



*cn*Pilot

Use Cases across

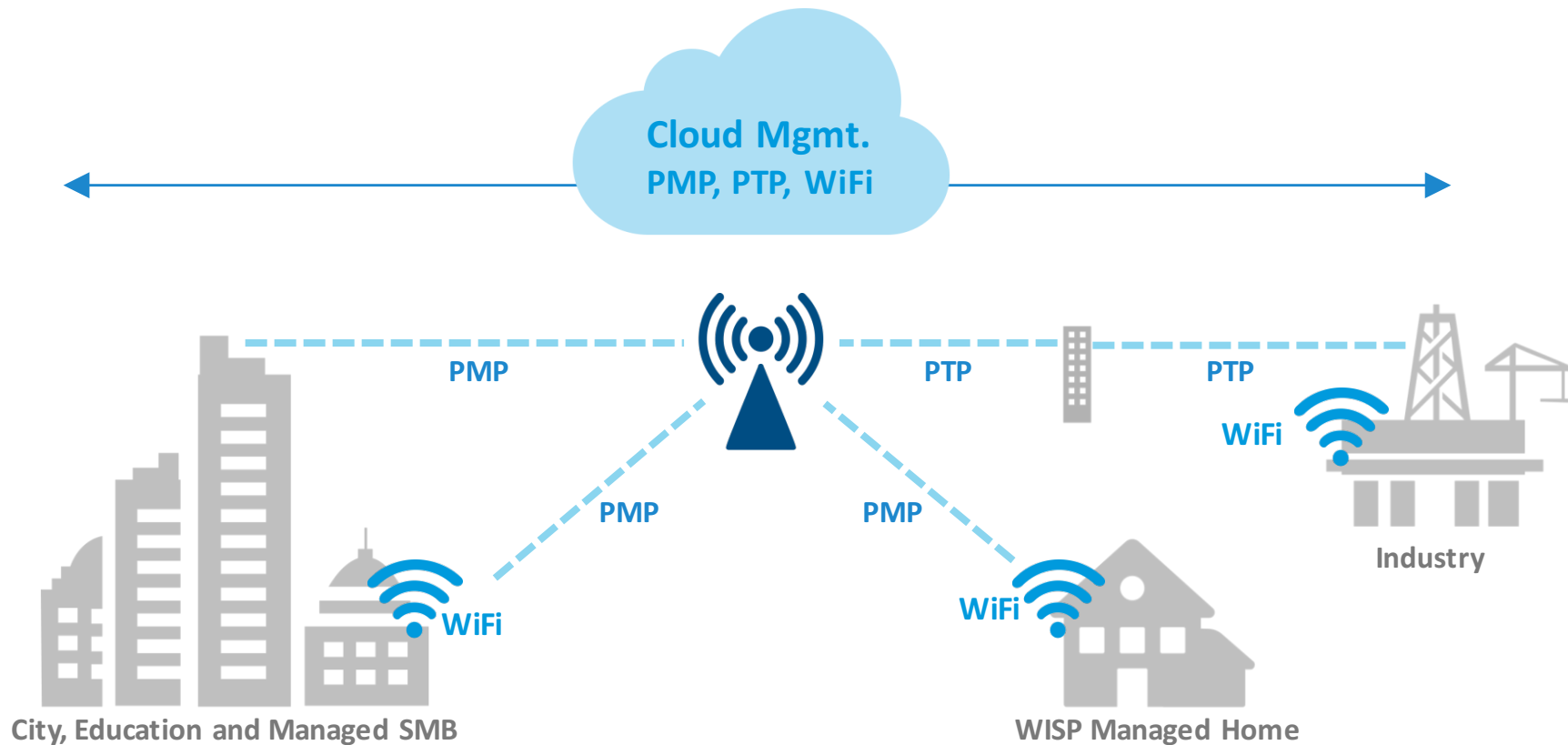
Home, Enterprise Indoor & Outdoors

Sept. 2015

Roadmap may change based on business needs

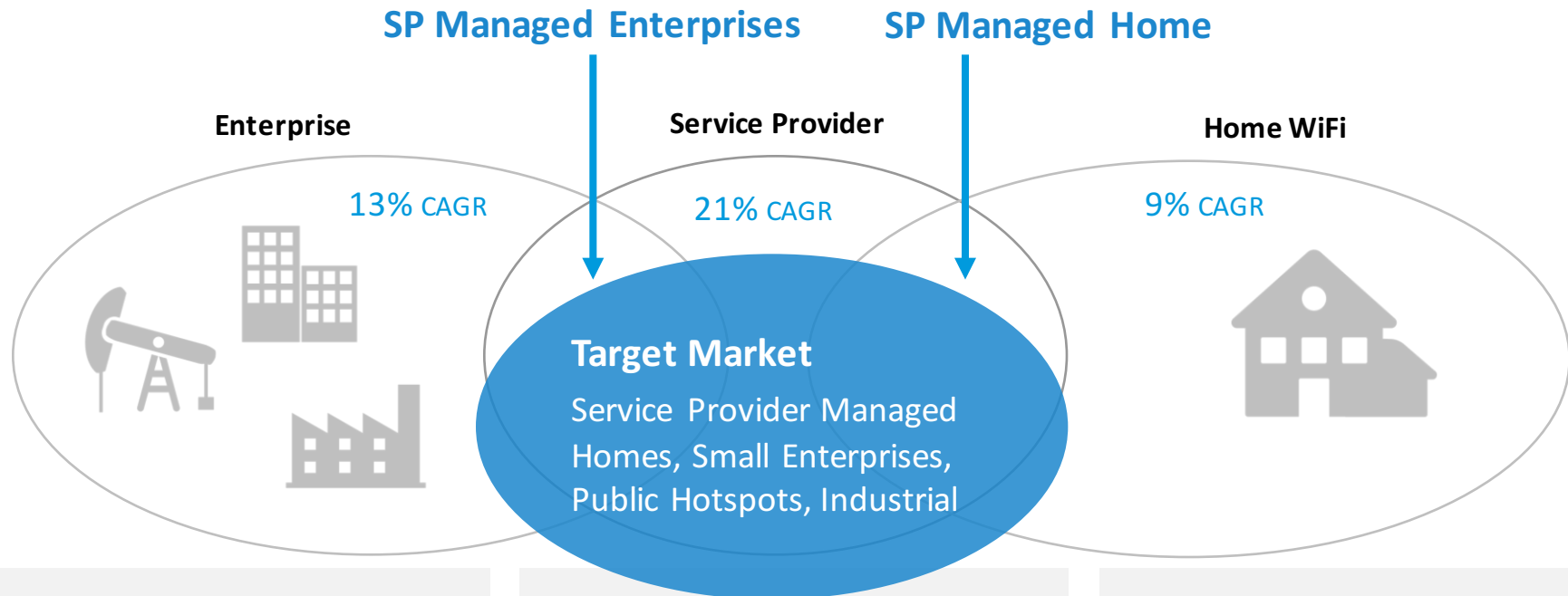
Vision and Mission

affordable, scalable, quick to deploy, easy to operate with intelligent remote diagnostics.



For Outdoors, Indoors, Public hotspots, Industrial and Indoor Enterprises

Cambium WiFi Focus - Service Provider



Solutions in the Market Today

1. **Expensive and Complex:** made for the large enterprises
2. **Inexpensive:** lacking in scalability, manageability and reliability

Need for Svc Provider

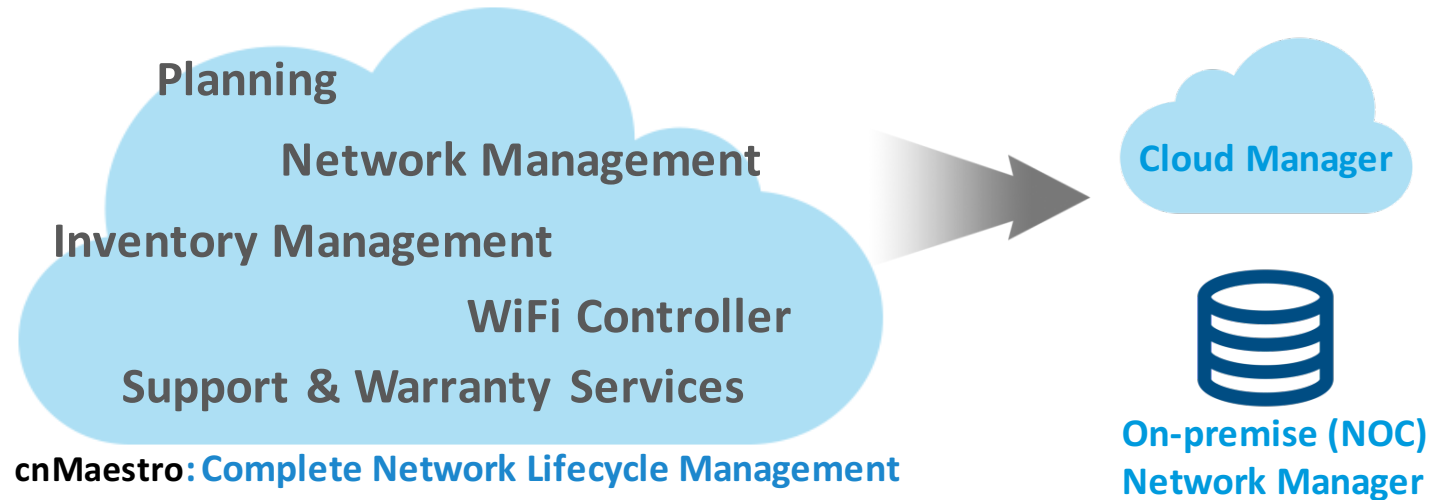
- **Quick to Deploy**
- **Easy to Manage**
- **Scalable**
- **Reliable and Affordable**

Cambium's WiFi Solution

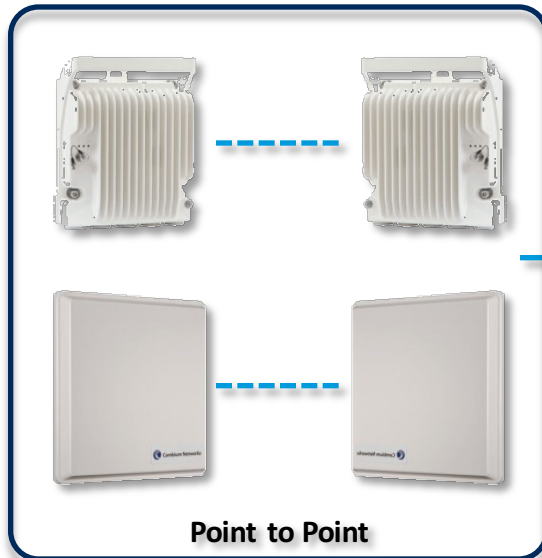
- ✓ **Zero Touch Deployment**
- ✓ **Easy Remote Manageability**
- ✓ **Cloud Managed with Very High Scalability**
- ✓ **Reliable and Affordable End to End Wireless**

“End-to-End Wireless” – From 200 Km to 20 m

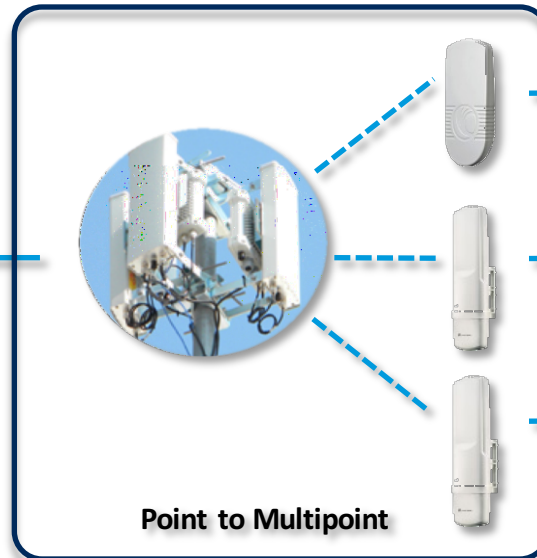
Under one roof



Long Distance: PTP 650, 820



Distribution Access: PMP 450, ePMP



Edge Access: cnPilot



cnPilot™ Portfolio (2015)



R200, R201

Home & Small Business Indoor
802.11n and 802.11ac
Single & Dual band routers



ePMP™ 1000 Hotspot

Enterprise class Outdoor
Single band 802.11n



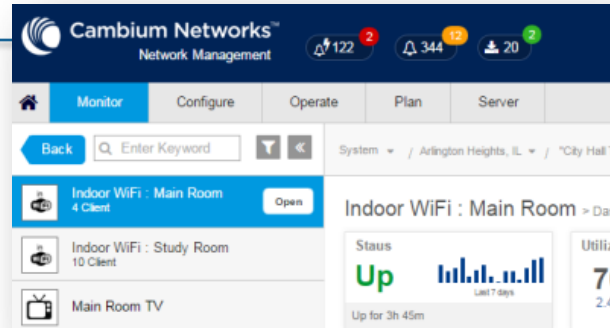
E400

Enterprise class Indoor
Dual band 802.11ac



E500

Enterprise class Outdoor
Dual band 802.11ac



cnMaestro - Cloud based manager and WiFi Controller

Use Cases

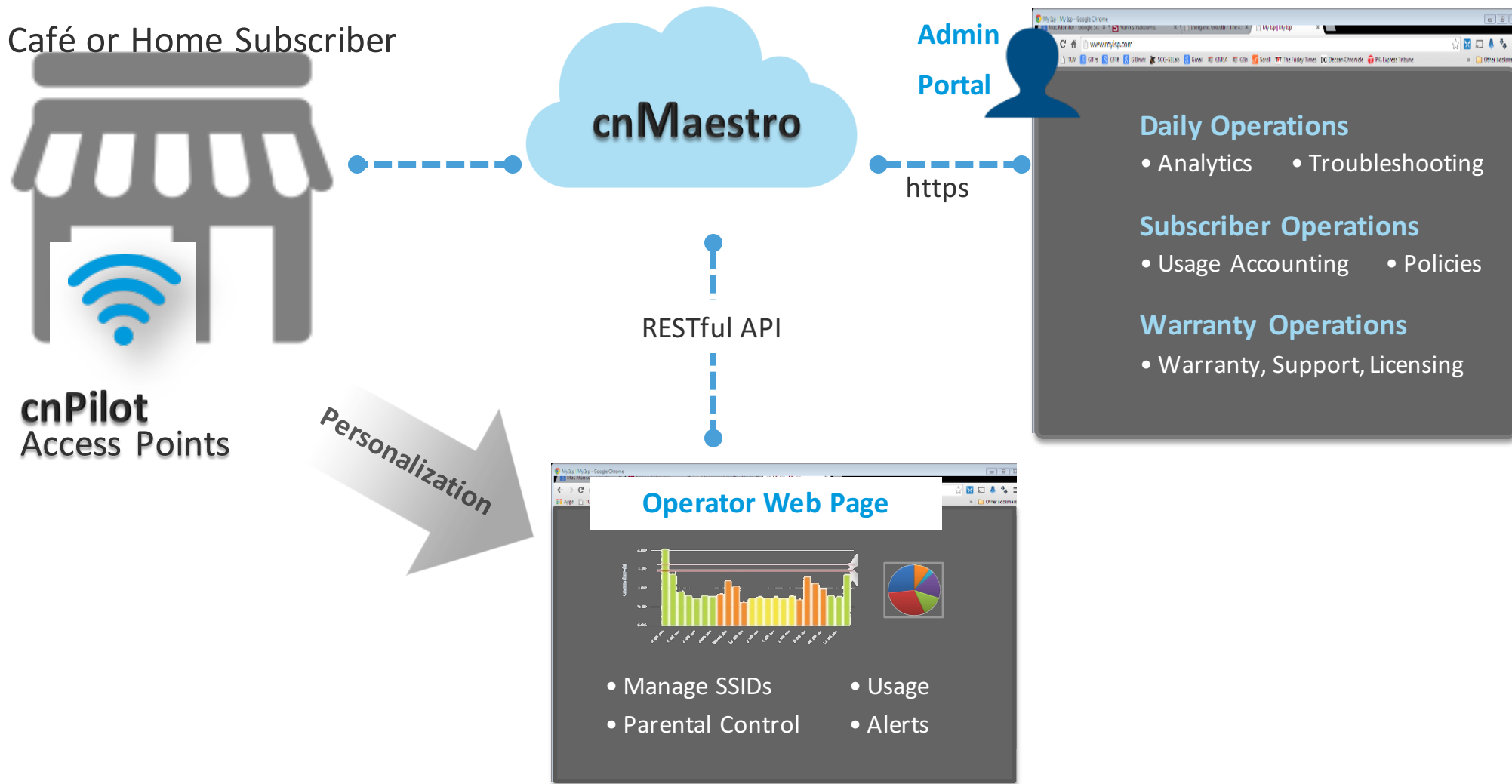


Cambium Networks™

Frictionless Deployment: cnPilot + CnMaestro



Personalization the easy better way



1. APIs to integrate with Operator branded portal

2. Operator branded Page: offers personalization, and easy Management for users

Troubleshooting the last Wireless leg

John Smith

Preloaded Status of all the component of end to end network - from mobile device having problem to the backhaul

The dashboard displays the end-to-end network status. On the left, an ePMP 1000 AP (Rolling Meadows Suburbs South AP) shows a Downlink MCS 2: Excellent and an Uplink MCS 12: Very Good. It is connected to an ePMP 1000 SM (Blanche Davis SM) via a 1.8 Kilometers link. The SM shows a Downlink of 4.8 Mbps and an Uplink of 2.8 Mbps. The SM is connected to a C3VoIP 201 WiFi (Charlotte Bowers WiFi) via 100 Mbps links. The WiFi shows DHCP and DNS are checked, and a Test Connectivity button is available. A section for WiFi Clients shows 18 clients associated.

Client Health | Network Connectivity | Alarms | Performance

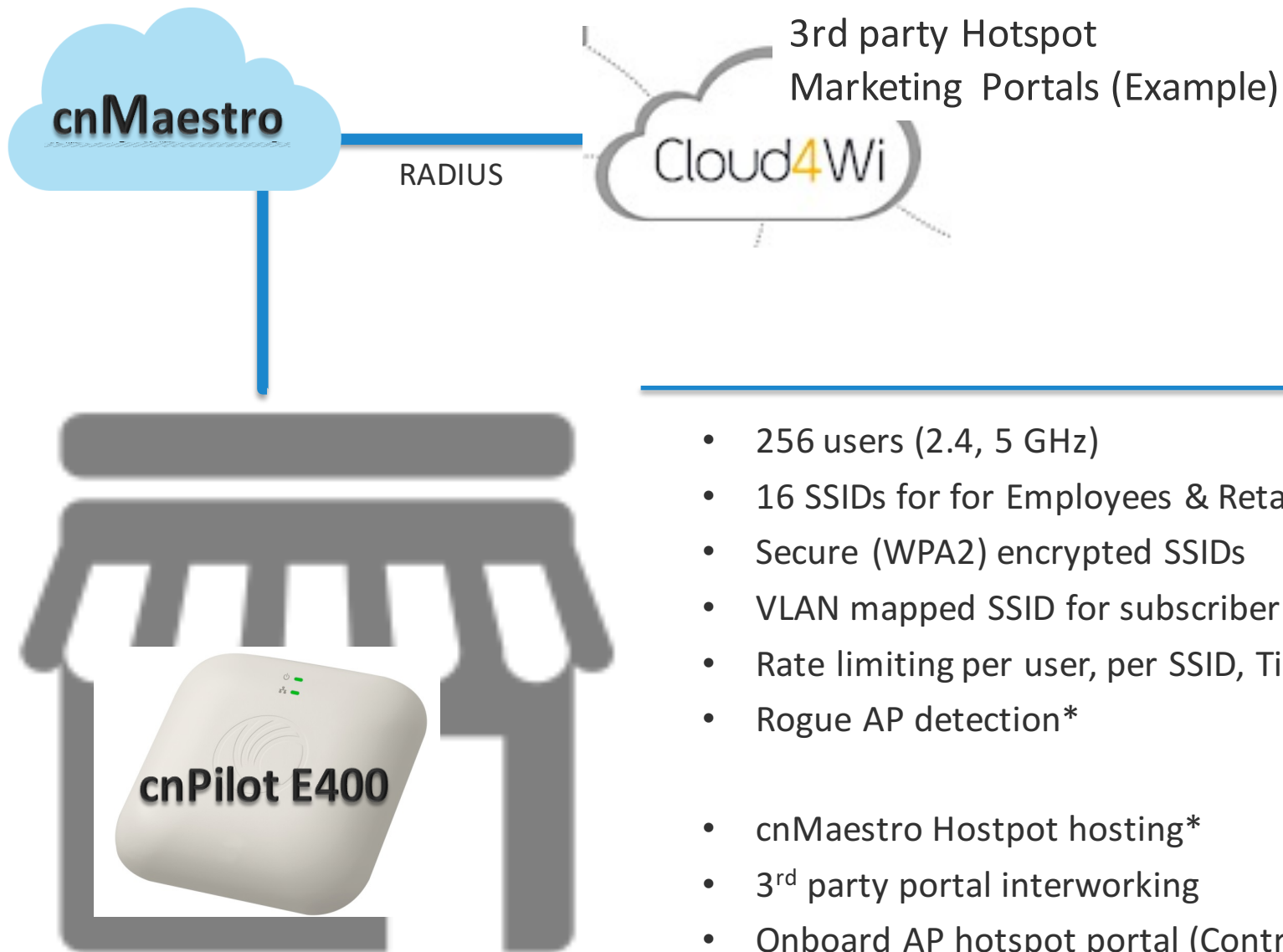
Name	IP & MAC	Manufacturer	Health	Band	WLAN	RSSI
Phone 1	192.168.1.1 c0-00-c0-00-...	Samsung	Excellent	2.4 Ghz	Guest	
Laptop	192.168.1.2 c0-00-c0-00-...	Apple	Poor	2.4 Ghz	Staff	
Phone 2	192.168.2.1 c0-00-c0-00-...	Dell	Excellent	2.1 Ghz	Guest	
Phone 3	192.168.2.2 c0-00-c1-00-...	Xiaomi	Fair	2.7 Ghz	Mobile Devices	

Showing 1 - 4 Total Items: 4

Remote Packet Capture and RF analysis tools

Easily identify the mobile device through their names and manufacturer

Features for Retail Deployment



Key Specs

- 256 users (2.4, 5 GHz)
- 16 SSIDs for for Employees & Retail Customers
- Secure (WPA2) encrypted SSIDs
- VLAN mapped SSID for subscriber traffic separation
- Rate limiting per user, per SSID, Time limit options
- Rogue AP detection*
- cnMaestro Hostspot hosting*
- 3rd party portal interworking
- Onboard AP hotspot portal (Controller-less option)
- Credential Caching for fast roaming
- Band Steering & load balancing*

* Roadmap

Schools

cnMaestro

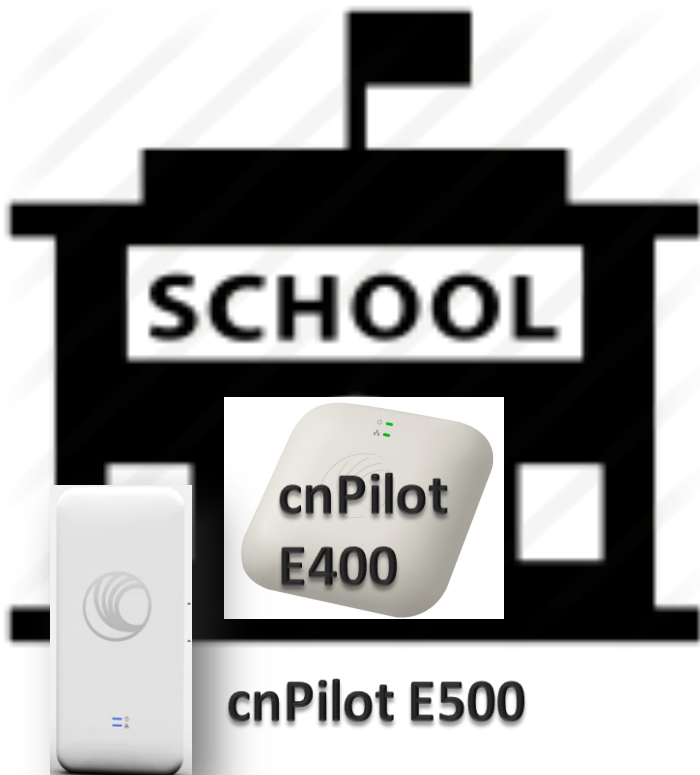
RADIUS



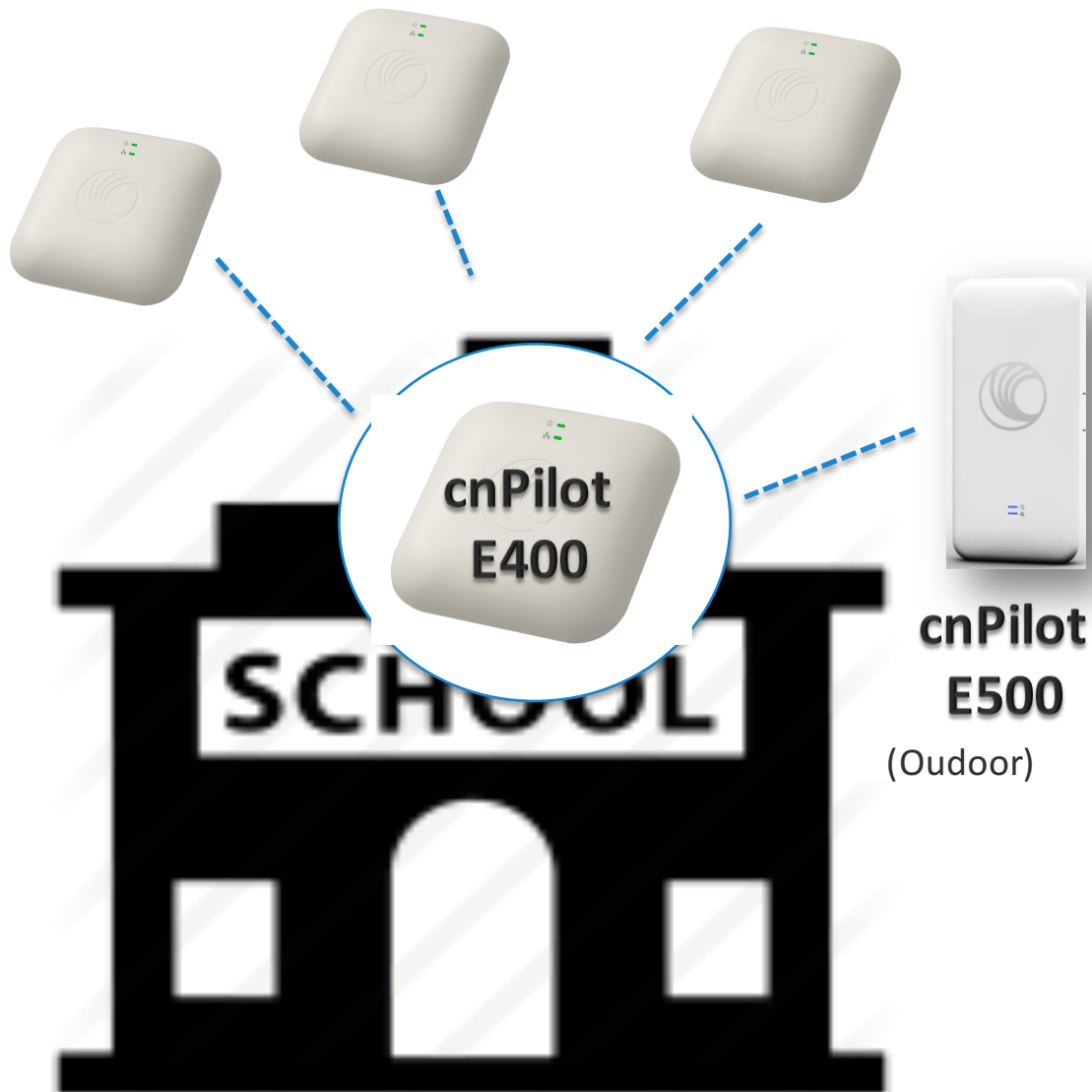
AAA

Key Specs

- APs can be powered from central PoE switch
- SSIDs for Students, Administrators, Teachers (16 SSIDs)
- Secure (WPA2) or Open SSIDs
- VLAN mapped SSID for traffic separation
- Rate Limit student traffic
- Turn on “student SSID” on weekdays 8 AM – 5 PM
- Band steering, load balancing for managing overloaded APs*
- Host splash page on controller*
- Onboard AP hotspot portal (Controller-less option)
- Seamless roaming via credential caching on cnMaestro
- Roam Indoor (E400) and Outdoors (E500*)
- AAA (RADIUS). Roadmap: LDAP



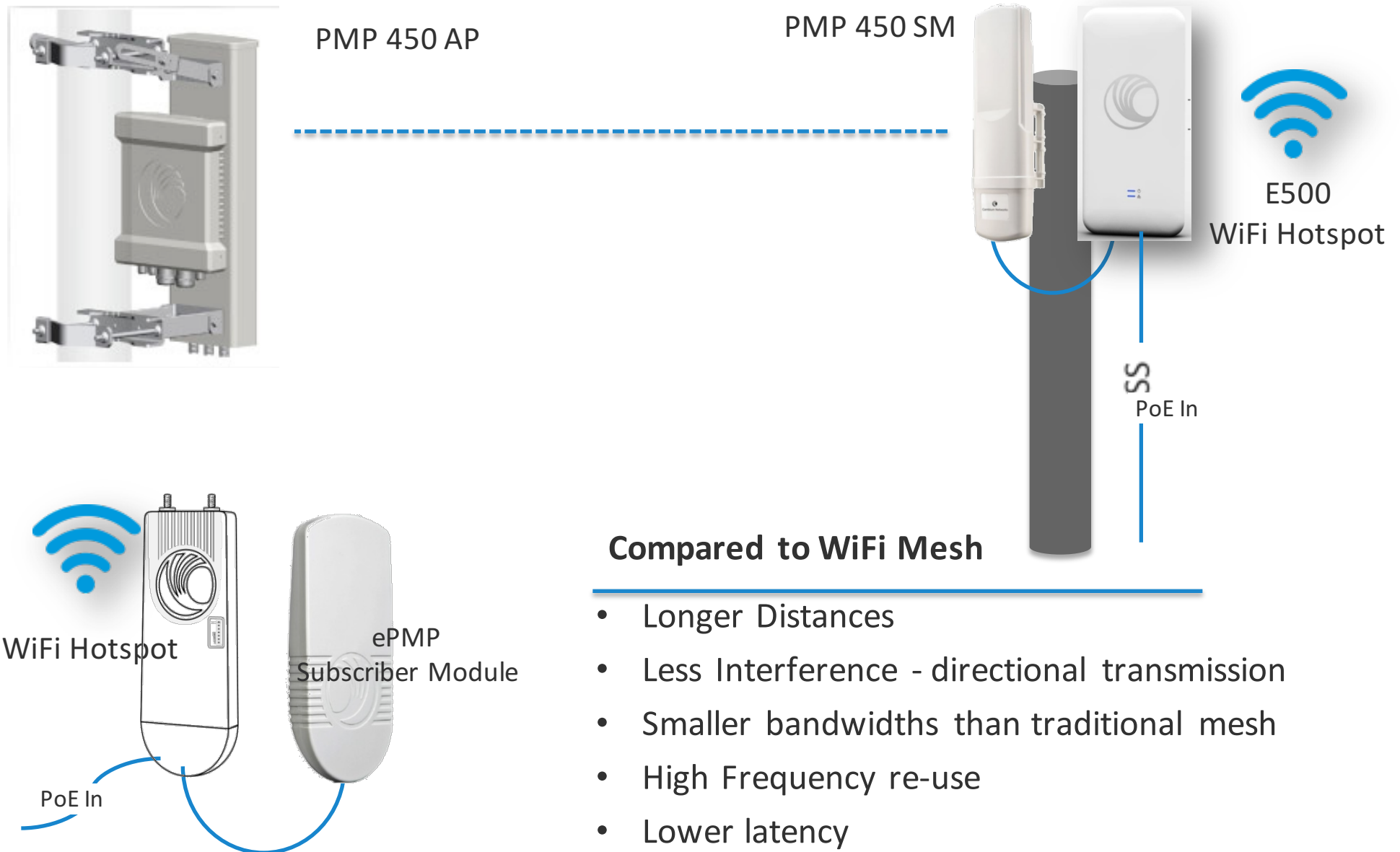
cnPilot E500



For quick install: WiFi Meshing

- One-Hop Mesh
 - Mesh:
 - Indoor – Indoor
 - Indoor-Outdoor
 - Outdoor-Outdoor
 - User caching across Indoor to Outdoor (1000 users)
- OR
- Use Cambium ePMP or PMP450 PTP/PMP for reliable backhaul

The alternative Option: Better than Wi-Fi Meshing

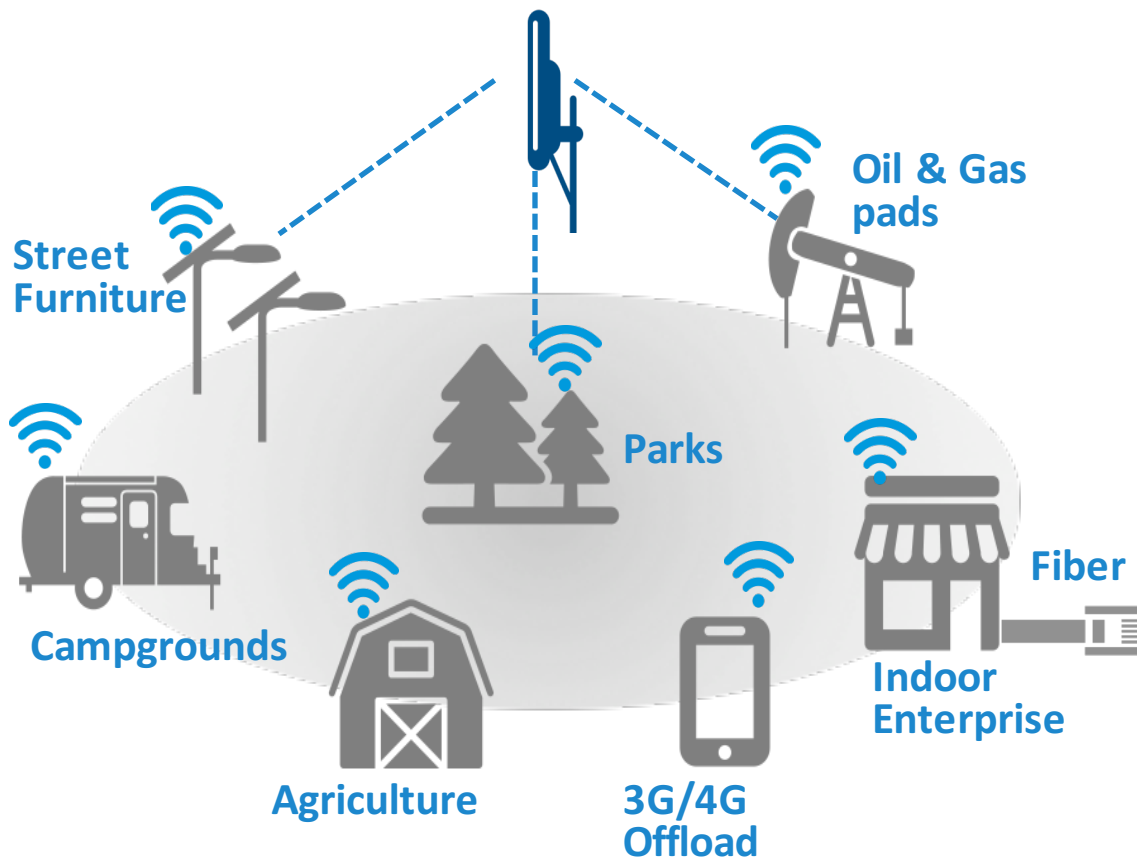


Compared to WiFi Mesh

- Longer Distances
- Less Interference - directional transmission
- Smaller bandwidths than traditional mesh
- High Frequency re-use
- Lower latency

cnPilot – Connecting the Unconnected

Manager, WiFi Controller



One Vendor for WiFi + Backhaul

- Long/Medium distance backhaul
- WiFi Meshing
- WiFi Access Points

cnMaestro – One Manager

- Single View
- Coordination between Backhaul + Access
- Troubleshooting

Public WiFi

- Rate Limiting per SSID; per user
- Multiple SSIDs
- 3GPP AAA; RADIUS EAP-SIM, WISPr1.0
- Band Steering, Load Balancing
- Auto channel selection
- Airtime fairness*
- Auto Transmit power control*
- Hotspot 2.0*

One SSID, multiple Locations, Increased brand presence

cnMaestro: WiFi Controller and Network Manager



- Community SSID = All around WiFi service availability, Customer sat., **Brand presence**
- Prioritized Owner access*; Rate limiting for public SSID clients; VLAN separation

cnPilot™ Portfolio (2015)

SEPT. 2015



Home & + Small Business
R200, R201

SEPT. 2015



ePMP™ 1000
Hotspot

SEPT. 2015

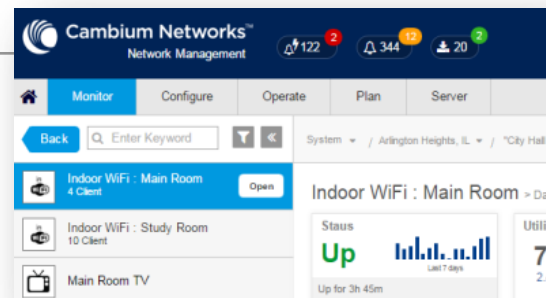


Enterprise Indoor
E400

1Q 2016



Enterprise Outdoor
E500



cnMaestro – Manager & WiFi Controller

E400 - Managed Indoor Enterprise Access Point

Dual band 802.11ac



RF

- 802.11a/b/g/n/ac
- 2x2 MIMO
- 2.4/5GHz
- Max TX power = 25dB (2.4, 5 GHz)

Physical

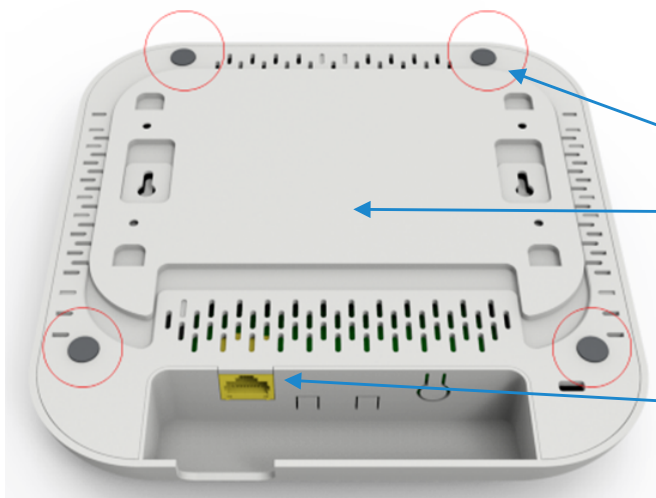
- Dimensions: 180x180x 26-31mm
- Software controlled LED
- Operating Temp 0-45 C

Installation

- Installable shoes for table mount
- Detached back-plate for easy ceiling mount

Ports

- 802.3af PoE Gigabit



Ceiling, wall, or desktop mount options

Security

- HTTPS, SNMPv3, Firewall, NAT, Client isolation
- Secure Configuration Store, Time based access

Guest Access

- Built-in Hotspot, third Party Hotspot
- Rate-limiting (per client/per WiFi)
- 802.1x, EAP-SIM/AKA
- Multiple AAA

WiFi

- VLAN Tagging per SSID
- WPA-TKIP, WPA2 AES, 802.11i
- Auto-channel selection, WMM
- **16 SSIDs, 256 Users**

Management

- Cloud/NOC Management, Autonomous operation
- Quick troubleshooting
- GUI, SNMPv3, CLI

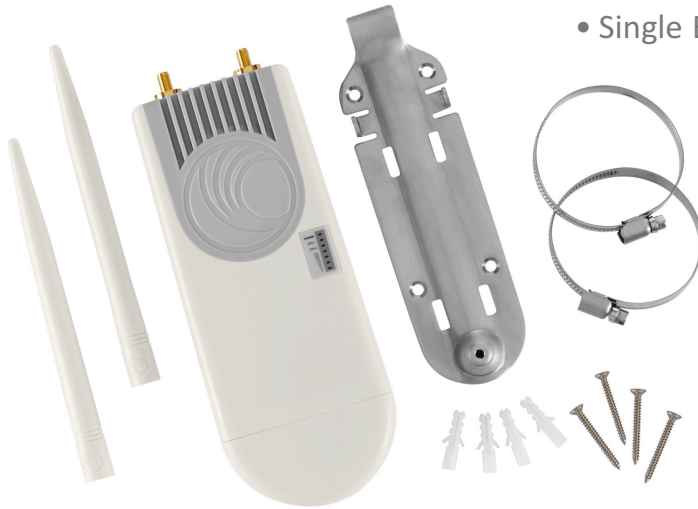
ePMP 1000 Hotspot – Managed Outdoor AP

Single band outdoor Enterprise class AP

Single band 802.11n (2.4 or 5 GHz)

Hardware

- 2 10/100 Ethernet ports
- Power Consumption: 5W (typical)/7W (max)
- Weight < 0.5 Kg. Dimensions: 30x15x9
- Certification: IP55
- Canopy PoE out PMP 450/ePMP
- Temperature rating: -30° C ~ + 60° C
- Single Band 802.11n [2.4, or 5 GHz]



Security

- HTTPS, SNMPv3, Firewall, NAT, Client isolation
- Secure Configuration Store, Time based access

Guest Access

- Built-in Hotspot, third Party Hotspot
- Rate-limiting (per client/per WiFi)
- 802.1x, EAP-SIM/AKA
- Multiple AAA

WiFi

- VLAN Tagging per SSID
- WPA-TKIP, WPA2 AES, 802.11i
- Auto-channel selection, WMM
- **8 SSIDs, 128 Users**

Management

- Cloud/NOC Management, Autonomous operation
- Quick troubleshooting
- GUI, SNMPv3, CLI

Questions?



Cambium Networks™