Deploy WiFi Quickly and Easily

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Introduction

There is a growing demand for reliable, high-speed WiFi in both public areas and businesses. Across industries from hospitality to various retail small businesses to expectations of the modern city, reliable WiFi is one of the highest indicators of customer satisfaction[1]. The availability of WiFi at these locations opens up new avenues for interaction and monetization with potential and current customers.

One challenge that is often underestimated in providing WiFi access is budgeting the time and money for proper backhaul access solutions to serve the exponentially growing WiFi traffic. And getting backhaul to where the WiFi access points should be located is often not a trivial task, especially in outdoor WiFi deployments.

The Backhaul Challenge

The challenge to deploying outdoors WiFi arises before the first hotspot is even set up. Trenching - digging up streets to lay fiber - can incur delays while requiring a considerable up-front investment. Rather than relying solely on fiber, smart wireless deployments are an essential factor for rapid flexible deployments. WLAN architectures like the one from Cambium work with both wired and wireless backhaul offering the ability to deploy using the best of both worlds.

In particular, Cambium's Point-to-Point (PTP) and Point-to-Multipoint (PMP) solutions deliver network access to both underserved hard to reach areas that lack the density to justify laying fiber or where trenching costs are prohibitive. The ability to quickly and easily deploy reliable wireless backhaul with none to low ongoing recurring expenses, considerably shortens the break-even period making the ROI very attractive. *(Figure 1)*

ROI FACTOR	3-T1 LEASED LINES	PMP 450
Max Throughput	1.5Mbps Per T1 (full duplex)	125Mbps
Estimated Monthly Fee	$600 (3 at $200 each)	$0
Installation/Equipment Fees	$1050 (3 at $350 each)	$4500
First Year Total Cost	$8250	$4500
On-going Annual Fees	$7200	$0

Figure 1: PMP 450 Leased-line Replacement
*Disclaimer: *All values are in USD. Actual costs and savings may vary based on individual usage, application, environmental, and network requirements*

With a rich array of solutions to meet various performance and deployment considerations, Cambium Network's **PTP solutions** including the PTP 650, which provides up to 450Mbps of throughput in the 4.9 GHz to 6.05 GHz frequency bands or the PTP 820 which provides the most advanced licensed microwave backhaul solutions, offer the best-in-class PTP directed backhaul for carrying WiFi traffic.

Where wireless access points are spread over an city block or more, Cambium's **PMP** and **ePMP™** product lines, offering PMP distribution wireless include GPS sync capabilities to provide high-capacity affordable wireless broadband for both Line of Sight (LOS) and near Line of Sight (nLOS) deployments, enable operators to set up a central serving base station and serve distributed locations.

[1] *Comcast Survey: Wireless Internet access is better at keeping 'Main Street' business patrons happier than freebies like candy, water or magazines (http://corporate.comcast.com/news-information/news-feed/smb-wifi-survey)*
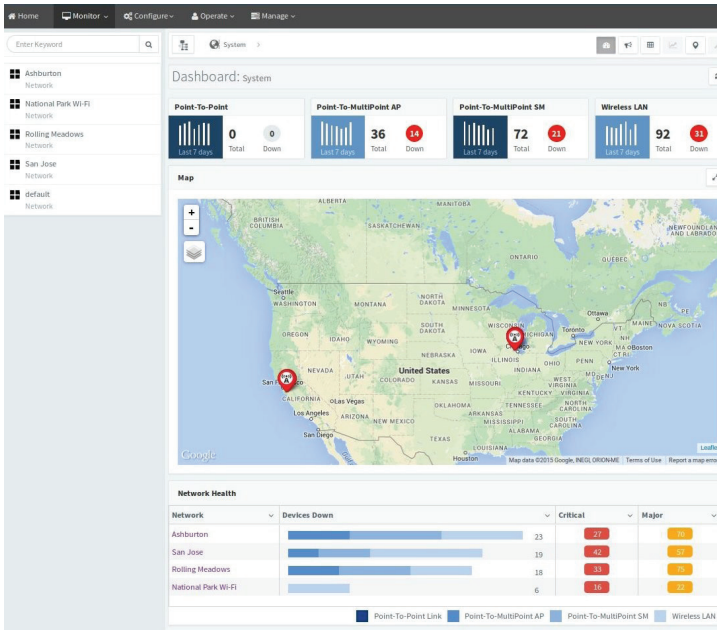
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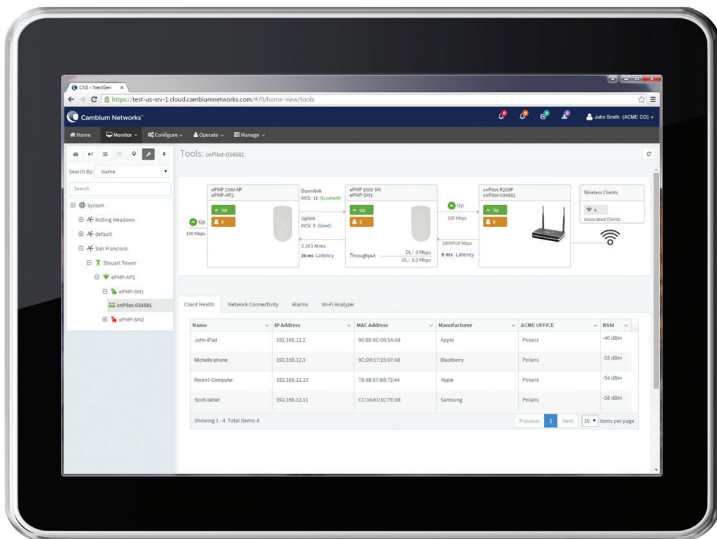

Figure 2: cn*Maestro Dashboard*

Figure 3: cn*Maestro Troubleshooting Tools*

Frictionless rapid wireless deployment is further enabled when backhaul, and access products work together and are coherently managed. In particular, Cambium Networks' economically priced ePMP 1000 Hotspot provides a low-cost easy way to deploy WiFi access in an IP55 rated package. With the ability to power a second ePMP radio, it enables two radios to be run from a single power line with the WLAN AP powering the Subscriber module (SM). With Cambium Networks' cn*Maestro™ (Figure 2)* managing both the backhaul and the access point from the same management system, it offers a coherent single-pane-of-glass experience, saving time and money often spent in integrating multiple vendor solutions or in trouble shooting issues.

Integrated troubleshooting *(Figure3)* with remote logging and packet capture enables the detection of the most common network problems such as the unavailability of a DNS server or a environmental conditions that affect wireless links. This helps support staff quickly navigate the complexity of helping customers with a wide variety of phones, tables and laptops gain reliable access to the wireless network.

Frictionless WiFi from Cambium combines WLAN and Backhaul features together to make WiFi deployments work from day one. For example, businesses usually need to provide access to both a public WiFi network for customers as well as provide an isolated secure internal network for use by staff. The cn*Pilot™* enterprise class of products such as the E400 and the ePMP 1000 Hotspot supports up to 8 SSIDs each of which can be set up to provide public WiFi hotspots, encrypted private wireless access for a business or a private wireless network for a service provider. Each of these WLAN networks can be configured with their own security policies and can be isolated on a network level using independent VLANs.

A few other key features for reliable frictionless working of the network are highlighted below:
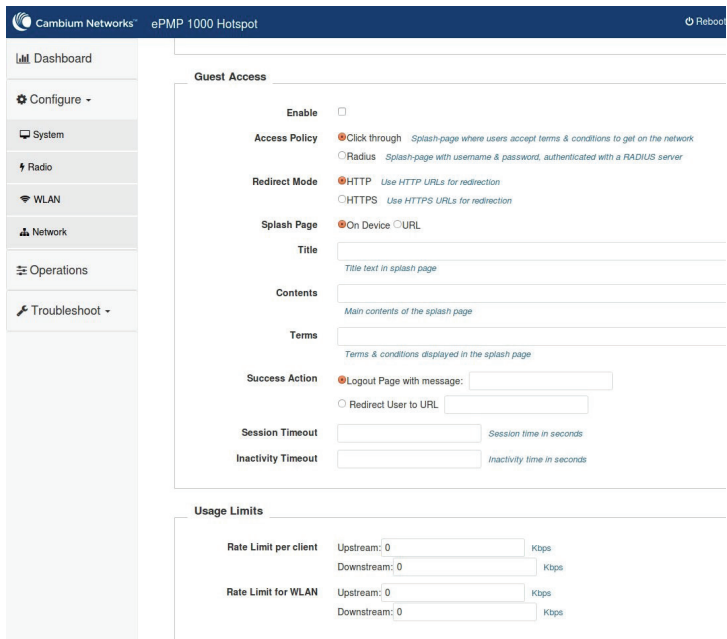
Figure 4: ePMP 1000 Hotspot Configuration

RATE LIMITING

Bandwidth hogs on WiFi, with WiFi being a shared medium, worsen
the experience of all users on the network. To ensure fair access to all
users good WLAN networks need to enable bandwidth limits on a per-user basis. In addition, if WiFi is provided over both a public guest
access WLAN as well as a private WLAN for the business, the public WLAN must not affect business operations. Configuring *(Figure 4)* an overall limit for the public WLAN to ensure a minimum level of availability on the private WLAN regardless of demand on the guest WLAN.

TRAFFIC FILTERING

Users of public wireless networks are free to run a wide variety of applications on the end devices. However, some of this traffic such as peer-peer sharing can adversely impact the quality of network access. In addition network protocols that generate wireless broadcast traffic that is
not useful in a public network use up valuable airtime.
This can also be a security risk for unsuspecting users.
It is usually sufficient to limit public WiFi to HTTP and HTTPS traffic. The in-built firewall lets you limit access
on a per-protocol basis or based on the traffic destination.
In addition unrestricted access can be provided to
whitelisted domains while requiring authentication for global access.
Client-client communication can be
disabled for security unless Chromecast and similar
devices or peer-peer gaming need to be supported.

CHANNEL SELECTION

Picking the right channel can have a great impact on the performance of the wireless network as a whole. The right value of course can vary by location depending on neighboring wireless LAN deployments. In addition, choosing the right WLAN channel is not
a one-time operation. RF conditions can vary outdoors depending
on conditions beyond the control of the operator. The in-built feature
to automatically select the optimal channel automatically picks the
channel that will provide the best performance. In addition, the
device can be configured to automatically scan the wireless spectrum
for available channels periodically or when there is no client traffic
without impacting network performance. This provides the ability to
react to dynamic RF conditions.

ENHANCED ROAMING

Wireless clients with sub-optimal roaming algorithms often do not disconnect from WiFi access points despite not being able to achieve a reliable wireless link. This can use up airtime due to transmission at low rates as well as frequent retries. This can bring down the overall capacity of the network even when such clients are not transmitting much traffic. This is especially problematic with open guest access outdoors WLANs where nearby cell phones may connect without active intervention from the user. Enable enhanced roaming to force such client to connect to the most reliable WLAN signal and disconnect them when they are not able to achieve connectivity above a minimal reliability threshold.

CONNECTING THE UNCONNECTED - WITH WIFI

Cambium Networks' comprehensive portfolio of PTP, PMP backhaul and Indoor and Outdoor WLAN access points all managed from a single management system, provides a truly end-to-end answer to rapidly deploy WiFi hotspots everywhere surmounting geographical challenges, reducing the time to get the backhaul to where the clients are, and taking the complexity out of managing the wireless components of your network. Together it makes it easier than ever before, in connecting the unconnected!

Cambium Networks™