▼
Transmit Power:	Auto ▼	Auto ▼
Client Limits:	127 (1~127, 0 means no limit)	127 (1~127, 0 means no limit)
Data Rate:	Auto ▼	Auto ▼

- Using the information collected by Background Scanning, ezMaster has the channel utilization statistics of all channels. With this info, APs can automatically adjust their radio channel for the best channel utilization and performance.
- Background Scanning must be enable for this feature to operate.
- Auto Channel Selection will take place on an AP when the Channel of the AP is set to Auto (under Wireless Radio Settings).

Band Steering


Band Steering: Prefer 5GHz 


5GHz RSSI: -66 dBm 


(NOTE: When enabled, band steering will be applied to all 2.4GHz/5GHz SSID profiles with the same SSID and security settings.)

Prefer 5GHz: Specify the minimum received signal strength indicator (RSSI) required for dual-band wireless clients to associate to the 5GHz band. If the client's RSSI value drops below this threshold, it will only be able to connect to the 2.4GHz band.

Band Steering

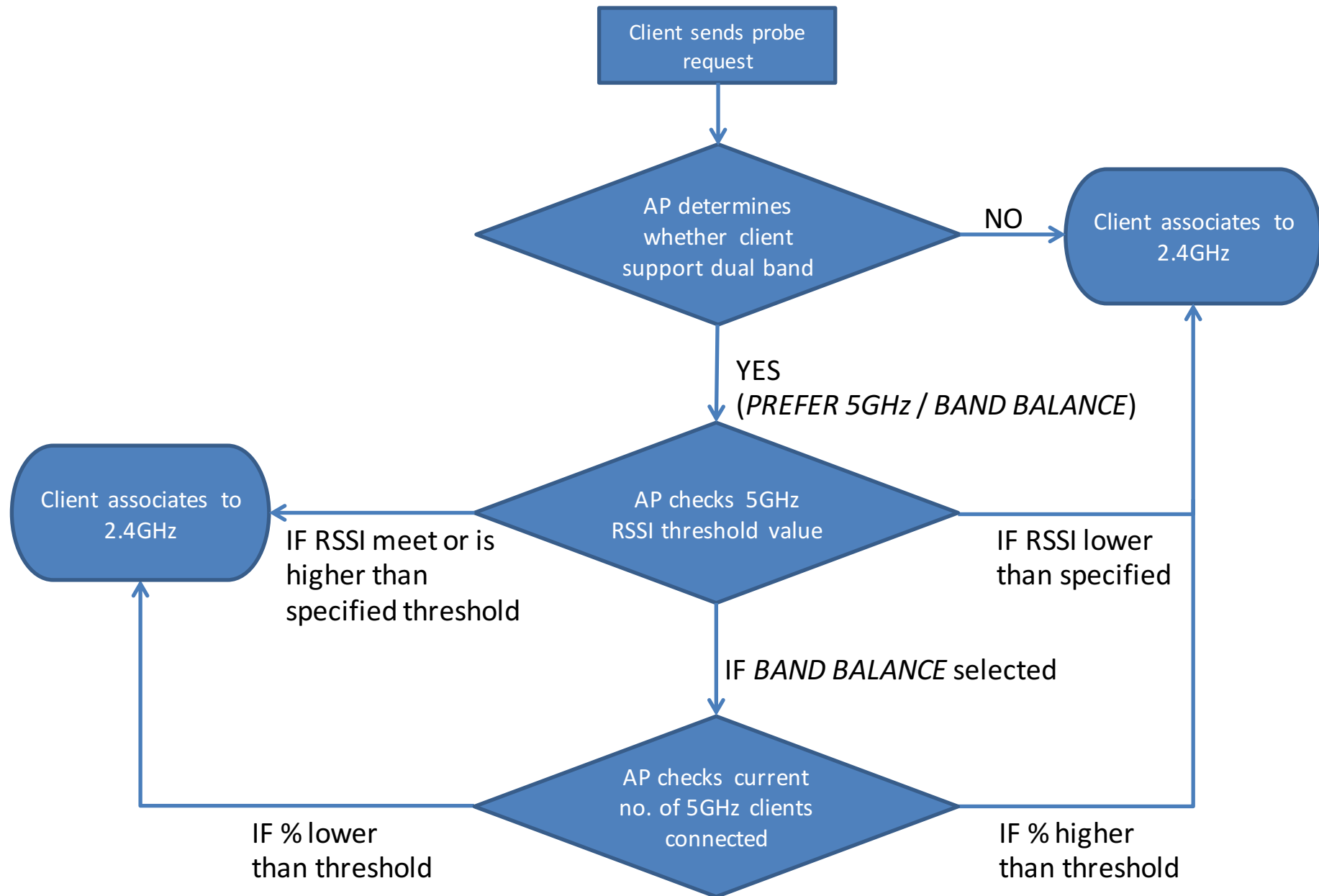
Band Steering: Band Balance 

5GHz RSSI: -66 dBm 

Percent of clients on 5GHz radio: 75 % 

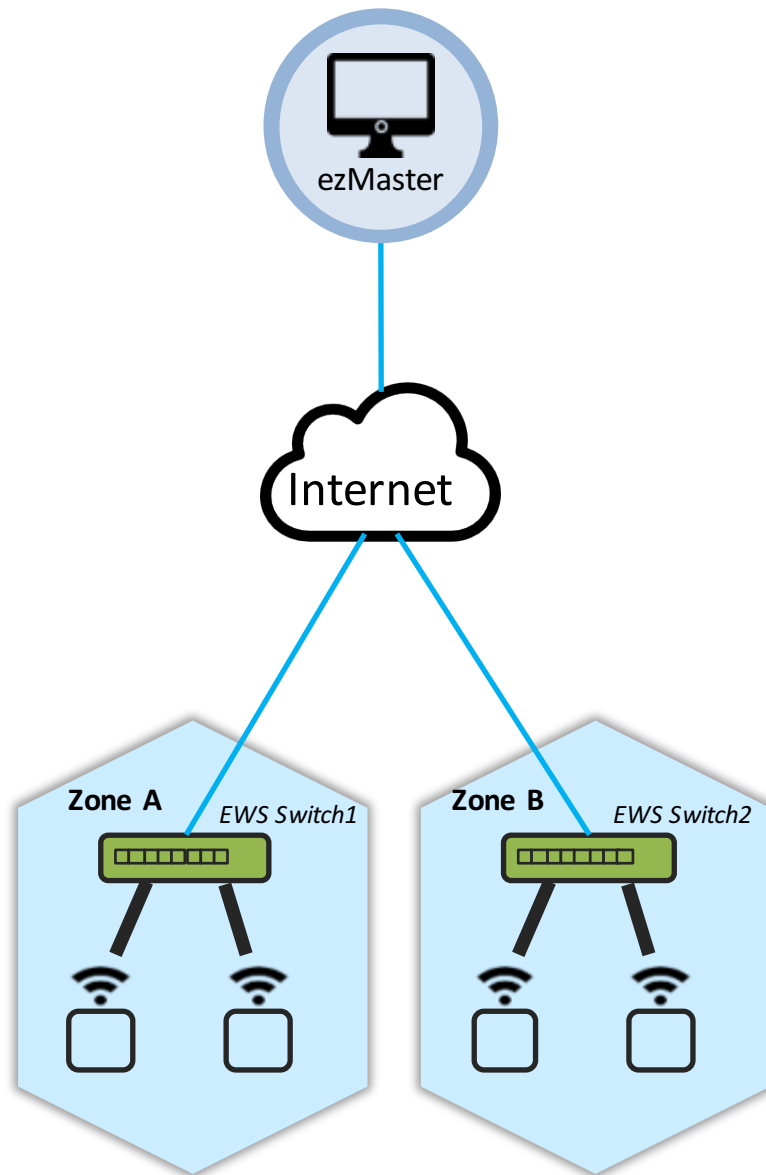
(NOTE: When enabled, band steering will be applied to all 2.4GHz/5GHz SSID profiles with the same SSID and security settings.)

Band Balance: Automatically balances the number of newly connected clients across both 2.4GHz and 5GHz bands. For example, the value 75 indicates that the AP will place 75% of all newly connected clients whose RSSI is above threshold onto the 5GHz band while the remaining 25% of the newly connected clients will be left on the 2.4GHz band.

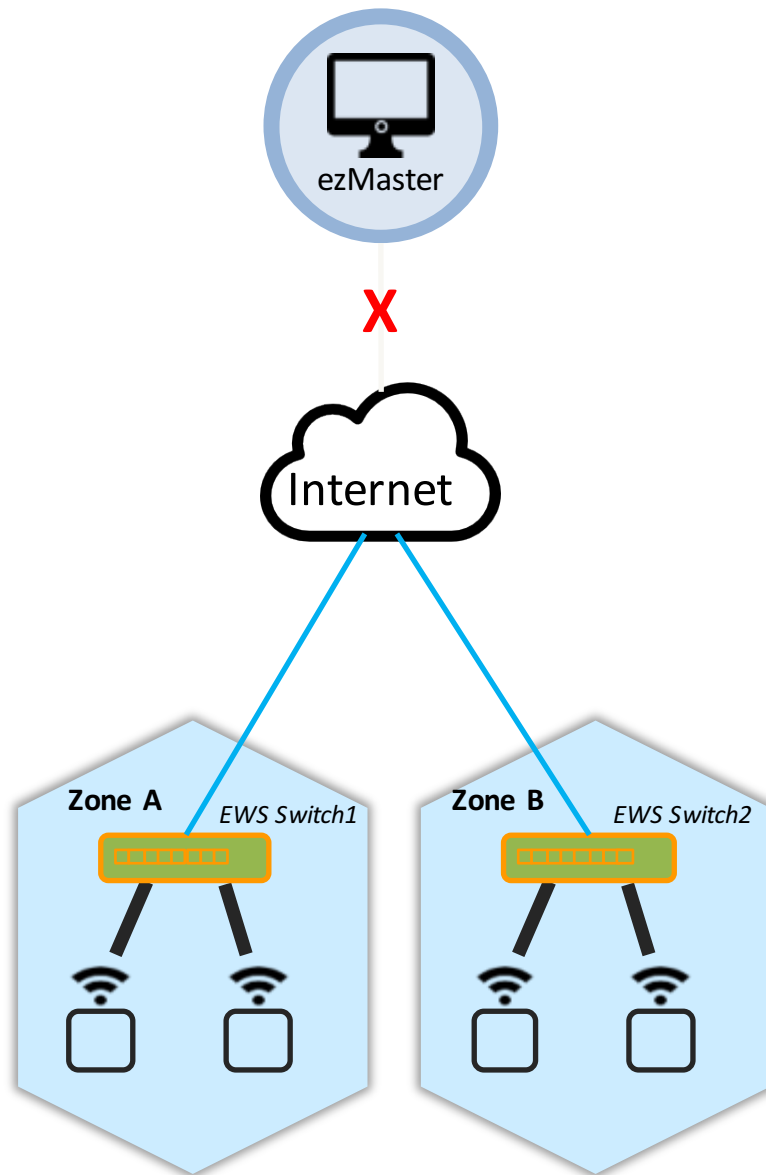




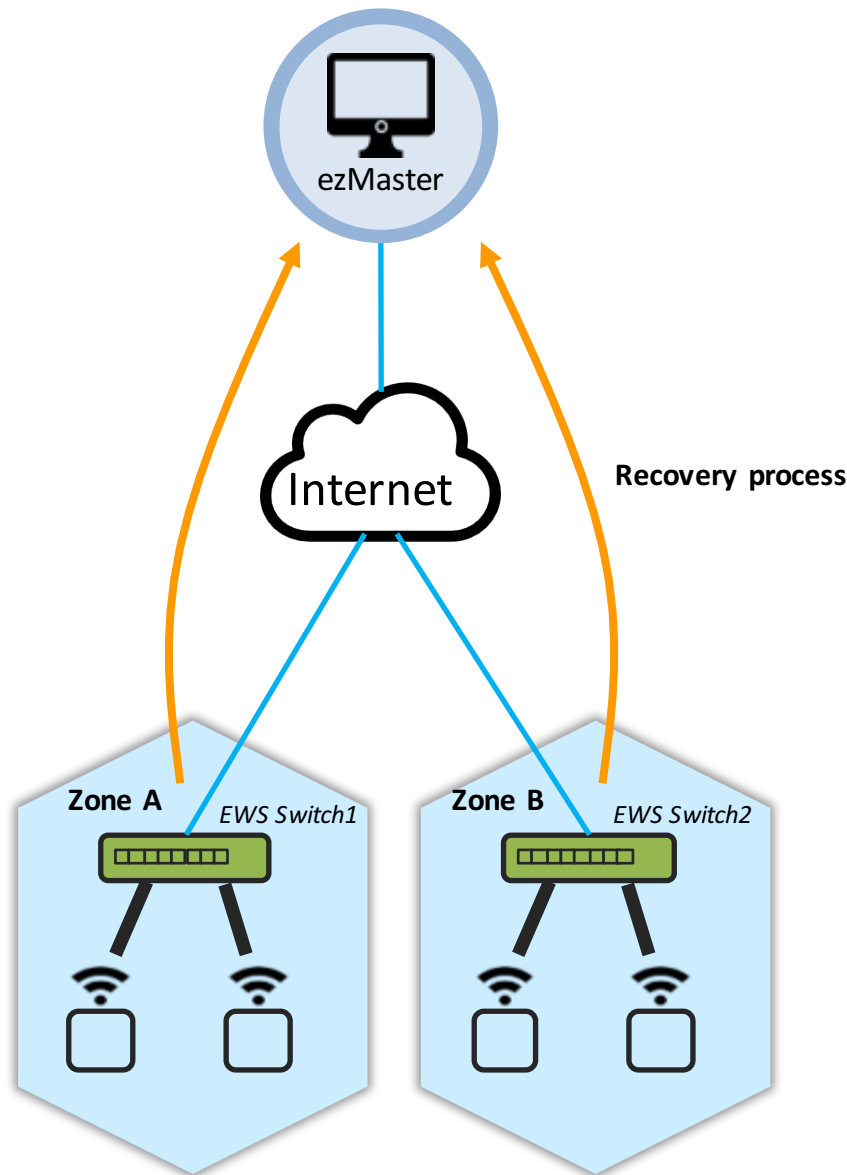
APPENDIX B: FUTURE FEATURES



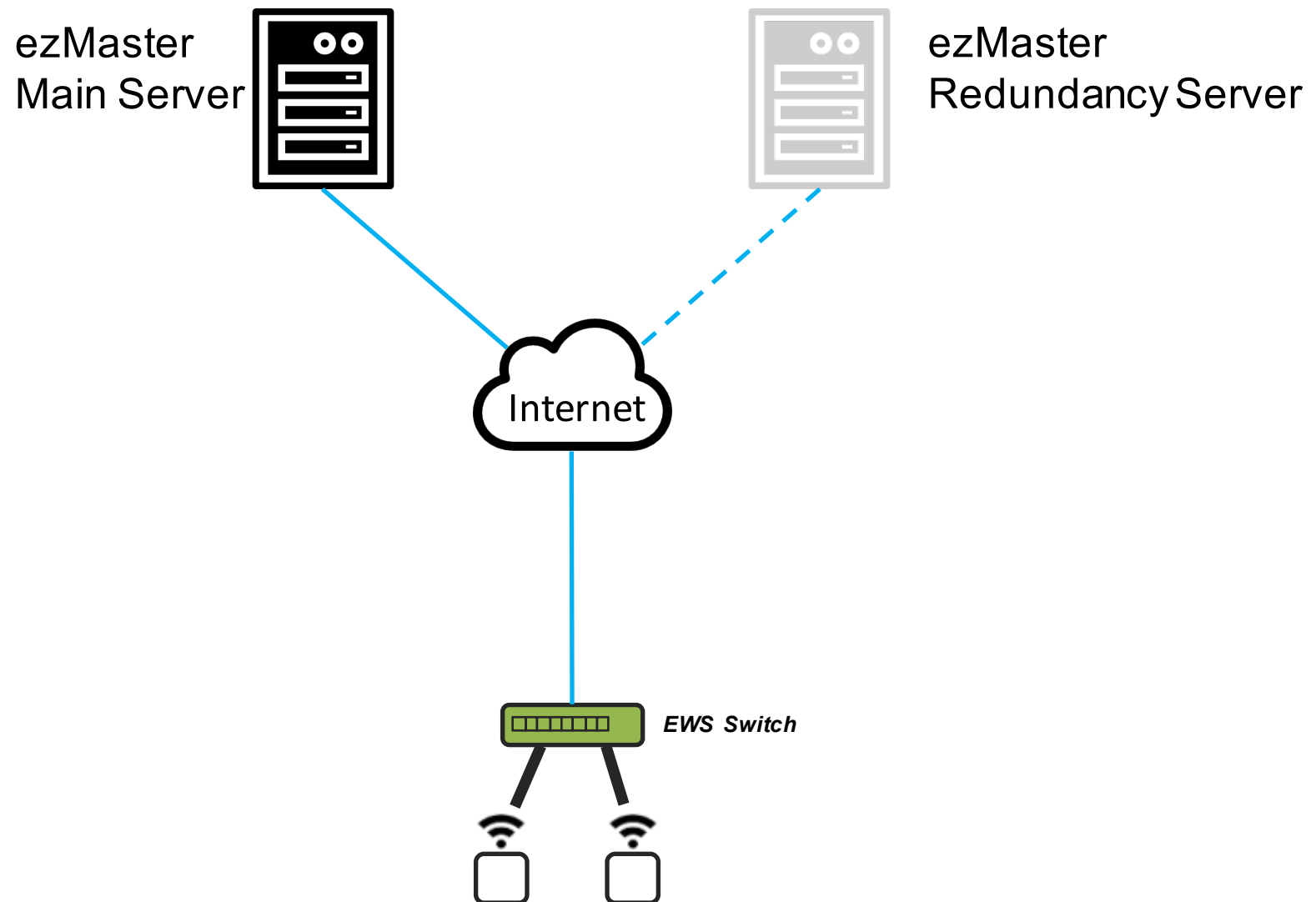
- Normally, all Switches and APs are managed centrally by ezMaster.
- Enable SmartSync feature in EWS Switch makes ezMaster be able to sync necessary data to the device.



- If ezMaster disconnects from the network, EWS Switches automatically activate the redundancy feature and manage APs in the same zone.
- All APs are still functioning normally.
- User can still monitor APs with EWS's GUI (statistics, AP status, clients ...etc.)



- When ezMaster is back online, EWS Switch will release its management on downstream to APs.
- Logs & statistic data will then synchronize back to ezMaster automatically.

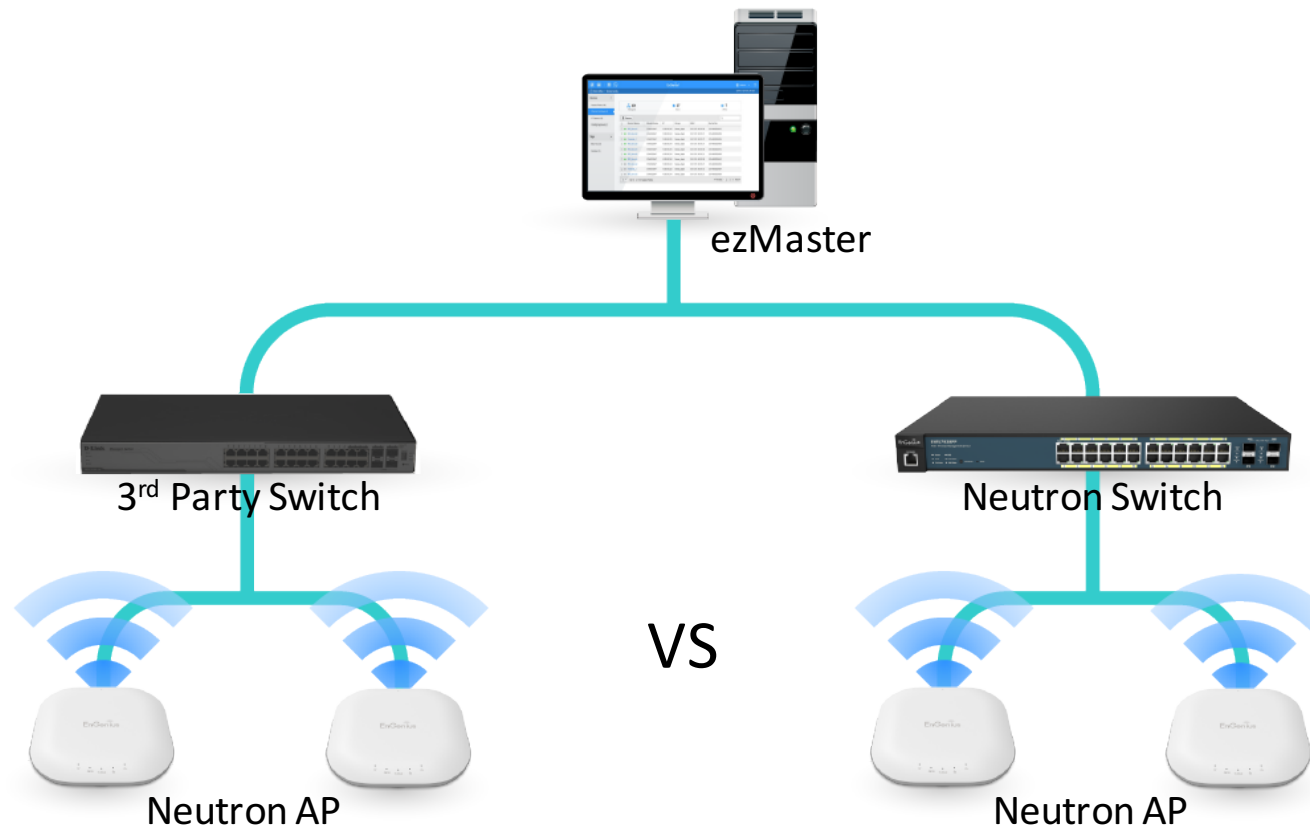




APPENDIX C: MISC



Advantages of a Complete EnGenius Network

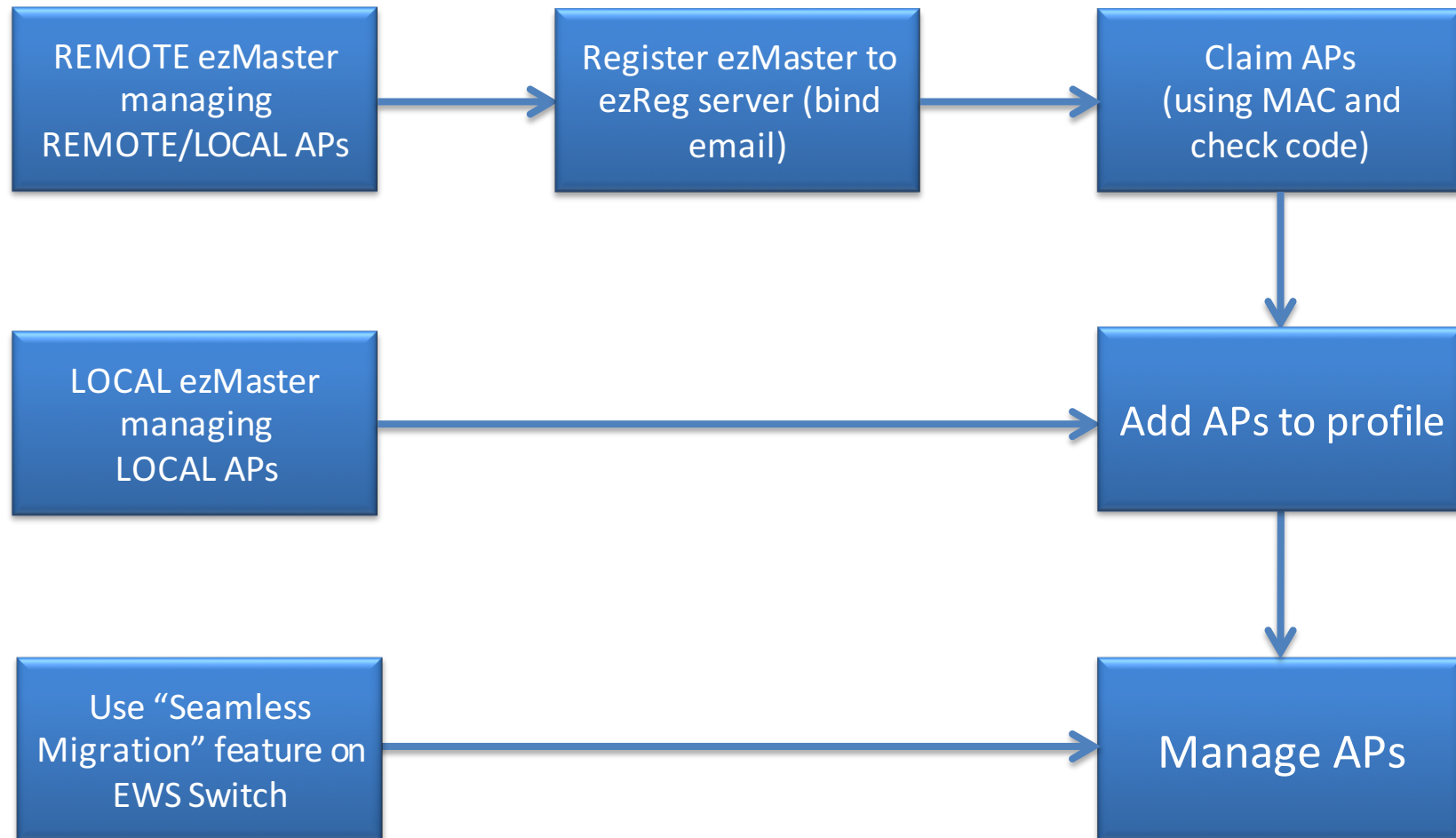


- AP config/settings
- AP status monitoring

- SmartSync Redundancy* (50 APs/switch)
- Complete Topology View
- PoE Port On/Off Control
- Seamless Migrate existing EWS network

**Available through future software upgrade.*

Flow Chart: Managing Access Points



Software Feature	ezMaster	EWS Switch
Project Based Management	v	-
Cross-Network AP Management	v	-
AP Group Configuration	v	v
Auto Channel Selection	v	v
Auto Tx Power	v	v
Background Scanning	v	v
Traffic Shaping	v	v
Fast Roaming	v	v
Band Steering	v	v
RSSI Threshold	v	v
Floor Plan with Wireless Coverage View	v	v
Map View	v	v
Rogue AP Detection	v	v
Visual Topology View	v	v
Wireless Client Fingerprinting	v	v
Wireless Traffic & Usage Statistics	v	v
Bulk Firmware Upgrade	v	v
One-Click Update	v	v
Captive Portal	v	v
Email Alert	v	v
Intelligent Troubleshooting	-	v
Schedule Tasks (WiFi/PoE Scheduling)	-	v