

A1 Dogodek za partnerje

Prilagodljive omrežne rešitve za zanesljive povezave!

Vransko, Hotel Grof | 15. 3. 2023 ob 9. uri

A1



Cambium Networks

PORT
CONNECT

| A¹ ICT Distribucija



PORT
C O N N E C T

Professional Solutions



Kristijan Fabina

Regional Sales
Manager

Cambium Networks



Borut Jakič

Regional Sales
Manager

PORT EUROPE



Marko Kašič

Lead ICT and
Cybersecurity
Presales Engineer

A1 Slovenija



Tadej Križovnik

ICT Distribution
Manager

A1 Slovenija

- **09:00 - 09:30** **Prihod in jutranja kava**
- **09:30 - 10:30** **Cambium Networks – 1. del**
- **10:30 - 11:00** **Odmor in čas za ogled demo kotičkov**
- **11:00 - 12:00** **Cambium Networks – 2. del in PORT**
- **12:00 - 13:00** **Kosilo**
- **13:00 -** **Demo kotički - ena-na-ena predstavitev opreme, možnost preizkusa, možnost za dodatna vprašanja**

MENI 1

Goveja ali dnevna zelenjavna juha

Tagliata govejega ramsteka, tartufov pire, sotirane bučke

Mešana solata

Dnevna sladica



MENI 2

Goveja ali dnevna zelenjavna juha

Telečji medaljoni v naravni omaki, ocvrt piščančji zrezek v panko drobtinah Pražen krompir, zelenjava na maslu

Mešana solata

Dnevna sladica

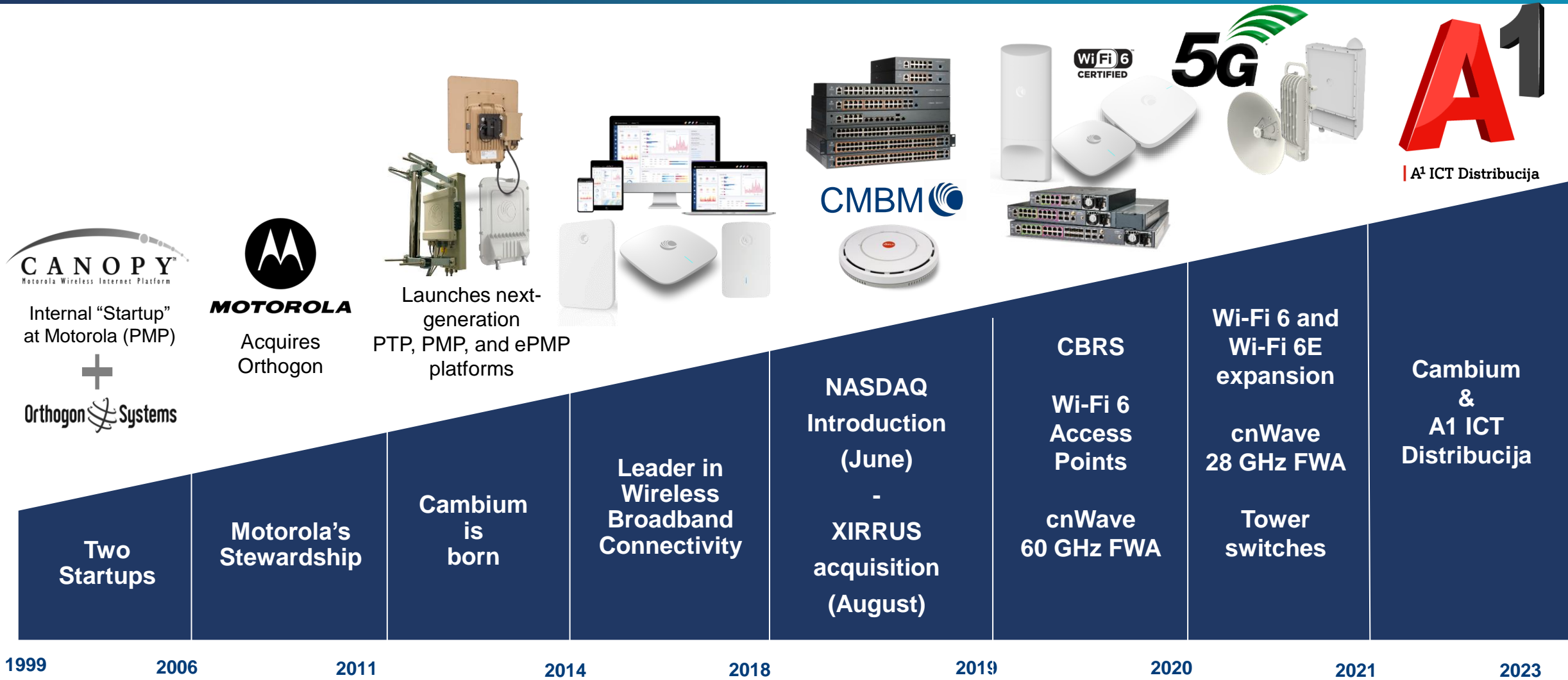
A1

Cambium Networks Enterprise Solutions



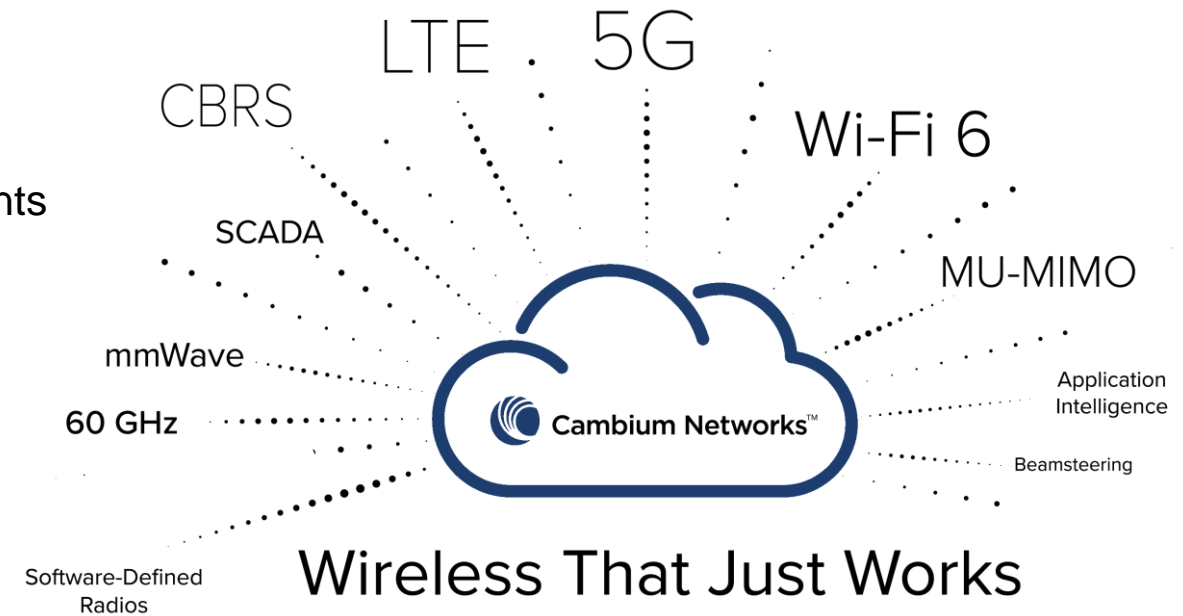
Cambium Networks™

Cambium Networks History



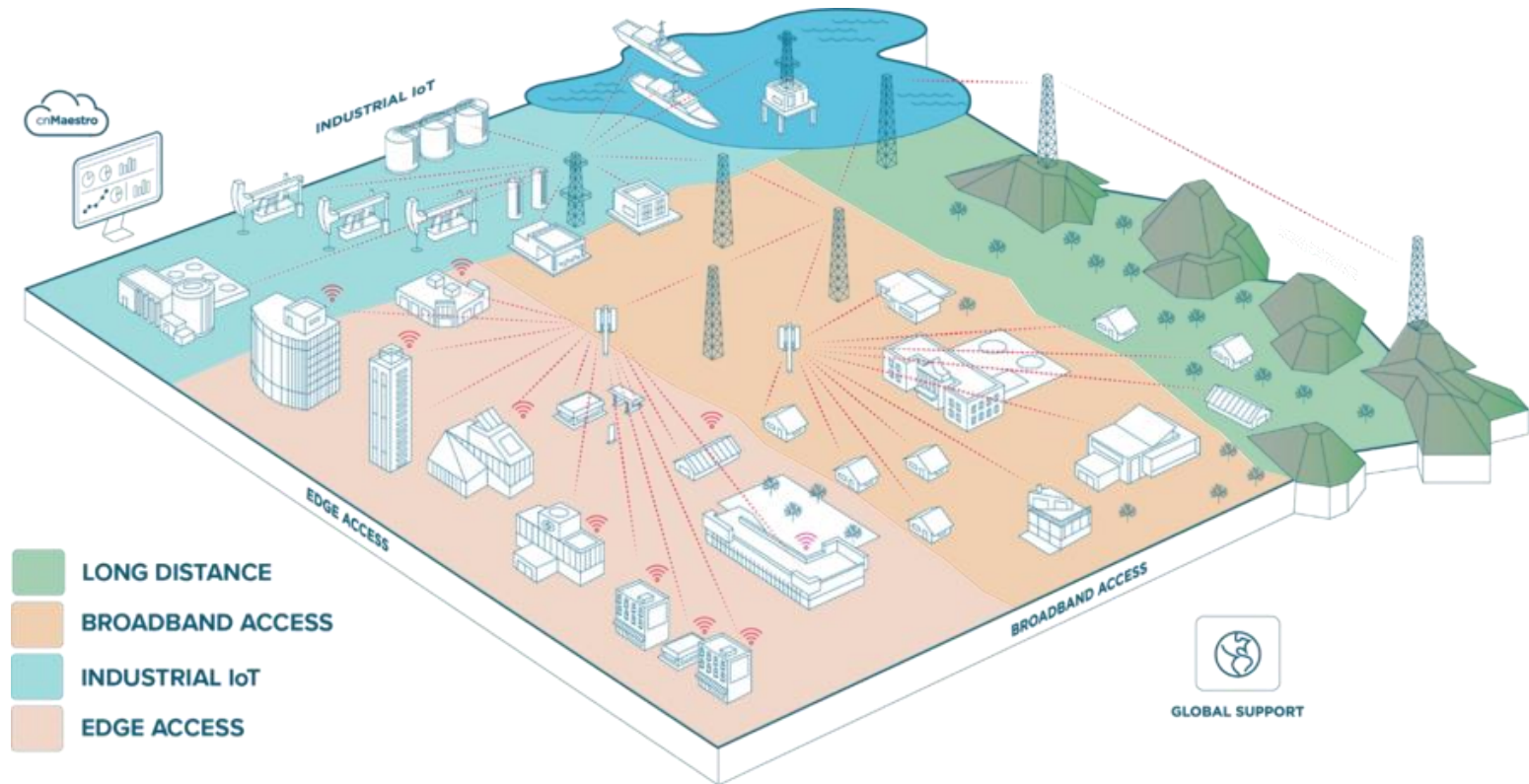
- Pioneer in Fixed Wireless Broadband
- Spun out of Motorola Solutions in 2011
- HQ outside of Chicago, IL with 700+ employees across 6 continents
- 9.000+ channel partners in 170+ countries
- More than 13 million nodes shipped
- Millions of FWA residential and business customers

- Facebook and Qualcomm technology partners
- MU-MIMO leader in FWA
- Industry leader in High-Density Wi-Fi
- Industry leader in 60 GHz FWA
- 5G Fixed Wireless Access innovator



CMBM 

- People Places Things
- 2m to 246km
- Kbps to Multi-Gigabit
- Indoor and Outdoor
- Proprietary, Wi-Fi, LTE, 5G
- Licensed and Unlicensed
- Scalable
- Concept to Commissioning
- Single Pane of Glass



Serving a Broad and Diverse Customer Base

Service Providers 	Enterprise 	Government 	Industrials 
                	            	               	               

25,600+ network operators

>12,600 channel partners



Kristijan Fabina

Regional Sales Manager
Cambium Networks

Based in
Croatia



Marko Čolakić

Inside Channel Account Manager
Cambium Networks

Based in
Croatia



Berk Bozkuş

Regional Technical Manager
Cambium Networks

Based in
Turkey



Kinan Hamwi

Channel Partner Marketing
Manager - EMEA
Cambium Networks

Based in
Spain

Point to Point



PTP 820

- Licensed microwave



PTP 670

- Sub-6 GHz
- Multi-band flexibility
- Channel sizes 5 MHz to 45 MHz
- 450 Mbps throughput

Fixed Wireless Access



LTE

- Fixed LTE
- Integrated RAN and EPC
- 2.4 GHz & 3 GHz



60 GHz cnWave

- Multi-gigabit throughput
- 60 GHz band



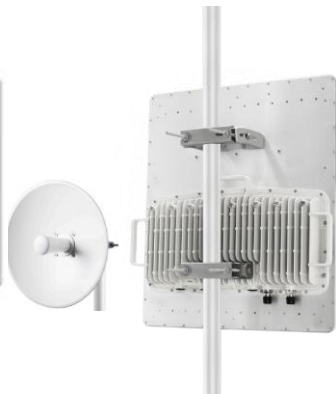
ePMP 3000

- 5 GHz 4x4 MU-MIMO & 80 MHz channel support
- Higher capacity & spectral efficiency



PMP 450M

- 14x14 cnMedusa™
- Massive MU-MIMO
- 5 GHz
- 1.5 Gbps capacity
- SFP/Eth
- 238 subscribers



PMP 450M

- 8x8 cnMedusa™
- Massive MU-MIMO
- 3.3 – 3.9 GHz
- 238 subscribers
- 900 Mbps capacity



cnMaestroX

- Public cloud, private Cloud, On-Premises (virtualization)
- 10,000 devices in management
- Full portfolio support

ENTERPRISE NETWORKING

Switches



cnMatrix EX2000 Series

- High-performance L3
- 10, 16, 24 & 52 port PoE+ models
- Multi-GigE support for Wi-Fi 6



cnMatrix EX1000 Series

- Value priced
- 10 & 28 port models
- Up to 56 Gbps



Wi-Fi



XV Series

- High-performance Wi-Fi 6/6E
- Application intelligence
- High security & performance
- SDR



cnPilot E Series

- Indoor & outdoor
- Cloud-savvy
- Economically priced

SD-WAN Firewall



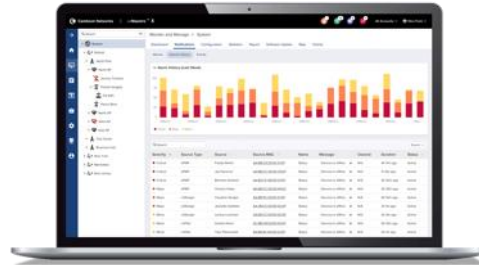
Quality of experience





cnMaestro™ X

- Single console for Cambium
- Cloud and on-prem options
- Multi-tenant MSP management



cnMaestro™ Essentials

- Cloud and on-prem management
- Secure, end-to-end control for the wireless fabric



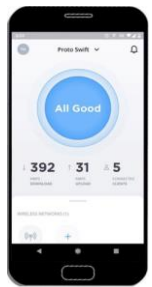
XMS & EasyPass

- Cloud management w/ analytics
- Simple, scalable, secure
- Azure/Google SSO integration



LINKPlanner

- Free, network design tool for RF environments
- Tens of thousands of links deployed



Swift

- Cloud-based management of your enterprise networks right from your phone



cnArcher™

- Free Android™ app
- Allows field techs to configure PMP networks



cnHeat

- Quickly pre-qualify customers
- Identify and market to new customers
- Optimize greenfield site placement



Wi-Fi Designer

- Free online Wi-Fi design tool for all Cambium APs
- Place APs, visualize coverage and generate BOM

Cambium Networks ONE Network Portfolio



Wi-Fi



Switching



Security & SD-WAN



Fixed Wireless



Wi-Fi 5



Wi-Fi 6



Wi-Fi 6E w/ SDR



Enterprise Networking Users

ENTERPRISE



HOSPITALITY



PUBLIC VENUES

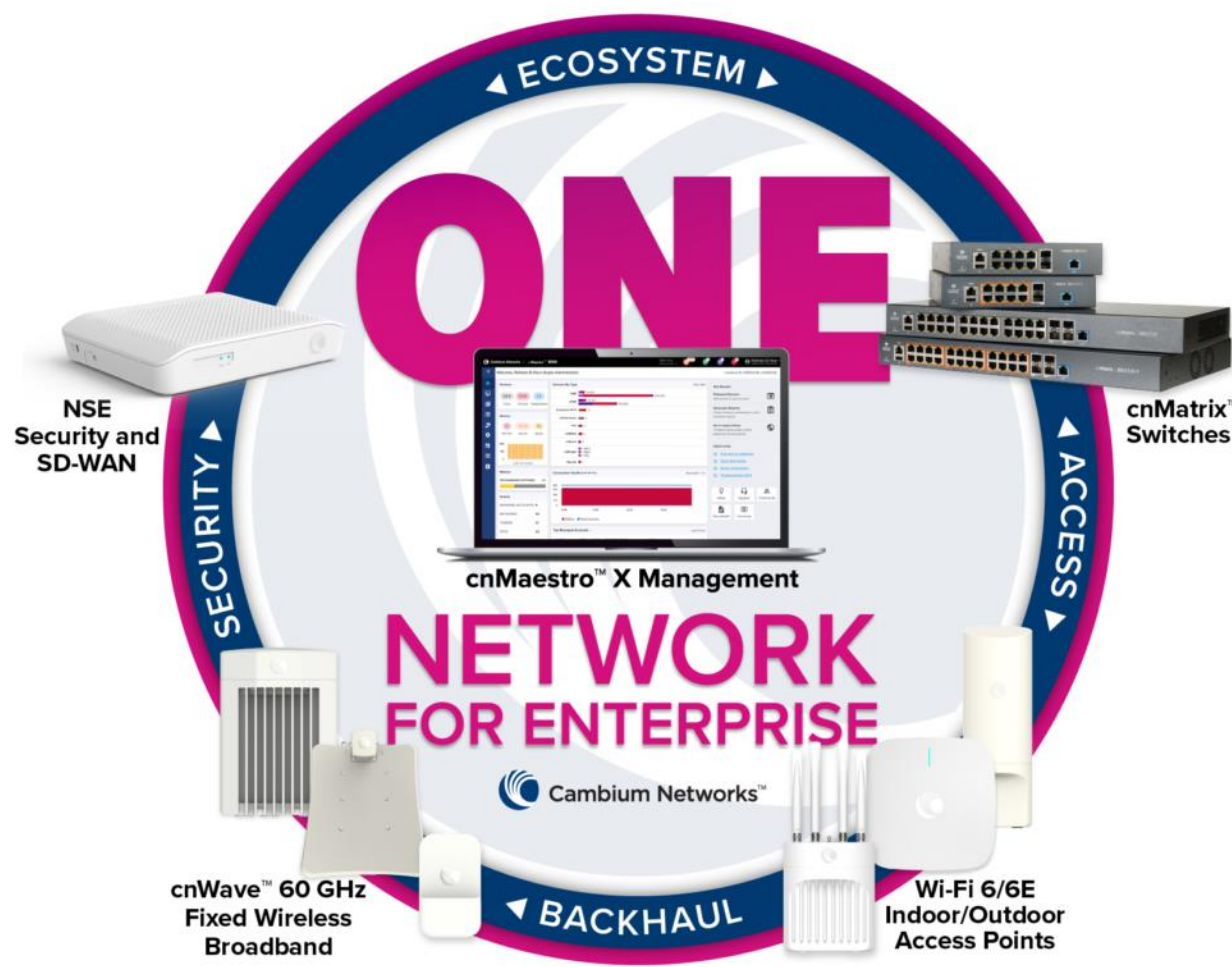


EDUCATION



Enterprise Networking Ecosystem Partners

Location Based Services	Location Analytics	Wi-Fi Design	Security	Healthcare	Client Engagement	Wireless Video Surveillance



ONE Network

- Wi-Fi, switching, security, SD-WAN
- Single pane management



Predicatable Performance

- High density, long range
- Application optimized



Operational Excellence

- Assurance
- Automation



Economical

- Less equipment
- Lower TCO



Cambium Networks™

A1

WiFi Access Points

- Kakovosten HW
- Odlična povezljivost v vseh pogojih
- Enostavno upravljanje (oblačni kontroler) vseh dostopnih točk/stikal/opreme

cnPilot Indoor Portfolio Highlights

Best buy



E425

E430

E410

E600

2.4GHz / 5GHz dual band
802.11ac Wave 2

High Efficiency,
high gain antennas

256 – 512 clients per AP, 16
SSID

Up to 2.1Gbps 5GHz PHY
Rate

Enhanced Roaming, RF
aware

Mid-market Enterprise,
Hospitality, Logistics, Retail

Radios	Dual band 2x2	Dual band 2x2	Dual band 2x2	Dual band 4x4
Wi-Fi	11ac.wave2	11ac.wave2	11ac.wave2	11ac.wave2
5GHz EIRP	25dBm	26dBm	30.5dBm	34dBm
Ethernet	3 x GE PoE out	4 x GE PoE out	1 x GE	2 x GE
BLE	No	Yes	No	Yes
Environment	Wall plate	Wall plate	Indoor	indoor

Key Value

Flexible mounting
USB port

Flexible mounting

Cost effective 2x2

Cost effective 4x4

cnPilot Outdoor Wi-Fi 5 Portfolio Highlights



E500

E501S

E502S



E505



E510



E700



XH2-240

Radios	2x2:2	2x2:2	2x2:2	2x2:2	2x2:2	4x4:4	4x4:4
Wi-Fi	11ac wave1	11ac wave1	11ac wave1	11ac wave2	11ac wave2	11ac wave2	11ac wave2
Capacity	1.16 Gbps	1.16 Gbps	1.16 Gbps	1.16 Gbps	1.3 Gbps	2.13 Gbps	6.9 Gbps
Antenna	Integrated 5 dBi omni	Integrated 13 dBi sector 120°	Integrated 17 dBi sector 30°	Integrated 5 dBi omni	Integrated 8 dBi omni	Integrated 8 dBi omni	Connectorized
Clients	256	256	256	256	256	512	512
Transmit power	28 dBm	28 dBm	28 dBm	25 dBm	28 dBm	28 dBm	25 dBm
Ethernet	1 x GE 1 x GE PoE-Out	1 x GE 1 x GE PoE-Out	1 x GE 1 x GE PoE-Out	1 x GE	1 x GE	1 x GE 1 x GE PoE-Out	2 x GE
Temperature range	-30° to +60°C	-30° to +60°C	-30° to +60°C	-30° to +60°C	-40° to +65°C	-40° to +65°C	-40° to +55°C

Best buy



XV2-22H



XV2-21X



XV2-2



XV3-8



XE3-4



XE5-8



XV2-2T0



XV2-2T1

Radios

Dual Band
2x2

Dual Band
2x2

Dual Band
2x2

Dual-Band, Tri-Radio
8x8/4x4

Tri-Band, Tri-
Radio
4x4/2x2

Tri-Band, 5-Radio
8x8/4x4

Dual Band
2x2

Wi-Fi

Wi-Fi 6

Wi-Fi 6

Wi-Fi 6

Wi-Fi 6

Wi-Fi 6/6E

Wi-Fi 6/6E

Wi-Fi 6

5GHz EIRP

27 dBm

33 dBm

33 dBm

36dBm

30dBm

30dBm

36dBm

Uplinks

3 x GbE

1 x GbE

1 x GbE, 1 x 2.5GbE

1 x GbE, 1 x 5GbE

1 x GbE, 1 x
2.5GbE

1 x GbE, 1 x 5GbE

1 x GbE, 1 x 2.5GbE

BLE

✓

✓

✓

✓

✓

✓

✓

Environment

Indoor

Indoor

Indoor

Indoor

Indoor

Indoor

Outdoor, IP67

Use Cases

Hospitality, Small
Enterprise, Retail

Hospitality, Small
Enterprise, Retail

Hospitality, Small
Enterprise, Retail

Education, Med/Large
Enterprise, Public
Venues

Education,
Med/Large
Enterprise

Public Venues,
Education, High
Density

Hospitality, Enterprise,
Education, Transportation,
Logistics, Retail

Key Value

Best price-
performance

Best price-
performance

Best price-
performance

SDR radio splits 5GHz
into dual 4x4 radios,
ideal for mixed Wi-Fi
5/6 networks

SDR selects
5GHz or 6GHz on
one radio. Ideal
for mixed Wi-Fi
5/6/6E networks

Multi-radio and
multi-SDR for large
mixed networks.
Ultra high density
use cases.

High efficiency antenna for
best-in-class range, easily 2x
the nearest competitor. PoE-
out for secondary device

XV2-22H wallplate Wi-Fi 6



	XV2-22H
Radios	2
Bands	5GHz: 2x2 2.4GHz: 2x2
Wi-Fi	802.11ax
5GHz EIRP	27 dBm
Ethernet	3 x GigE (PoE Out)
Zigbee	No
Key Values	Multi-protocol 802.15.4 transceiver (BLE or Zigbee/Thread/Matter)



XV2-21X

Radios	2
Bands	5GHz: 2x2 2.4GHz: 2x2
Wi-Fi	802.11ax
5GHz EIRP	33 dBm
Ethernet	1 x GigE
BLE	No
Key Values	Value priced for small enterprise, hospitality, education, etc

Wi-Fi 6 Portfolio Highlights



XV2-2



XV3-8

cnMaestro or XMS-Cloud

Software Defined Wi-Fi

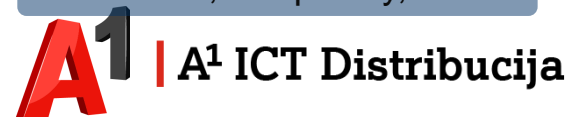
Up to 1000 associated clients per AP, 16 SSID

Multi-gigabit Ethernet

WPA3 Security

Enhanced Roaming, RF aware

Mid-market Enterprise, Education, Hospitality, Retail



Radios	2	4
Bands	5GHz: 2x2 2.4GHz: 2x2	Dual 5GHz: 4x4 (or combine into one 8x8) 2.4GHz: 4x4 Dedicated sensor, dual band
Wi-Fi	802.11ax	802.11ax
5GHz EIRP	33dBm	36dBm
Ethernet	1 x 2.5 GigE	1 x 5 GigE 1 x 1 GigE
BLE	No	Yes
Key Values	No premium for Wi-Fi 6 2.5 GigE uplink Value priced for small enterprise, hospitality, education, etc	No premium for Wi-Fi 6 High Density/High Performance Software-defined radios Dedicated sensor radio for security

Software Defined radios; dual 4x4 5GHz or Single 8x8

Ultra high-density for legacy networks and 802.11ax Up to 9.6Gbps 5GHz, IOT ready



Legacy Networks:

Double network capacity for high density networks
Increase MU-MIMO performance for legacy 11ac clients

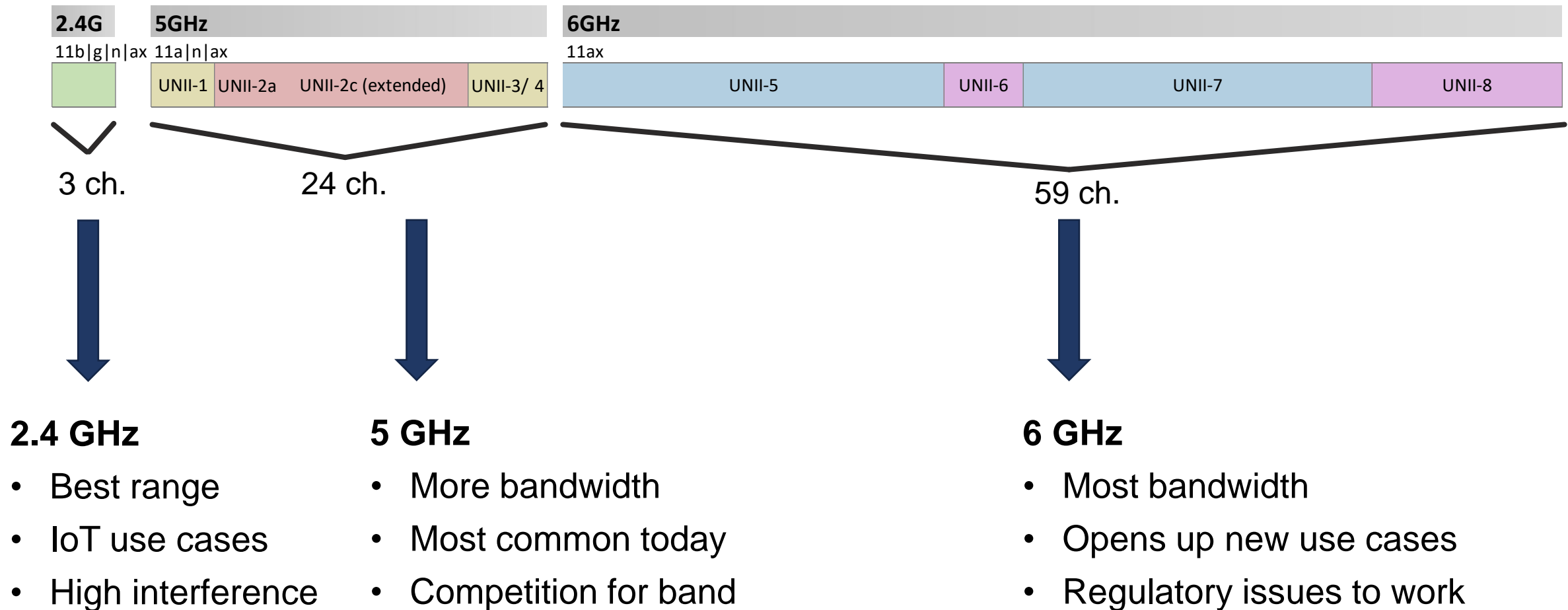
Ideal for 11n, 11ac mixed with new 11ax devices

Migration to 802.11ax Networks:

Increase network density and capacity, reduce latency
MU-OFDMA, MU-MIMO, IOT ready

Ideal when the network is 50% 11ax and 11ax IOT

Wi-Fi 6E Triples Available Wi-Fi Spectrum

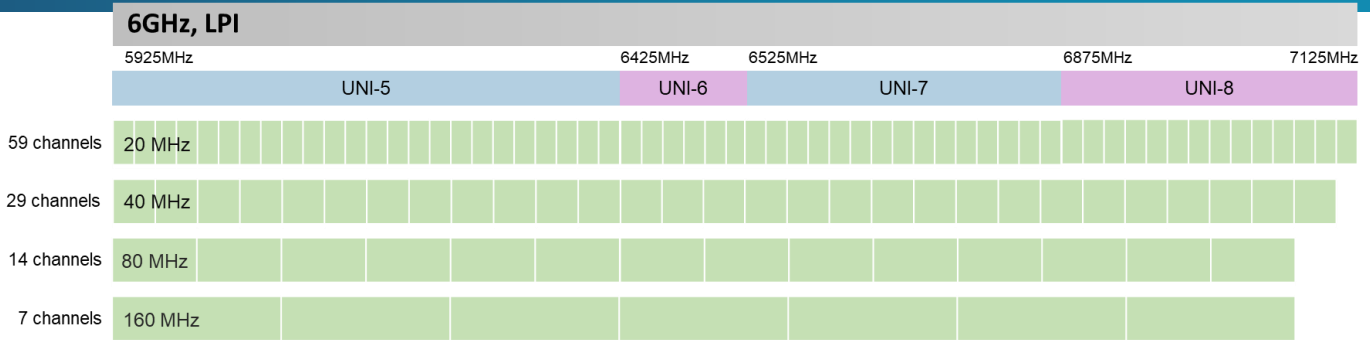


Wi-Fi expansion over 6 GHz

Up to 1200 MHz open for Wi-Fi

Protects incumbent users of 6 GHz

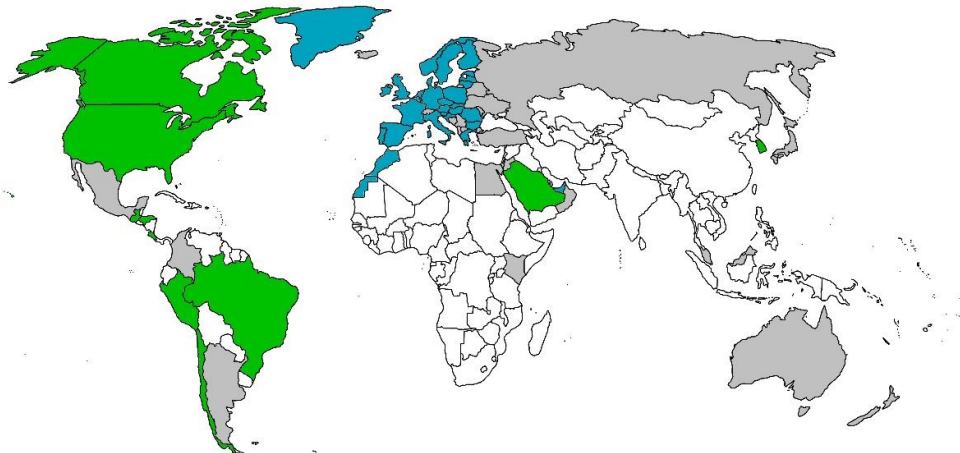
Greenfield Wi-Fi networks



LPI Power Class (low power indoor)

- 18dBm on a 20MHz channel, ~12dB lower than most WIFI 6 APs
- Dramatically different deployment methods
- Approved in nine countries (about 1.5 billion people)

● 1200 MHz for LPI
 ● 500 MHz for LPI
 ● Considering 500 or 1200 MHz



SP Power Class (standard power)

- 36dBm on a 20MHz channel
- Similar deployment methods as Wi-Fi 6

● Released for SP
 ● Unannounced or still evaluating AFC for 800 - 1000 MHz SP



Wi-Fi 6E Portfolio Highlights



XV3-4



XE5-8

cnMaestro or XMS-Cloud

Software Defined Wi-Fi

Up to 2000 associated clients per AP, 16 SSID

Multi-gigabit Ethernet

WPA3 Security

Enhanced Roaming, RF aware

Mid-market Enterprise, Education, Hospitality, Retail

Radios	3	5
Bands	4x4 5/6GHz; 2x2 5GHz; 2x2 2.4GHz	2 x 4x4 5/6GHz; 2 x 4x4 5GHz; 1 x 4x4 2.4GHz
Antennas	4x4/2x2	8x8/4x4
Bandwidth	6.58 Gbps	11.3 Gbps
Ethernet	1 x 2.5GigE + 1 x GigE	2 x 5GigE
USB	Yes	Yes
Use Cases	Enterprise, Hospitality, Education	Public Venues, Sports Arenas, Education

Video Conferencing



AR/VR



Cloud Everything



Location Tracking



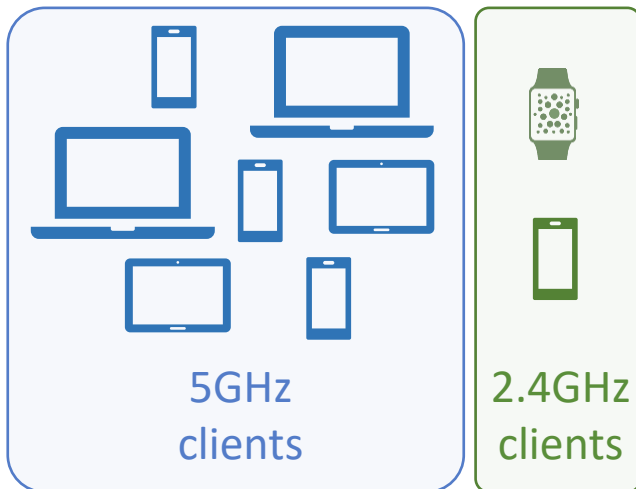
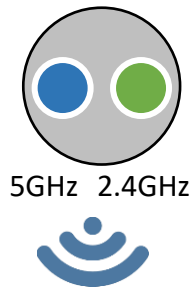
Internet of Things



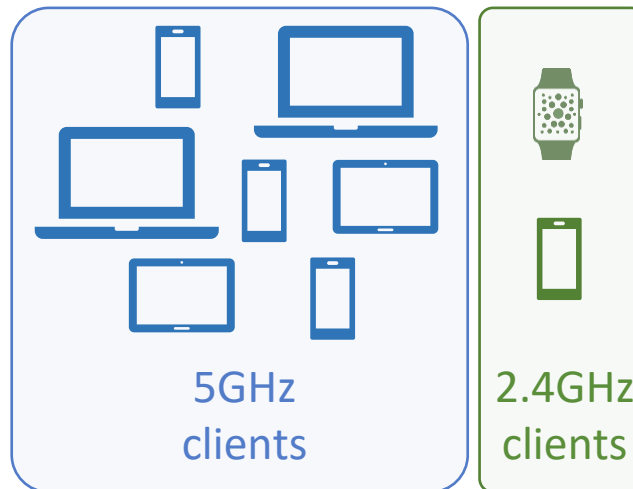
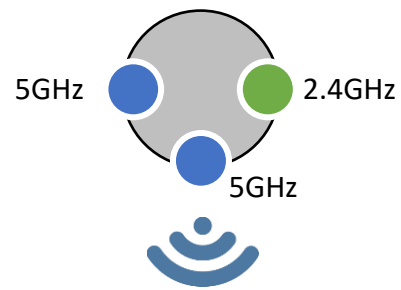
4K/8K Video



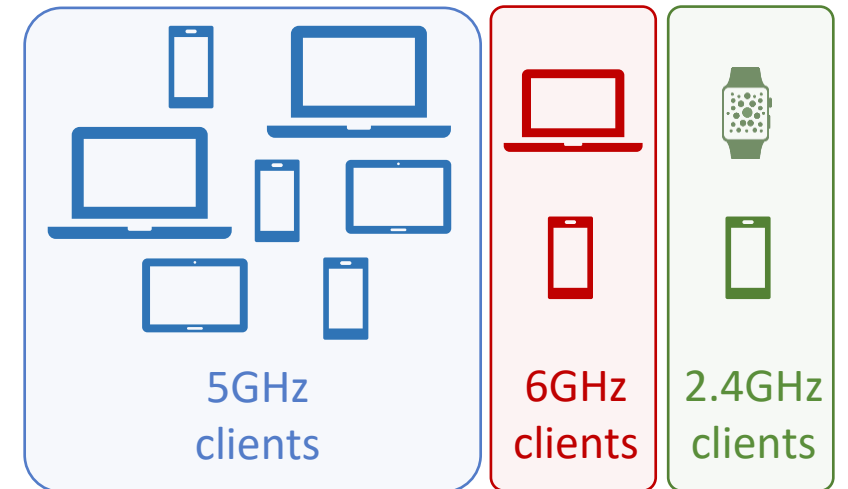
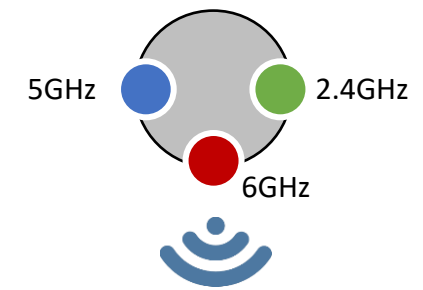
Traditional Wi-Fi Unused resources



SW-Defined Wi-Fi Optimized capacity

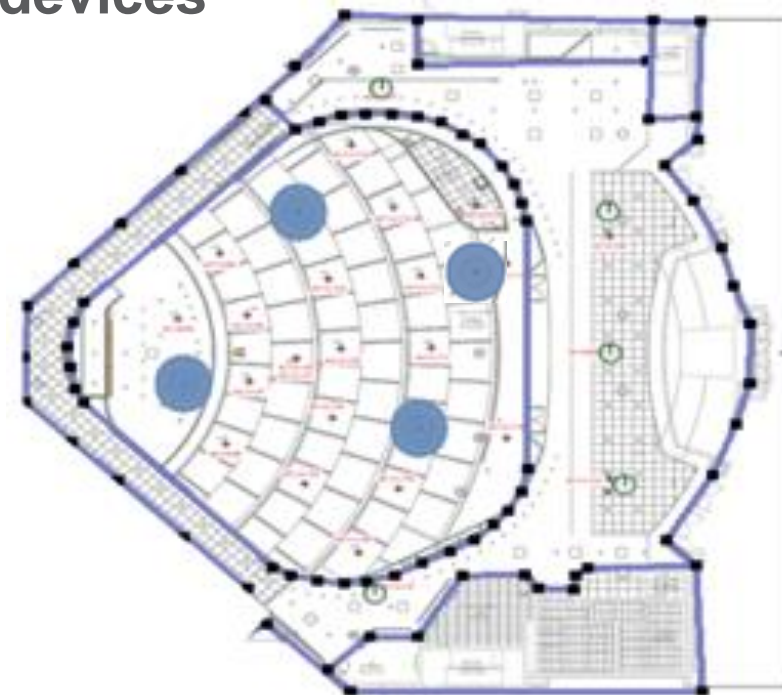
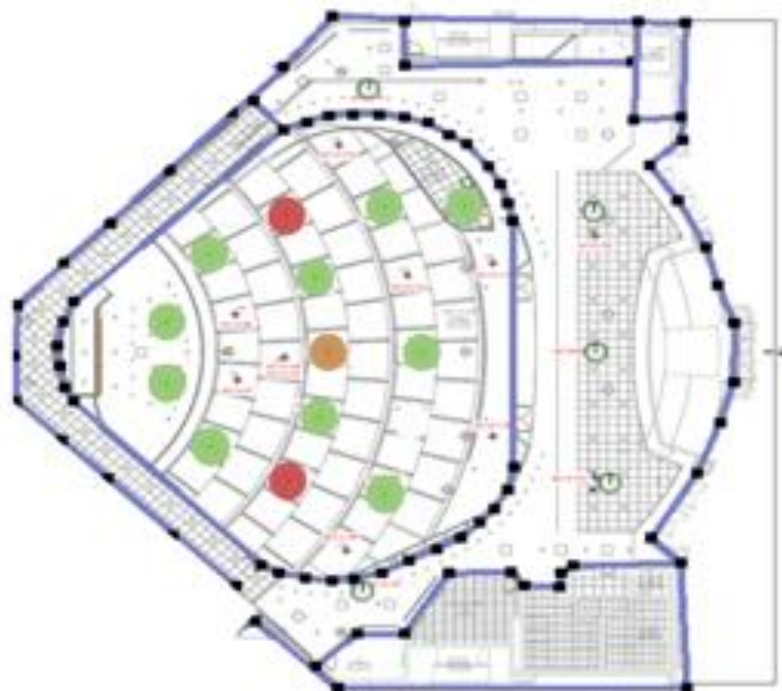


SDR Tri-Band Wi-Fi Investment protection



Example High Density Comparison

500 seat auditorium
400+ simultaneous devices
95%+ 5GHz



2-radio
AP Design **12** APs
14 radios used

5-radio
AP Design **4** High Density APs
20 radios used

10 2.4GHz radios turned off

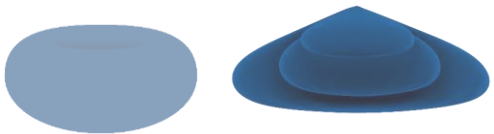
1 2.4GHz radio turned off

XV2-23T (2x2 omni, small form factor)



XV2-23T	
Radios	2
Bands	5GHz: 2x2 2.4GHz: 2x2
Wi-Fi	802.11ax
5GHz EIRP	27 dBm
Ethernet	Gigabit PoE-In
Antenna	10 dBi

XV2-2T: Shattering Conventional Wisdom for Wi-Fi Coverage and Economics

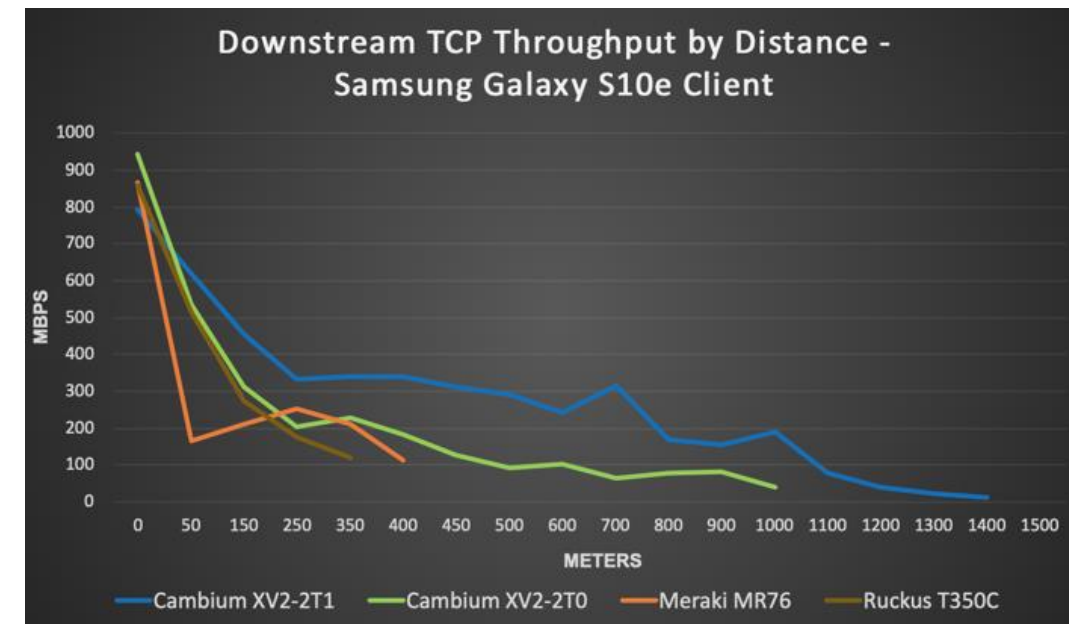


Highlights

- Unique innovative design
- Best consistency and range
- Purpose-built high-gain omni antenna – (5 dbi in 2.4 GHz, 9 dbi in 5 GHz)
- Integrated omni (XV2-2T0) antenna
- Integrated 120 deg (XV2-2T1) antenna
- Better reach to connect weaker clients
- 2.5 Gbps & 1 Gbps PoE Out
- 30W of PoE out with 802.3bt power input
- Integrated BLE
- Lightning Surge Protection, LTE Filter
- IP67, -40°C to 65°C temperature rating

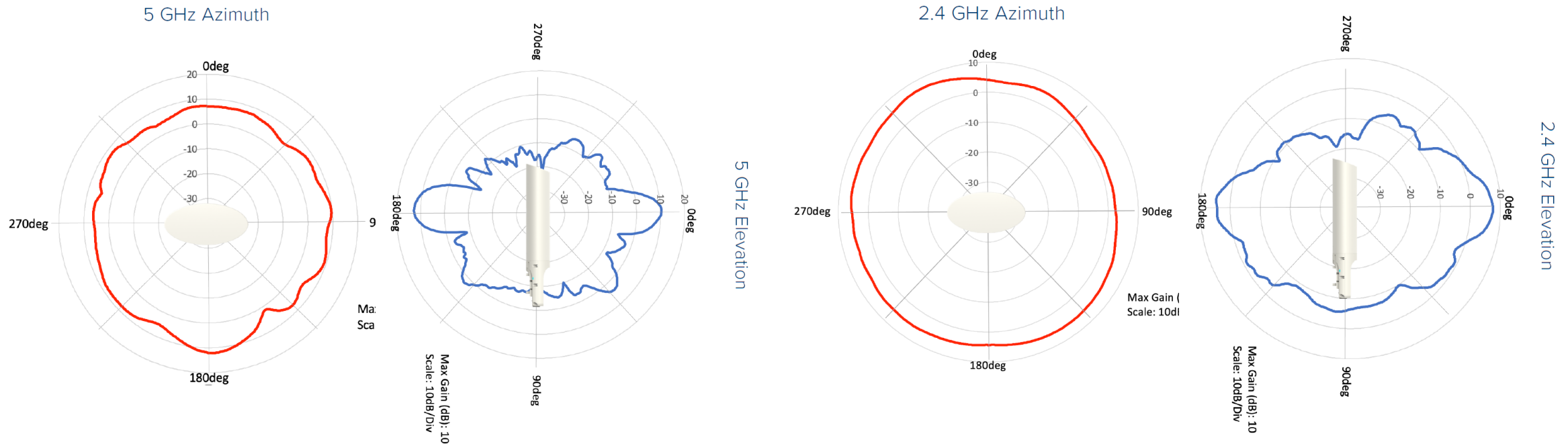
Superior Coverage

- 2-3X greater range vs. competitors
- Reduced AP count significantly lowers TCO



Design Goals:

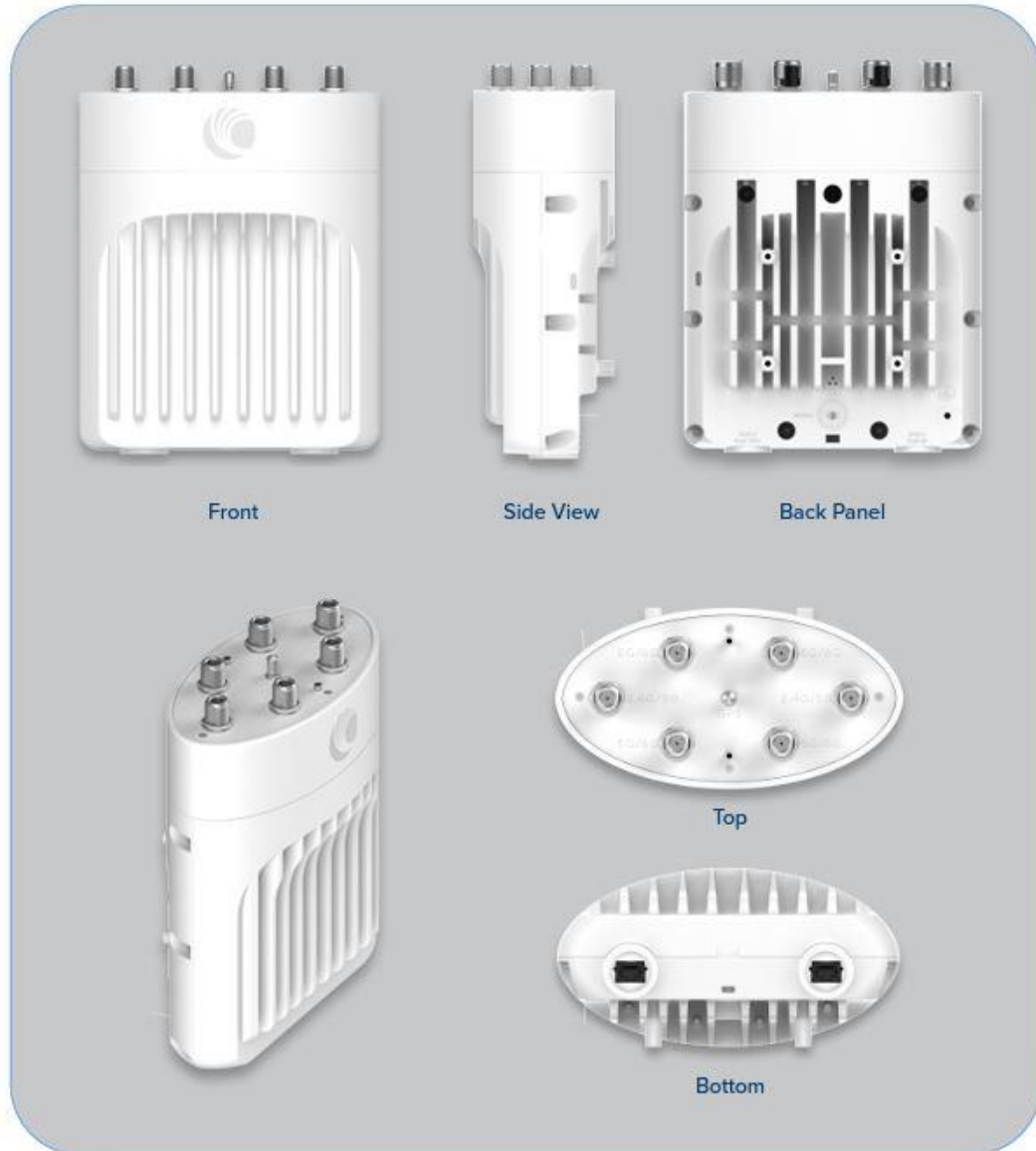
- Increase the average antenna gain to improve downstream signal and upstream link budget
- Improve coverage consistency by removing nulls and decreasing MIN and AVG gain delta
- Apply improvements to both 5GHz and 2.4GHz radios



XV2-2T1 (sector 120 degrees)



XV2-23T (2x2 omni, small form factor)



XV3-4TN

Radios	3 (SDR)
Bands	5/6 GHz: 4x4/2x2 2.4GHz: 2x2
Capacity	6.6 Gbps
5GHz EIRP	36 dBm
Ethernet	2.5 Gbps and 1 Gbps
WLAN	1500 clients

Professional Wi-Fi solution for any application

XV2-22H
3 GE, PoE out, BLE/Zigbee



cnPilot XV2-2
2x2 Wi-Fi 6

cnPilotXirrus XV3-8
Software Defined 8x8 Wi-Fi 6

High density like
conference venues and
auditoriums



cnMaestro
Cloud or Virtualized
One interface for entire network

XV2-2T WiFi6
2x2 802.11ax



cnMatrix EX2000



Wi-Fi 6 2x2 Competitive Comparison



Functionality	Cambium XV2-2	Aruba AP-505	Cisco 9105AX	Extreme AP305C	Meraki MR36	Ruckus R550	Huawei 5760-10	Ubiquiti U6 Lite
Total User Radios	2	2	2	2	2	2	2	2
Wi-Fi 6 User Radios	2	2	2	2	2	2	2	1
SW Defined Radios	No	No	No	Yes	No	No	No	No
Uplinks	1 x 2.5GigE	1 x 1GigE	1 x 1GigE	1x1GigE	1x1GigE	2x1GigE	1x1GigE	1x1GigE
Sensor Radio	No	No	No	No	Yes	No	No	No
L7 DPI in AP	Yes	Yes	No	No	No	No	No	No
List Price AP	\$445	\$730	\$748	\$555	\$849	\$895	\$725	\$99
List Price Cloud (1 Year)	\$90/\$50/\$0	\$100	NA	\$150/\$0	\$150	\$95		\$0 (Min 20 APs)

Wi-Fi 6 4x4 Competitive Comparison

Functionality	Cambium XE3-4	Aruba AP-515	Cisco 9115	Extreme AP410C	Meraki MR46	Ruckus R650	Huawei 6761-21	Ubiquiti U6 LR
Total User Radios	3	2	2	2	2	2	2	2
Wi-Fi 6 Radios	3	2	2	2	2	2	2	1
SW Defined Radios	Yes 4x4/2x2	No	No	Yes	No	No	No	No
Uplinks	1 x 2.5GigE 1 x 1GigE	1 x 2.5GigE 1 x 1GigE	1 x 2.5GigE	1 x 2.5GigE 1 x 1GigE	1 x 2.5GigE	1 x 2.5GigE 1 x 1GigE	1 x 10GigE, 1 x 2.5GigE	1 x 1GigE
Sensor Radio	No	No	No	Yes	Yes	No	Yes	No
L7 DPI in AP	Yes	Yes	No	Yes	No	No	No	No
List Price AP	\$895	\$1095	\$1345	\$999	\$1449	\$1095	?	\$179
List Price Cloud (1 Year)	\$90/\$50/\$0	\$100	NA	\$175/\$0	\$150	\$95	?	\$0 (Min 20 APs)

Wi-Fi 6 8x8 Competitive Comparison

Functionality	Cambium XV3-8	Aruba AP-555	Cisco 9130AX	Meraki MR55	Ruckus R850	Huawei 6760-X1	Ubiquiti
User Radios	3	3	3	2	2	3	NA
SW Defined Radios	Yes	Yes	Yes	No	No	Yes	NA
Uplinks	1-5GigE 1-1GigE	2-5GigE	1-5GigE	1-5GigE	1-5GigE 1-1GigE	2-10GigE 1-1GigE	NA
Sensor Radio	Yes	No	Yes	Yes	No	No	NA
L7 DPI in AP	Yes	Yes	No	No	No	No	NA
List Price AP	\$1314	\$1895	\$2095	\$1849	\$1695	?	NA
List Price Cloud (1 Year)	\$90/\$50/\$0	\$100	Not Available	\$150	\$95	?	NA

Wi-Fi 6E Competitive Comparison

Functionality	Cambium XE5-8	Cambium XE3-4	Juniper AP45	Juniper AP34	Aruba AP-635	Extreme AP4000
Total User Radios	5	3	3	3	3	3
Max 5GHz Radios	4	2	1	1	1	1
Max 6GHz Radios	2	1	1	1	1	1
Antenna Configuration	8x8/4x4	4x4/2x2	4x4	2x2	2x2	2x2
Total Wi-Fi Bandwidth	15 Gbps	6.6 Gbps	8.4 Gbps	4.2 Gbps	3.9 Gbps	3.9 Gbps
Software-Defined Radios	Yes	Yes	No	No	No	No
Sensor Radio	No	No	Yes (dedicated)	Yes (dedicated)	No	Yes (SW defined)
Uplinks	2 x 5GigE	1 x 2.5GigE 1 x 1GigE	1 x 5GigE 1 x 1GigE	1 x 5GigE	2 x 2.5GigE	1 x 2.5GigE 1 x 1GigE
L7 DPI in AP	Yes	Yes	No	No	Yes	No
List Price AP	\$2195	\$895	?	?	\$1395	\$999
List Price Cloud (1 Year)	\$90 / \$50 / \$0	\$90 / \$50 / \$0	\$390	\$390	\$100	\$150

Outdoor Wi-Fi 6 2x2 Competitive Comparison

Functionality	Cambium XV2-2T	Aruba AP-565/7	Meraki MR76	Ruckus T350C	Ubiquiti
Total User Radios	2	2	2	2	NA
Total Wi-Fi Bandwidth	1.77Gbps	1.77Gbps	1.77Gbps	1.77Gbps	NA
Uplinks	1-2.5GigE	1-1GigE	1-1GigE	1-1GigE	NA
PoE Out	Yes	No	No	No	NA
L7 DPI in AP	Yes	Yes	No	No	NA
Temp Range	-40 to +65C	-40 to +55C	-40 to +55C	-20 to +65C	NA
Antennas	Internal	Int or Ext	External	Internal	NA
HW Warranty	3 years	Lim Lifetime	1 year	1 year	NA
List Price AP	\$774	\$1295	\$1559	\$1195	NA
List Price Cloud (1 Year)	\$90/\$50/\$0	\$100	\$150	\$95	NA

Equivalent AP Models

Type	Cambium	Aruba	Cisco	Extreme	Meraki	Ruckus
Wi-Fi 6E 2x2	XE3-4	AP630	9162	AP5010	CW9162	NA
Wi-Fi 6E 4x4	XE3-4	AP650	9136, 9166, 9164	AP4000	MR57, CW9164/66	R760
Wi-Fi 6E 5-radio	XE5-8	NA	NA	NA	NA	NA
Wi-Fi 6 2x2	XV2-2	AP-500	9105	AP305C/CX	MR36	R550
Wi-Fi 6 4x4	XE3-4	AP-510/530	9115/9120	AP410C/510C/650	MR45/46	R650/750
Wi-Fi 6 8x8	XV3-8	AP-550	9117/9130AX	NA	MR55/56	R730/850
Wi-Fi 6 2x2 outdoor	XV2-2T	AP-565	9124 (4x4)	AP360i/e	MR76	T350C
Wi-Fi 5 2x2/3x3	E410/XV2-21X	AP-207/303/305	1815i/1832/2702	AP30/122/130	MR20/33/42	R310/510/610
Wi-Fi 5 4x4	e600	AP-315/325/335/345	1852/3702/3802/4802	AP550	MR52/53	R710/720
Wi-Fi 5 Wall Plate	e425H, e430H	AP-203H/303H	1810W/1815W	AP150W	MR30H	H310/H320



Cambium Networks™

A1

cnMatrix switches

Deploy Resilient Networks with cnMatrix Switching



cnMaestro



XMS



Professional switches with L2 and L3 functionalities

Policy based automation
Ability to profile devices and automatically configure

Management through cnMaestro or XMS-Cloud
Uninterrupted operation even when connectivity to the cloud is lost

Auto policy wipe - Improves security by removing configuration of disconnected devices

Best in class total cost of ownership

✓ 5 years warranty

cnMatrix EX - Wireless Aware, Cloud Ready Enterprise Switching



Layer 3 Switches: EX 2K, TX 2K Series



Layer 2 Switches: EX 1K Series



Enterprise grade Layer 2 & Layer 3 switches

- 8-port, 16-port, 24-port, 48-port PoE/non-PoE options
- Multi-gig switch with 2.5G ports, 802.3bt with 60W of output power per port
- Switches with modular AC/DC power supply options
- 8-port, 16-port switches supporting dual redundant hot-swappable power supplies and GPS Sync
- Cost effective Layer 2 switches

Right-sized
Options

Policy Based Automation

- **Automated Security:** Automatic device profiling, network segmentation, policy enforcement. Automatic port configuration clean-up on device disconnect
- **Zero Touch Simplicity:** Zero-Touch Provisioning, Zero Touch Adds, Moves, Changes eliminates the need to color code ports
- **Error-free operations:** Reduce time, effort and human errors by eliminating the need for manual configuration

Simplified
Operations

Industry Leading TCO

- **Free Cloud,** Swift Mobile App Management, Competitive Hardware Pricing
- Intuitive Cloud Dashboard & Automation makes IT staff more efficient, reduces OPEX

Reduced
Cost

cnMatrix TX Switches: TX-2K



- 8-port, 16-port, 24-port, Models
- PoE & Passive PoE, High Power PoE (90w) Options
- Dual Redundant Field Replaceable Power supplies
- Cambium (GPS) Sync – dual sources
- Hardened with extended temperature range: -10°C up to 65°C

Switch Capabilities

- Enterprise-grade, non-blocking architecture, comprehensive Layer 2-3 features
- Dual Redundant AC/DC Power Options (400-1000W)
- Comprehensive & Intelligent PoE Modes
 - 802.3af/at/bt – up to 90W
 - Passive 54V - up to 90W
 - Passive 24V - up to 15W
- Full Control and Statistics

Purpose
Built

Policy Based Automation

- **Enhanced Security:** Automatic device profiling, network segmentation, policy enforcement. Automatic port configuration clean-up on device disconnect
- **Extreme Simplicity:** Zero-Touch Provisioning, Zero Touch Adds, Moves, Changes eliminates the need to color code ports
- **Error-free operations:** Reduce time, effort and human errors by eliminating the need for manual configuration

Simplified
Operations

Best in Class TCO

- **Free Cloud,** Swift Mobile App Management, Competitive Hardware Pricing
- Intuitive Cloud Dashboard & Automation reduces OPEX

Reduced
Cost

- Fully managed L2/L3
- Policy based automation
- SFP+ interfaces
- 3 year standard warranty
- -30° C to +60° C
- Mount – wall, rack, DIN Rail
- 802.3af/at/bt – up to 90W per port
- 24V Passive PoE – up to 15W
- 54V Passive PoE – up to 90W

TX1012-DC



TX1012-AC





Q4 2023

cnMatrix EX3024F

- ✓ 24 x SFP+ 10 Gbps fiber ports
- ✓ Dual internal power supplies
- ✓ Advanced silicon
- ✓ L3 features
- ✓ Larger SW table sizes
- ✓ More filtering/ACL support
- ✓ 10 Gbps ports can be lagged up to 60G for uplink

Switching

Management



Enterprise Networking

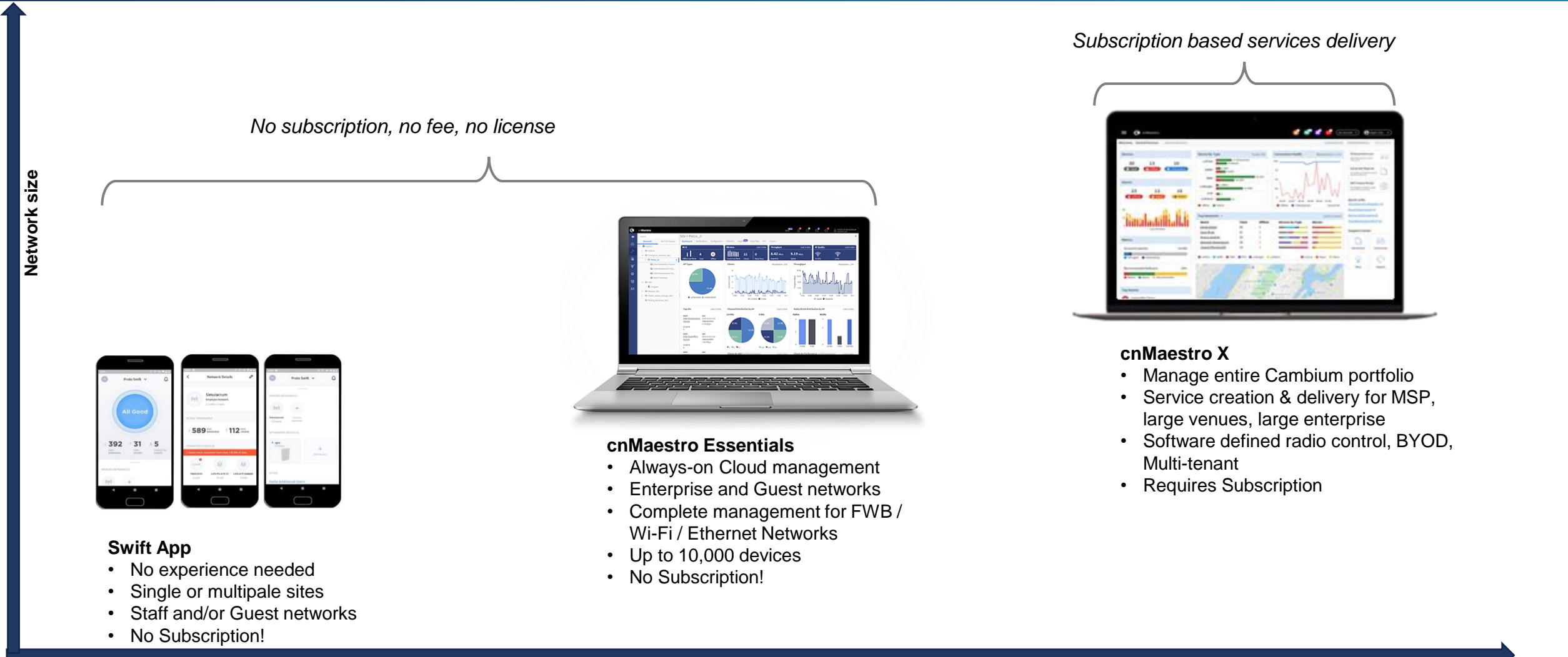
A1

Controllers

cnMaestro & XMS

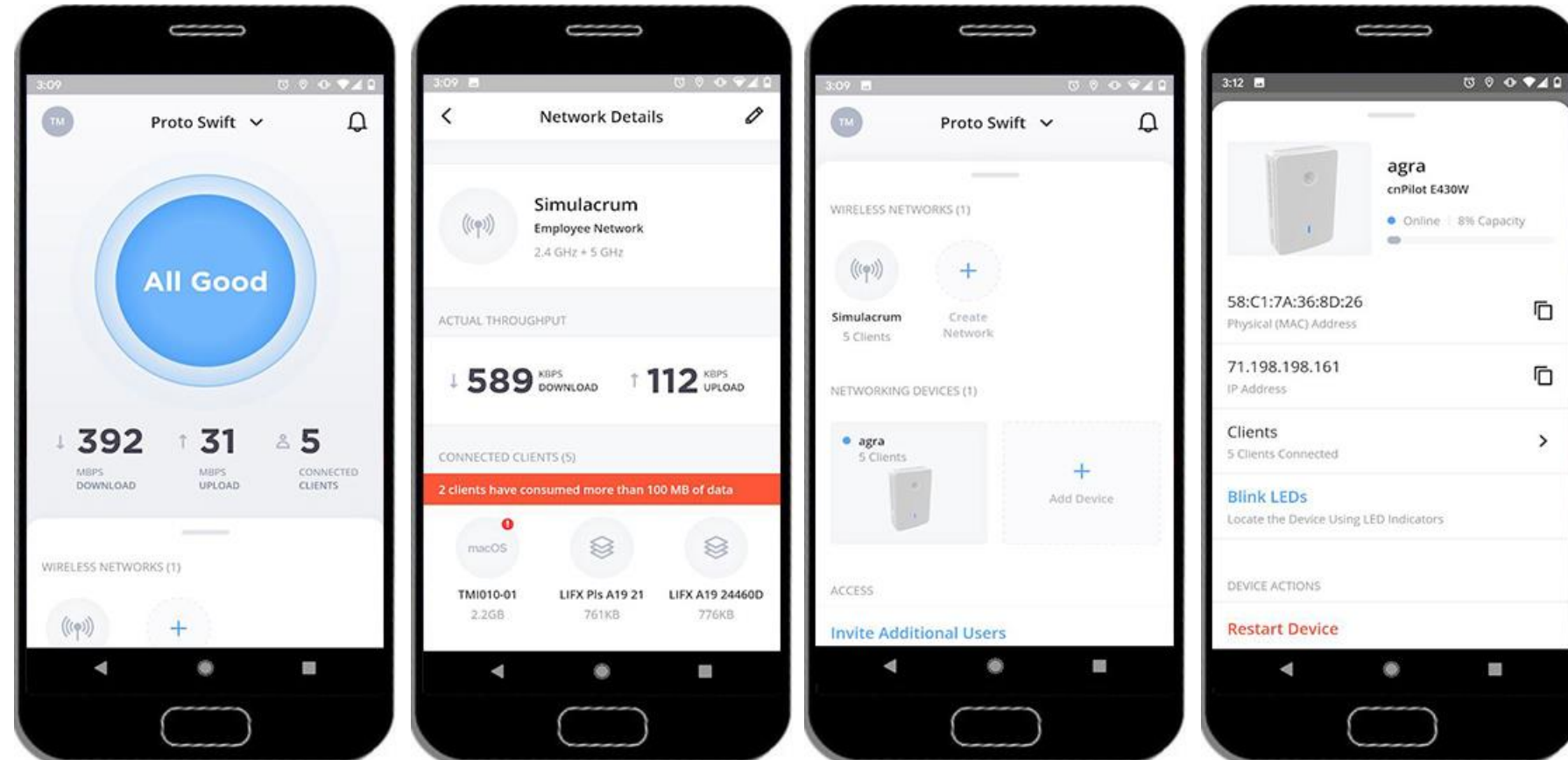


Cambium Networks™



Cambium Networks Swift gives you cloud-based management of your Enterprise networks right from your phone. Configure your networks in a few taps and get the most relevant statistics at your fingertips.

Manage multiple networks with a single login. Swift supports multiple users with configurable read-only or read-write roles.



The app supports Cambium Networks cnPilot Wi-Fi Access Points and cnMatrix switches.

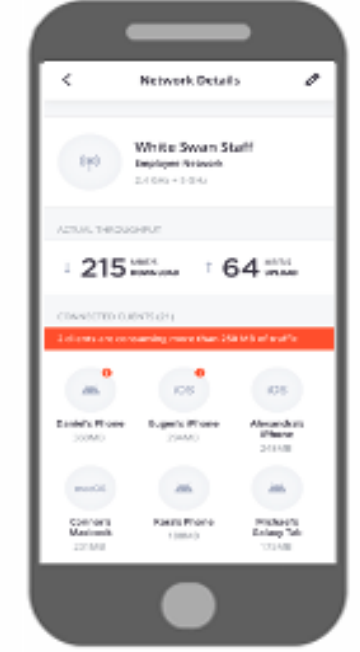
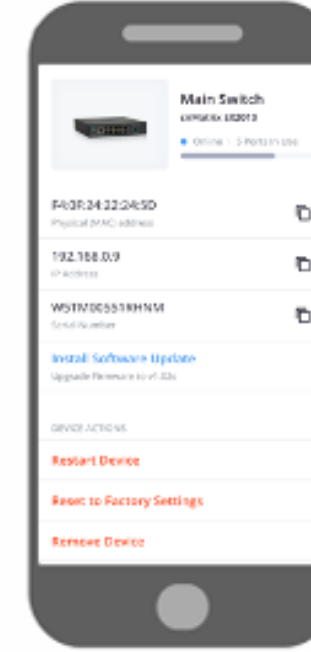
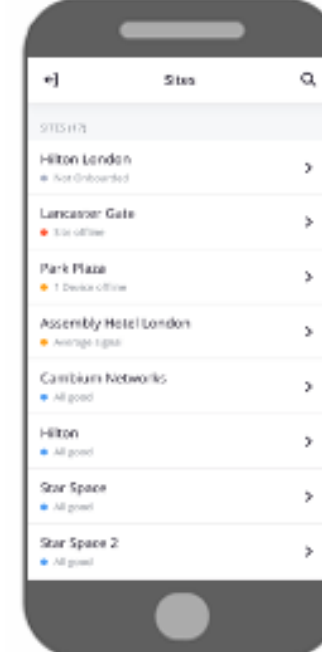
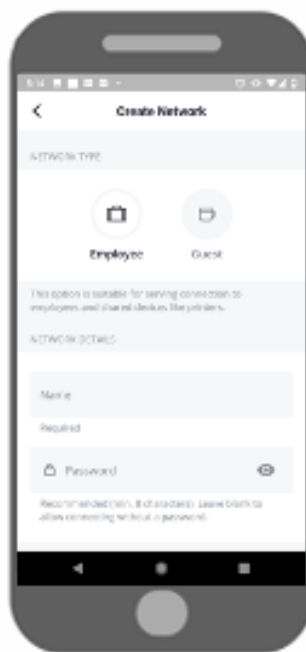
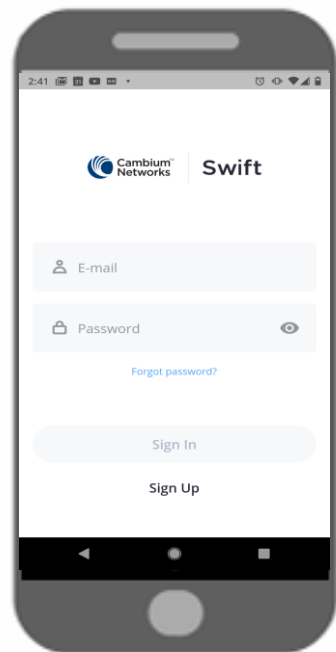
Mobile Experiences for Operating the Network

CREATE ACCOUNT

CREATE NETWORK

ONBOARD & DEPLOY

MANAGE & MONITOR NETWORK



Make it easy for non-experts to deploy a Wi-Fi network in minutes

cnMaestro – platform for monitoring and management

cnMaestro Essentials

- Managing Cambium wireless and wired solutions
- Simplified wireless LAN view and hierarchical device tree for FWB
- Tower-to-edge view, Rogue AP detection, Wi-Fi packet capture, PTP/PMP link test
- Social login, sms authentication, voucher system, captive portal
- 25.000 Cambium devices in management, 150.000 wireless clients supported
- Dedicated Devices dahsboards, statistics and trending
- Scheduled system backup, automatic software updates, E-mail alerts
- Role-based access, auto provisioning, RADIUS, TACACS+, LDAP, AD login

cnMaestro X

- MSP dashboard, multi-tier customization
- Restful APIs and webhooks for integration with existing OSS/BSS systems
- 1 year Wi-Fi historical data, 2 year FWB
- Support for 2000+ PSKs
- Advanced captive portal capabilities, up to 500 portals, 10.000 sessions
- High-availability 1+1 for virtualization
- Cambium CarePro – 24/7 technical support, accelerated access to L2 engineers

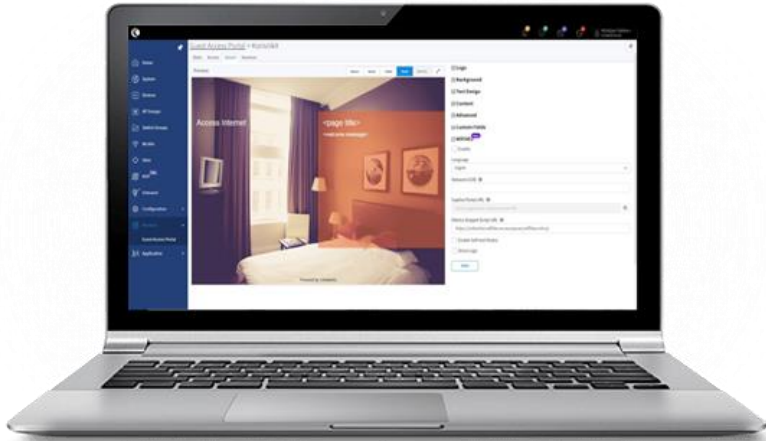


cnMaestro
Cloud controller



cnMaestro
Image for virtualization

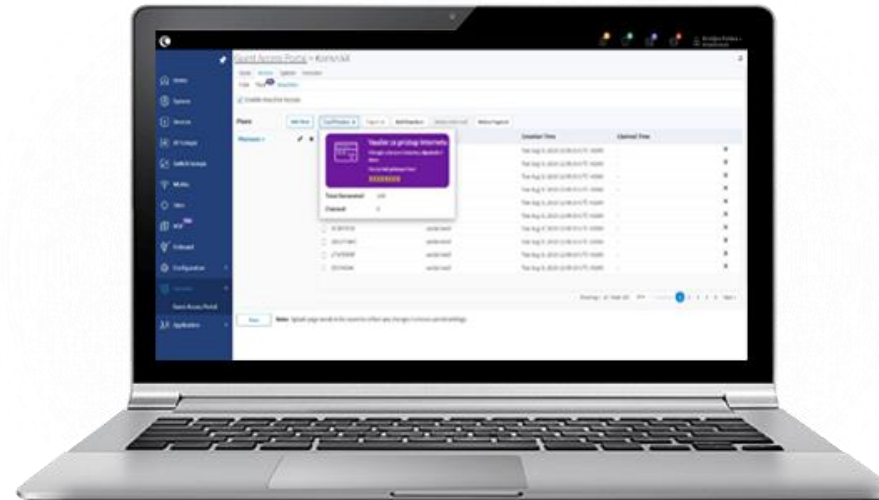


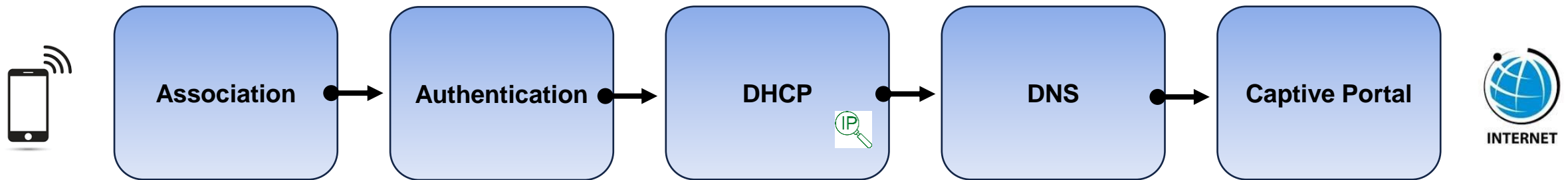


- Captive portal with five (5) pre-defined templates
- Possibility to customize design (font, size of letters, colors...)
- Bypass Captive Portal Detection
- Rate limit per client or per WLAN, client Quota limit
- Social login supported
- SMS authentication
- Supported paid access



- Integrated Voucher system
- Create different access plans
- Voucher expiration time, session duration, downlink/uplink rate limit, voucher device limit, bind voucher to device
- Customize voucher design and content
- Generate multiple vouchers
- Voucher export in PDF or CSV
- Voucher preview – claimed, unclaimed, deleted, expired





AI driven analytics engine, synthesizes telemetry data, learns from customer issues to draw insights

- Where is issue? Client side, RF, interference, network services
- Root causes for client experience issues
- Recommendation for remediation

Wi-Fi

Offline Last Week: 35
Total: 0
Offline: 0

cnMatrix

Offline Last Week: 0
Total: 0
Offline: 0

Wireless

Last 5 mins

Count Last Week: 55
Clients: 0
Mesh Peers: 0

Throughput

Last 5 mins

Downlink: 7.7 Kbps
Uplink: 7.44 Kbps

Connection Health X

Last 24 Hours

78.88%
310/393 Success
Failure Threshold : 10%

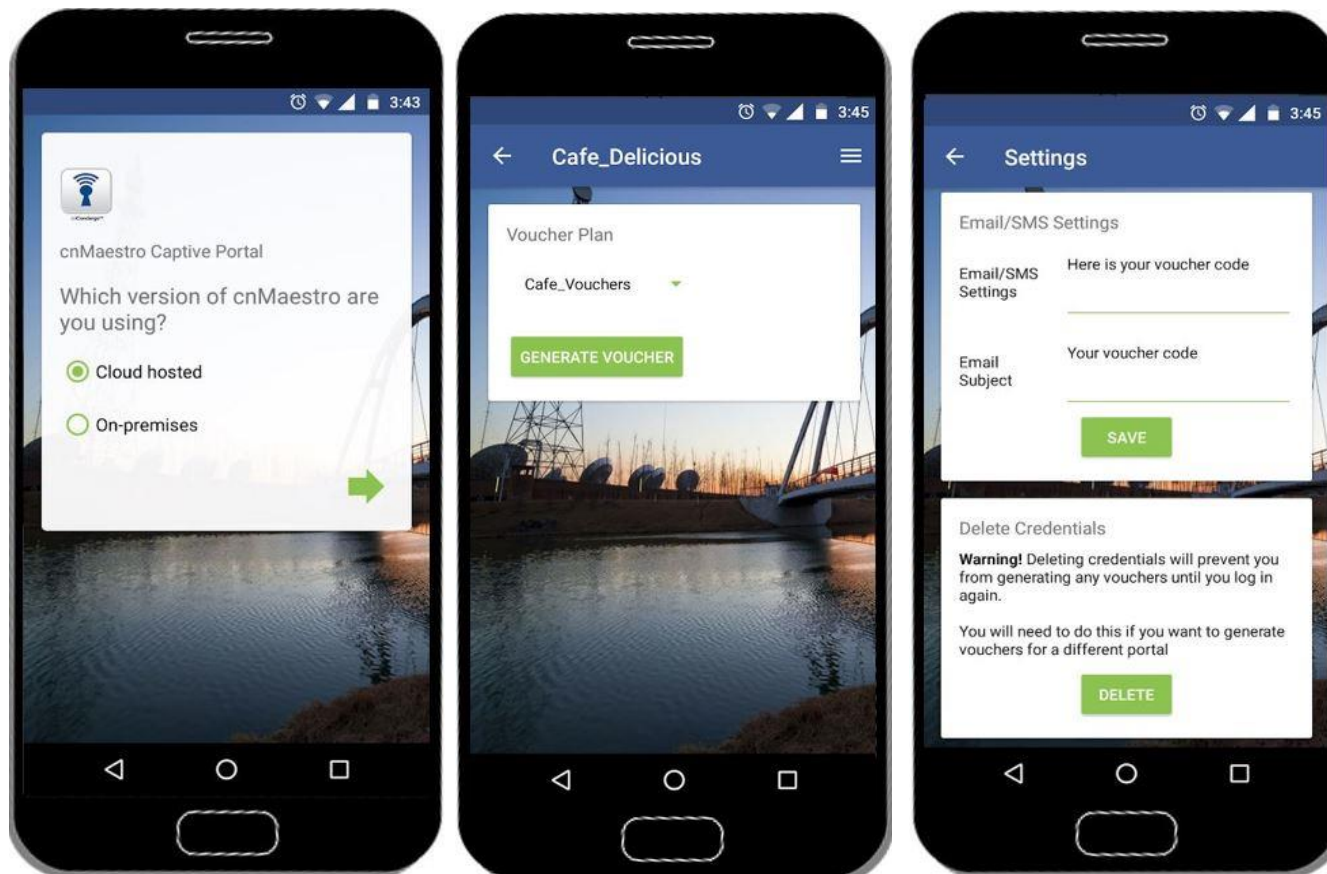
Wi-Fi Client Analytics X

Last 24 Hours

Host Name	MAC Address	Device Type	Device OS	Failures
Lester's iPhone	00:3E:E1:00:00:37	phone	iOS	12
Russell's iPhone	00:25:00:00:00:2B	phone	iOS	9
Elva's iPhone	00:23:32:00:00:2D	phone	iOS	8
Rachel's iPhone	00:3E:E1:00:00:34	phone	iOS	7
Sadie's iPhone	00:3E:E1:00:00:44	phone	iOS	5
Beulah's iPhone	00:25:00:00:00:40	phone	iOS	5
Landon's iPhone	00:23:32:00:00:5E	phone	iOS	5
Sadie's iPhone	00:23:32:00:00:52	phone	iOS	5
Eric's iPhone	00:25:00:00:00:4C	phone	iOS	4

- Root Cause Analysis detects DNS issues
- Issue seen primarily with Apple devices
- Misbehaving Clients: Apple devices were taking a minute to send a DNS query: Captive Portal Page was not being presented in a timely fashion

cnConcierge lets you generate cnMaestro guest portal vouchers.



QUICK LOOK:

Print hotspot access codes in a snap

Just press a button on our WLAN Code Printer and print coupon codes in no time!

No computer is required to print the code as the printer is directly connected to the internet wirelessly and receives a coupon code directly from your cnMaestro when you press a button.

The printer was developed by our team and is the first and only wifi code printer that can print coupon codes on the fly from cnMaestro!



Simple configuration

- automatic synchronization of voucher plans from cnMaestro
- automatic WLAN setting from cnMaestro

- Voucher Printer
- 6 Voucher Plans

Webinterface

- individual Icons
- individual Sorting
- individual Text
- available voucher codes
- Statistic
- automatic Online-Updates



Wi-Fi Designer Planning Tool

- Online design tool for Cambium Enterprise Wi-Fi
- Import floor plan, draw walls and specify wall attenuation
- Place Access Points on floor plan and visualize signal coverage
- Generate BOM and report for your project
- Send report and network design to your email address
- **Key Benefits**
 - No cost / license free
 - Fast and easy to use
 - RF design for unique Cambium High Density APs
 - Multi-radio APs
 - Software-defined Wi-Fi



Watch video



A1

DEMO



Cambium Networks™

cnPilot™ r195 Series Wi-Fi Router

For Residential and Small Business, 802.11ac Dual-Radio, 2x2

QUICK LOOK:

- Dual-radio, 802.11ac (5 GHz/2.4 GHz)
- Five Gigabit Ethernet ports
- High-gain duplex antennas for extended range
- TR-069, TR-098, TR-0104, TR-0106, TR-0143
- r195P features 30V power out, ATA ports





Manage with cnMaestro™

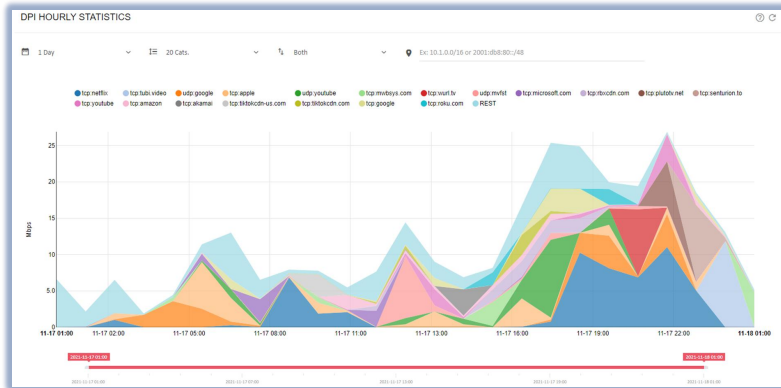


Cambium Networks™

A1

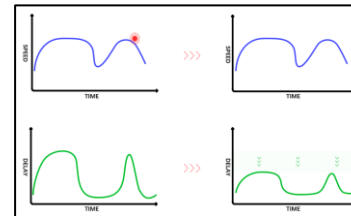
QoE – Quality of Experience

Network visibility via multi-level statistics



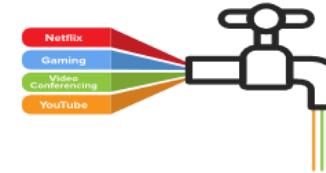
Application usage history

Automatic congestion detection and management



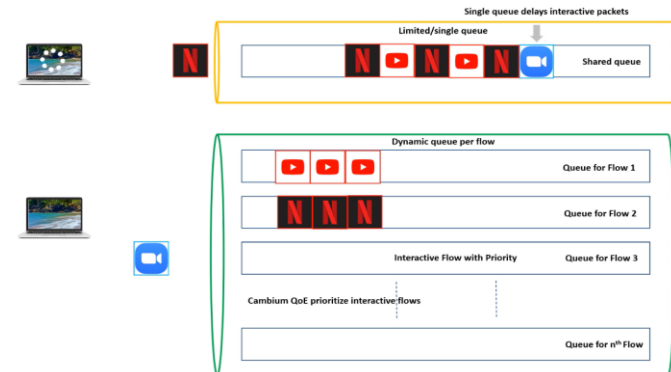
50% reduction in latency during congestion

Multi criteria-based traffic shaping



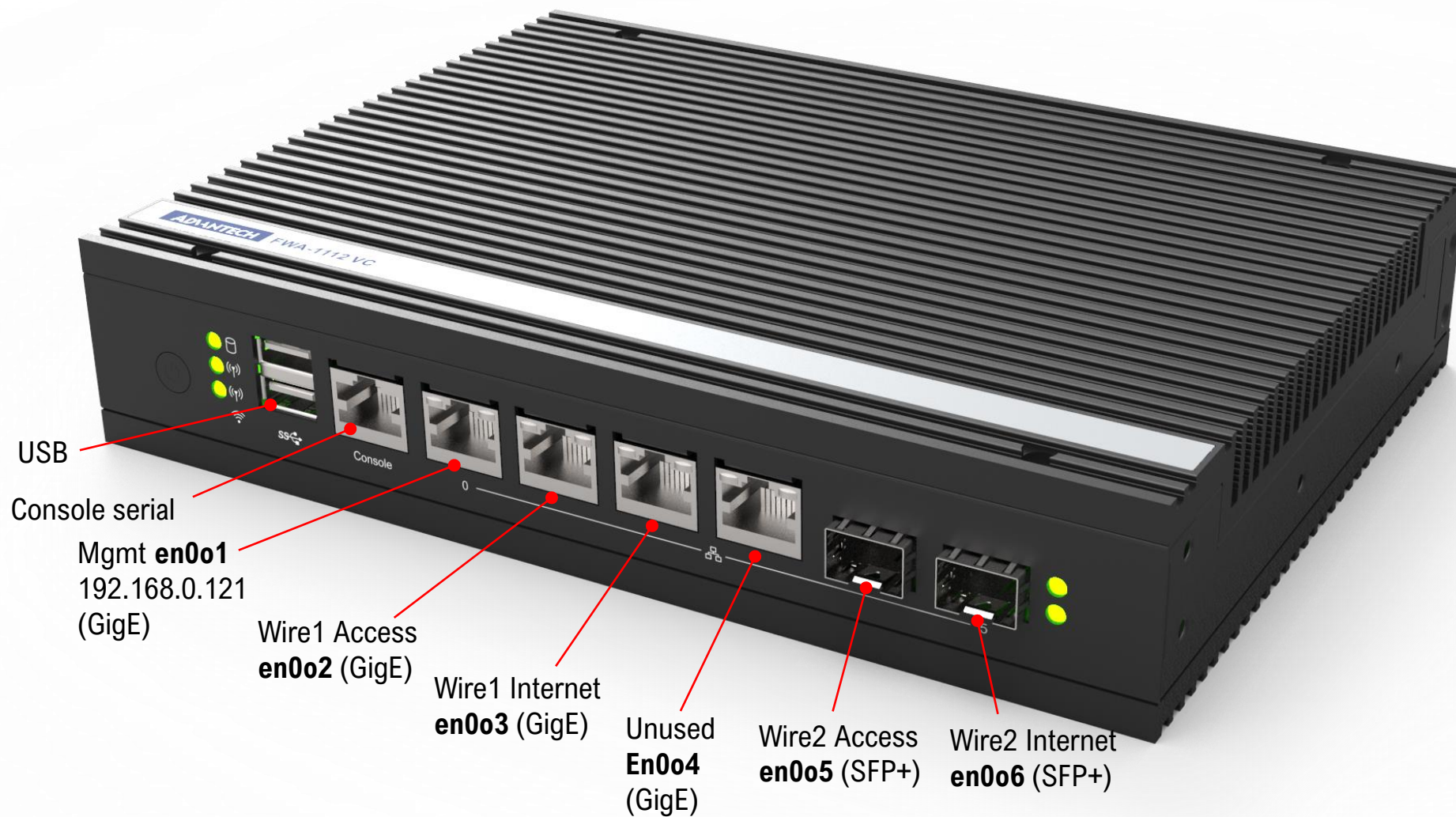
Radius/REST API/Simplified UI for flow creation

Multi-queue, priority based rate limiting

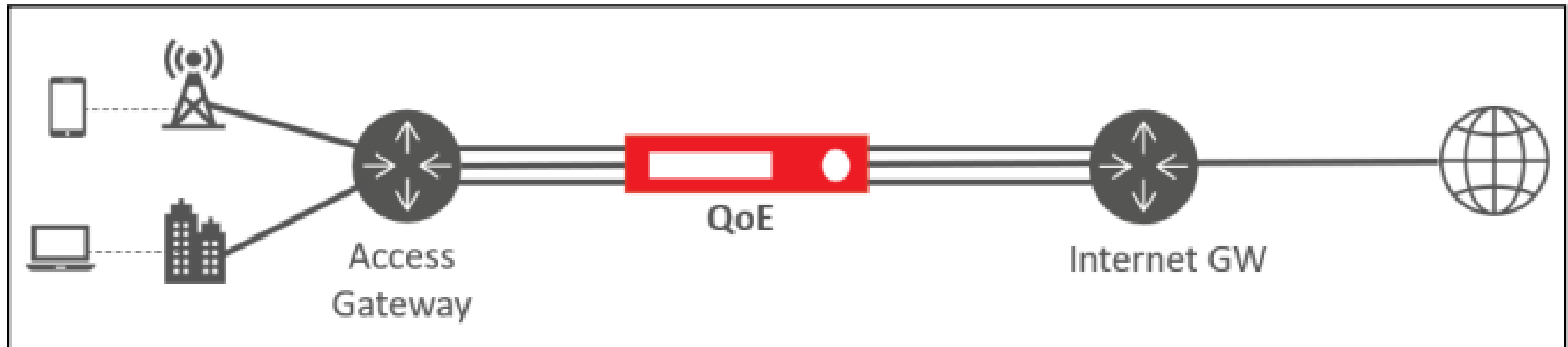


Detailed subscriber statistics

...or this (newer) model



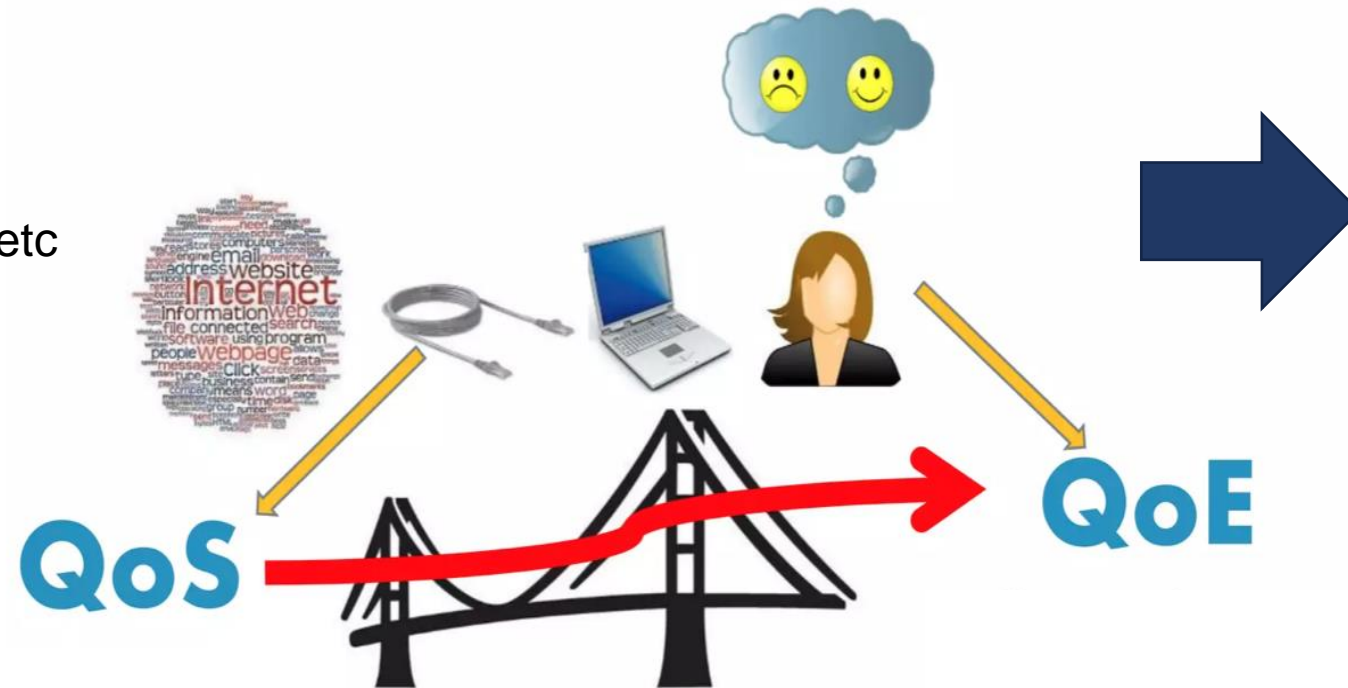
QoE appliance to be connected between access network and internet network



Network agnostic appliance – Cambium QoE appliance can be integrated with any network equipment or wireless APs/CPEs

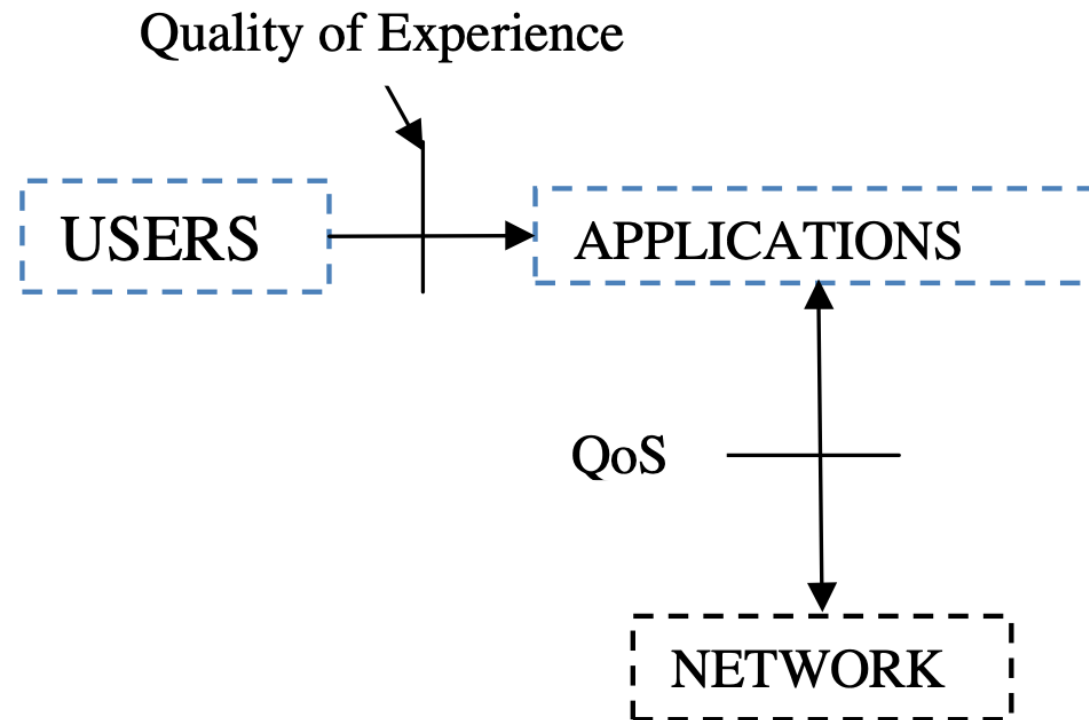
Technology-Centric

- Throughput
- Packet loss
- Transmission delays etc



User-Centric

- Responsiveness
- Interactivity
- Acceptability
- Satisfaction etc...

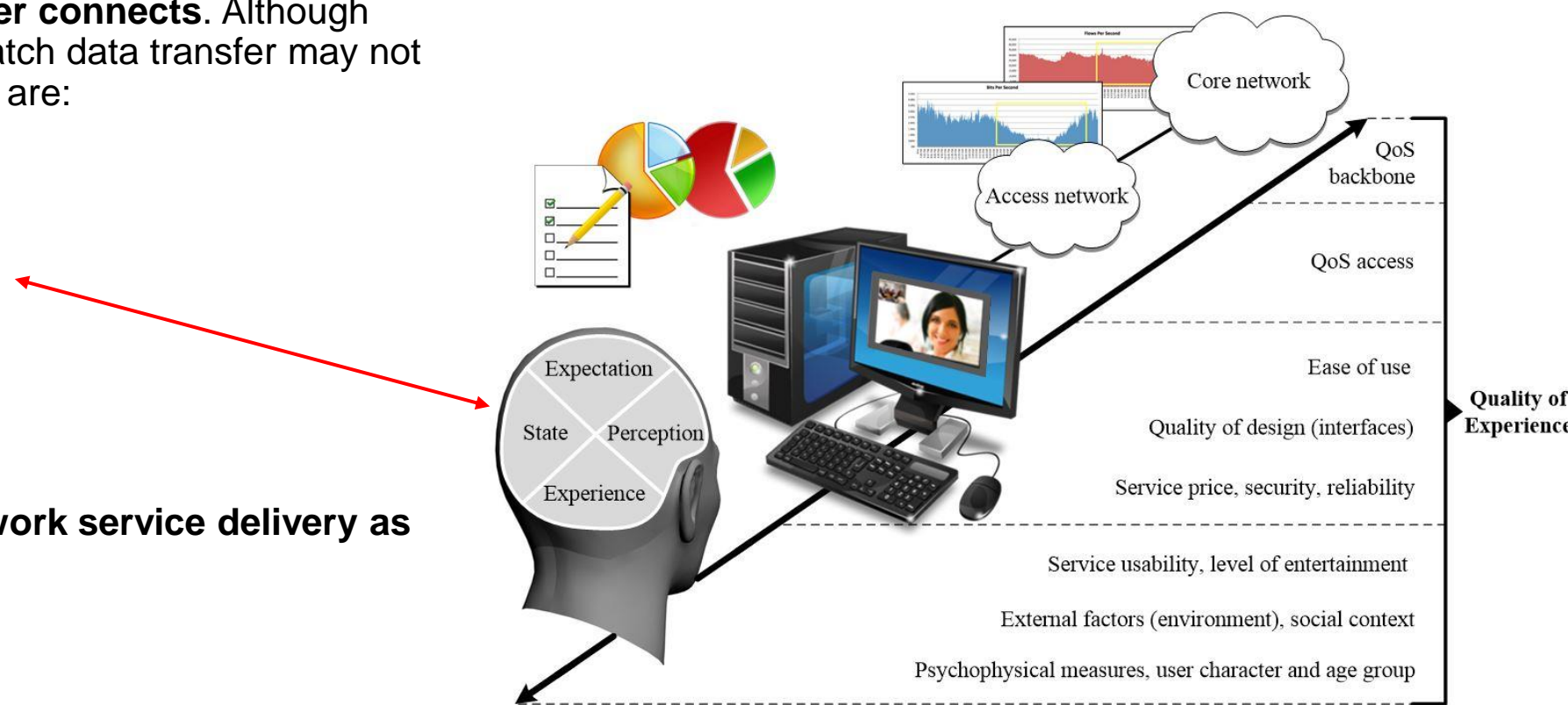


What is Quality of Experience (QoE)

QoE measures how the service is experienced at the edge of the network, where the customer connects. Although some legacy applications such as batch data transfer may not be as sensitive to QoE, others, such are:



QoE is a measurement of the network service delivery as experienced by the customer.

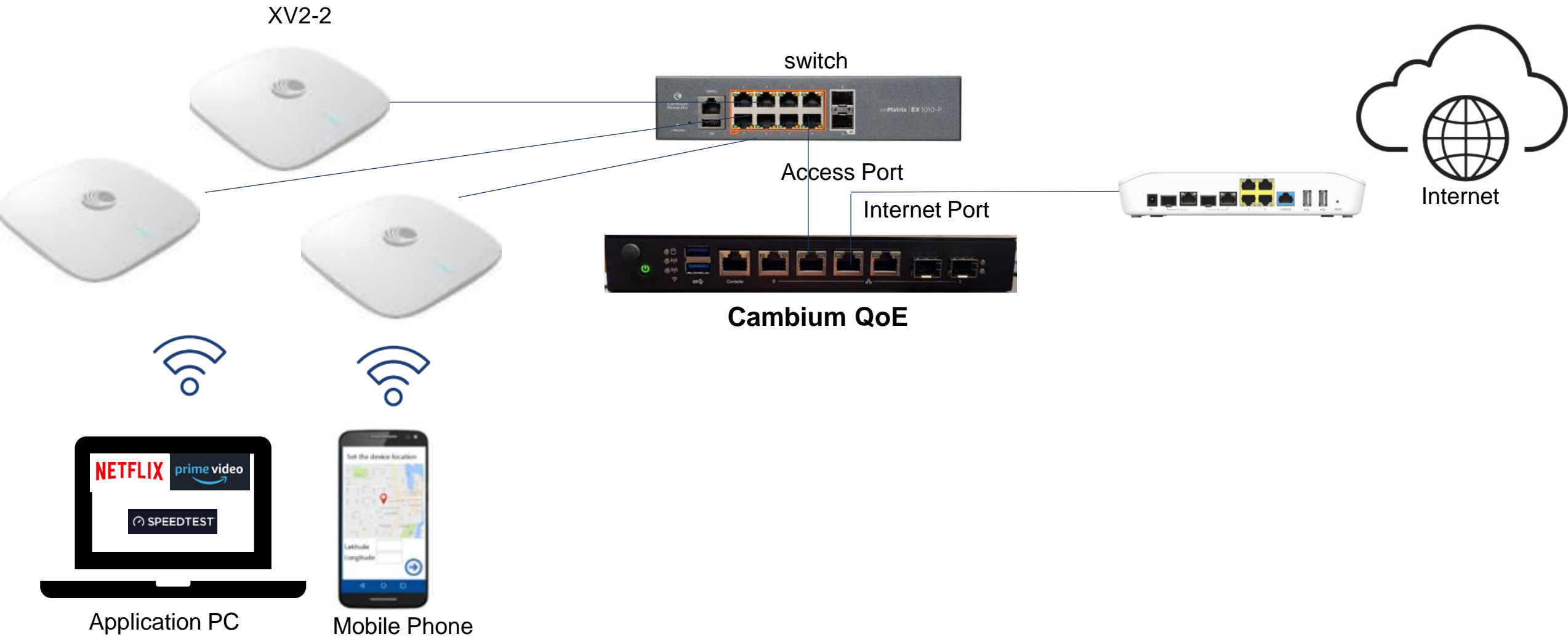


who can use it?

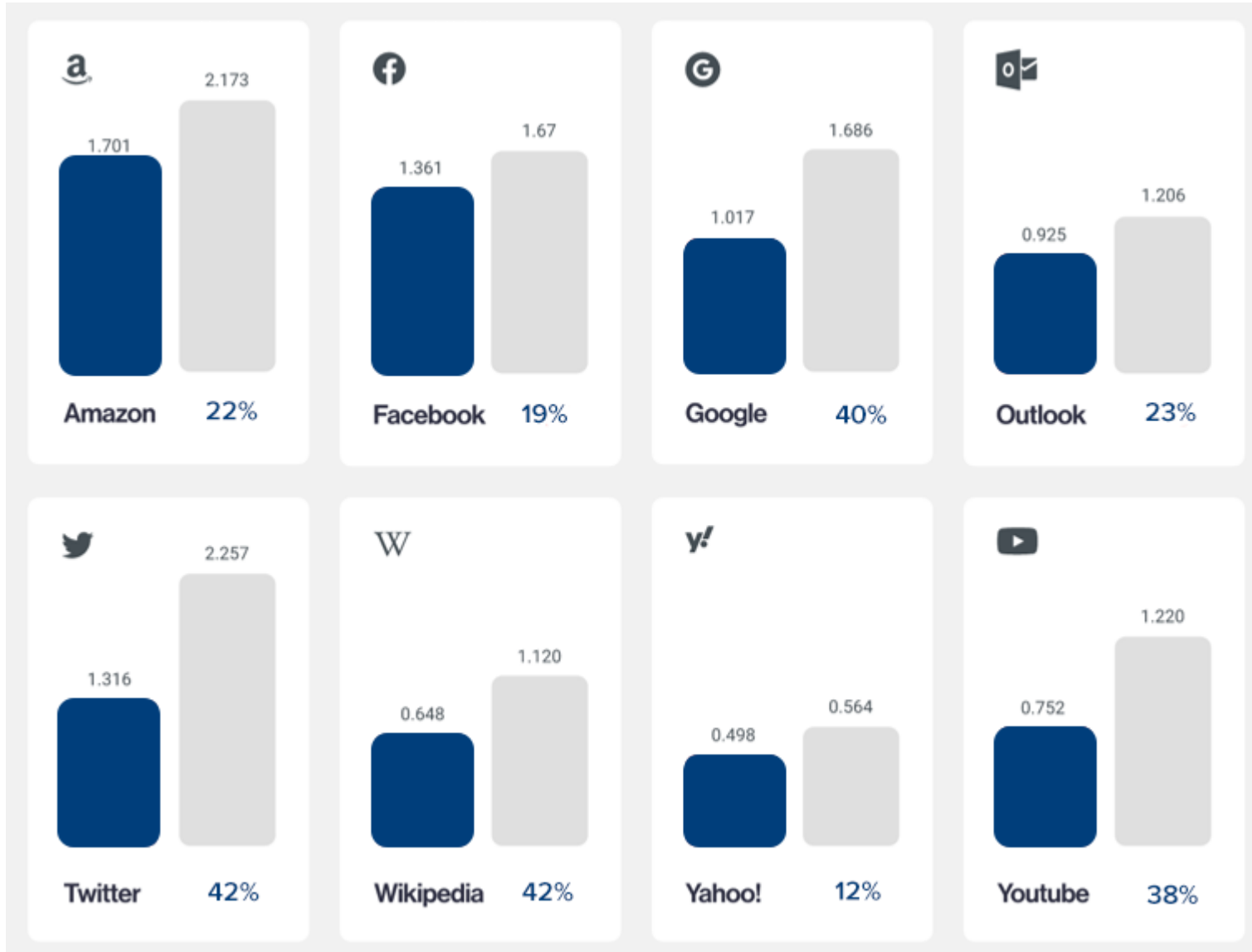
EVERYONE

cnInsights features	Cambium customers					Non Cambium		
	FWA			WiFi		FWA	WiFi	Wired
	ePMP WISPs /Operators	450 WISPs /operators	cnWave Operators	Indoor	Outdoor	WISPS /Operators	WiFi Indoor/Outdoor	Wired Fiber/Cable
Application based traffic shaping	X	X	X	X	X	X	X	X
TCP optimizer	X	X	X	X	X	X	X	X
Rate limiting	X	X	X	X	X	X	X	X
Application insights with QoS	X			X	X			
MUMIMO gain enhancer	X	X						
DOS detection	X	X	X	X	X	X	X	X

Deployment Model: Enterprise Wi-Fi (Example)



Page loading time for different services

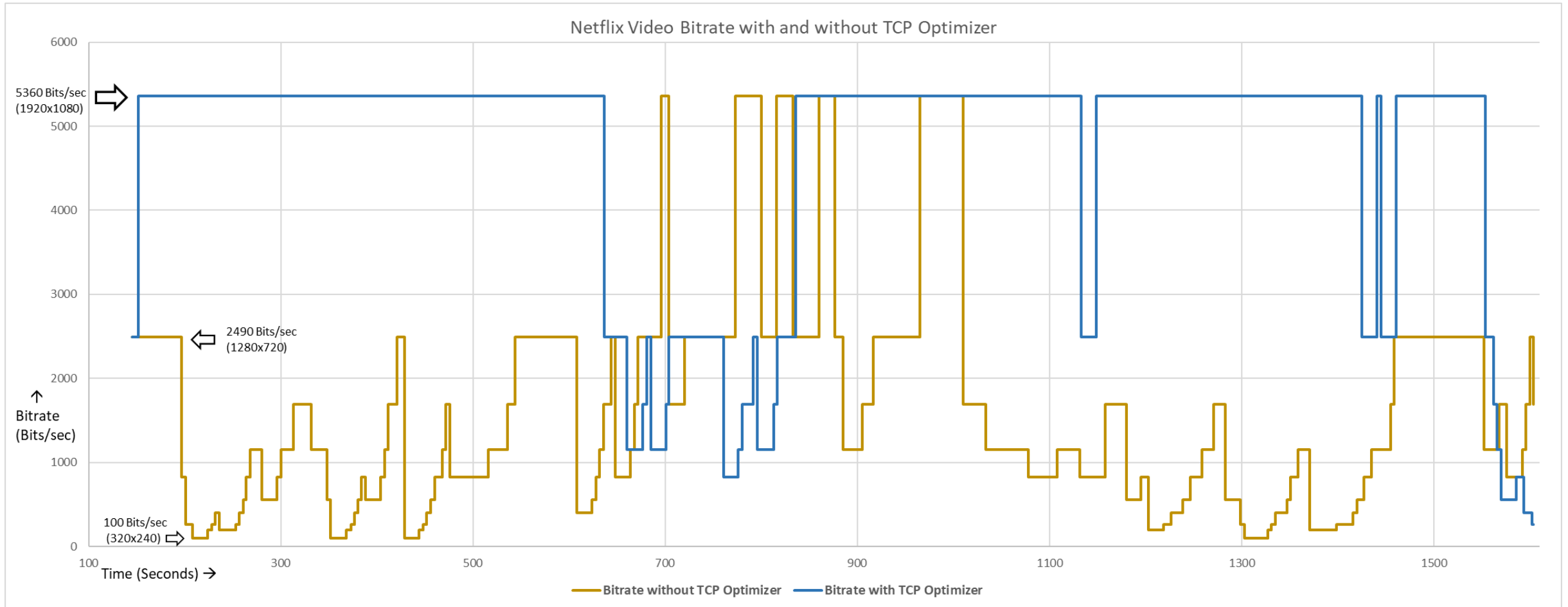


Page loading time (sec)

■ No acceleration

■ Accelerated by QoE

Use case: impact of TCP optimization



Same video played with and without TCP optimization. Induced packet loss constant. Bit rate stats taken from Netflix debug stats and plotted over time.

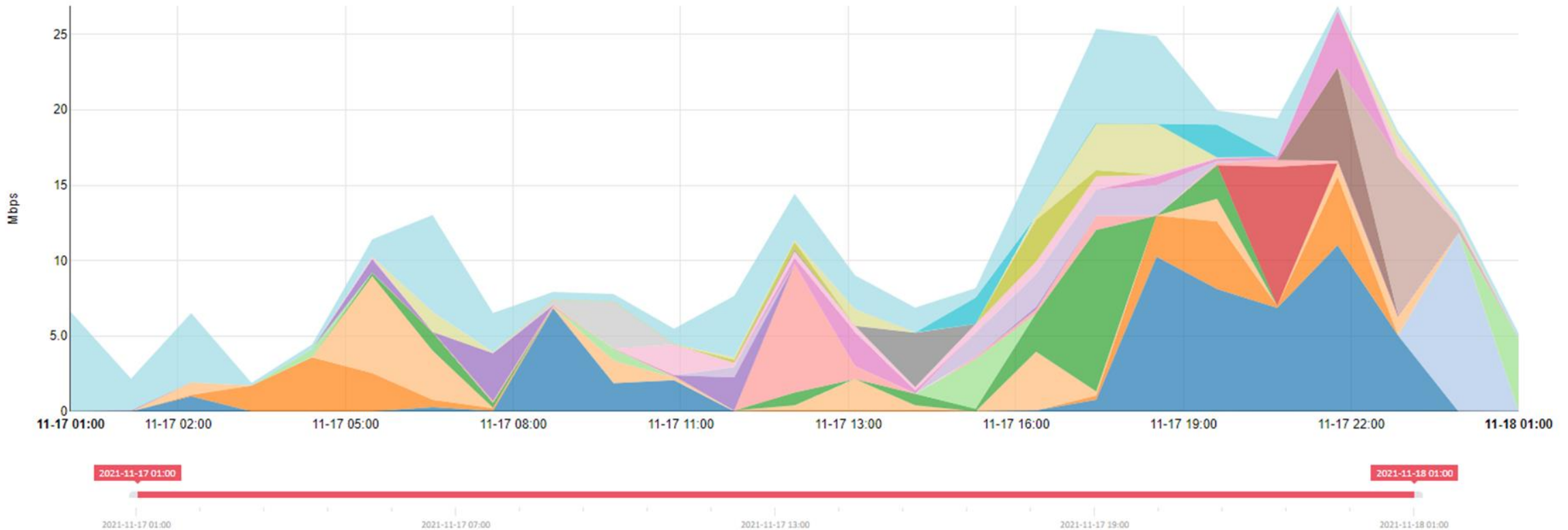
Application insights at a network level

DPI HOURLY STATISTICS

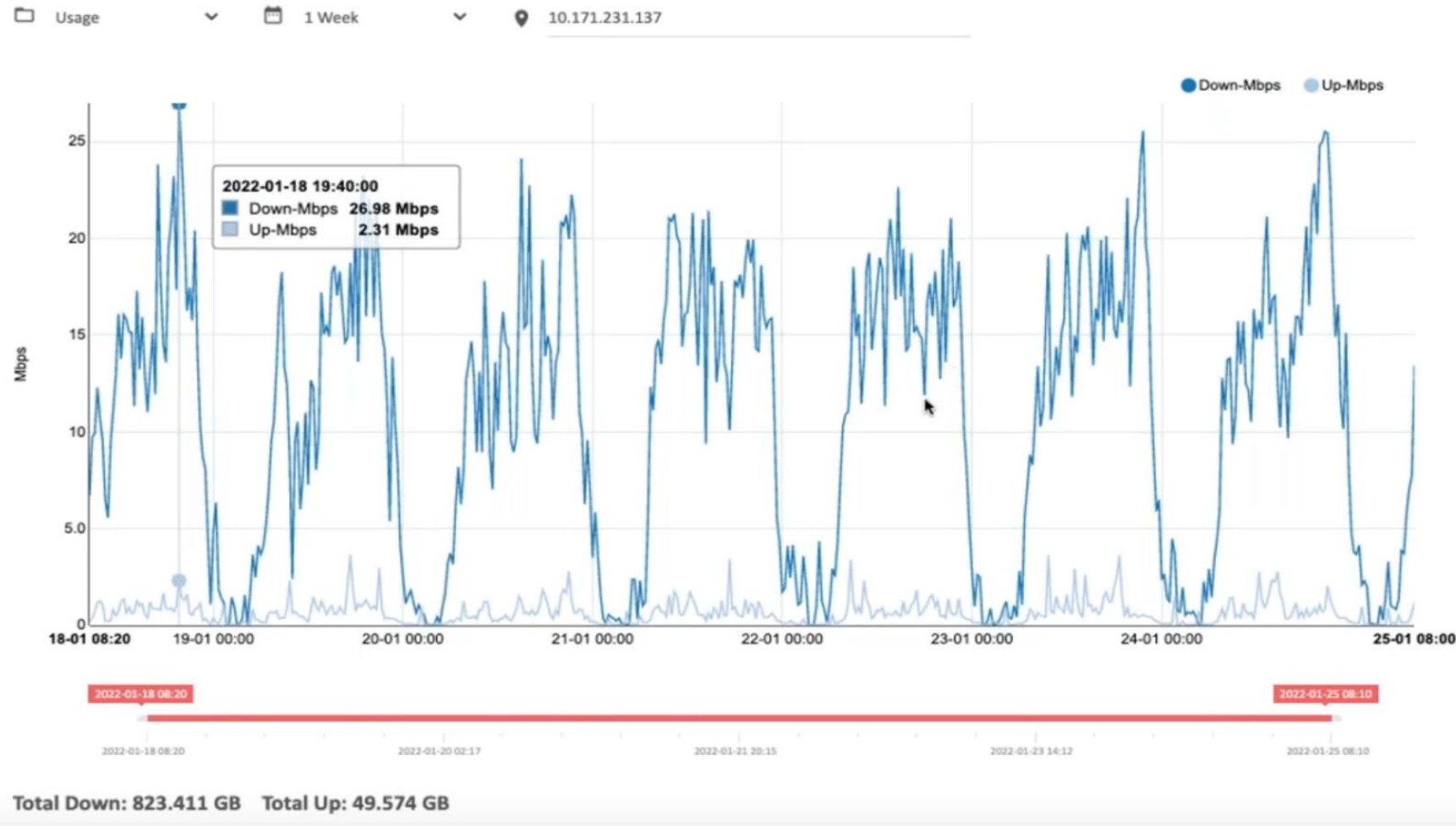


1 Day 20 Cats. Both Ex: 10.1.0.0/16 or 2001:db8:80::/48

- tcp:netflix
- tcp:tubi.video
- udp:google
- tcp:apple
- udp:youtube
- tcp:mwbsys.com
- tcp:wurl.tv
- udp:mvfst
- tcp:microsoft.com
- tcp:rbxcdn.com
- tcp:plutotv.net
- tcp:senturion.to
- tcp:youtube
- tcp:amazon
- tcp:akamai
- tcp:tiktokcdn-us.com
- tcp:tiktokcdn.com
- tcp:google
- tcp:roku.com
- REST



SUBSCRIBER USAGE OVER TIME



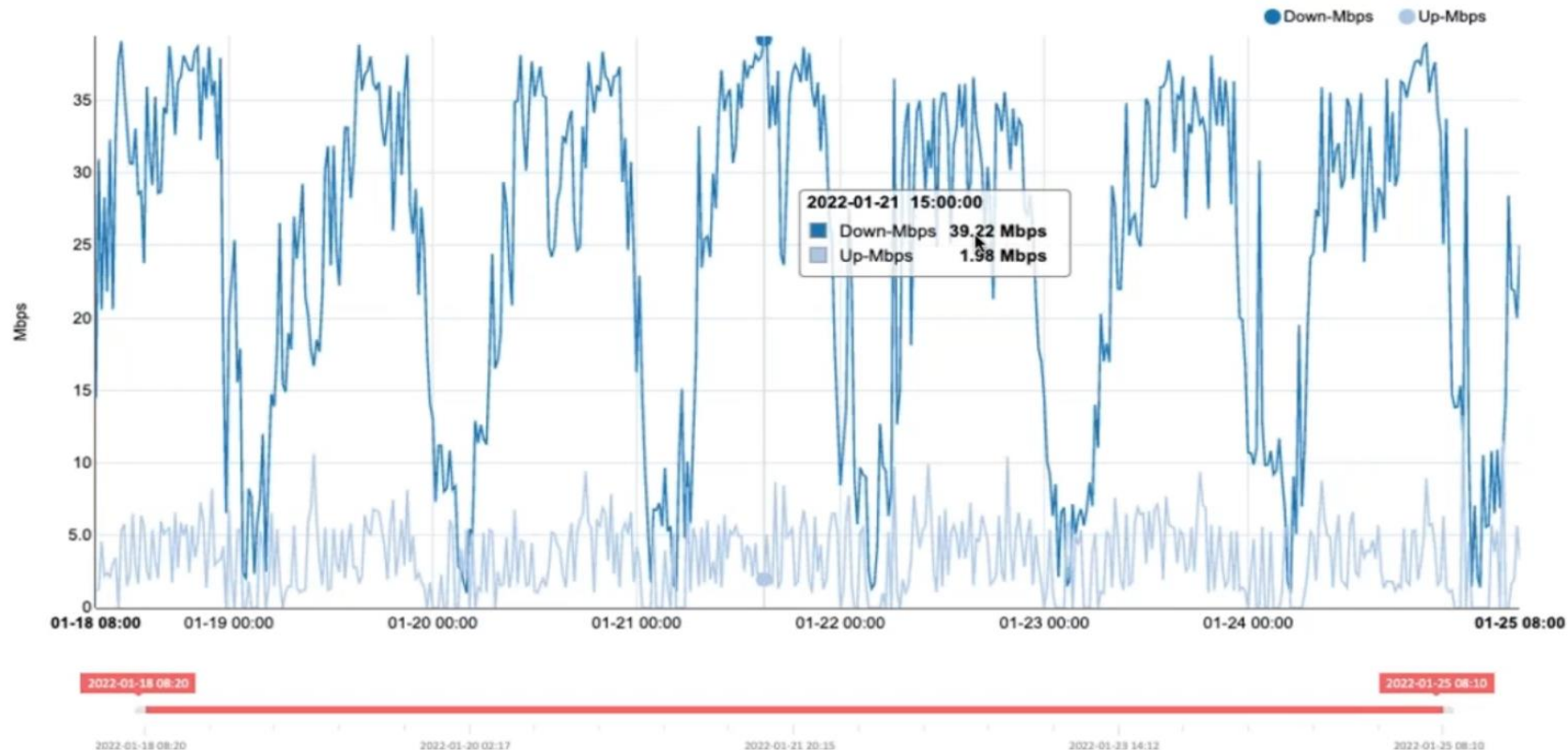
- **Subscriber Usage (Mbps)**
- Max speed (Mbps)
- Latency (ms)
- Retransmission (%)
- Active and created flows

Subscriber level stats

SUBSCRIBER MAXIMUM SPEED OVER TIME



Maximum Speed 1 Week 10.171.231.137 Filter



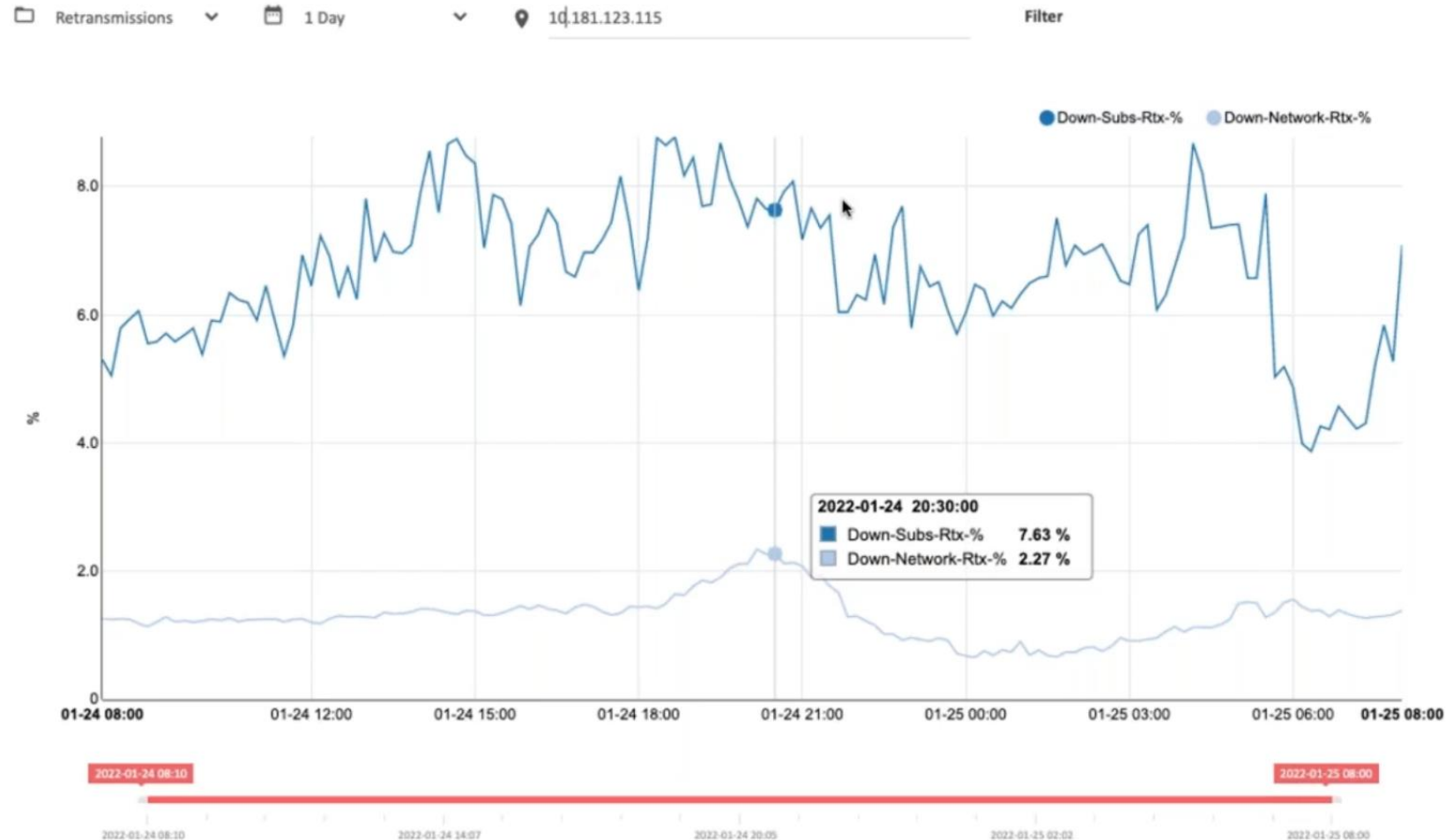
- Subscriber Usage (Mbps)
- **Max speed (Mbps)**
- Latency (ms)
- Retransmission (%)
- Active and created flows

SUBSCRIBER LATENCY OVER TIME



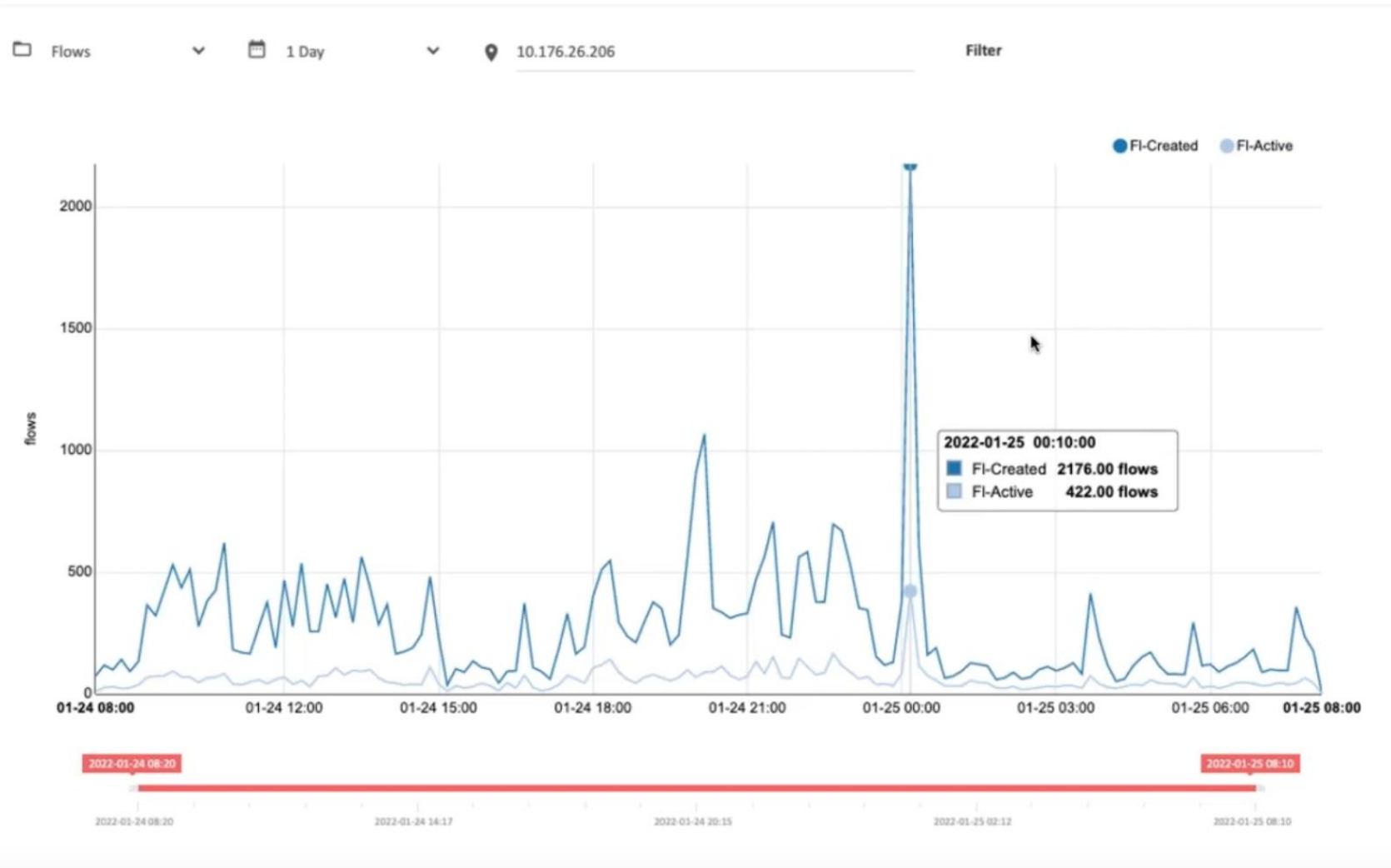
- Subscriber Usage (Mbps)
- Max speed (Mbps)
- **Latency (ms)**
- Retransmission (%)
- Active and created flows

SUBSCRIBER RETRANSMISSIONS OVER TIME



- Subscriber Usage (Mbps)
- Max speed (Mbps)
- Latency (ms)
- **Retransmission (%)**
- Active and created flows

SUBSCRIBER FLOWS OVER TIME



- Subscriber Usage (Mbps)
- Max speed (Mbps)
- Latency (ms)
- Retransmission (%)
- **Active and created flows**

What is it?

Ability to leverage deep packet inspection to identify application traffic and throttle that traffic.

i.e. Squeeze Tiktok to 500kbps, Netflix to 2Mbps

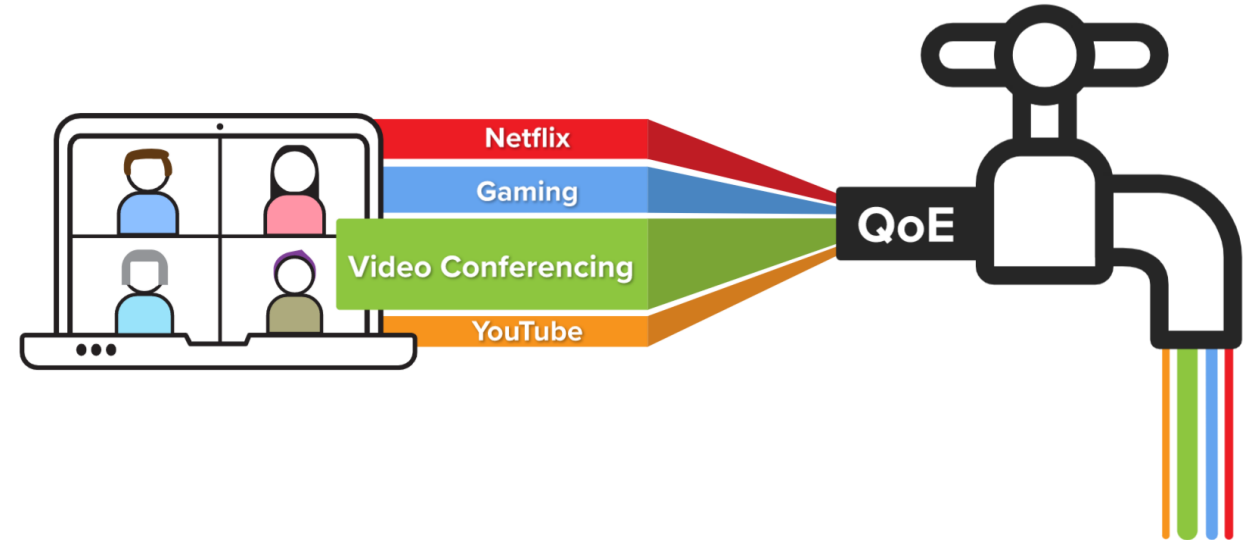
How does it help?

Improved quality of experience by preventing lower priority applications to take up bandwidth.

i.e. Game update while doing a video conference call.

Where does it apply?

Across all networks carrying internet traffic

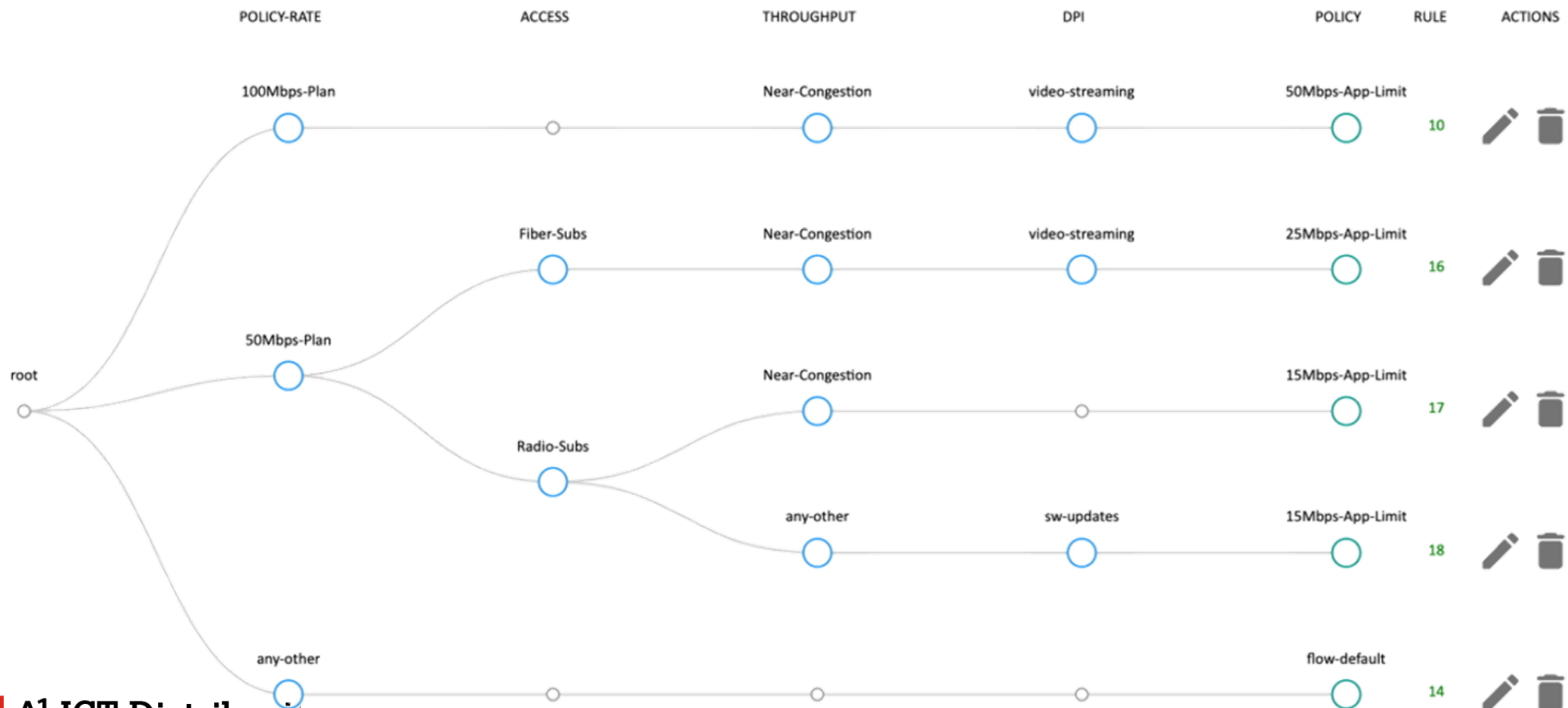


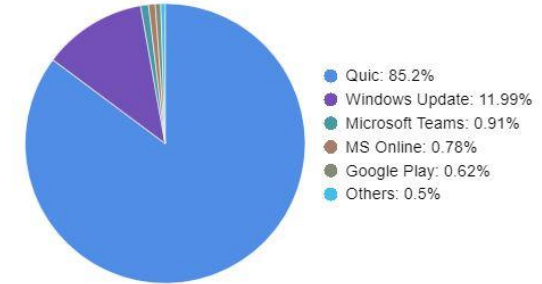
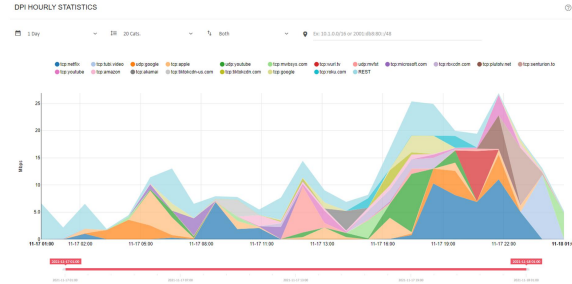
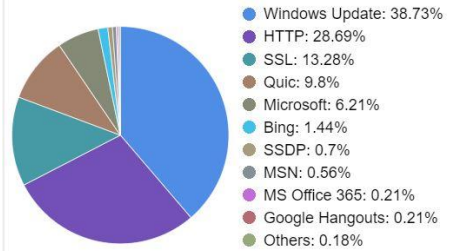
Flow shaping example (2)

SUBSCRIBER FLOWS CONFIGURATION



RULES TREE-VIEW RULES TABLE-VIEW POLICIES





cnMaestro Essentials

Rate limiting

cnMaestroX

Rate limiting
DPI/Application visibility

Quality of Experience

Rate limiting (LAN)
DPI/Application visibility (LAN)
Traffic shaping (LAN)
Advanced QoS (LAN)
DDoS detection
TCP optimization
MU-MIMO enhancement (PMP)

NSE3000

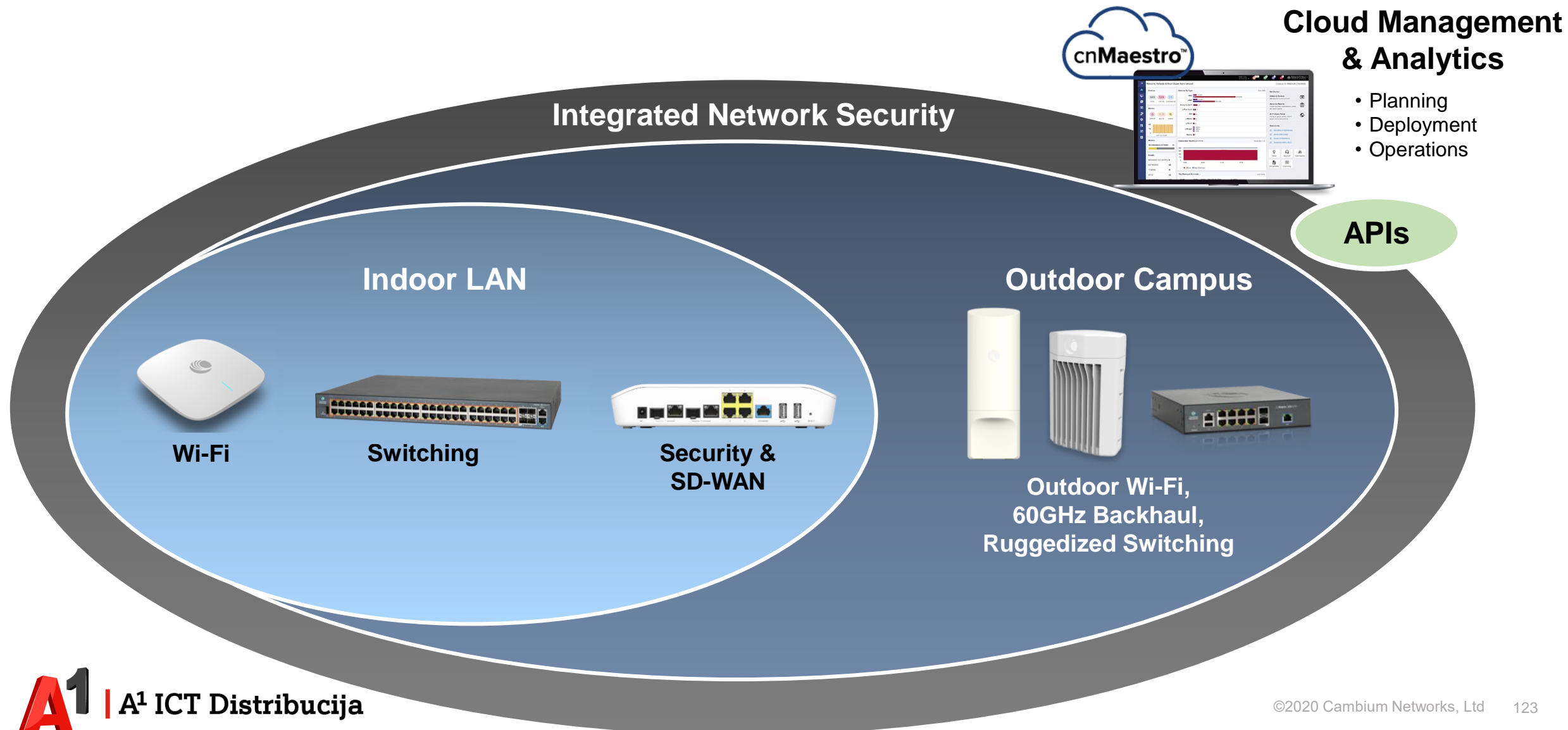
Rate limiting (WAN)
DPI/Application visibility (WAN)
Traffic shaping (WAN)
Advanced QoS (WAN)
Firewall, VPN, MFA, IoT Security
LAN security assessment
ZTNA, IDS/IPS
DHCP, DNS, RADIUS servers
Routing, Load balancing, failover
SD-WAN

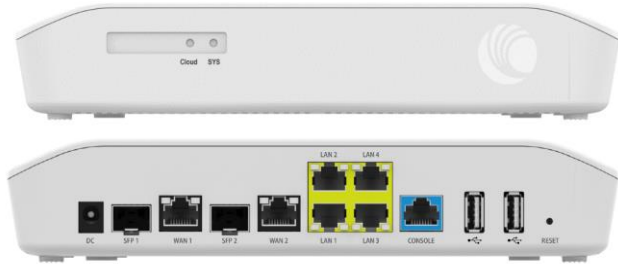


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A1

Network Service Edge (NSE)



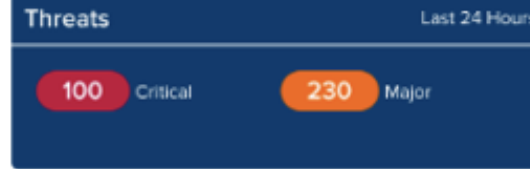


NSE 3000 Appliance

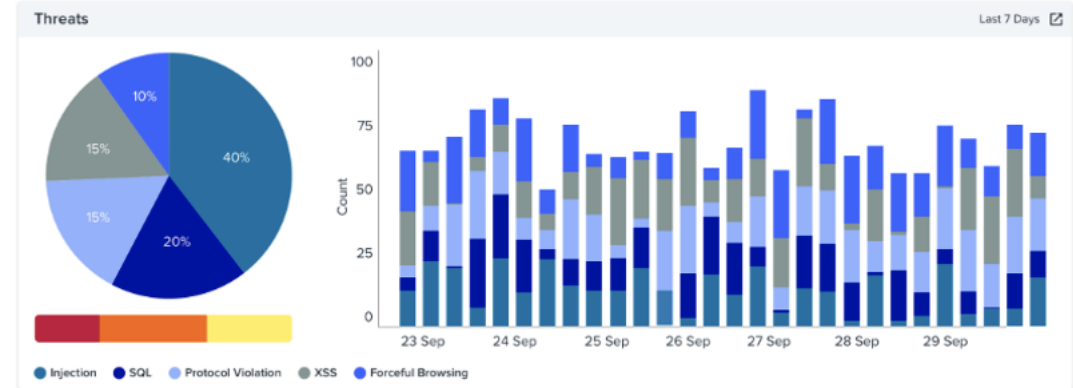
- 2 WAN 1Gb (SFP/RJ45), 4 LAN 1Gb (RJ45) ports
- Table / wall mount
- USB 3.0 for LTE / 5G backhaul



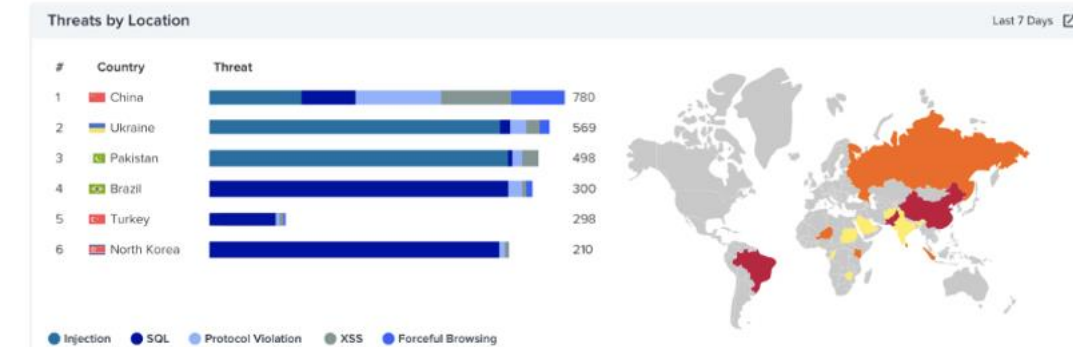
Security Posture



Attack Activity

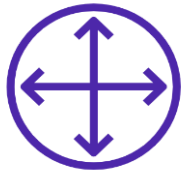


Attack Location



Converged WAN Edge, Security and Network Service Delivery

WAN EDGE



- Routing
- WAN Load-Balancing and failover
- Bandwidth Control
- WAN QoS
- SD-WAN

SECURITY



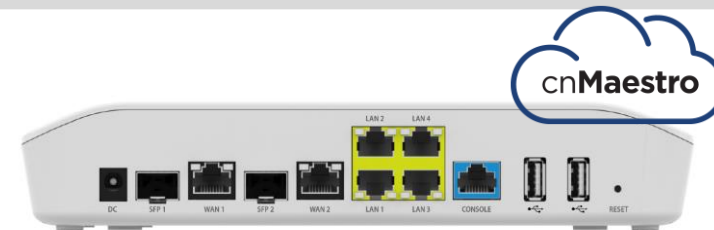
- Firewall
- **IoT Security**
- VPN with MFA
- **LAN security assessment**
- **Zero Trust Network Access (ZTNA)**
- IDS / IPS

NETWORK SERVICES



- DHCP
- RADIUS
- **Directory connectors**

Synthesize sensors across Wi-Fi, Wired ports and WAN
Qualify service across the enterprise network
Clear the blind spot in IoT security



NSE 3000 Edge Appliance

Search

Networks Wi-Fi AP Groups

- System
 - Base Infrastructure
 - Default
 - City Primary College
 - City Primary College
 - Admin Room
 - College Campus North
 - College Campus South
 - College Campus East
 - College Campus West
 - Primary International School
 - Public School
 - Engineering College

City Primary College

Dashboard Notifications Configuration Security Details Performance Software Update Tools Clients

Status

Online
0d 3h 15m

Offline Last Week Uptime

0d 22h 44m

Link Status

Online 1d 2h 10m **Offline** 1d 2h 10m

WAN-0 WAN-1

Threats

Last 24 Hours

100 Critical **230** Major

Vulnerabilities

Last 24 Hours

25 Major

Alarms

10 Critical 120 Major 12 Minor

Last 24 Hours

Threats

Last 7 Days

Count

23 Sep 24 Sep 25 Sep 26 Sep 27 Sep 28 Sep 29 Sep

● Injection ● SQL ● Protocol Violation ● XSS ● Forceful Browsing

Assists Score

80% Good
160 of 200 Checks passed

13 Failed 10 Passed 2 Pending

Port Status

Details

Product Name: cnSG

MAC Address: AA:B9:DD:33:DD:45:AF

Threats by Location

Last 7 Days

#	Country	Threat
1	China	780
2	Ukraine	569
3	Pakistan	498
4	Brazil	300
5	Turkey	298
6	North Korea	210

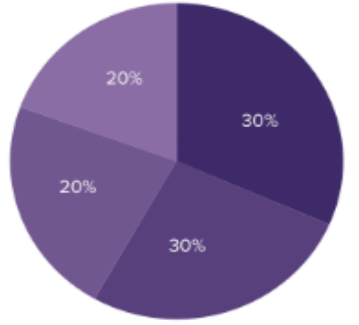
● Injection ● SQL ● Protocol Violation ● XSS ● Forceful Browsing

Total Ports	4
Port Status	3 Up / 1 Down
WAN-0 IP Address	192.168.100.205
WAN-1 IP Address	192.168.100.201
SG Group	Default
Sync Status	In Sync
Serial Number	JKHKHD22443
Software Version	4.2.1-r12
Description	-

Top Alarms

- 🔔 **5TMF-DWXR-7BB2-QVHF**
Security Risk Found
1d 4h 22m ago
- 🔔 **XZCQ-GG35-NYEH-MGT5**
Security Risk Found
5d 3h 3m ago
- 🔔 **VLFY-R755-NG8M-W5UC**
Security Risk Found
3d 2h 3m ago
- 🔔 **H4V2-23ZK-QPXU-N8ND**
Device is offline
5d 4h 1m ago
- 🔔 **H4V2-23ZK-QPXU-N8ND**
Device is offline
1d 6h 18m ago
- 🔔 **MUB5-CJK9-YA5S-U4LP**
Device is offline
0d 1h 1m ago
- 🔔 **MUB5-CJK9-YA5S-U4LP**
Client Offline
4d 1h 9m ago
- 🔔 **L5W3-Q35R-Q5QC-DEFG**
Client Offline
2d 5h 12m ago
- 🔔 **L5W3-Q35R-Q5QC-DEFG**
Client Offline
0d 0h 1m ago

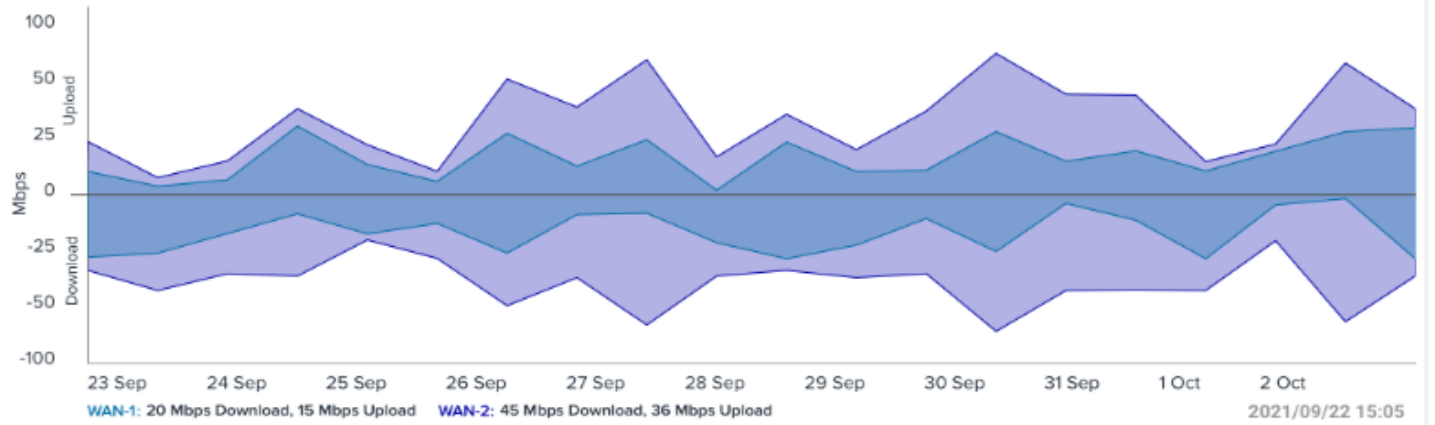
Client Vulnerabilities



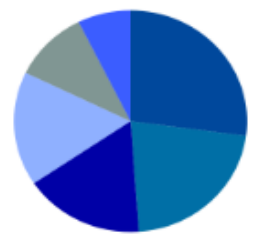
Top Vulnerable Clients

#	Client Name	Score	Vulnerabilities
1	Buck Bergnaum	951	<div style="width: 100%; height: 10px; background-color: #4b4b9b;"></div>
2	Amani McCullough	975	<div style="width: 100%; height: 10px; background-color: #4b4b9b;"></div>
3	Tiffany Jacobson	742	<div style="width: 85%; height: 10px; background-color: #4b4b9b;"></div>
4	Outdoor Camera	740	<div style="width: 60%; height: 10px; background-color: #4b4b9b;"></div>
5	Bridie Sporer	662	<div style="width: 50%; height: 10px; background-color: #4b4b9b;"></div>
6	Anna Haley	158	<div style="width: 15%; height: 10px; background-color: #4b4b9b;"></div>

Throughput



Top Application



Top Clients

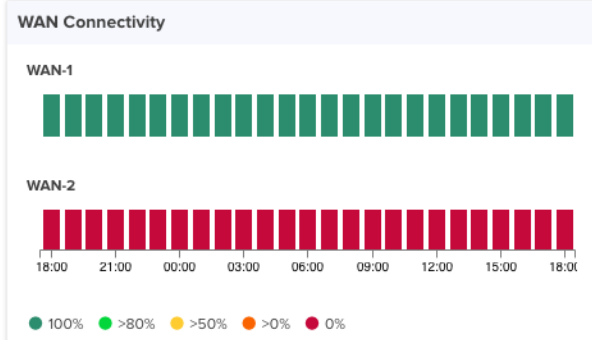
#	Client Name	Total Bytes	Usage (%)
1	Zackary Bradtke	250 MB	25%
2	Lemuel Powlowski	250 MB	25%
3	Vincenza Jerde	125 MB	12.5%
4	Jerod Breitenberg	125 MB	12.5%
5	Outdoor Camera	100 MB	10%
6	Palma Berastrom	100 MB	10%

Monitoring - Network

Dashboard Notifications Configuration Security **Network** Performance Software Update Clients

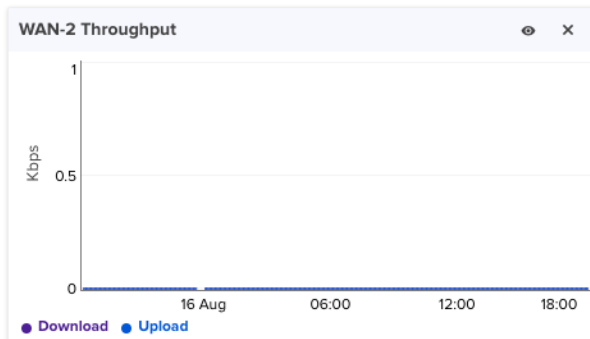
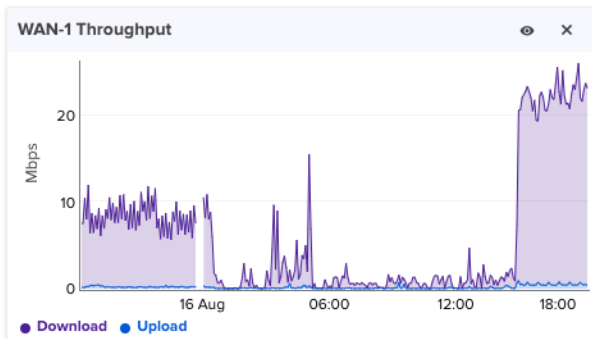
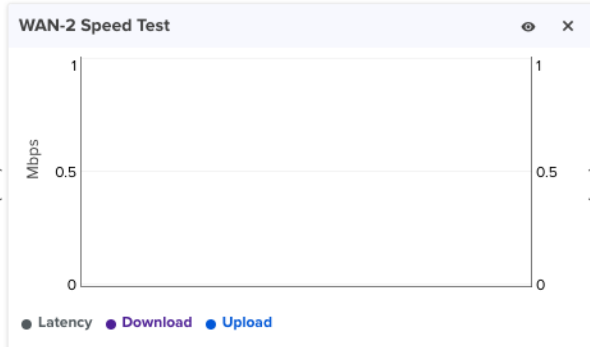
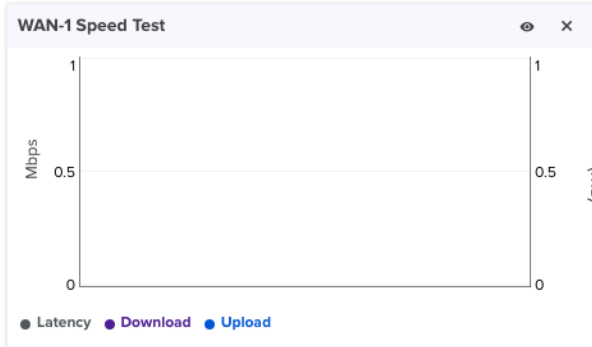
LAN Routes **WAN**

Time Range: Last 24 Hours Period: 5 Minutes



WAN Details

	WAN-1	WAN-2
Status	Online	Offline
Refresh time	Tue, Aug 16, 2022, 06:13 ...	Tue, Aug 16, 2022, 06:13 ...
IP Mode	Static	DHCP
IPv4 Address	<u>106.51.84.154</u>	<u>0.0.0.0</u>
Gateway	106.51.64.1	0.0.0.0



Dashboard Notifications Configuration Security **Network** Performance Software Update Clients

LAN **Routes** WAN

Routes

Apply Filter(s)

Destination	Mask	Gateway	Flags	Metric	VLAN
0.0.0.0	0.0.0.0	106.51.64.1	UG	1	1
106.51.64.0	255.255.224.0	0.0.0.0	U	0	1
192.168.10.0	255.255.255.0	0.0.0.0	U	0	10
192.168.20.0	255.255.255.0	0.0.0.0	U	0	20
192.168.30.0	255.255.255.0	0.0.0.0	U	0	310
192.168.51.0	255.255.255.0	0.0.0.0	U	0	510
192.168.52.0	255.255.255.0	0.0.0.0	U	0	520
192.168.110.0	255.255.255.0	0.0.0.0	U	0	110
192.168.200.0	255.255.255.0	0.0.0.0	U	0	2000
192.168.210.0	255.255.255.0	0.0.0.0	U	0	210

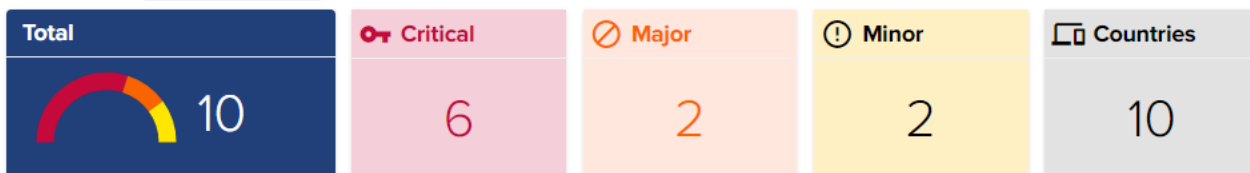
Showing 1 - 10 Total: 11 10 < Previous 1 2 Next >

🏠 Lima > Newman 🔄

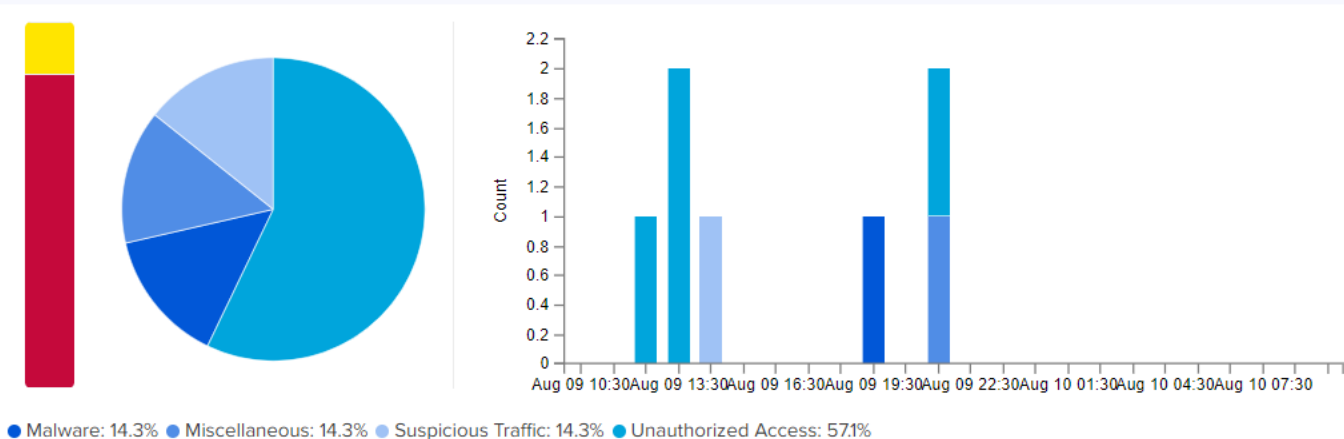
Dashboard Notifications Configuration **Security** Network Performance Software Update Clients

Threats Vulnerabilities

Time Range: Last 24 Hours Period: 5 Minutes



Threats by Category Last 24 Hours



Threats by Location Last 24 Hours



● Application Attack ● DoS Attack ● Information Leak ● Malware ● Miscellaneous ● Suspicious Traffic ● Unauthorized Access

[Apply Filter\(s\)](#)

Severity	Date and Time	Snort Class	Category	Country
Critical	Tue Aug 09 2022, 12:39:57 PM	unsuccessful-user	Unauthorized Access	Hungary
Critical	Tue Aug 09 2022, 12:19:56 PM	attempted-admin	Unauthorized Access	United Kingdom
Critical	Tue Aug 09 2022, 8:57:00 PM	successful-user	Unauthorized Access	Ireland
Critical	Tue Aug 09 2022, 1:25:33 PM	successful-admin	Unauthorized Access	Sweden
Critical	Tue Aug 09 2022, 6:43:26 PM	trojan-activity	Malware	United States
Critical	Tue Aug 09 2022, 9:17:01 PM	policy-violation	Miscellaneous	China
Major	Wed Aug 10 2022, 9:21:06 AM	rpc-portmap-decode	Application Attack	Germany
Major	Wed Aug 10 2022, 8:51:04 AM	web-application-activity	Application Attack	Iran
Minor	Wed Aug 10 2022, 9:06:05 AM	icmp-event	Suspicious Traffic	India
Minor	Tue Aug 09 2022, 1:40:34 PM	not-suspicious	Suspicious Traffic	Unknown



Vulnerable Clients

Apply Filter(s)

Hostname	IP Address	Mac Address	Device Type	Device OS	Last Scan	Vulne
sitindia	192.168.210.110	50:9A:4C:1F:DC:FD	COMPUTER	Linux	Aug 16 2022, 13:18	57
sitindia-OptiPlex-9020	192.168.10.124	34:17:EB:A3:07:F2	COMPUTER	Windows	Aug 16 2022, 14:32	47
MacBook-Air	192.168.10.36	38:C9:86:4F:4B:E7	LAPTOP	macOS	Aug 16 2022, 07:20	31
Unknown	192.168.210.142	A0:36:9F:28:BB:F0	COMPUTER	Windows	Aug 02 2022, 23:57	18
E700-9E9F08	192.168.210.21	58:C1:7A:9E:9F:08	Enterprise WiFi Access Point	Cambium OS	Jul 28 2022, 21:49	5
sitindias-MBP	192.168.110.108	AC:BC:32:C2:7D:B7	LAPTOP	macOS	Aug 12 2022, 13:13	11
Corporate-Switch	192.168.10.29	A0:40:A0:6E:BC:07	Router, Access Point or Femtocell	BusyBox/OpenWrt	Aug 16 2022, 17:05	9
XV3-8-4DDCCC	192.168.210.14	BC:E6:7C:4D:DC:CC	Enterprise WiFi Access Point	Cambium OS	Aug 16 2022, 11:54	2
XE3-4-001188	192.168.210.12	B4:A2:5C:00:11:88	Enterprise WiFi Access Point	Cambium OS	Aug 16 2022, 17:51	2
E410-0DC8A4	192.168.210.9	58:C1:7A:0D:C8:A4	Enterprise WiFi Access Point	Cambium OS	Aug 16 2022, 07:46	2

Showing 1 - 10 Total: 25 10 < Previous 1 2 3 Next >

All Vulnerabilities

Apply Filter(s)

Severity	Identifier	Service	Product	Product Version	Clients Impacted
Critical	CVE-2017-7679	http	Apache httpd	2.4.18	1
Critical	CVE-2015-5600	ssh	OpenSSH	6.9	1

CVE-2014-2323 Detail

Current Description

SQL injection vulnerability in mod_mysql_vhost.c in lighttpd before 1.4.35 allows remote attackers to execute arbitrary SQL commands via the host name, related to request_check_hostname.

[View Analysis Description](#)

Severity CVSS Version 3.x CVSS Version 2.0

CVSS 3.x Severity and Metrics:

NIST: NVD **Base Score:** 9.8 CRITICAL **Vector:** CVSS:3.1/AV:N/AC:L/PR:N/UI:N/S:U/C:H/I:H/A:H

NVD Analysts use publicly available information to associate vector strings and CVSS scores. We also display any CVSS information provided within the CVE List from the CNA.

Note: NVD Analysts have published a CVSS score for this CVE based on publicly available information at the time of analysis. The CNA has not provided a score within the CVE List.

References to Advisories, Solutions, and Tools

By selecting these links, you will be leaving NIST webspace. We have provided these links to other web sites because they may have information that would be of interest to you. No inferences should be drawn on account of other sites being referenced, or not, from this page. There may be other web sites that are more appropriate for your purpose. NIST does not necessarily endorse the views expressed, or concur with the facts presented on these sites. Further, NIST does not endorse any commercial products that may be mentioned on these sites. Please address comments about this page to nvd@nist.gov.

Hyperlink	Resource
http://download.lighttpd.net/lighttpd/security/lighttpd_sa_2014_01.txt	Exploit Vendor Advisory
http://jvn.jp/en/jp/JVN37417423/index.html	Third Party Advisory
http://lists.opensuse.org/opensuse-security-announce/2014-03/msg00023.html	Mailing List Third Party Advisory
http://lists.opensuse.org/opensuse-security-announce/2014-03/msg00023.html	Mailing List Third Party Advisory

Monitoring – IDS events

Apply Filter(s) Export ▾

Severity	Category	Source Type	Name	Message	Raised Time
Notify	SECURITY Status	Device NSE 3000	IPS_RULESET_UPDATE	Updated rule [snort-vrt]. Total [1... View Details	Tue Aug 16 2022 17:01:09 UTC
Notify	SECURITY Status	Device NSE 3000	IPS_RULESET_UPDATE	Updated rule [snort-vrt]. Total [1... View Details	Tue Aug 16 2022 05:00:53 UT
Notify	SECURITY Status	Device NSE 3000	IPS_THREAT_DETECTED	Intrusion attempt from [103.29... View Details	Tue Aug 16 2022 02:59:52 UT
Notify	NETWORK Status	Device NSE 3000	STATUS_UP	Device is online. View Details	Mon Aug 15 2022 23:57:42 UT
Notify	SECURITY Status	Device NSE 3000	IPS_RULESET_UPDATE	Updated rule [snort-vrt]. Total [1... View Details	Mon Aug 15 2022 17:00:59 UT
Notify	SECURITY Status	Device NSE 3000	IPS_RULESET_UPDATE	Updated rule [snort-vrt]. Total [1... View Details	Mon Aug 15 2022 05:00:57 UT
Notify	SECURITY Status	Device NSE 3000	IPS_THREAT_DETECTED	Intrusion attempt from [2.57.12... View Details	Sun Aug 14 2022 18:22:04 UT
Notify	SECURITY Status	Device NSE 3000	IPS_RULESET_UPDATE	Updated rule [snort-vrt]. Total [1... View Details	Sun Aug 14 2022 17:01:00 UTC
Notify	SECURITY Status	Device NSE 3000	IPS_THREAT_DETECTED	Intrusion attempt from [2.57.12... View Details	Sun Aug 14 2022 14:43:39 UT
Notify	SECURITY Status	Device NSE 3000	IPS_THREAT_DETECTED	Intrusion attempt from [2.57.12... View Details	Sun Aug 14 2022 08:23:34 UT

Event Details ✕

Name	IPS_THREAT_DETECTED
Severity	Notify
Message	Intrusion attempt from [192.168.0.101:55037] to [209.53.113.223:80] [1:26287:6] [APP-DETECT Absolute Software Computrace outbound connection - search.namequery.com] Classification [misc-activity] Priority [3] Protocol [TCP]
Event Time	Wed Aug 17 2022 02:32:58 UTC -0700
MAC	30:CB:C7:70:04:18
Source Device (MAC)	-
Category	SECURITY
Device Type	NSE 3000
Mode	Security Gateway
Model	NSE 3000 Security Gateway
Device Name	NSE-700418
Age	0d 12h 45m

<
>

- **Application based (DPI) and L3/L4**

Add New Filter Rule ✕

Precedence

Action

Type

Deep Packet Inspection (DPI) Type

DPI Application

NSE Groups > apt

- Basic
- Management
- Network
- WAN
- Firewall**
- Threat Protection
- VPN and RADIUS Server
- User-Defined Overrides

Filter Rules

Precede...	Action	Type	Deep Packet Inspection (DPI) ...	DPI Applic...
20	deny	layer7-filter	application	applemus

[Add New](#)

Denial of Service (DoS) Protection

- IP Spoof Enable IP spoof attack protection (checks whether spoofed IP address is reachable before)
- Smurf Attack Enable SMURF attack protection (do not respond to broadcast ICMP)
- IP Spoof Log Enable IP spoof log messages (log unroutable source addresses)
- ICMP Fragment Enable fragmented ping attack protection (drop fragmented ICMP packets)

- Separately control inbound and outbound mode
- Modes: disabled, allow, deny
- IP-based exception override

GEO IP

IP Inbound Mode

Deny

IP Inbound Countries

China x

Russian Federation x

Select or Search...

GEO IP Inbound Allow List

Search

Start IP

End IP

7.8.9.10

7.8.9.11

[Add New](#)

Apply Filter(s) ☰

Host Name	IP Address	MAC Address	Manufacturer	Device Type	Device OS
ubuntu	192.168.200.54	DC:A6:32:B9:66:27	Raspberry Pi	Raspberry	Chrome os
-	192.168.200.72	58:C1:7A:F5:E4:A1	Cambium Networks	Enterprise switch	Cambium os
SE-7006B0	192.168.200.81	30:CB:C7:70:06:B0	Cambium Networks	Network service edge	Cambium os
iceT	192.168.200.83	00:11:32:1E:74:7A	Synology	Nas_storage	Dsm
LittleEngine	192.168.200.68	48:51:B7:D2:FA:5A	Unknown	Computer	Windows
Lamp	192.168.200.58	D0:73:D5:21:2D:52	Lifx	Light	Unknown
TMI010-MAC	192.168.200.59	F0:18:98:0F:85:58	Apple	Laptop	Macos
Tertius	192.168.200.53	BC:E6:7C:51:1F:A6	Cambium Networks	Enterprise wifi access point	Cambium os
HS300	192.168.200.57	C0:06:C3:42:5C:7A	Tp-link	Smart_plug	Unknown
BRW008092CC6CFF	192.168.200.67	00:80:92:CC:6C:FF	Unknown	Printer or scanner	Embedded os
Trevors-MBP	192.168.200.82	3C:15:C2:EA:F2:8A	Apple	Laptop	Macos
Pixel-5	192.168.200.85	5E:8D:D7:10:6D:AE	Google	Mobile	Android
Side-Table-Lamp	192.168.200.65	D0:73:D5:24:46:0D	Lifx	Light	Unknown
-	192.168.200.79	F8:0F:F9:69:45:25	Google	Streaming_dongle	Android
guest2	192.168.200.84	58:C1:7A:0A:6D:24	Cambium Networks	Enterprise wifi access point	Cambium os

Competition

	Watchguard	Meraki		Fortigate	Sonicwall	Sophos	Cambium
Model	FireboxT40	MX67	MX68	40F	TZ270	XGS87	NSE 3000
Form Factor	Desktop	Desktop	Desktop	Desktop	Desktop	Desktop	Desktop, Wall mount
Complete Branch	No	Yes	Yes	Yes	Dated Wi-Fi (11ac)	Dated Wi-Fi (11ac)	Yes
ZTNA	No	Cisco Duo	Cisco Duo	Integrated	SASE solution	Separate VM appliance	Roadmap
IoT Security	No	Limited	Limited	Yes (Additional license)	Limited	Limited	Integrated
Throughput (with threat protection)	300Mbps	600Mbps	600Mbps	990Mbps	1Gbps	700Mbps	911 Mbps
Licenses	3 bundles	3 bundles	3 bundles	5 bundles	2 bundles	2 bundles + 6 licenses	1 – cnMaestro X SKU 1 – CC UPG SKU (for HW replacement)
1-year base lic (Street price)	\$480	\$225	\$225	\$365	\$410	\$165	\$160 (Includes HW replacement)
1-year Adv lic (Street price)	\$920	\$450	\$450	\$391	\$310	\$215	Not Applicable
NaaS	No	No	No	Yes?	No	No	\$35/NSE/Mo for 3-yr \$26/NSE/Mo for 5-yr
2021 UTM Rev (est)	\$300M	\$55M		\$415M	\$400M	\$640M	\$0

Fortinet Battle Card (1 of 2)

Fortigate 40F

Fortigate 40F

- Interfaces
 - 5x 1G RJ-45 ports, can be split between LAN, WAN and Fortilink
- 5Gbps “firewall” but 800Mbps NGFW, 990Mbps Application Control
- Street Price: \$444
- Portfolio scales from SMB to very large enterprise
- “Secured wired and wireless” portfolio



- Comparable licenses (Street Price)

Advanced Threat Protection Bundle: \$235/\$704/\$1172

- IPS, Advanced Malware Protection Service, Application Control
- FortiCare Premium (24/7 support, updates, NBD advanced replacement)

Cloud Management: \$130/\$389/\$648

- Cloud Management, Analysis and 1 Year Log Retention

FortiGate-40F 1 Year IoT Detection Service \$104.24

- Cloud based detection of IoT devices

Other bundles

- SMB Protection \$391/\$1173/\$1955
 - IPS, Advanced Malware Protection, Application Control, Web & Video Filtering, Antispam, FortiGate Cloud subscription and FortiCare Premium
- Enterprise Protection \$417/1251/2085
 - IPS, Advanced Malware Protection, Application Control, Web & Video Filtering, Antispam, Security Rating, IoT Detection, Industrial Security, FortiConverter Svc, and FortiCare Premium

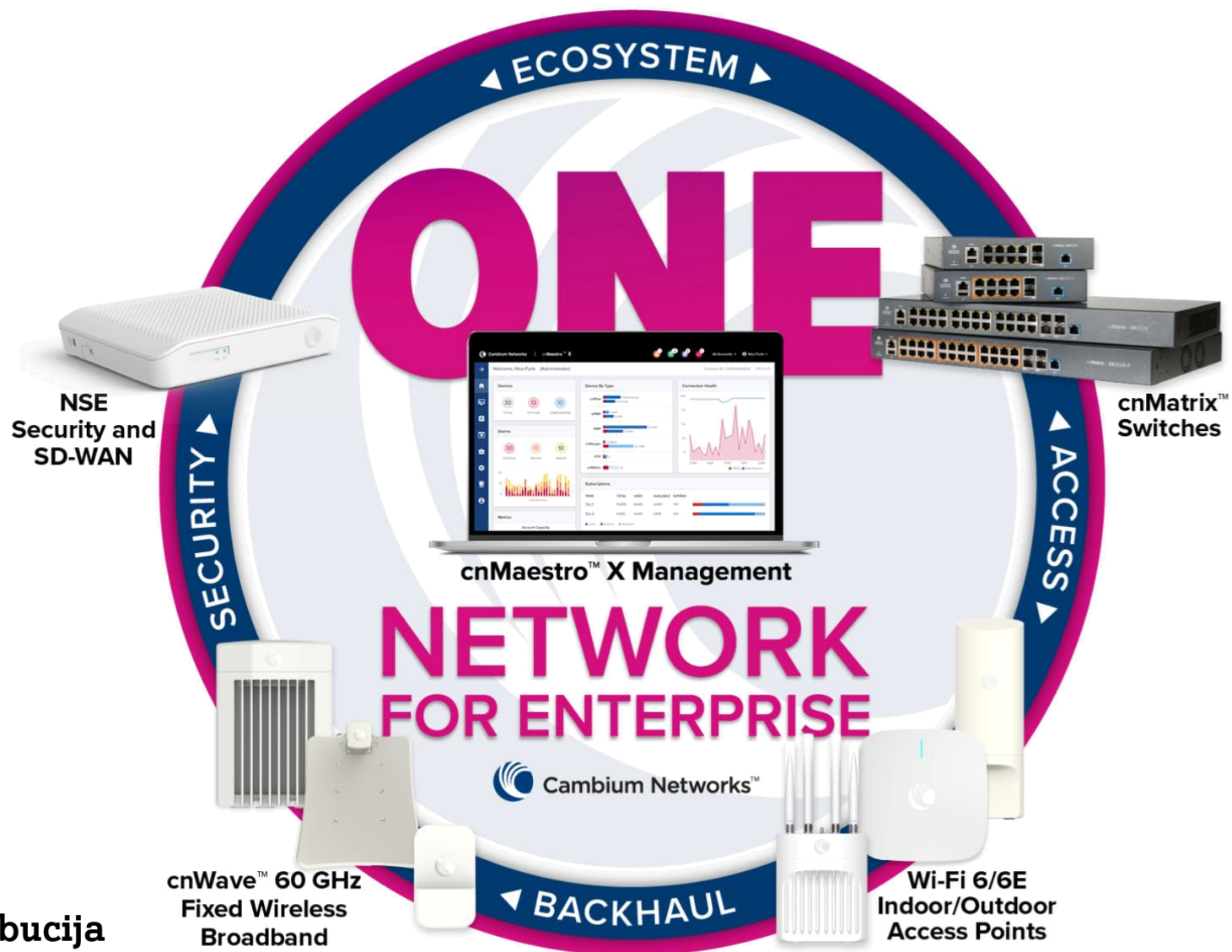
NSE 3000

- WAN interface
 - 2 dedicated 1GbE SFP/RJ45 and cellular uplink via 3rd party USB modem
- LAN interface
 - 4 LAN 1GbE RJ45 ports
- 1Gbps firewall throughput and 900Mbps throughput when all features turned on
- Street Price: \$750
- cnMaestro X: \$160/\$330/\$495
 - Upgrade to CC Ad included





- **NSE 4000 – 2023**
- **2-3x headline performance**
- **1U Rack mount**





Cambium Networks™

A1

ePMP – Point to Multipoint



ePMP 3000
4X4 **MU-MIMO**/OFDM
1.2 Gbps
4910-5970 MHz
20/40/80MHz channel width
4 x RP-SMA connectors
GPS synchronization
IP55
3 years warranty



ePMP 3000L
2X2 MIMO/OFDM
600 Mbps
4910-5950 MHz
20/40/80MHz channel width
2 x RP-SMA connectors
GPS synchronization
IP67
3 years warranty



ePMP 3000 MicroPOP
2X2 MIMO/OFDM
600 Mbps
5150-5875 MHz
20/40/80 MHz channel width
Integrated 9 dBi omni antenna
IP67
3 years warranty



4X4 MU-MIMO sector antenna

70° beam width
4 x RP-SMA connectors
17 dBi gain
Dual polarization
IP65
-40 °C to +60 °C



4X4 dual horn MU-MIMO antenna

60° beam width
4 x RP-SMA connectors
12 dBi gain
IP55
-40 °C to +60 °C



2x2 sector antenna MIMO

120° beam width
2 x RP-SMA connectors
18 dBi gain
IP65
-40 °C to +60 °C



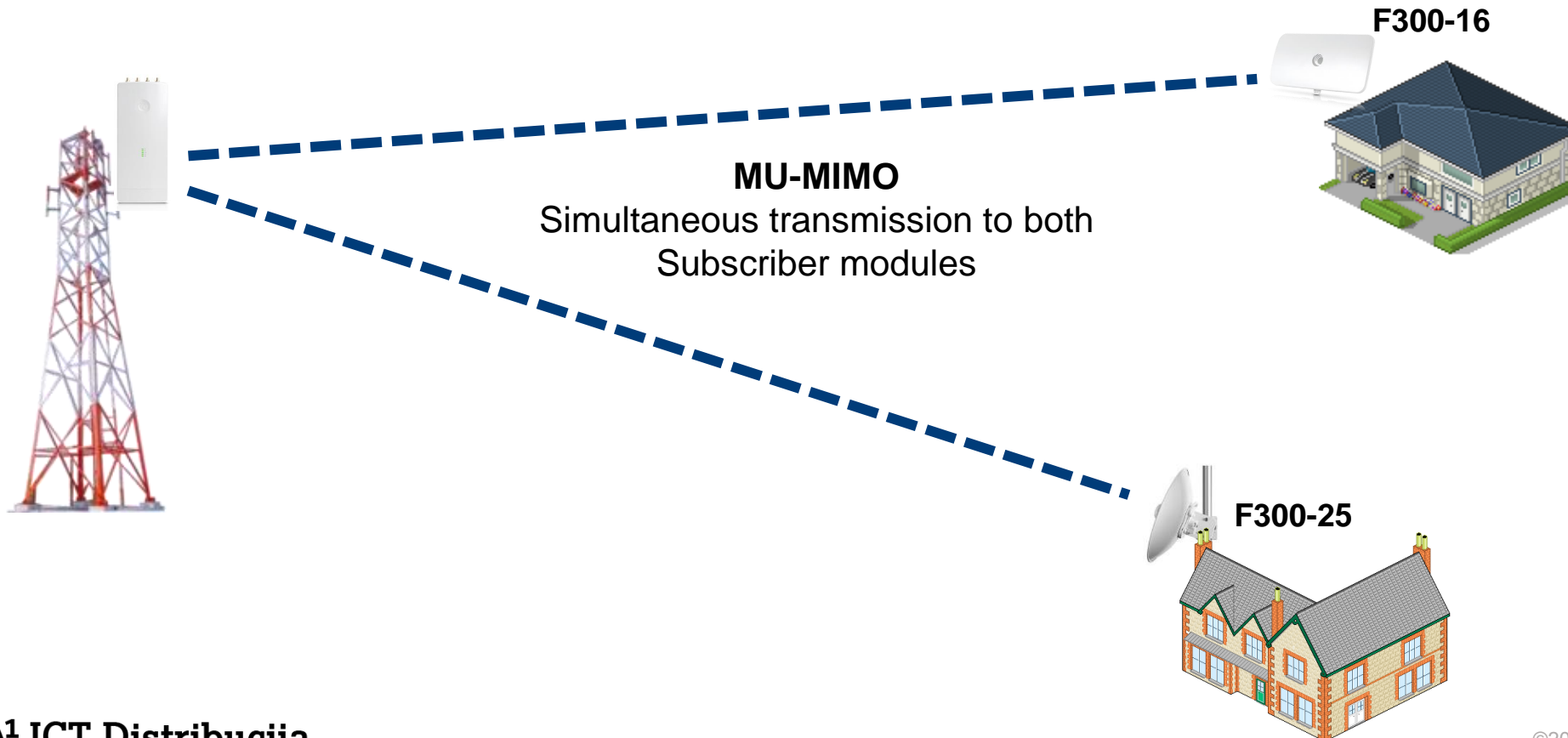
2x2 MIMO beamforming antenna

uplink only
90° beam width
2 x RP-SMA connectors
17 dBi gain
IP65
-30 °C to +55 °C

Industry leading interference mitigation



Increased throughput with MU-MIMO technology



Installation examples of ePMP base stations





Force300
connectorized



Force300-13L
13 dBi antenna



Force300-13
13 dBi antenna



Force300-16
16 dBi antenna



F300-19R
19 dBi antenna



Force 300-25
25 dBi antenna

Features

- **802.11ac wave2** MU-MIMO subscriber modules
- Optional Point-to-Point mode on all units
- 2x2 MIMO/OFDM, 256 QAM
- **Up to 700 Mbps throughput**
- 4.9 – 5.9 GHz
- 20/40/80 MHz supported channel sizes
- 1 x Gbps Ethernet interface
- -30 °C to +60 °C temperature range
- IP55
- +30 dBm transmit power
- 3 year warranty (can be extended to 5 years)



Integrated spectrum
analyzer

Industry first proprietary point to point product based on 802.11ax!

- Up to 1 Gbps usable throughput
- Sub 5 ms latency

Target Markets & Applications

- High-capacity Enterprise point to point
- Low-cost WISP back-haul
- GPON last mile
- Connecting MicroPOP locations with high capacity
- 500+ Mbps packages for wireless ISPs

Force-400C



Force-425



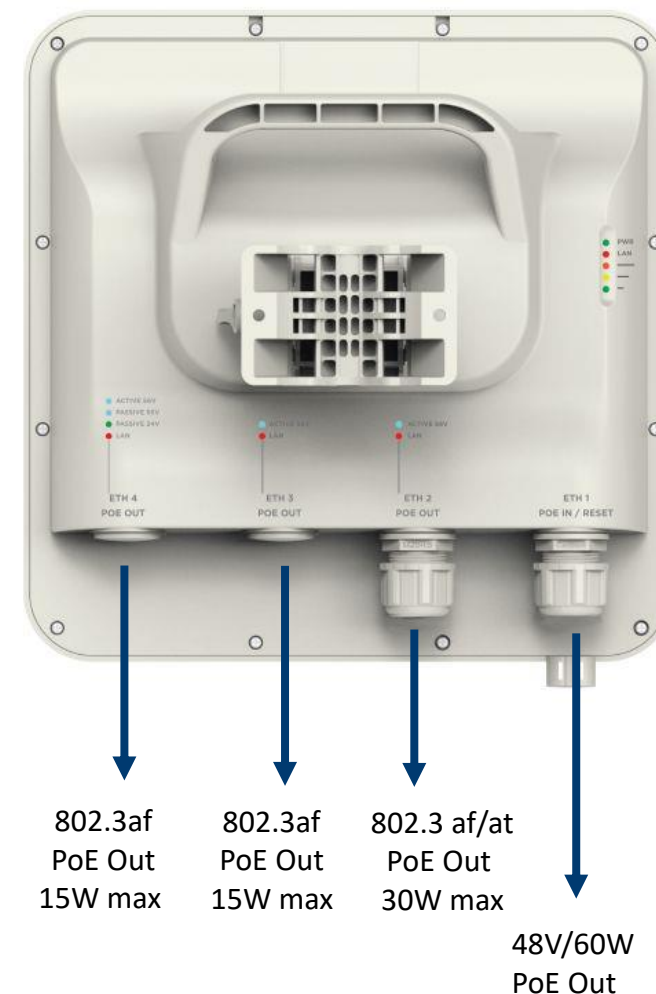
- 802.11ax
- Sub 5 ms latency
- Frequency range 4.9 - 6.135 GHz
- 20/40/80 MHz supported channel sizes
- **12.5 bps/Hz** spectral efficiency
- 1024 QAM modulation
- 200.000 PPS
- **IP67 ruggedization**
- **25 dBi** integrated dish antenna
 - optional 3 dB range extender
- **Interfaces**
 - Gigabit Ethernet
 - SFP – optional GPON module



Connect up to 3 cameras on radio with built-in PoE switch.
Device has integrated 19 dBi antenna.

- **45W PoE-out budget**
 - Budget is shared among the ports
 - Port 1 supports 802.3at (30W)
 - Port 2 supports 802.3af (15W)
 - Port 3 is selectable (15W)
 - 802.3af
 - 48V passive pass through
 - 24V passive pass through

If Port 1 and Port 2 are at max consumption (45W) Port 3 will be inactive. Likewise with Port 1 and Port 3 then Port 2 will become inactive. However, all 3 ports can operate at 15W load



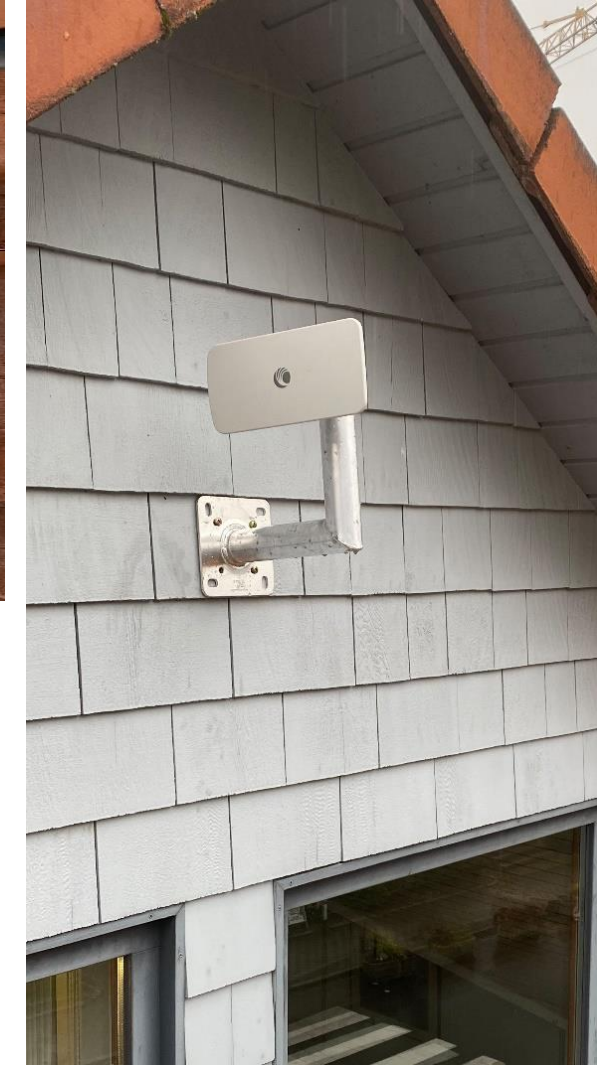
Installation example of ePMP subscriber modules / PTP



Installation example of ePMP subscriber modules / PTP



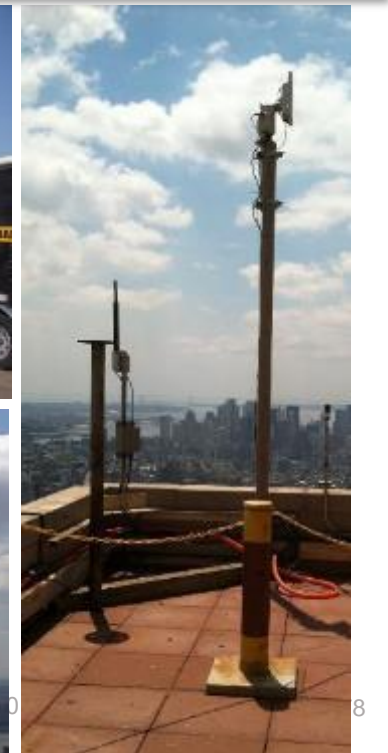
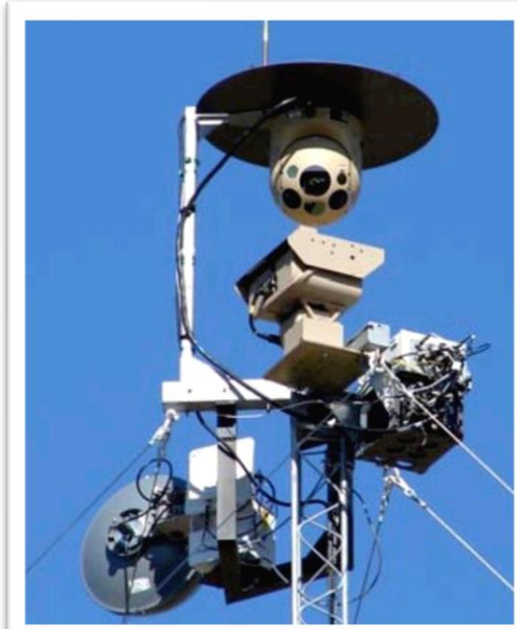
Installation example of ePMP subscriber modules / PTP



Installation example of ePMP subscriber modules / PTP



Applications





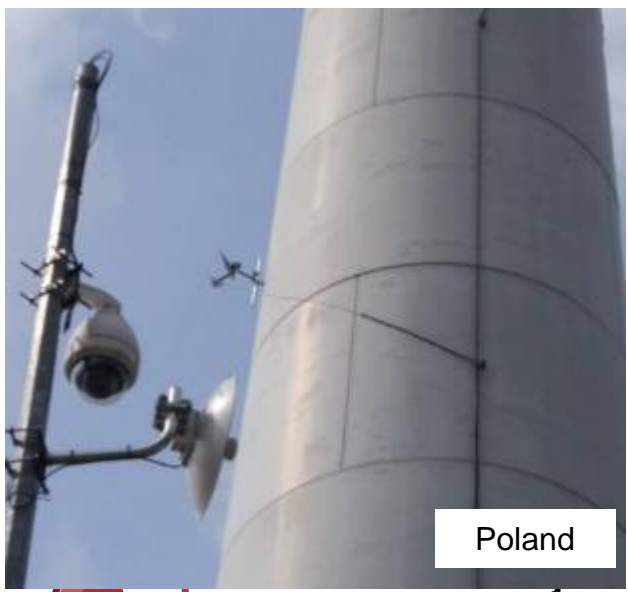
Proven in CCTV Deployments



NYC



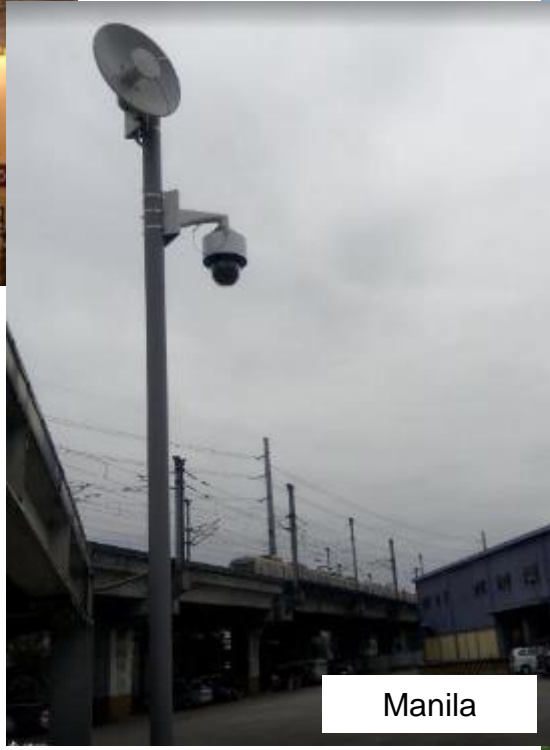
Singapor



Poland



Mexico City



Manila



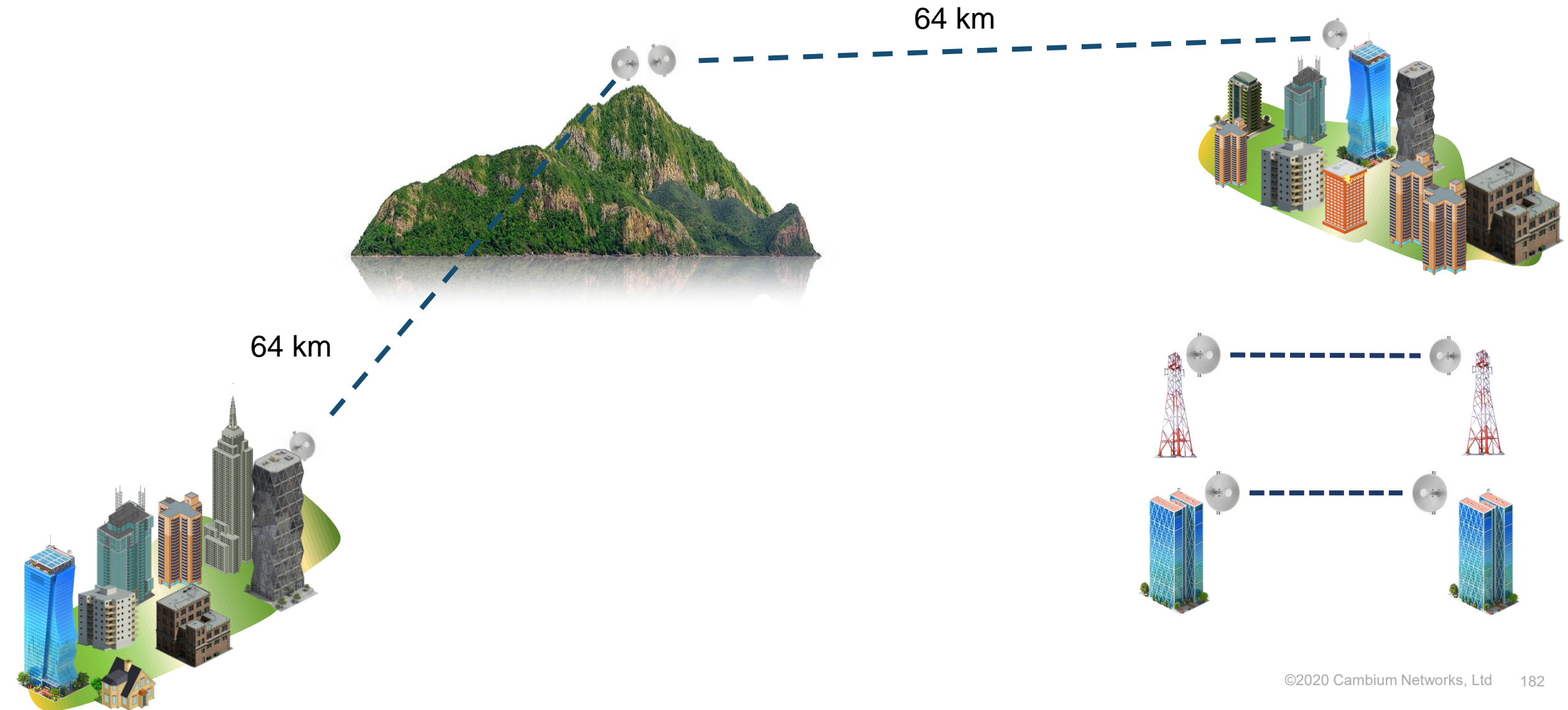
Chicago

Applications

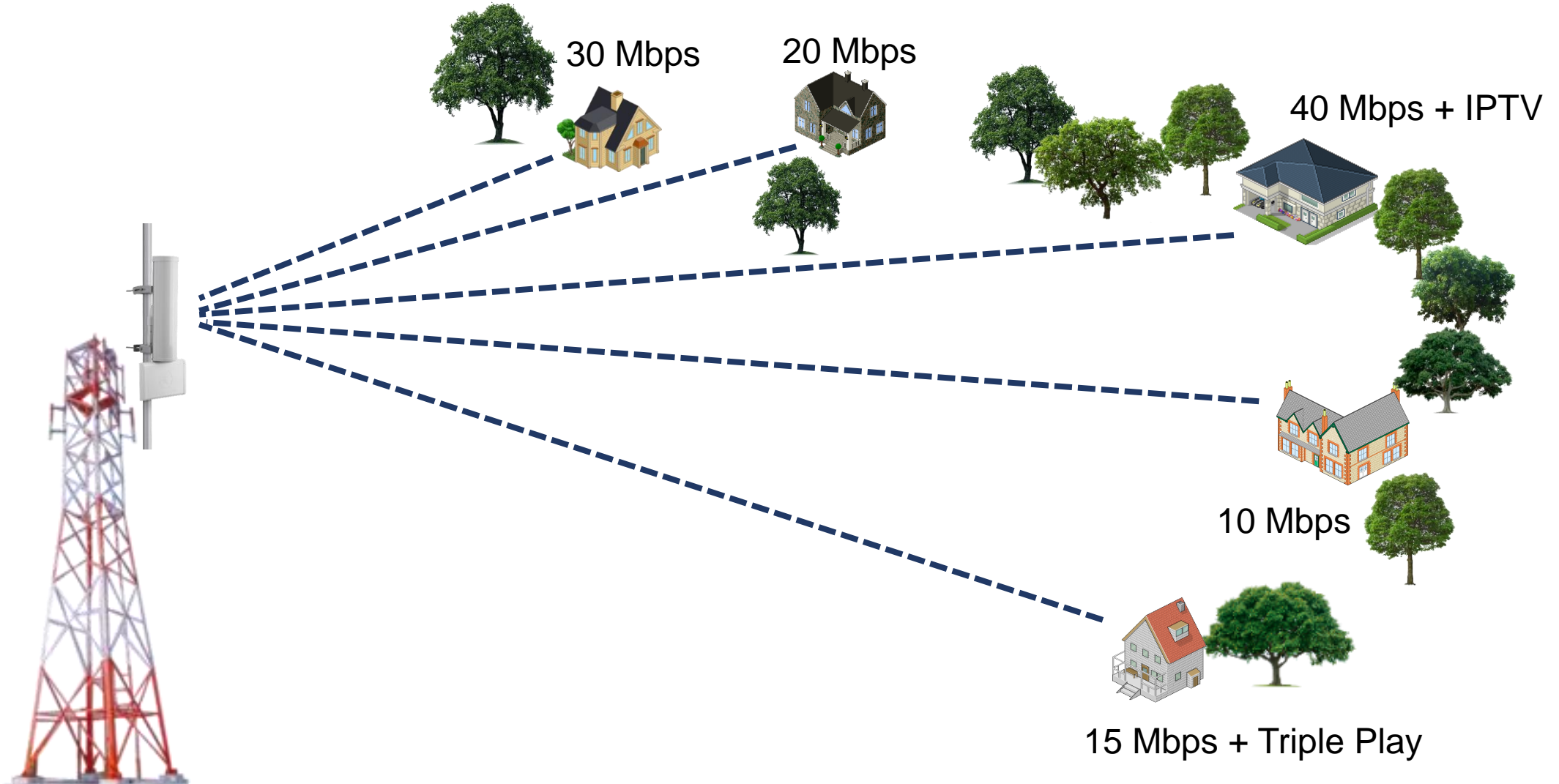


| A¹ ICT Distribucija

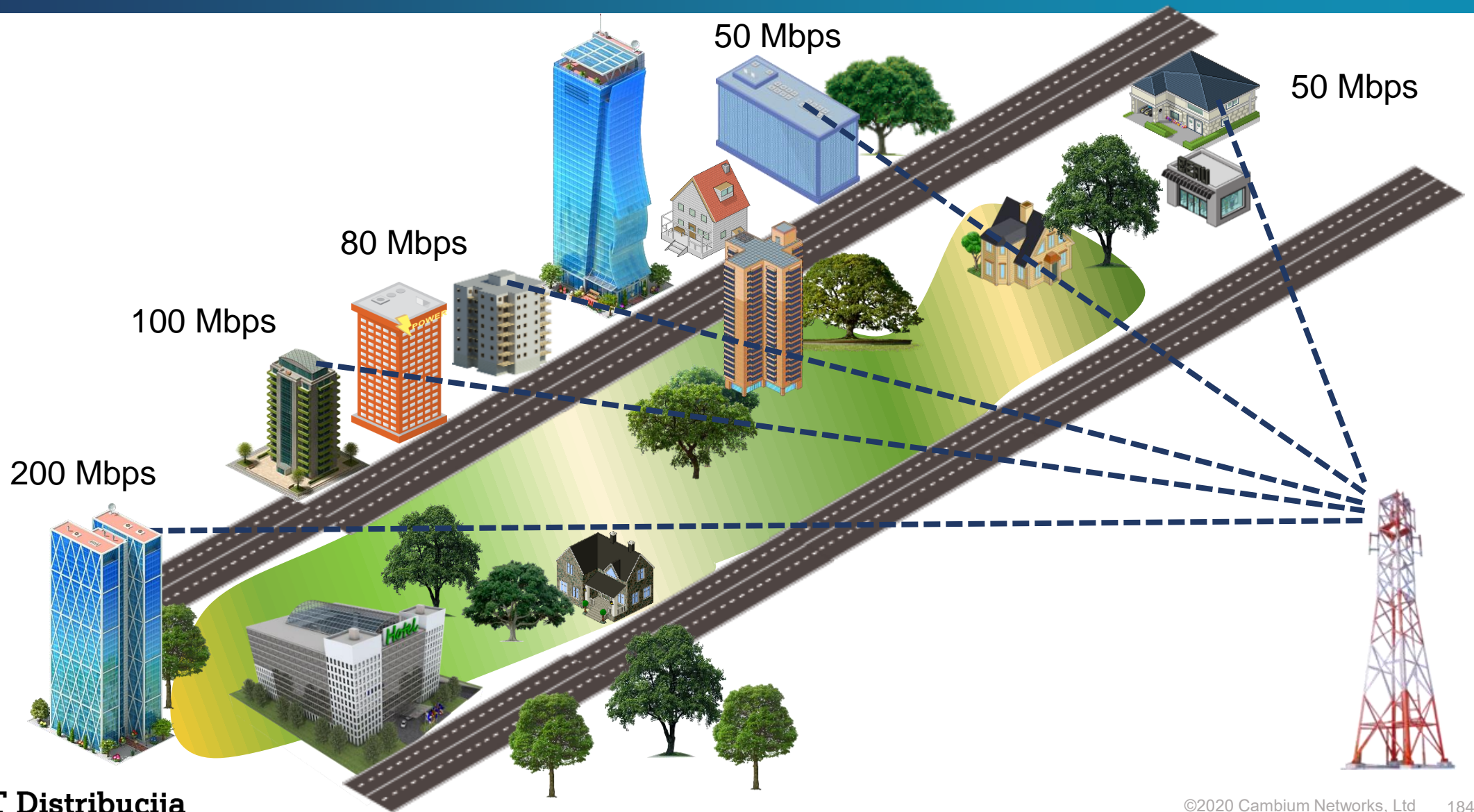
Point to Point – Connecting locations up to 64 km distance



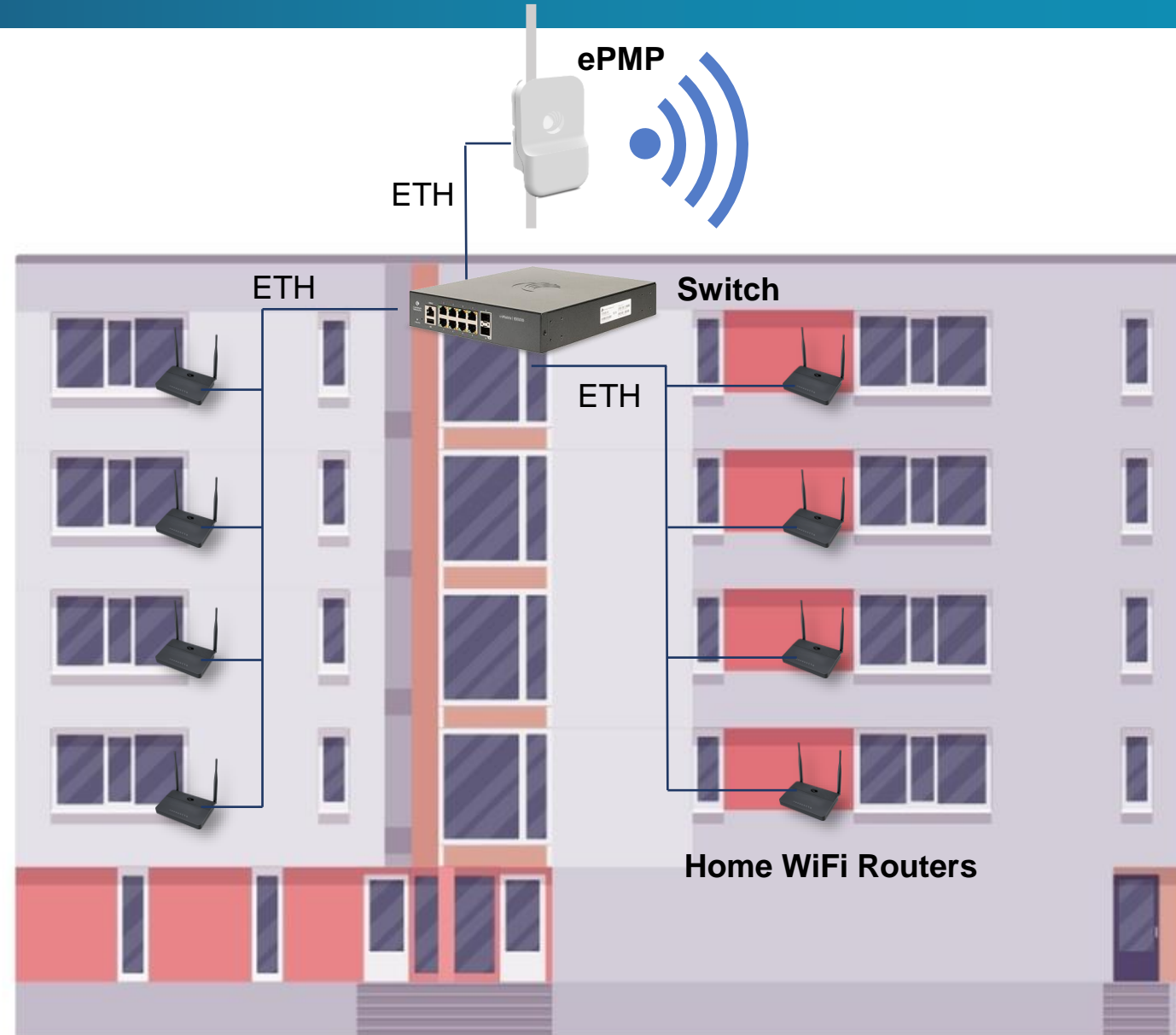
Point to Multipoint – Connecting residential or business customers



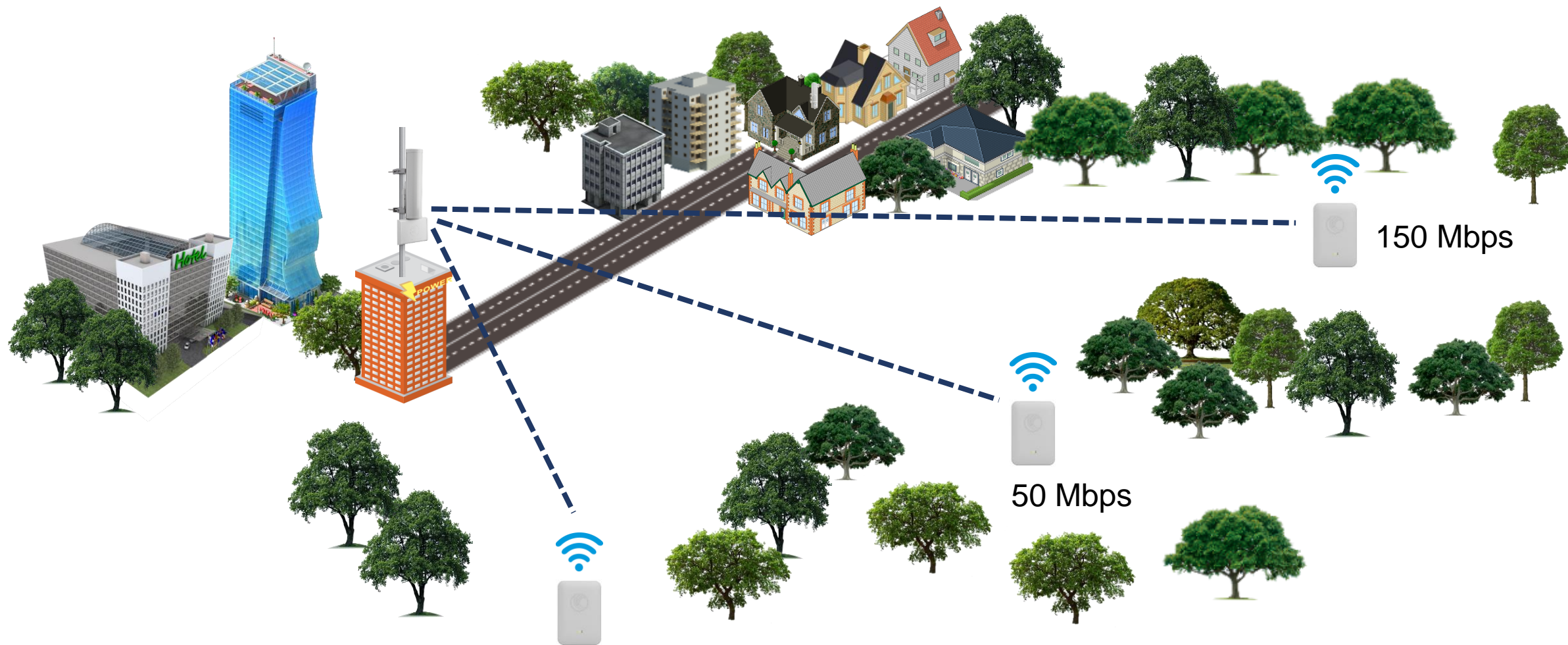
Point to Multipoint – Connecting residential or business customers



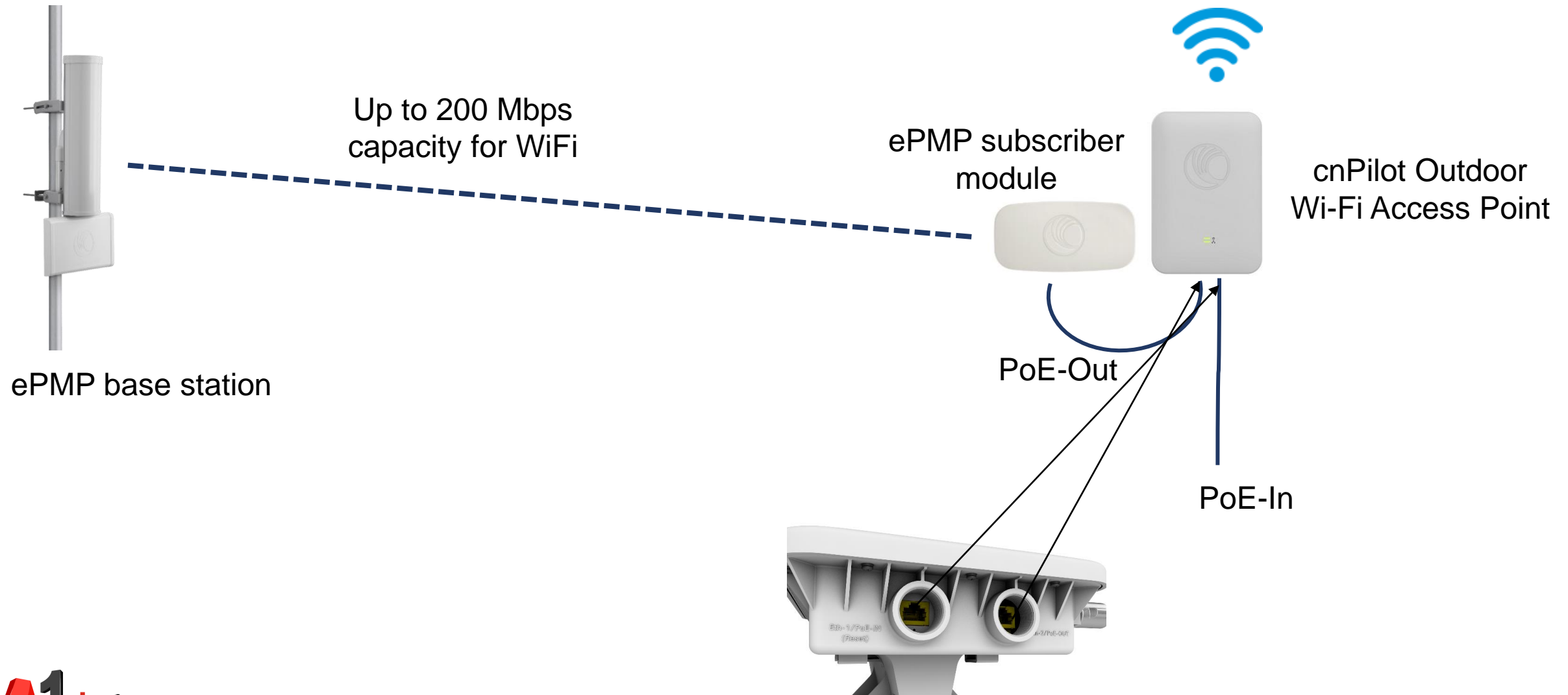
Multi Gigabit connectivity for Enterprise > MDU



Point to Multipoint – Connecting outdoor Wi-Fi Access Points



Unique characteristics of Cambium solutions



Point to Multipoint – Connecting CCTV cameras





| A¹ ICT Distribucija

ePMP 4000 (WiFi6) Point to Multi-Point



ePMP
4000
802.11ax

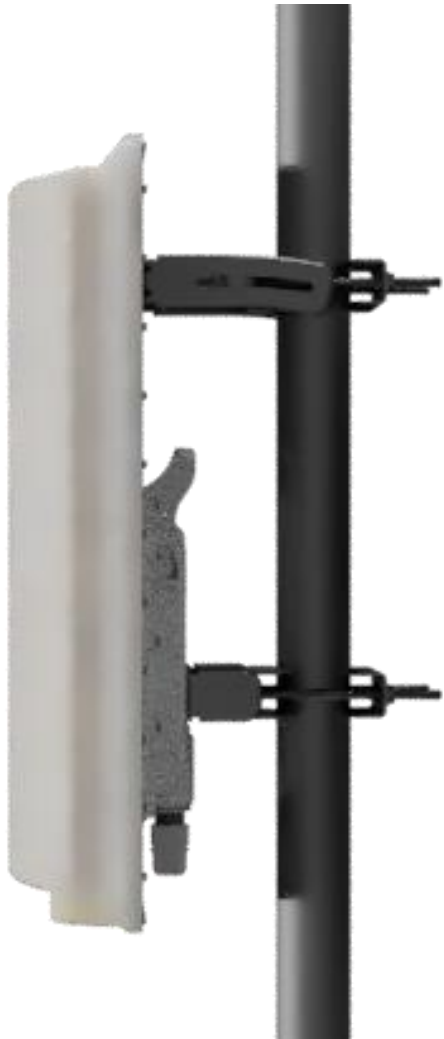
5GHz

Band 4.9 - 6.2 GHz

6GHz

Band 6 - 7.125 GHz





- GPS Sync
- Modulation QAM1024
- MIMO 2x2
- 56V passive/active 802.3at PoE
- 1xGbE, 1xSFP
- Sector antenna from ePMP1000/2000/3000L
- Performance 400Mbps@40MHz (800Mbps@80MHz)

5GHz PMP: AP ePMP4500 – monster is coming!



- GPS Sync
- Modulation QAM1024
- MU-MIMO 8x8
- 56V PoE and DC (35W)
- 1xGbE + 1xSFP+
- Integrated antenna 90°
- Performance [1.5Gbit@40MHz](#) (3Gbit@80MHz)

**ePMP
4000**
802.11ax @ 6GHz

PTP

Band 6 - 7.125 GHz



Force4600C

PMP

Band 6 - 7.125 GHz



ePMP4600

AP



ePMP4600L

SM



Force 4625

6 GHz alpha trials

Start Test

Downlink 1 253.715 Mbps

Uplink 128.129 Mbps

Aggregate 1 381.844 Mbps

Registered Subscriber Modules

Show Details

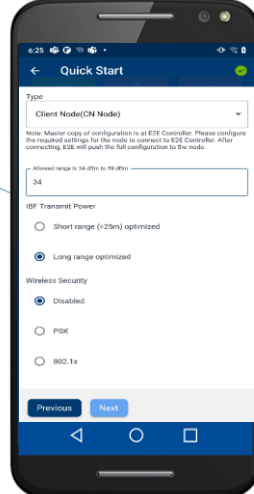
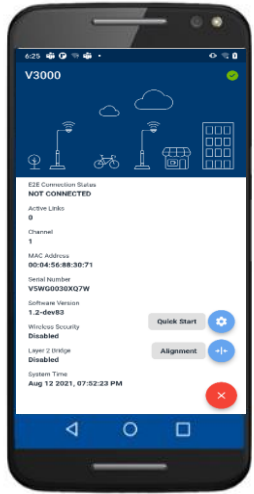
Device Name	SM Distance (miles)	Session Time (hh:mm:ss)	RSSI (dBm) Downlink / Uplink	SNR (dB) Downlink / Uplink	MCS Downlink / Uplink	Downlink Quality	Downlink Capacity	MIR Profile	MIR Rate (kbps) Downlink / Uplink	
Price-Test	0.559	00:14:13	-55/-57	32/39	DS 8/DS 11	100 %	72 %	OFF	N/A/N/A	6 GHz Force 6

RESULT HISTORY

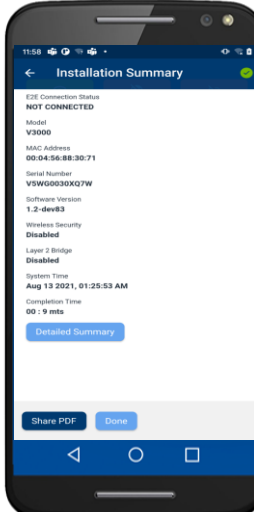
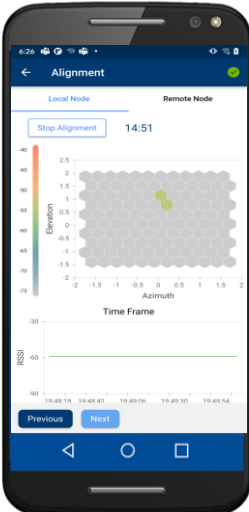
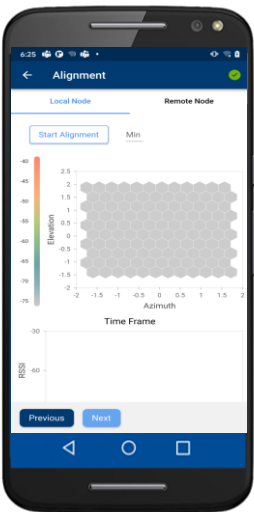
Date	ms	Mbps	Mbps
09.22.22 03:10 PM	3	936.46	928.30
09.22.22 03:00 PM	3	922.78	894.03
09.22.22 02:57 PM	3	927.31	948.97
09.22.22 02:53 PM	3	926.58	928.42
09.22.22 02:33 PM	3	921.01	917.41
09.22.22 02:32 PM	3	931.13	929.27



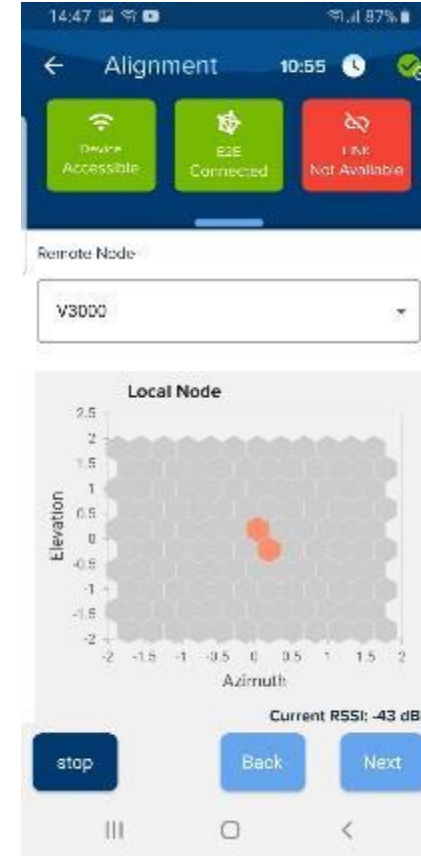
cnArcher mobile application for installers



- Configuration, link alignment, speed test
- Installation summary with photos, configuration details and uplink/downlink test results
- Software upgrade from mobile device before installation
- Onboard devices to cnMaestro management
- Automatic recording of location coordinates



cnArcher – Alignment procedure



The units should be visually aligned.

Use the Alignment Tube or Telescope Mount

Use the GUI or New cnArcher



Geva Elettronica Battery PoE/WiFi unit available here:
<https://shop.gevaelettronica.it/en/battery-poe/28-batterypoe-at2-24v-48v-30w-14000-mah.html>

- ePMP is standard **3 year warranty**
- **Feature rich** and **high performance** PTP/PMP with GPS Sync and MU-MIMO
- **Support** - local distributor, Cambium regional sales and technical managers, Support portal
- **Free resources**
 - Partner portal
 - Service provider portal
 - Support portal
 - Training portal (*training and certifications are free*)
- **LinkPlanner** tool for network planning (free)
- **cnArcher** tool for installers (free)
- **cnMaestro** (free) management platform with the most flexible architecture on the market (*Cloud/Virtualization*), covering entire portfolio
- Complementary solutions
- Lowest total cost of ownership (TCO)



Cambium Networks™

A1

60 GHz

802.11ad vs. 802.11ay

	802.11ad	802.11ay
Protocol	802.11ad (2016)	Pre-802.11ay
Channel support	2-3	1-4
Maximum Throughput	5 Gbps	10 Gbps
Maximum Channel Width	2160 MHz	4320 MHz (Channel bonding)
Channel Access	CSMA	TDMA/TDD
Network Synchronization	No	Yes, via GPS
Mesh Support	No	Yes
CPE per Sector	8	15

Distribution Node

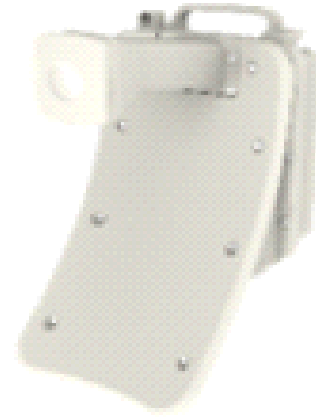


V5000
Dual Sector

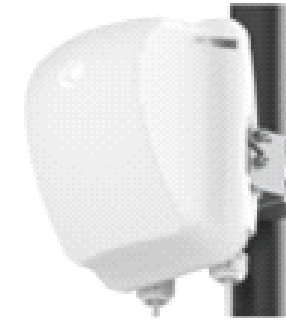
Client Nodes (PMP or PTP)



V3000
High Gain
44.5 dBi Dish



V2000
Flexible
Mid-Range



V1000
Small
Form-Factor

All 60 GHz cnWave products include:

- Cloud or on-premises network management with cnMaestro™
- Optional advanced management features with cnMaestro X
- Network planning capabilities with cnHeat, LINKPlanner, and ANP
- On-board or Remote e2e Controller Software

- Layer 2 or layer 3 network connectivity
- IPv4 or IPv6 networking protocols
- Security with HTTPS interfaces and 128-bit AES encryption
- 3-year warranty
- Options for extended warranty, Cambium Care Pro, and advanced replacement

cnWave 60 GHz Client Node Selection Guide



V5000 DN	V1000	V2000	V3000 – Small Dish	V3000 – Large Dish
Capacity (each direction)	Up to 1Gbps ✓	Up to 1.8 Gbps ✓✓✓	Up to 1.8 Gbps ✓✓✓	Up to 1.8 Gbps ✓✓✓
PTP – Range*	Up to 150 m ✓	Up to 1.0 km ✓✓	Up to 1.5 km ✓✓	Up to 2.3 km ✓✓✓
PMP – Range*	Up to 150 m ✓	Up to 470 m ✓✓	Up to 670 m ✓✓	Up to 720 m ✓✓✓
Form Factor	Small ✓✓✓	Integrated Radome ✓✓	Dish ✓	Dish ✓
Ease of PTP Alignment	Simple ✓✓✓	Simple ✓✓✓	Use the alignment tube ✓	Use the alignment tube ✓
Built-in I/O	Single 1000BaseT ✓	2.5 GbE PoE In 2.5 GbE PoE Out ✓✓✓	1000BaseT PoE In 1000BaseT PoE Out SFP+ ✓✓✓	1000BaseT PoE In 1000BaseT PoE Out SFP+ ✓✓✓
List Price	✓✓✓	✓✓	✓	✓

* Recommended ranges are rules of thumb. (MCS9 99.9% at 32 mm/hour rain) LINKPlanner should be used to determine range, capacity and add margin for your specific geographic location and connectivity requirements

V3000 – High Gain Client Node

Frequency: 57 to 66 GHz

Modulation: BPSK to 16 QAM (MCS 0 to MCS 12)

Throughput

- 1.9 Gbps Uplink + 1.9 Gbps Downlink
- 2.7 Gbps Uplink + 2.7 Gbps Downlink with channel bonding

Ultra High Antenna Gain with Beam Forming

- 44.5 dBi or 40.5 dBi antenna
- +/- 2.0 (Azimuth), +/- 1.0 (Elevation)

Synchronization: IEEE-1588 TC*

Low Latency: < 1 ms

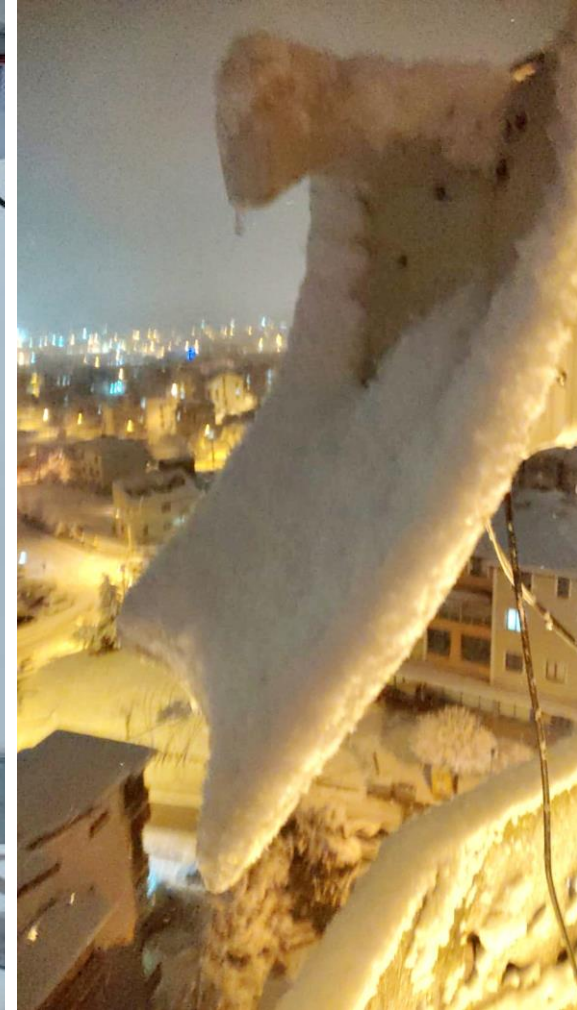


V3000
44.5 dBi Antenna



V3000
40.5 dBi Antenna

Snow holds sometimes



New 60 GHz cnWave V3000 Radome

Specifications

Model Number	C600500D004A
Material Type	Plastic
Wind Survivability	200 km/h (124 mph)
Product Compatability	C600500D001A and C600500D003A

Protects V3000 Large reflector from snow and ice accumulation



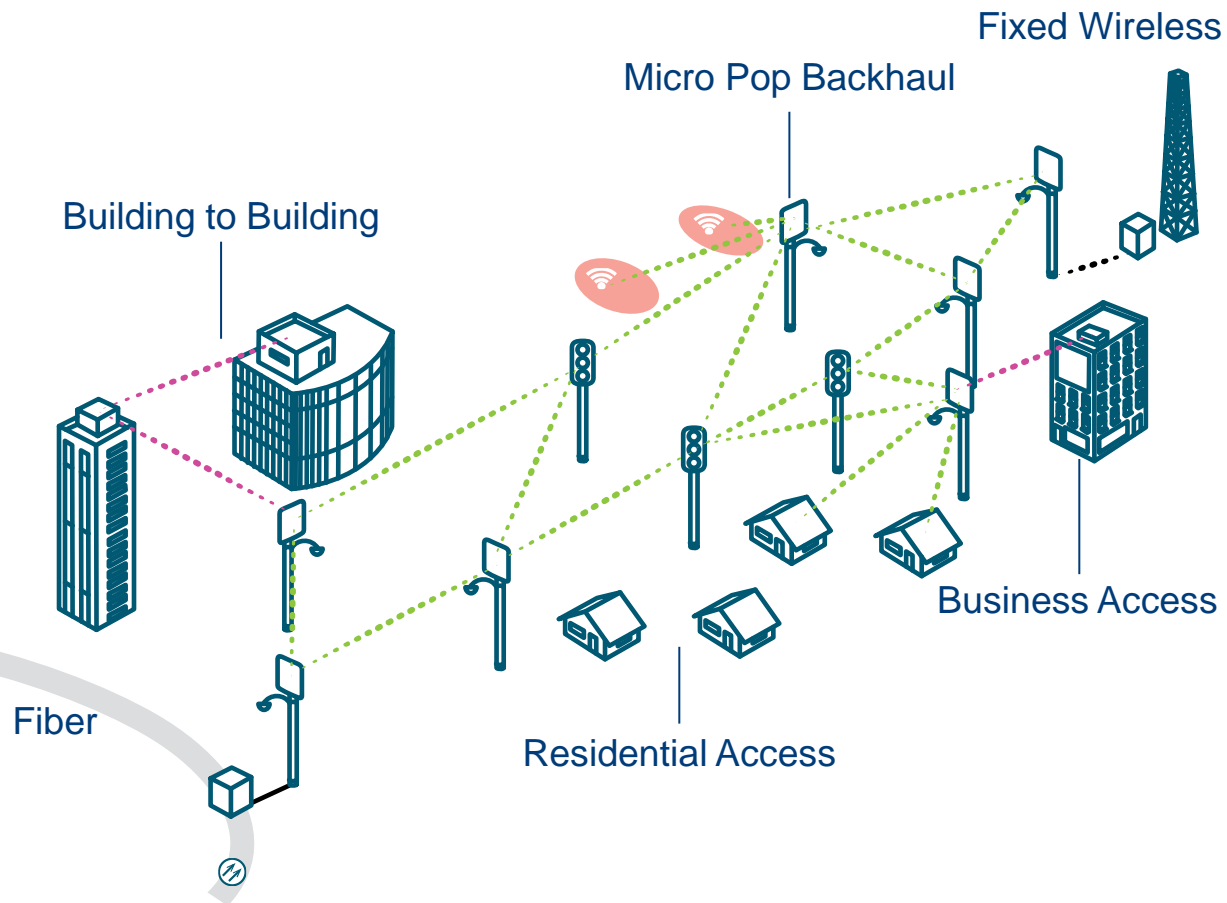
New 60 GHz cnWave V3000 Radome

Specifications

Model Number	C600500D004A
Material Type	Plastic
Wind Survivability	200 km/h (124 mph)
Product Compatability	C600500D001A and C600500D003A

Protects V3000 Large reflector from snow and ice accumulation





WTTH – Wireless To The Home

Providing Wireless Broadband access directly to the home.

WTTB – Wireless To The Building

Wireless Broadband access provided to rooftops or side of buildings, which then get distributed to individual offices and homes via wire.

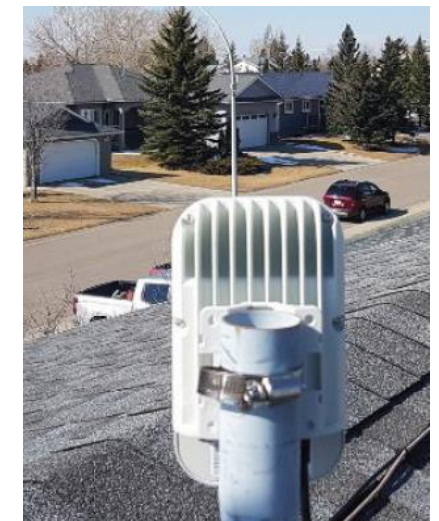
RTRT – Roof-Top To Roof-Top

Long range Point to Point with high gain dish
Multi Dwelling Distribution

Fiber Extension

Backhaul for 5G Small Cell, outdoor Wi-Fi, MicroPoP and CCTV

Think Bucket Trucks and Ladders Instead of Tower Climbs



Service Provider Suburban Deployment



Roof Top to Roof Top

DN-CN, PMP with Mesh



Wi-Fi

Enterprise Deployment, business zone



Roof Top to Roof Top

Multipoint with Mesh

Wi-Fi

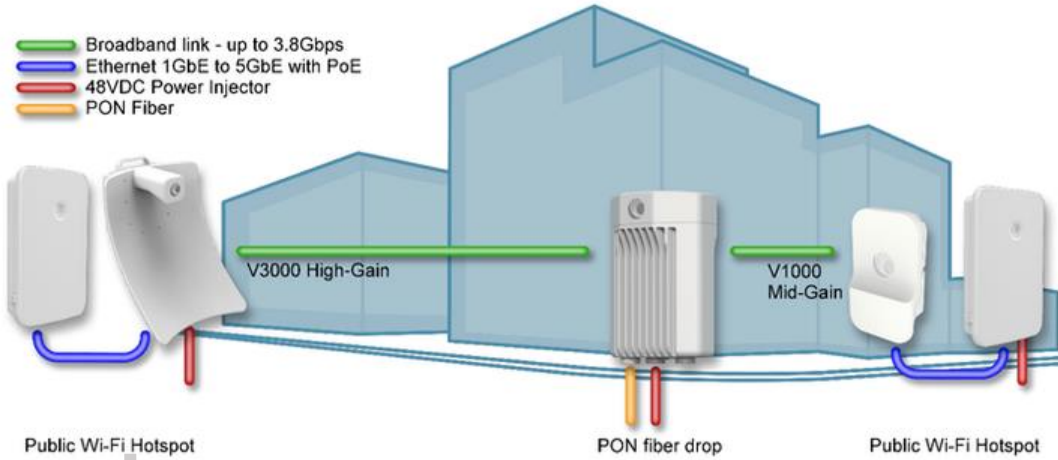


- Key Application:
 - Building to Building connectivity, Wi-Fi coverage for parking lots
- Solution:
 - Mesh network with V5000, V3000 and V1000



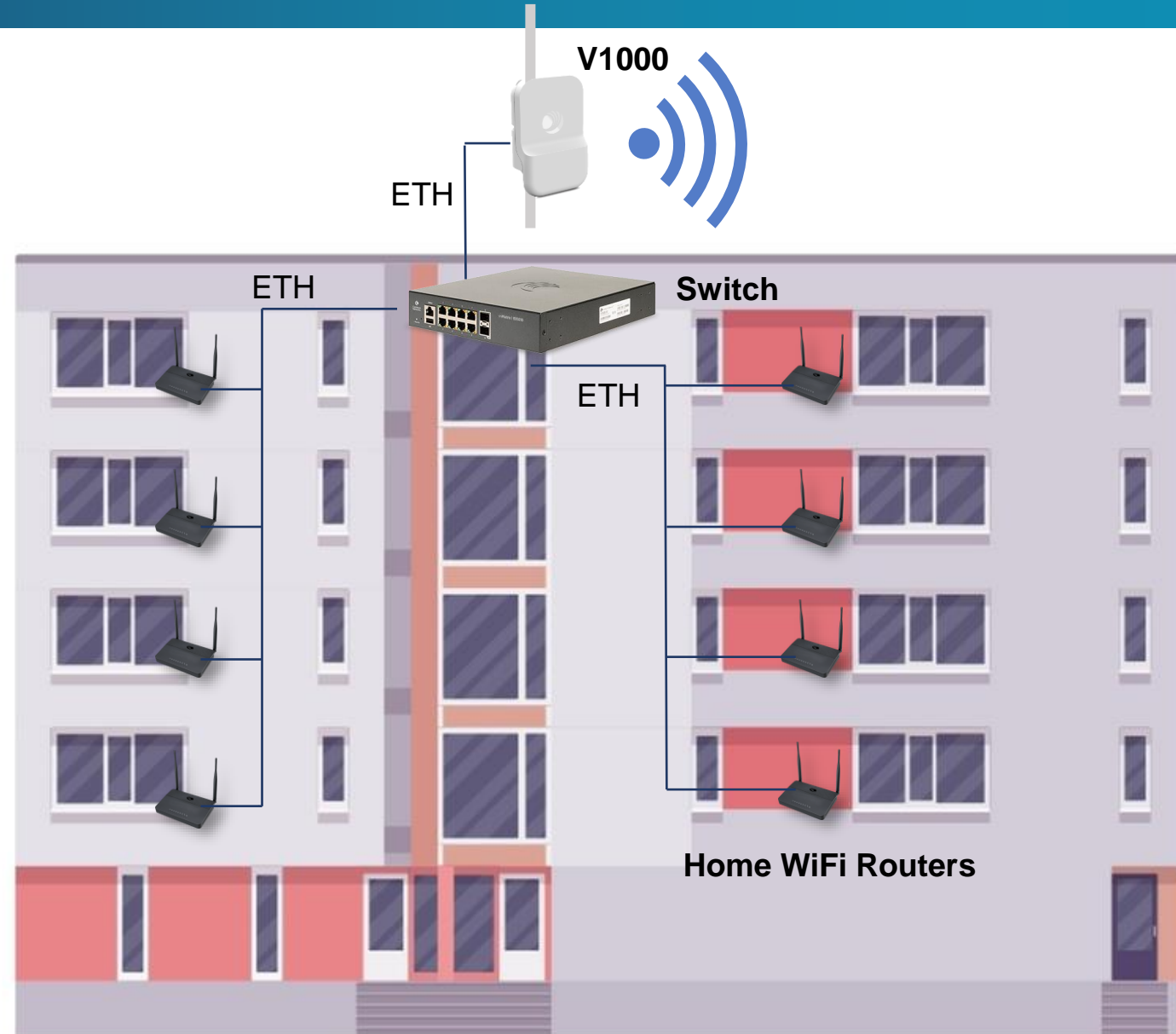
Multi Gigabit connectivity for Enterprise > MDU

- Broadband link - up to 3.8Gbps
- Ethernet 1GbE to 5GbE with PoE
- 48VDC Power Injector
- PON Fiber

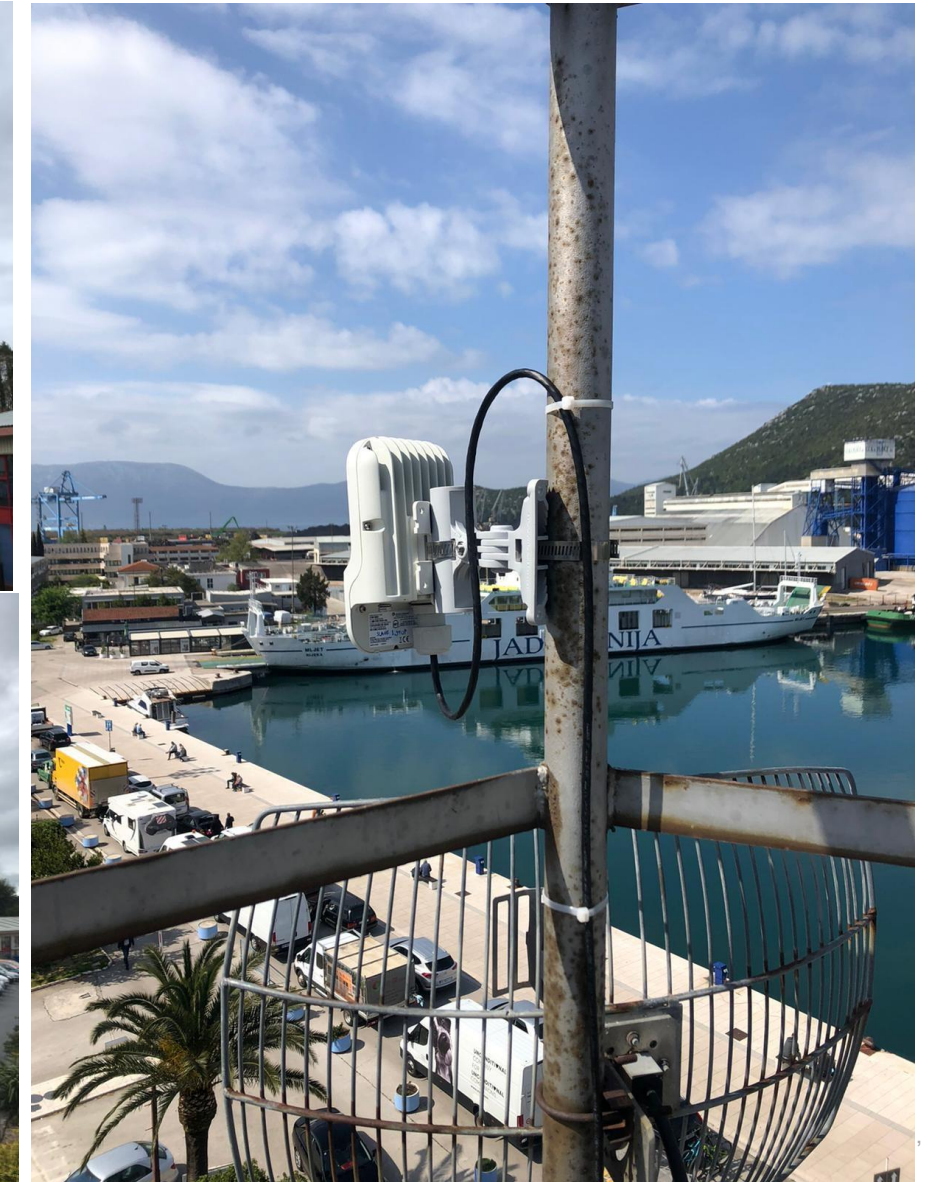


Wi-Fi 6 AP

This Photo by Unknown Author is licensed under [CC BY](https://creativecommons.org/licenses/by/4.0/)



Pictures of installations



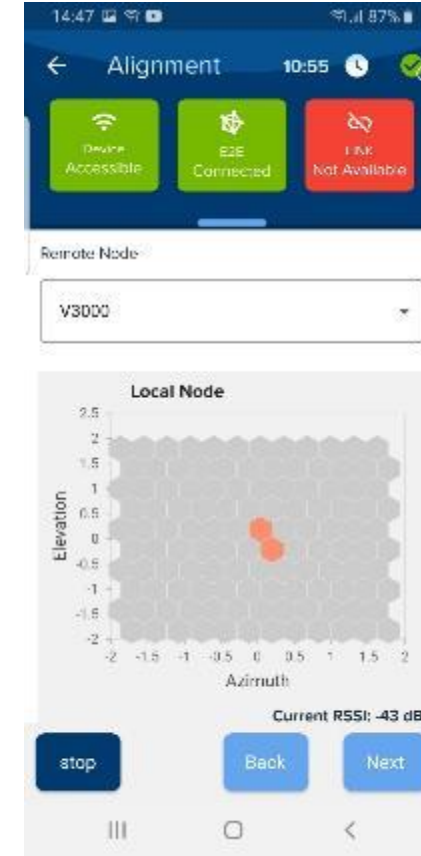
Precision bracket



Precision bracket and telescope



cnArcher – Alignment procedure



The units should be visually aligned.

Use the Alignment Tube or Telescope Mount

Use the GUI or New cnArcher



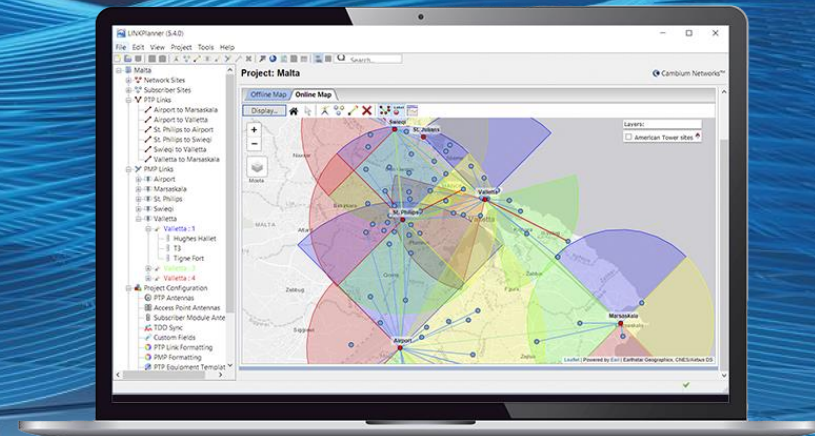
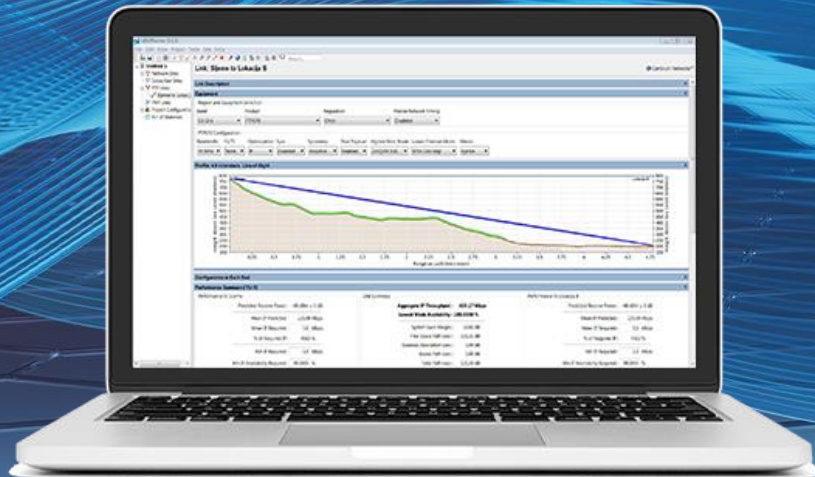
Geva Elettronica Battery PoE/WiFi unit available here:
<https://shop.gevaelettronica.it/en/battery-poe/28-batterypoe-at2-24v-48v-30w-14000-mah.html>



Cambium Networks™

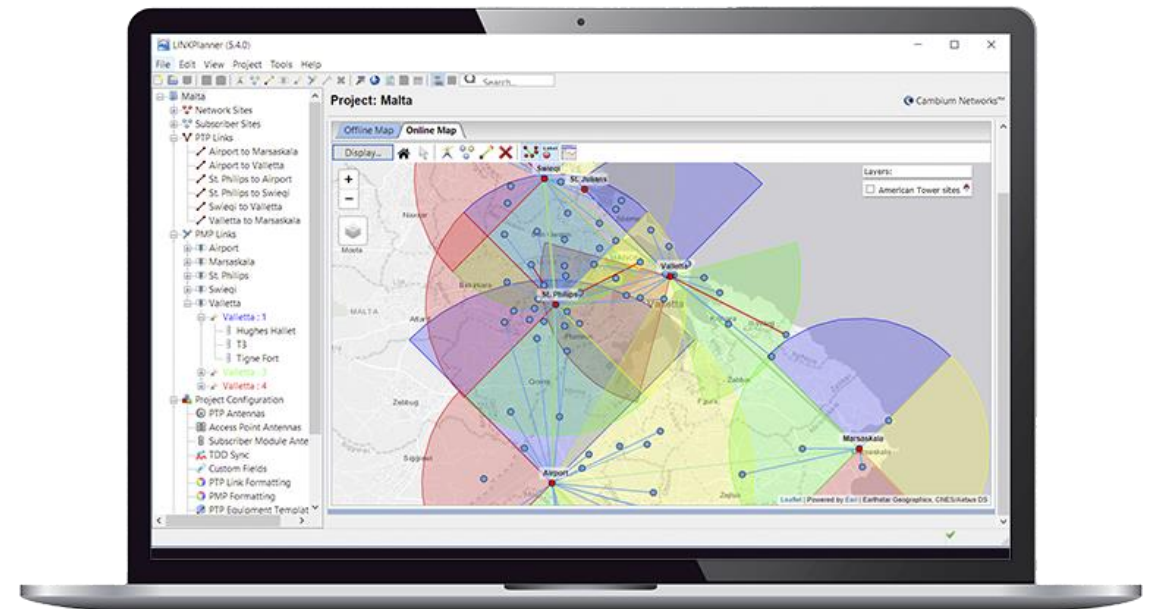
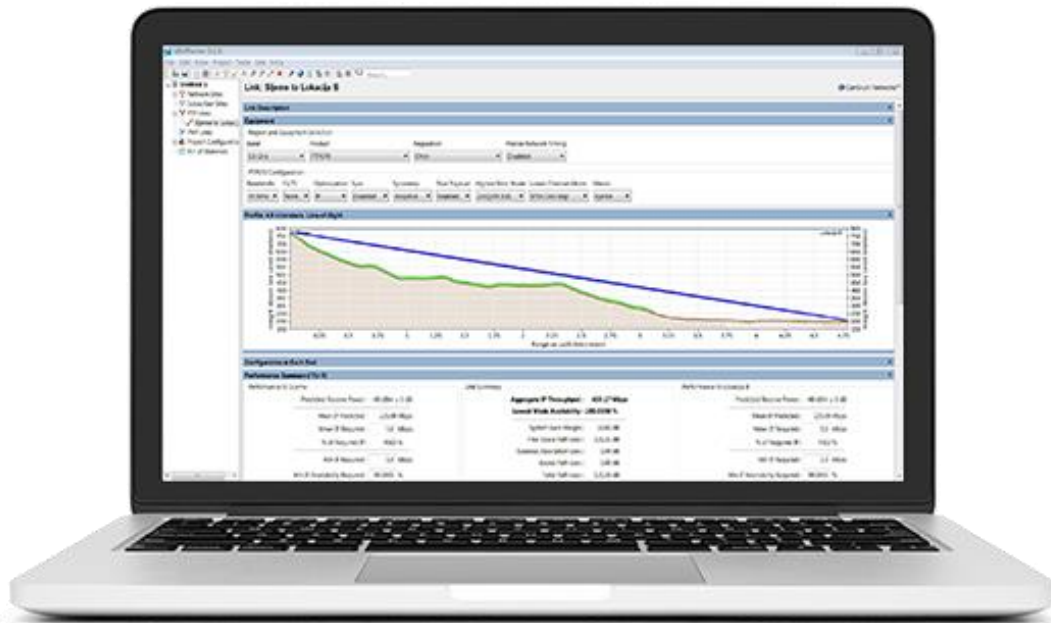
A1

Link Planner



LinkPlanner – free tool for radio planning

LINKPlanner allows you to model “what if” scenarios – based on geography, distance, antenna height, transmit power, and other factors – to optimize system performance before purchase. Quickly design networks for optimal deployment and cost effectiveness with ease.



<https://support.cambiumnetworks.com/files/linkplanner/>

Free for download and use

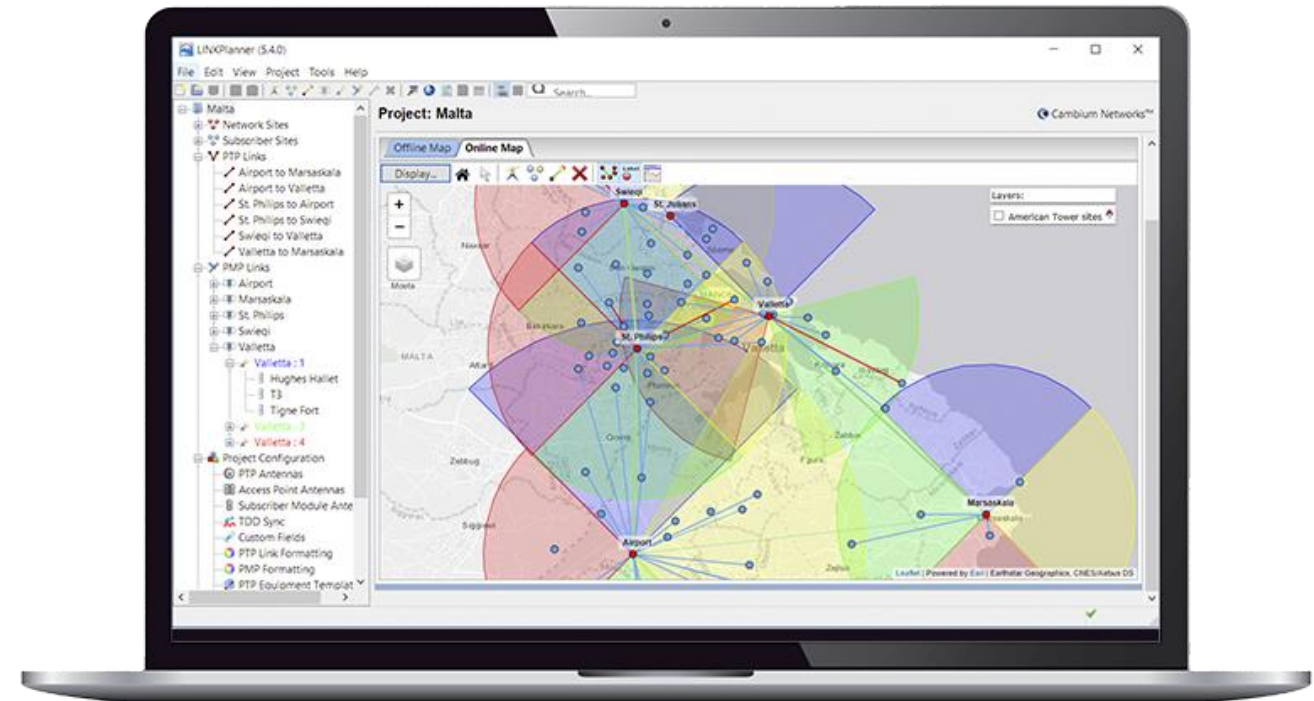
<https://support.cambiumnetworks.com/files/linkplanner/>

LINKPlanner

- Support PTP/PMP configuration with BOM creation
- Engineering report

Advanced Network Planer

- Mesh network designing
- Site identification and preparation
- LOS identification & optimization
- Build-in TCO/CAPEX calculator



Select Devices and Channel size

Equipment ⌵

Region and Equipment Selection

Band	Product	Remote Product	Regulation
60 GHz	V3000 (Preliminary)	V3000 (Preliminary)	Other

V3000 Configuration

Bandwidth	Golay Code	DL/UL Ratio	Maximum Mod Mode	Minimum Mod Mode	Master
2.16 GHz	1	50/50	MCS12 (16QAM 0.75 Sngl)	MCS2 (BPSK 0.5 Sngl)	A

Profile: 0.5 kilometers, Line-of-Sight ⌵

Configuration at Each End ⌵

A	B
Cambium Networks 1ft V3000 High Gain Integrated (42.0dBi)	Cambium Networks 1ft V3000 High Gain Integrated (42.0dBi)
Antenna Height: 5 meters (Max height at site is 10.0 m)	Antenna Height: 5 meters (Max height at site is 10.0 m)
Maximum EIRP: 61.0 dBm <input type="checkbox"/> User limit	Maximum EIRP: 61.0 dBm <input type="checkbox"/> User limit
Maximum Power: 19.0 dBm <input type="checkbox"/> User limit	Maximum Power: 19.0 dBm <input type="checkbox"/> User limit
Tx Frequency: 60.48 GHz <input type="button" value="Select..."/>	Tx Frequency: 60.48 GHz <input type="button" value="Select..."/>
<input type="checkbox"/> Interference:	<input type="checkbox"/> Interference:
MAC Address: <input type="text"/>	MAC Address: <input type="text"/>

Select Transmit Frequencies

A to B - 60 GHz, BW : 2.16 GHz

Search

- 58.32 (Channel 1)
- 60.48 (Channel 2)
- 62.64 (Channel 3)
- 64.80 (Channel 4)

OK Cancel

LINKPlanner (5.4.0) File Edit View Project Tools Link Help

Search...

V3000 trial

- Network Sites
 - Site A
 - Site B
 - Site C
 - Site D
- Subscriber Sites
- PTP Links
 - Site B to Site A**
 - Site C to Site D
- PMP Links
- Project Configuration
- Bill of Materials

Link: Site B to Site A

Link Description

Equipment

Region and Equipment Selection

Band	Product	Remote Product	Regulation
60 GHz	V3000 (Preliminary)	V3000 (Preliminary)	ETSI

V3000 Configuration

Bandwidth	Golay Code	DL/UL Ratio	Maximum Mod Mode	Minimum Mod Mode	Master
2.16 GHz	1	50/50	MCS12 (16QAM 0.75 Sngl)	MCS2 (BPSK 0.5 Sngl)	Site B

Profile: 0.5 kilometers, Line-of-Sight

Configuration at Each End

Performance Summary (ITU-R P.530-12)

Performance to Site B		Link Summary		Performance to Site A	
Predicted Receive Power :	-30 dBm ± 5 dB	Aggregate IP Throughput :	3.840 Gbps	Predicted Receive Power :	-30 dBm ± 5 dB
Mean IP Predicted :	1.920 Gbps	Lowest Mode Availability :	100.0000 %	Mean IP Predicted :	1.920 Gbps
Mean IP Required :	0.50 Gbps	System Gain Margin :	35.86 dB	Mean IP Required :	0.50 Gbps
% of Required IP :	384 %	Free Space Path Loss :	121.45 dB	% of Required IP :	384 %
Min IP Required :	0.10 Gbps	Gaseous Absorption Loss :	5.69 dB	Min IP Required :	0.10 Gbps
Min IP Availability Required :	99.9900 %	Excess Path Loss :	0.00 dB	Min IP Availability Required :	99.9900 %
Min IP Availability Predicted :	100.0000 %	Total Path Loss :	127.14 dB	Min IP Availability Predicted :	100.0000 %

Performance Details

Performance Summary (ITU-R) ^

<p>Performance to A</p> <p>Predicted Receive Power: -27 dBm ± 5 dB</p> <hr/> <p>Mean IP Predicted: 1.920 Gbps</p> <p>Mean IP Required: <input type="text" value="0.50"/> Gbps</p> <p>% of Required IP: 384 %</p> <hr/> <p>Min IP Required: <input type="text" value="0.10"/> Gbps</p> <p>Min IP Availability Required: <input type="text" value="99.9900"/> %</p> <p>Min IP Availability Predicted: 99.9997 %</p>	<p>Link Summary</p> <p>Aggregate IP Throughput: 3.840 Gbps</p> <p>Lowest Mode Availability: 99.9997 %</p> <hr/> <p>System Gain Margin: 39.39 dB</p> <p>Free Space Path Loss: 122.58 dB</p> <p>Gaseous Absorption Loss: 7.02 dB</p> <p>Excess Path Loss: 0.00 dB</p> <p>Total Path Loss: 129.61 dB</p>	<p>Performance to B</p> <p>Predicted Receive Power: -27 dBm ± 5 dB</p> <hr/> <p>Mean IP Predicted: 1.920 Gbps</p> <p>Mean IP Required: <input type="text" value="0.50"/> Gbps</p> <p>% of Required IP: 384 %</p> <hr/> <p>Min IP Required: <input type="text" value="0.10"/> Gbps</p> <p>Min IP Availability Required: <input type="text" value="99.9900"/> %</p> <p>Min IP Availability Predicted: 99.9997 %</p>
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Performance Details ^

Charts

Details

Common details

MCS:	<input type="text" value="MCS12"/>	<input type="text" value="MCS11"/>	<input type="text" value="MCS10"/>	<input type="text" value="MCS9"/>	<input type="text" value="MCS8"/>	<input type="text" value="MCS7"/>	<input type="text" value="MCS6"/>	<input type="text" value="MCS4"/>	<input type="text" value="MCS3"/>	<input type="text" value="MCS2"/>
Mode:	<input type="text" value="16QAM"/>	<input type="text" value="16QAM"/>	<input type="text" value="16QAM"/>	<input type="text" value="QPSK"/>	<input type="text" value="QPSK"/>	<input type="text" value="QPSK"/>	<input type="text" value="QPSK"/>	<input type="text" value="BPSK"/>	<input type="text" value="BPSK"/>	<input type="text" value="BPSK"/>
Code Rate:	<input type="text" value="0.75"/>	<input type="text" value="0.625"/>	<input type="text" value="0.5"/>	<input type="text" value="0.8125"/>	<input type="text" value="0.83"/>	<input type="text" value="0.75"/>	<input type="text" value="0.67"/>	<input type="text" value="0.75"/>	<input type="text" value="0.625"/>	<input type="text" value="0.5"/>
Payloads:	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>	<input type="text" value="Single"/>
Max Aggregate IP Throughput (Gbps):	<input type="text" value="3.840"/>	<input type="text" value="3.290"/>	<input type="text" value="2.690"/>	<input type="text" value="2.220"/>	<input type="text" value="2.090"/>	<input type="text" value="1.770"/>	<input type="text" value="1.430"/>	<input type="text" value="1.090"/>	<input type="text" value="0.918"/>	<input type="text" value="0.740"/>

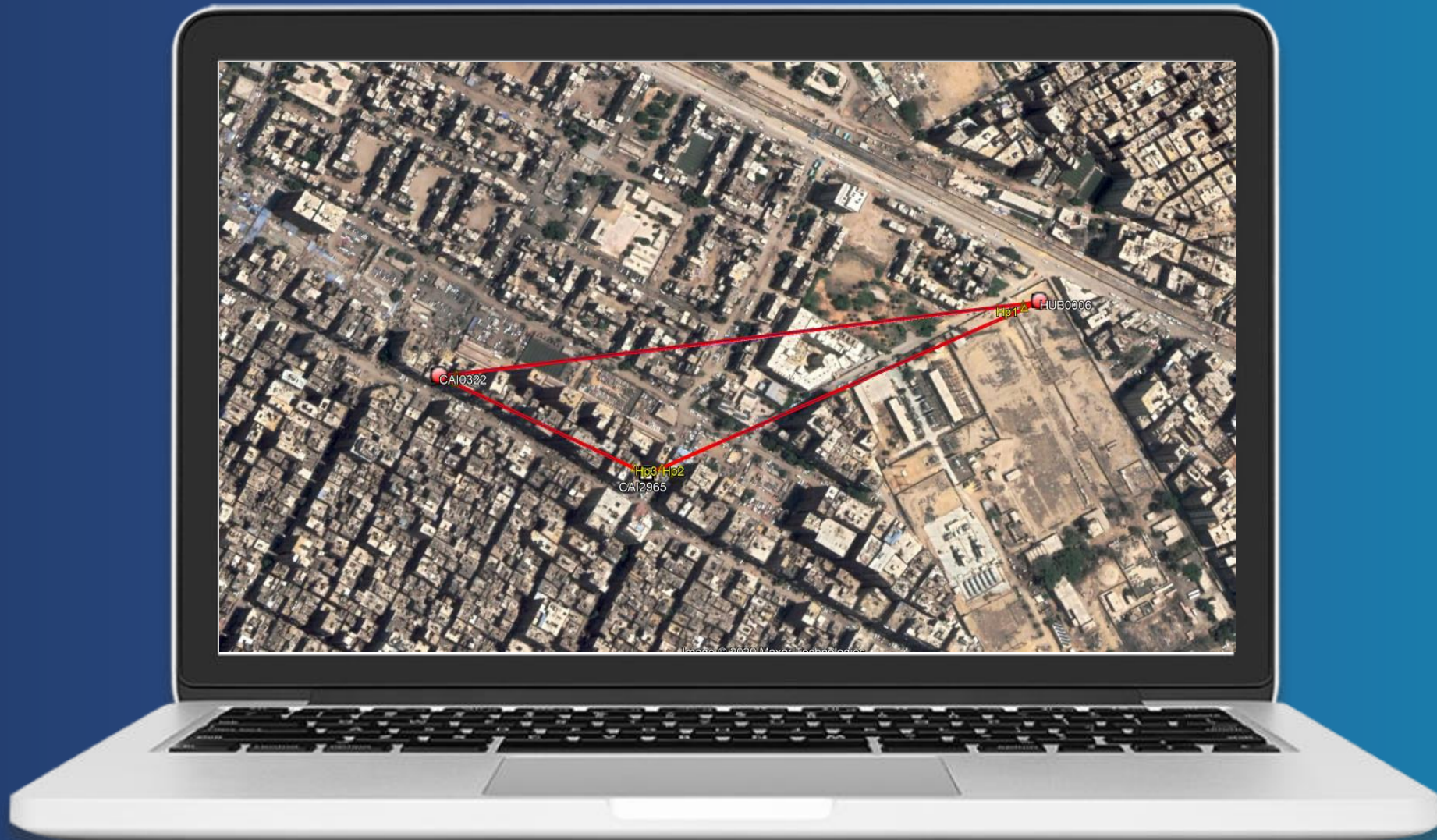
Performance to A

Max IP Throughput (Gbps):	<input type="text" value="1.920"/>	<input type="text" value="1.645"/>	<input type="text" value="1.345"/>	<input type="text" value="1.110"/>	<input type="text" value="1.045"/>	<input type="text" value="0.885"/>	<input type="text" value="0.715"/>	<input type="text" value="0.545"/>	<input type="text" value="0.459"/>	<input type="text" value="0.370"/>
Fade Margin (dB):	<input type="text" value="20.39"/>	<input type="text" value="22.39"/>	<input type="text" value="23.39"/>	<input type="text" value="32.39"/>	<input type="text" value="34.39"/>	<input type="text" value="35.39"/>	<input type="text" value="36.39"/>	<input type="text" value="37.39"/>	<input type="text" value="38.39"/>	<input type="text" value="39.39"/>
Mode Availability (%):	<input type="text" value="99.9973"/>	<input type="text" value="99.9980"/>	<input type="text" value="99.9982"/>	<input type="text" value="99.9994"/>	<input type="text" value="99.9995"/>	<input type="text" value="99.9996"/>	<input type="text" value="99.9996"/>	<input type="text" value="99.9997"/>	<input type="text" value="99.9997"/>	<input type="text" value="99.9997"/>
Receive Time in Mode (%):	<input type="text" value="99.9973"/>	<input type="text" value="0.0007"/>	<input type="text" value="0.0003"/>	<input type="text" value="0.0012"/>	<input type="text" value="0.0001"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>

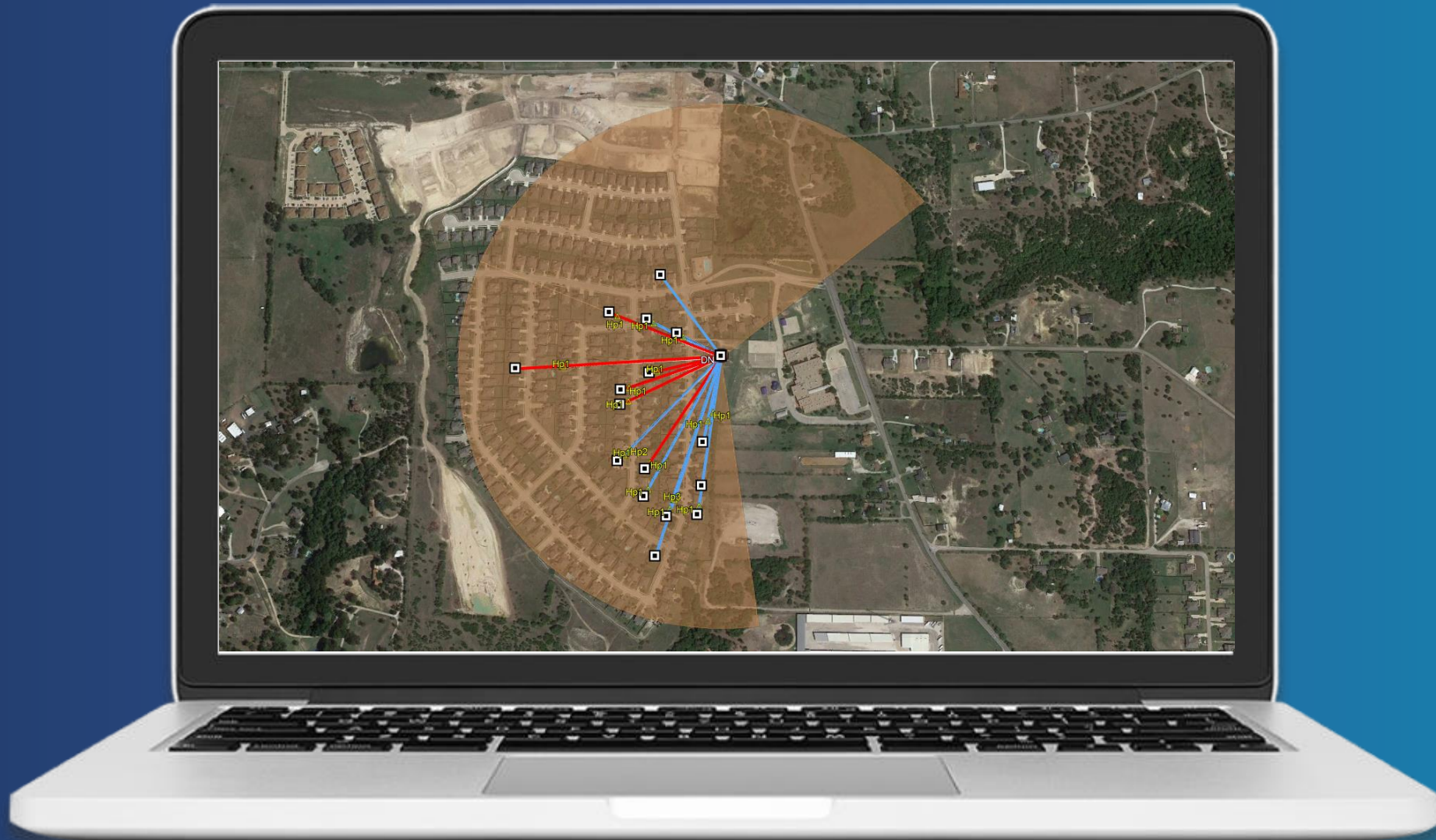
Performance to B

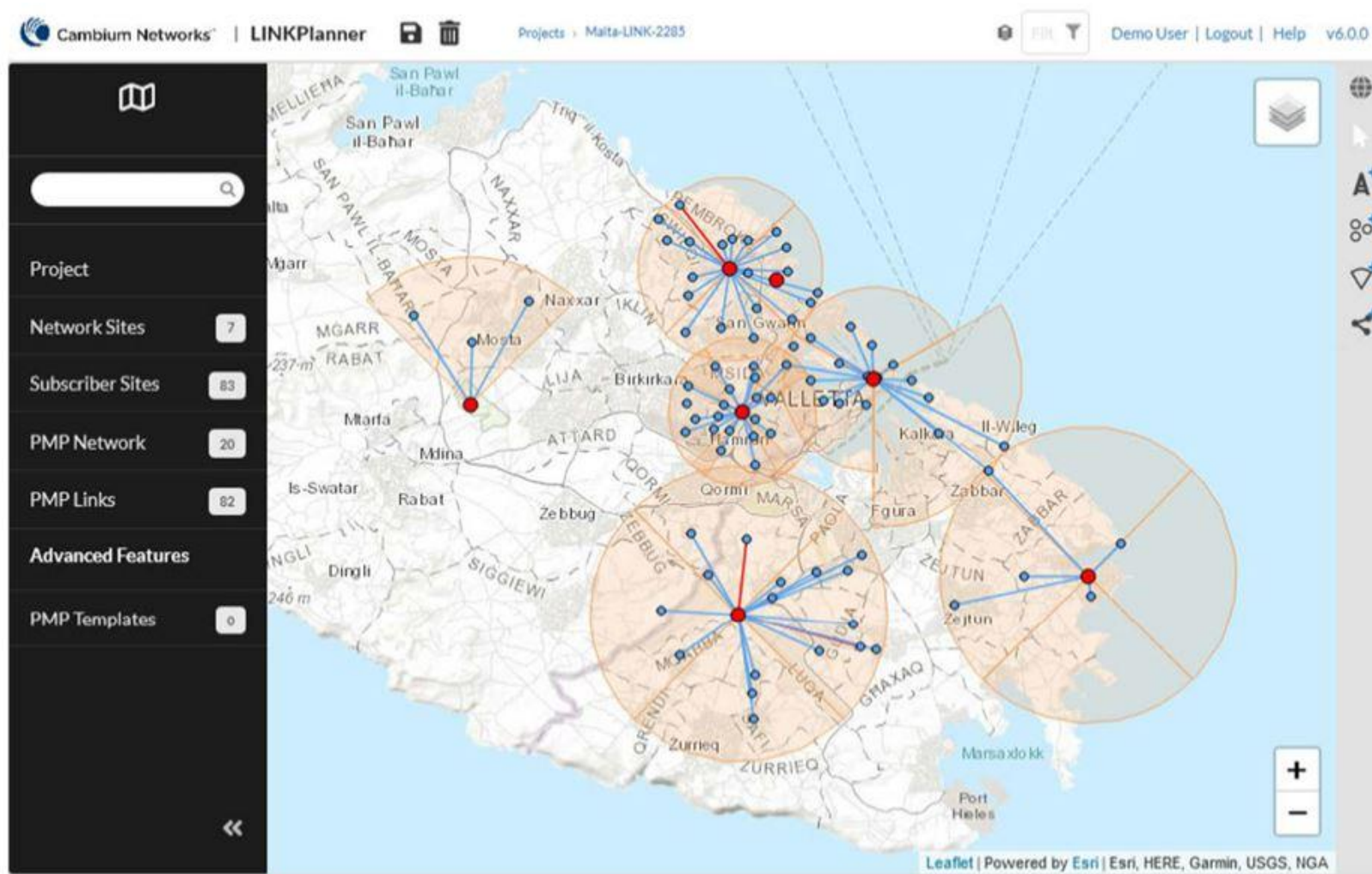
Max IP Throughput (Gbps):	<input type="text" value="1.920"/>	<input type="text" value="1.645"/>	<input type="text" value="1.345"/>	<input type="text" value="1.110"/>	<input type="text" value="1.045"/>	<input type="text" value="0.885"/>	<input type="text" value="0.715"/>	<input type="text" value="0.545"/>	<input type="text" value="0.459"/>	<input type="text" value="0.370"/>
Fade Margin (dB):	<input type="text" value="20.39"/>	<input type="text" value="22.39"/>	<input type="text" value="23.39"/>	<input type="text" value="32.39"/>	<input type="text" value="34.39"/>	<input type="text" value="35.39"/>	<input type="text" value="36.39"/>	<input type="text" value="37.39"/>	<input type="text" value="38.39"/>	<input type="text" value="39.39"/>
Mode Availability (%):	<input type="text" value="99.9973"/>	<input type="text" value="99.9980"/>	<input type="text" value="99.9982"/>	<input type="text" value="99.9994"/>	<input type="text" value="99.9995"/>	<input type="text" value="99.9996"/>	<input type="text" value="99.9996"/>	<input type="text" value="99.9997"/>	<input type="text" value="99.9997"/>	<input type="text" value="99.9997"/>
Receive Time in Mode (%):	<input type="text" value="99.9973"/>	<input type="text" value="0.0007"/>	<input type="text" value="0.0003"/>	<input type="text" value="0.0012"/>	<input type="text" value="0.0001"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>	<input type="text" value="0.0000"/>

Design Example 1 - PTP



Design Example 2 - PMP





<https://lp.cambiumnetworks.com>



Cambium Networks™

A1

References

Cambium/Xirrus Wi-Fi customers

ENTERPRISE



HOSPITALITY



PUBLIC VENUES CONFERENCES AND EVENTS



EDUCATION









**ZAVOD ZA ŠPORT
JESENICE**



- Marriott Grand Hotel Flora, Roma – Italy (cnPilot)
- Sheraton Diana Majestic Milan – Italy (Xirrus)
- Sheraton Charles de Gaulle - France (Xirrus)
- Sheraton Schiphol - Belgium (Xirrus)
- Sheraton Cervo - Italy (Xirrus)
- Sheraton Schiphol, Amsterdam- Netherlands (Xirrus)
- Sheraton Esmeralda Sardinia - Italy (Xirrus)
- Westin Paris Vendôme – France (Xirrus)

Hotel Academia, Croatia



★★★★
ACADEMIA



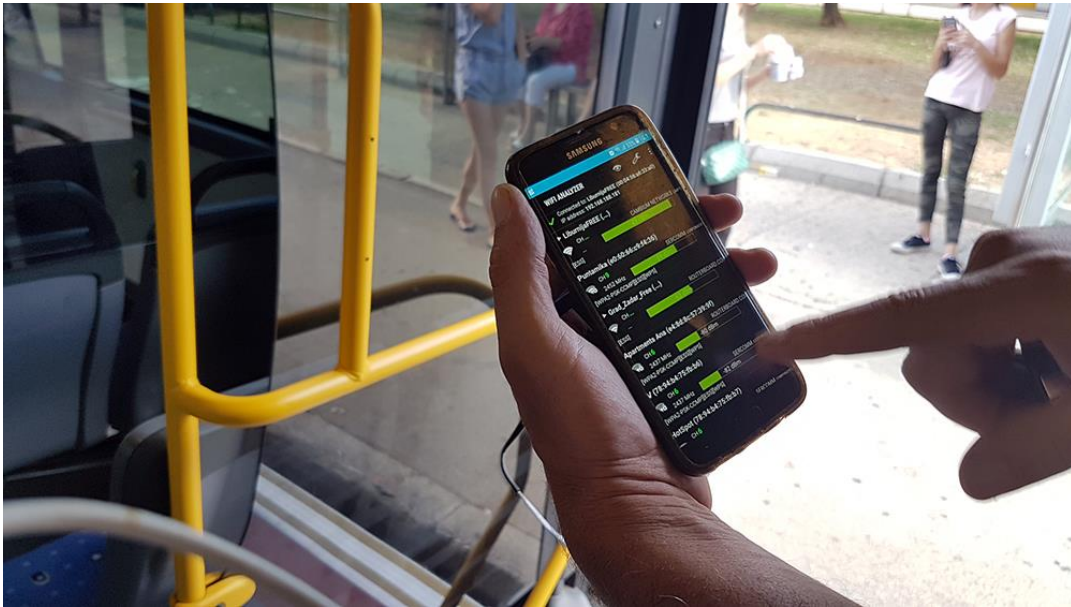




- Largest gaming show in south east Europe
- 70.000+ visitors
- 6 halls, 15.000+ m2
- Thousands of simultaneous clients on the network
- Extreme high density
- Challenging RF environment

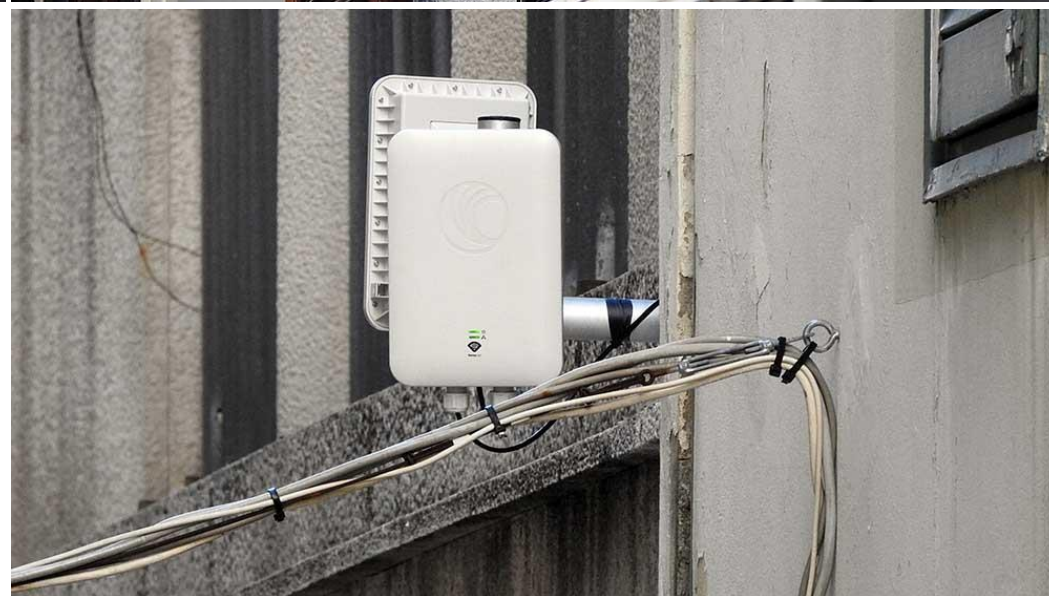
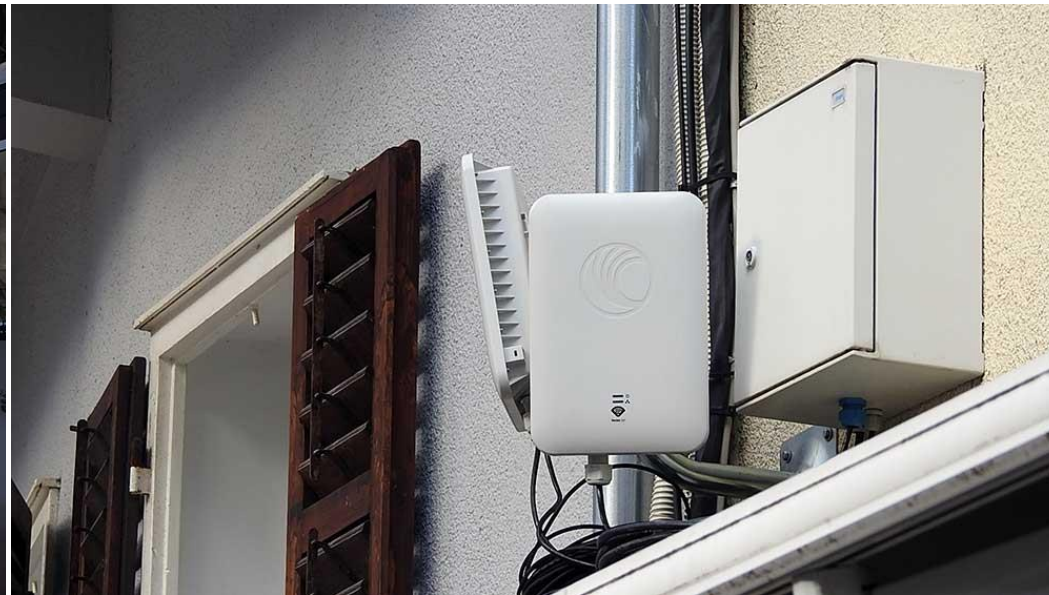
Watch the video





SOLUTION

- 40 busses
- cnPilot E600 4x4:4 with USB port
- LTE USB dongle with SIM card
- cnMaestro Cloud controller



Skladišta



Marina Preko, Croatia





UK Premier League Football Club with 450 million strong international fan base

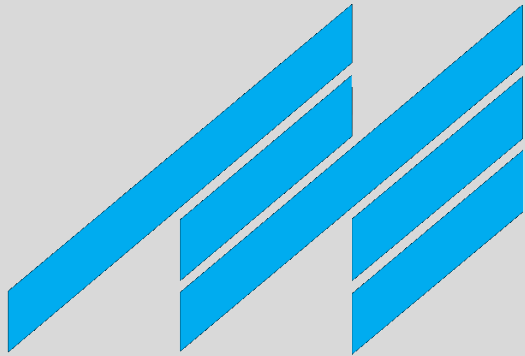
REQUIREMENTS

- Wireless coverage in stands and adjoining corporate facilities
- Enable fans to share match-day experiences with each other and connect with the club
- Analytics track how fans use the facilities

SOLUTION

- High Density APs with Application Control to ensure reliability for critical applications
- Ubiquitous wireless network to support custom services, including wayfinding and dynamic content
- Over 4X the coverage and up to 8X the capacity of competitive solutions to deliver high-density wireless support

MESSE MÜNCHEN INTERNATIONAL



Largest exhibition venue in Germany and home of the world's largest construction show – Bauma

REQUIREMENTS

- Coverage across 570,000 m² (6.1 million sq ft)
- Wireless connectivity for 530,000+ visitors at Bauma

SOLUTION

- Over 200 High Density APs
- Max Simultaneous Devices – 6,000+
- Total Unique Clients During Bauma Event – 62,646
- Application Control to block P2P apps



“

We've increased our capacity and solved a problem that we've never been able to solve and we've been able to do all the other wireless needs at the event at somewhere under half of the cost for the facility side of things as we have in the past.

JOHN O'GARA

Group Manager for Microsoft's CMG Events & Studies

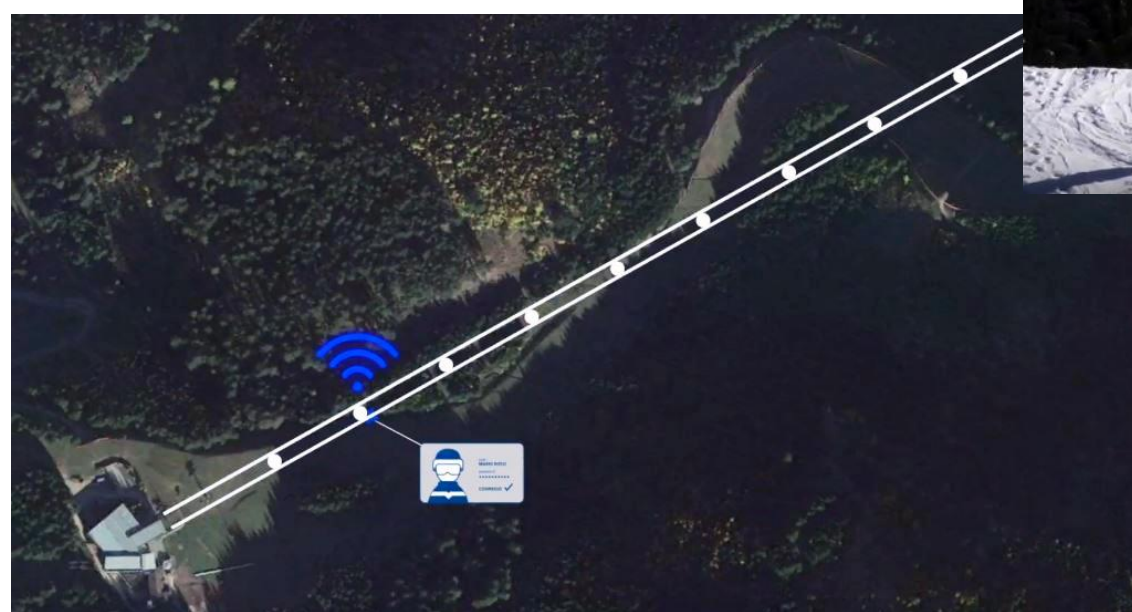
REQUIREMENTS

- Simultaneously connect 10,000s of Wi-Fi users
- Temporary deployment minimizing amount of equipment
- Simple network that can be centrally managed

SOLUTION

- High performance High Density APs
- 80% less equipment and 80% less time to deploy

Ski resort in Italy, Alpe Cermis



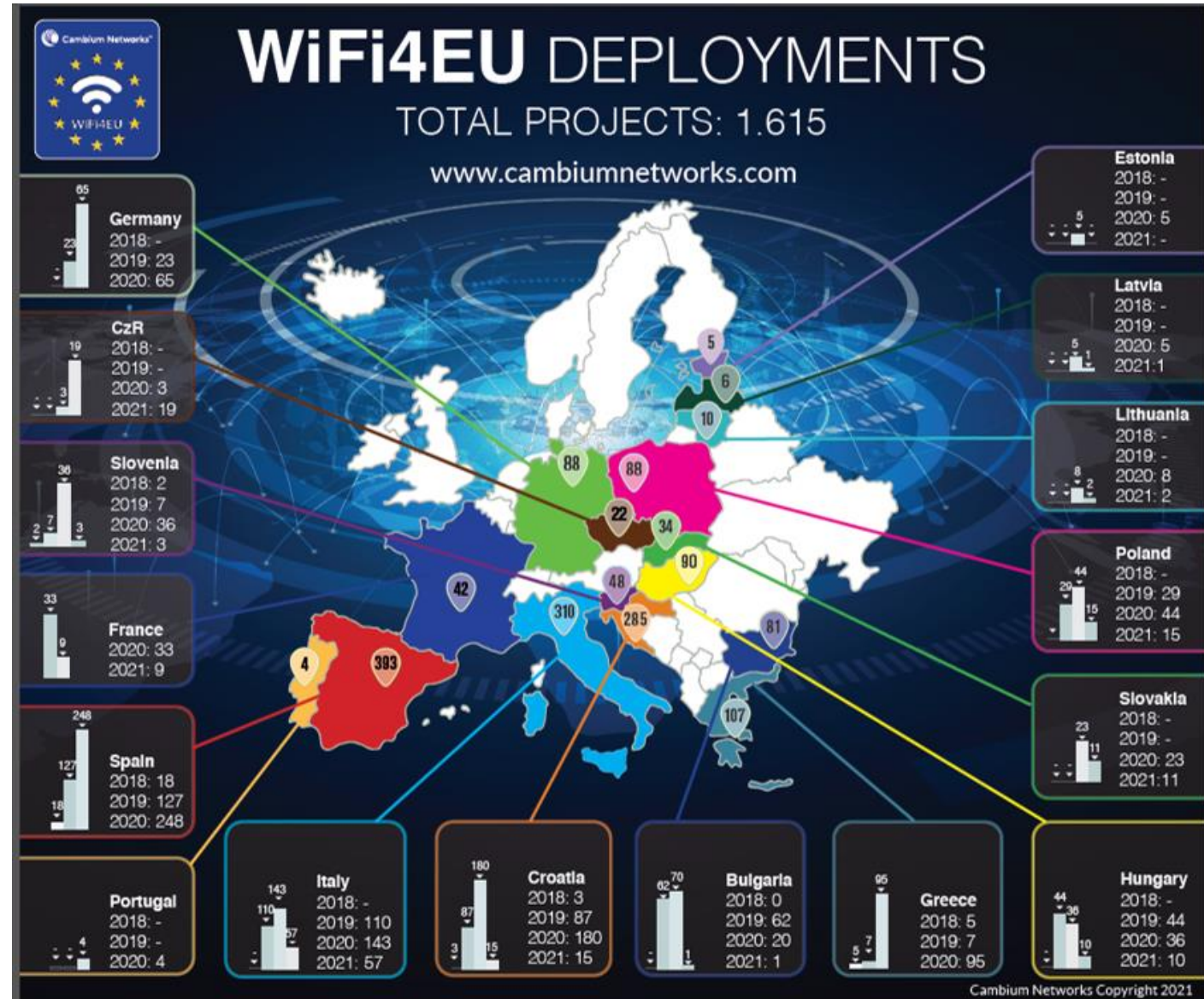
Watch the video



WiFi4EU success story, ~3000 municipalities



380+ municipalities in Spain
318 municipalities in Croatia
300+ municipalities Italy
90+ municipalities in Bulgaria
60+ municipalities in Slovenia





Cambium Networks™



Connected Partner Program

- **ConnectedPartner**
 - All approved partners enter at the CP level and receive many program benefits



All Cambium partners are supported and their efforts are protected with deal registrations.

Why register a deal?

- Project protection reduces conflicts between Partners on same projects
- Protection of sales margins
- Additional Partner discounts on registered deals
- Partners are more competitive and their offer is more attractive to end-user



Deal registration Program Requirements



Intended for first deployment

New customer
New application
New market
New product into a customer



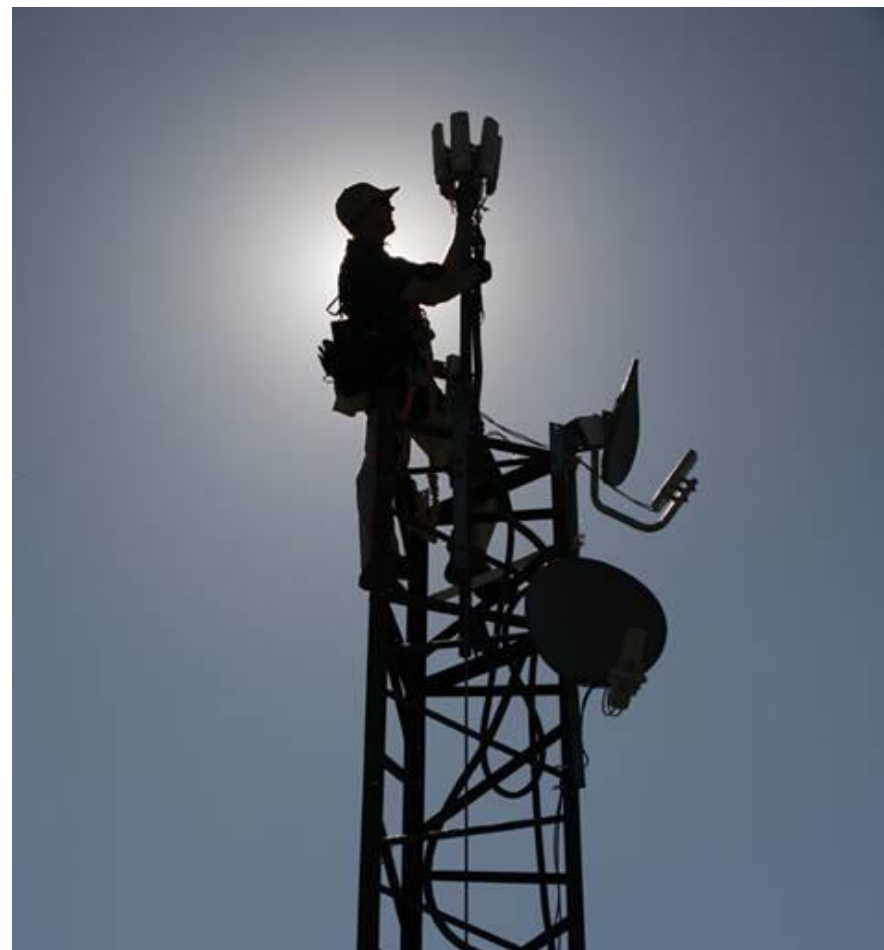
Must be end-customer project/program specific



Must be registered at least 15 days before purchase

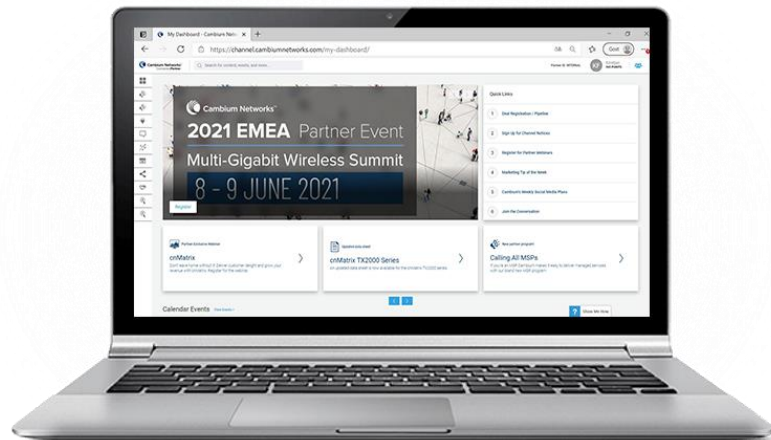


Must meet minimum deal value, as outlined in the Program Guidelines



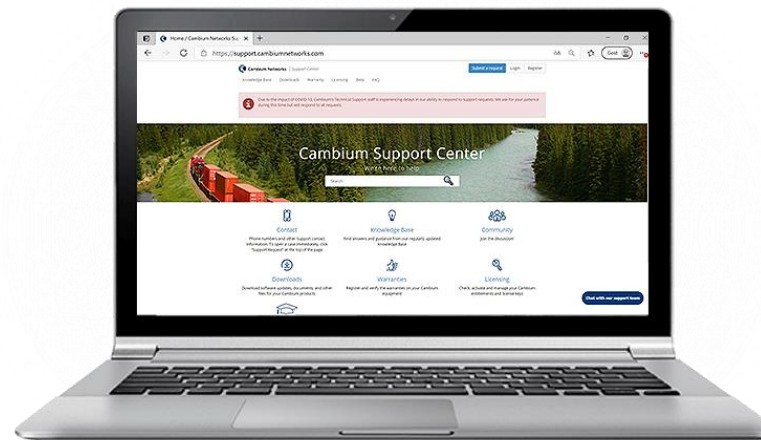
Partner Portal

<https://channel.cambiumnetworks.com>



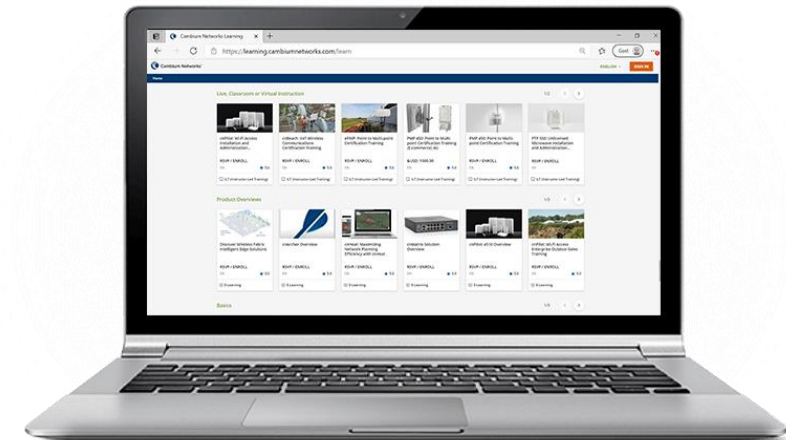
Support Portal

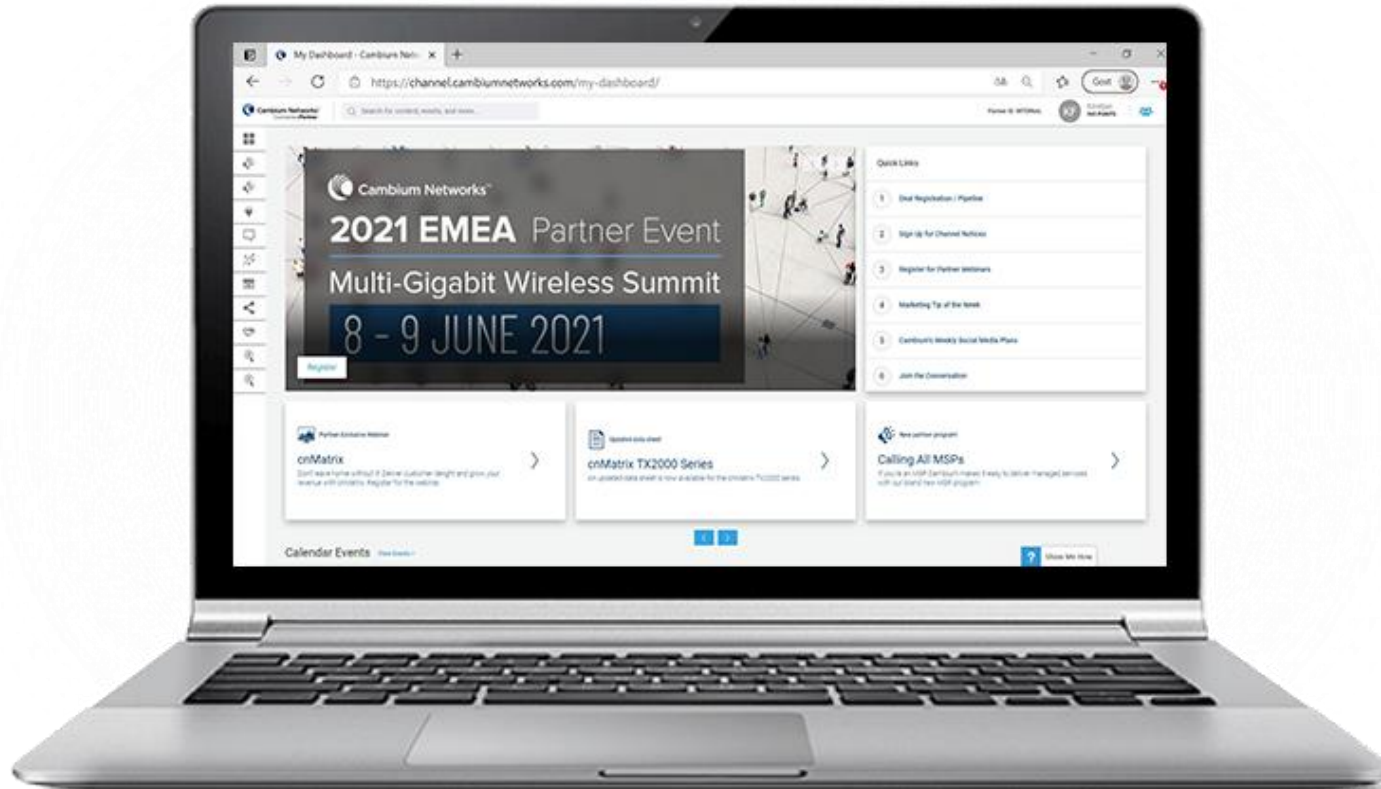
<https://support.cambiumnetworks.com>



Learning portal

<https://learning.cambiumnetworks.com>





Content & Resources

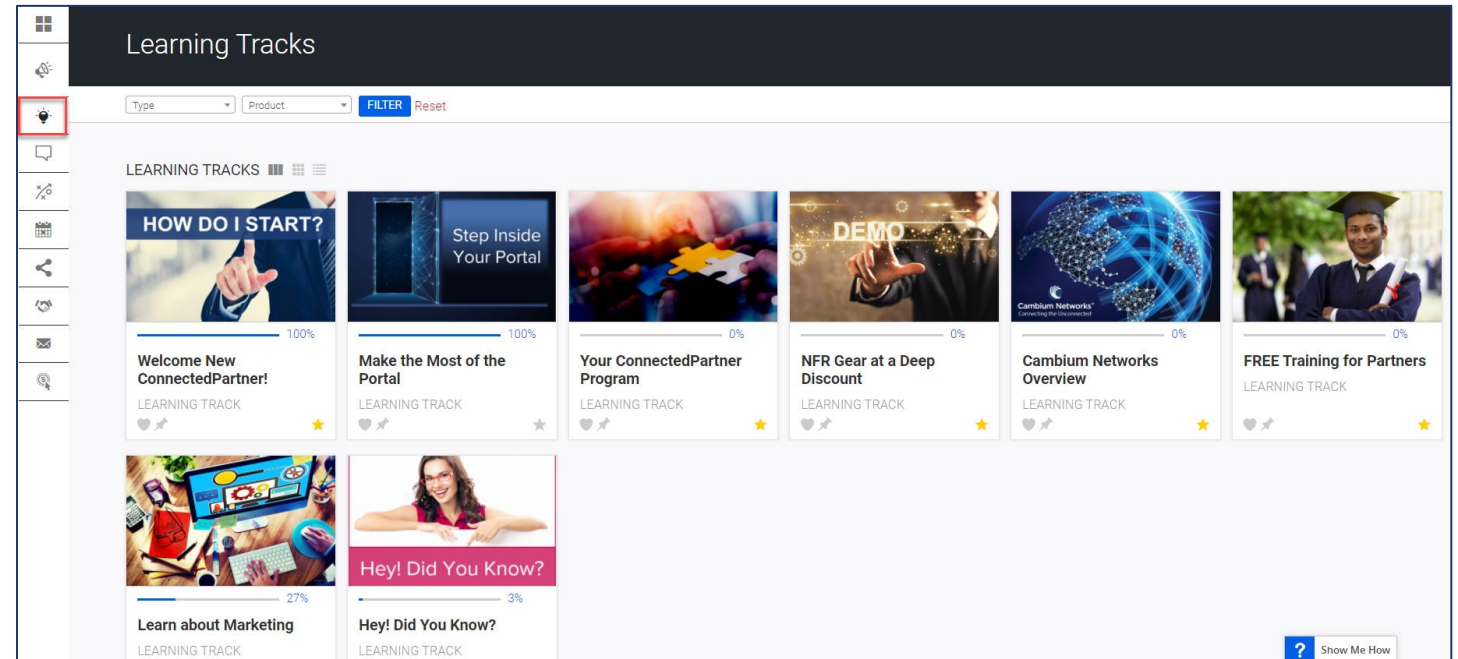
- Brochures & solution papers
- Data sheets
- Case studies
- Product info
- Slide decks

Playbooks

- Vertical market content
- Marketing resources
- Program info
- Pricing info

<https://channel.cambiumnetworks.com/>

- **Go to Learning Tracks**
- **Click each track to learn about:**
 - Your partnership program
 - Your partner portal
 - Cambium Networks
 - NFR gear
 - Training resources
 - And more!

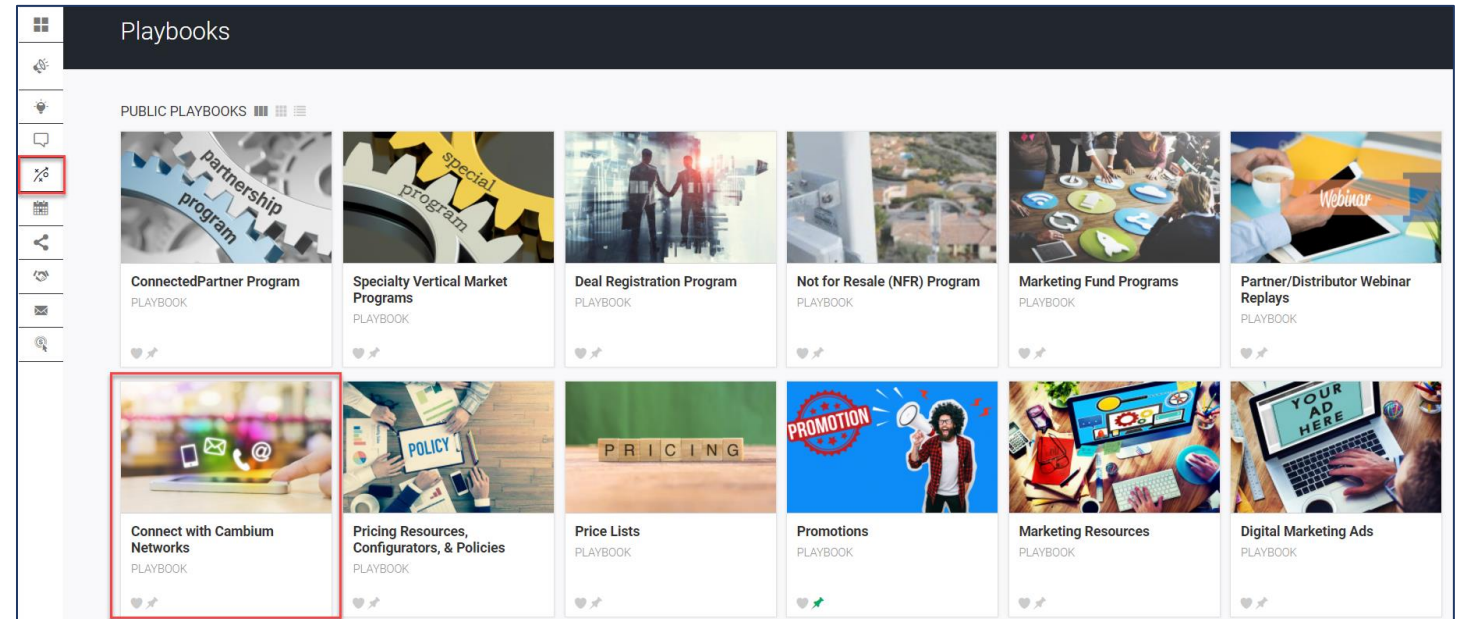


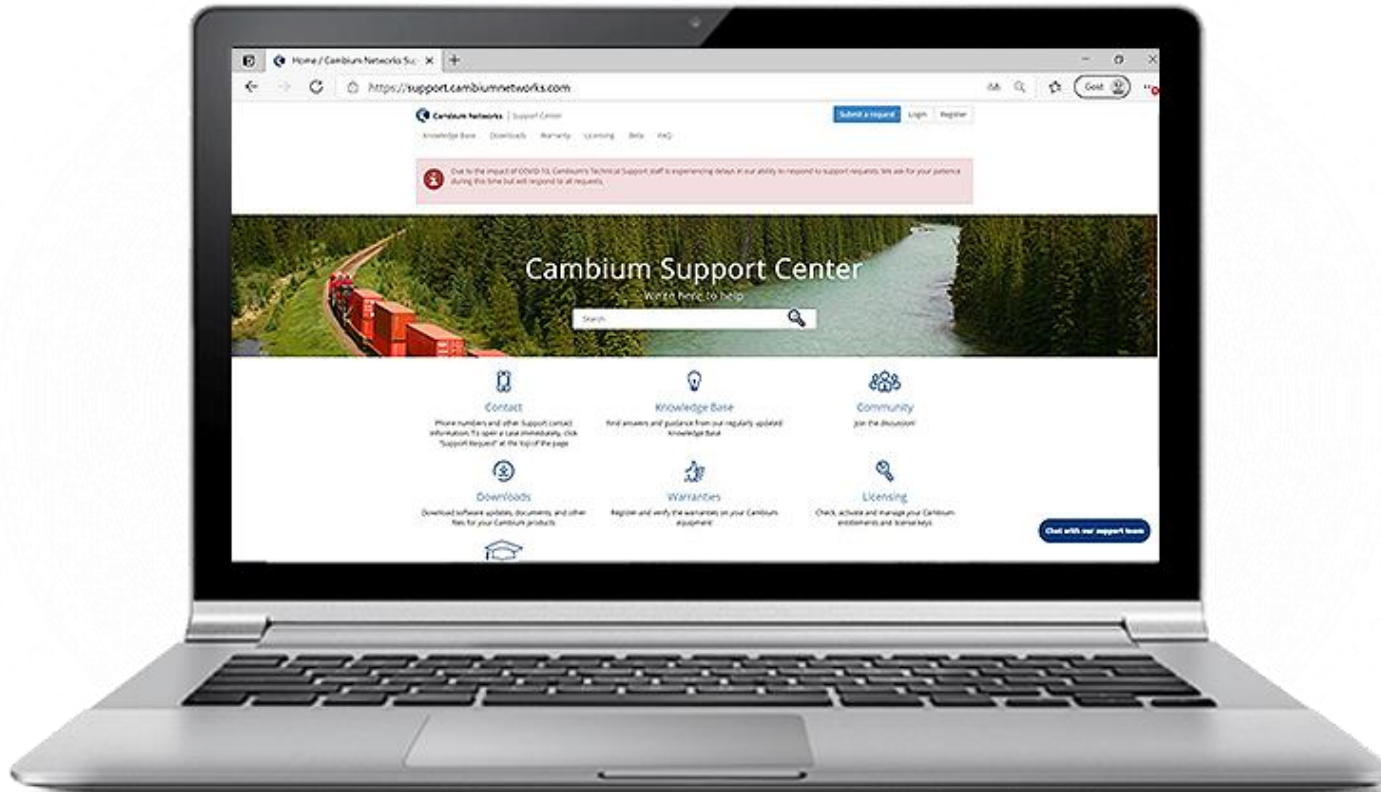
The screenshot displays the 'Learning Tracks' section of a user interface. At the top, there is a search bar with 'Type' and 'Product' dropdowns, and buttons for 'FILTER' and 'Reset'. Below this, a grid of learning track cards is shown. Each card features a title, a progress bar, and a star icon. The tracks include:

- HOW DO I START?** (100% progress)
- Welcome New ConnectedPartner!** (100% progress)
- Step Inside Your Portal** (100% progress)
- Make the Most of the Portal** (100% progress)
- Your ConnectedPartner Program** (0% progress)
- NFR Gear at a Deep Discount** (0% progress)
- Cambium Networks Overview** (0% progress)
- FREE Training for Partners** (0% progress)
- Learn about Marketing** (27% progress)
- Hey! Did You Know?** (3% progress)

A 'Show Me How' button is located in the bottom right corner of the interface.

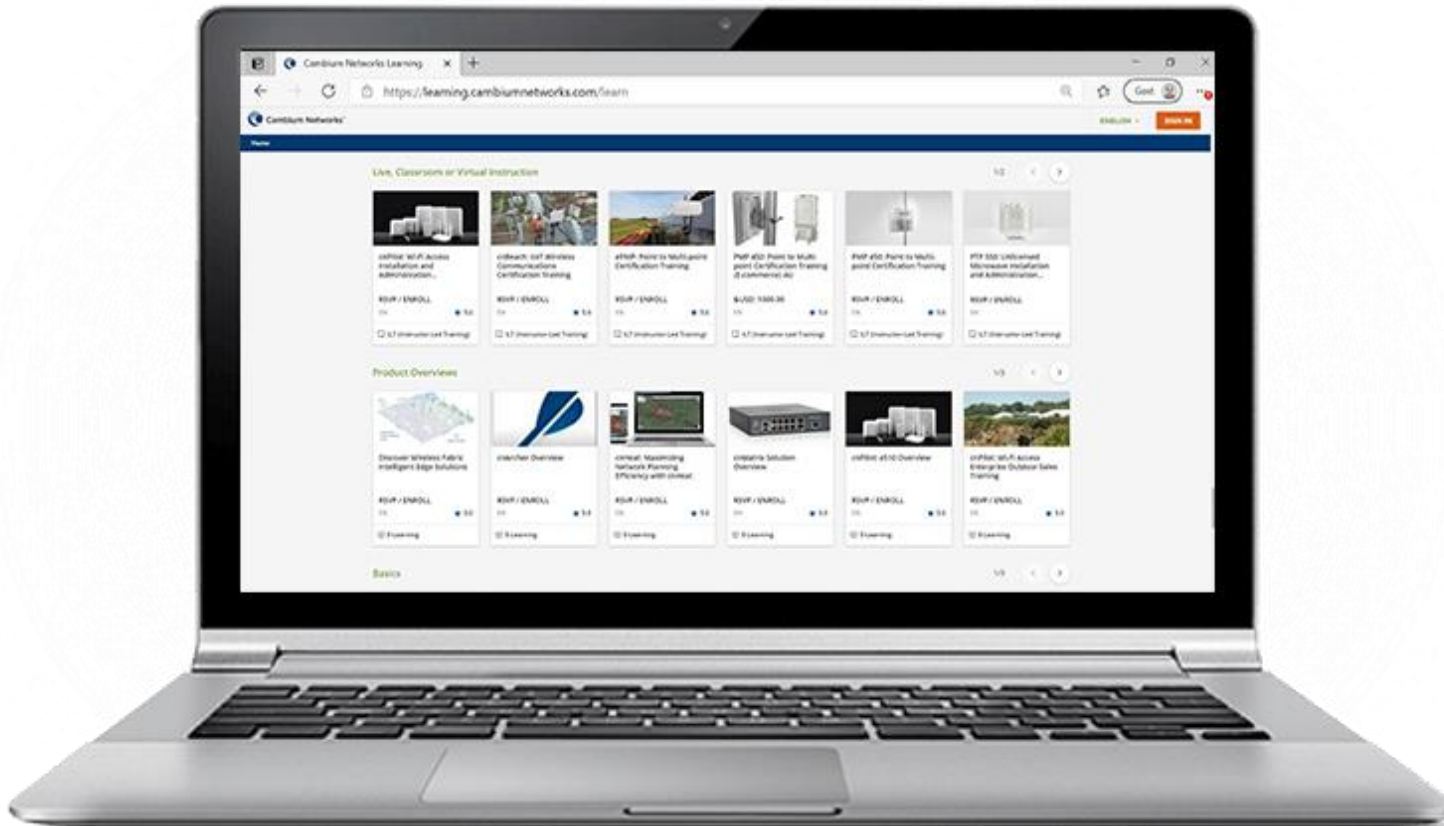
- **Go to Playbooks**
- **Click Connect with Cambium Networks**
 - Find your local sales team
 - Contact channel team
 - Access links to other Cambium Resources:
 - Cambium website
 - Cambium's social media pages
 - Cambium Community
 - Support
 - Training





- Knowledge base
- Software download
- Warranty registration
- RMA cases
- Support cases (**Free**)
- Support communication
- Technical materials

<https://support.cambiumnetworks.com/>



- Product information
- Free trainings (sales & technical)
- Free certification

<https://learning.cambiumnetworks.com/>

- Available to all Cambium Networks partners
- Deep discounts for demo equipment
- Equipment is for demo purposes, not for resale
- Demo equipment is not mandatory, it is optional

Call your distributor and ask for offer!



- NFR oprema za lastno rabo
- Predpogoj je registracija na partnerskem portalu:

<https://channel.cambiumnetworks.com>





A¹ ICT Distribucija



Cambium Networks™

**How to apply for a specialized
affiliate program?**

Specialized programs

Sign up for one or more specialized affiliate programs and **get special discounts** on professional Wi-Fi solutions, switches and radio solutions designed to connect surveillance cameras and any remote locations. To get special discounts on Wi-Fi and switches, you need to register the project on the Partner portal.



Step 2

Sign up for one or more exclusive affiliate programs and get exclusive discounts on professional Wi-Fi, switch and radio link solutions designed to connect security cameras and any remote location. If you are developing a business in the specified sectors, you can apply to all programs. To enroll in any program, follow the instructions, and then repeat the process to enroll in other special programs.

Click on the link to apply for specialized vertical



<https://channel.cambiumnetworks.com/engage/healthcare-program-application/>

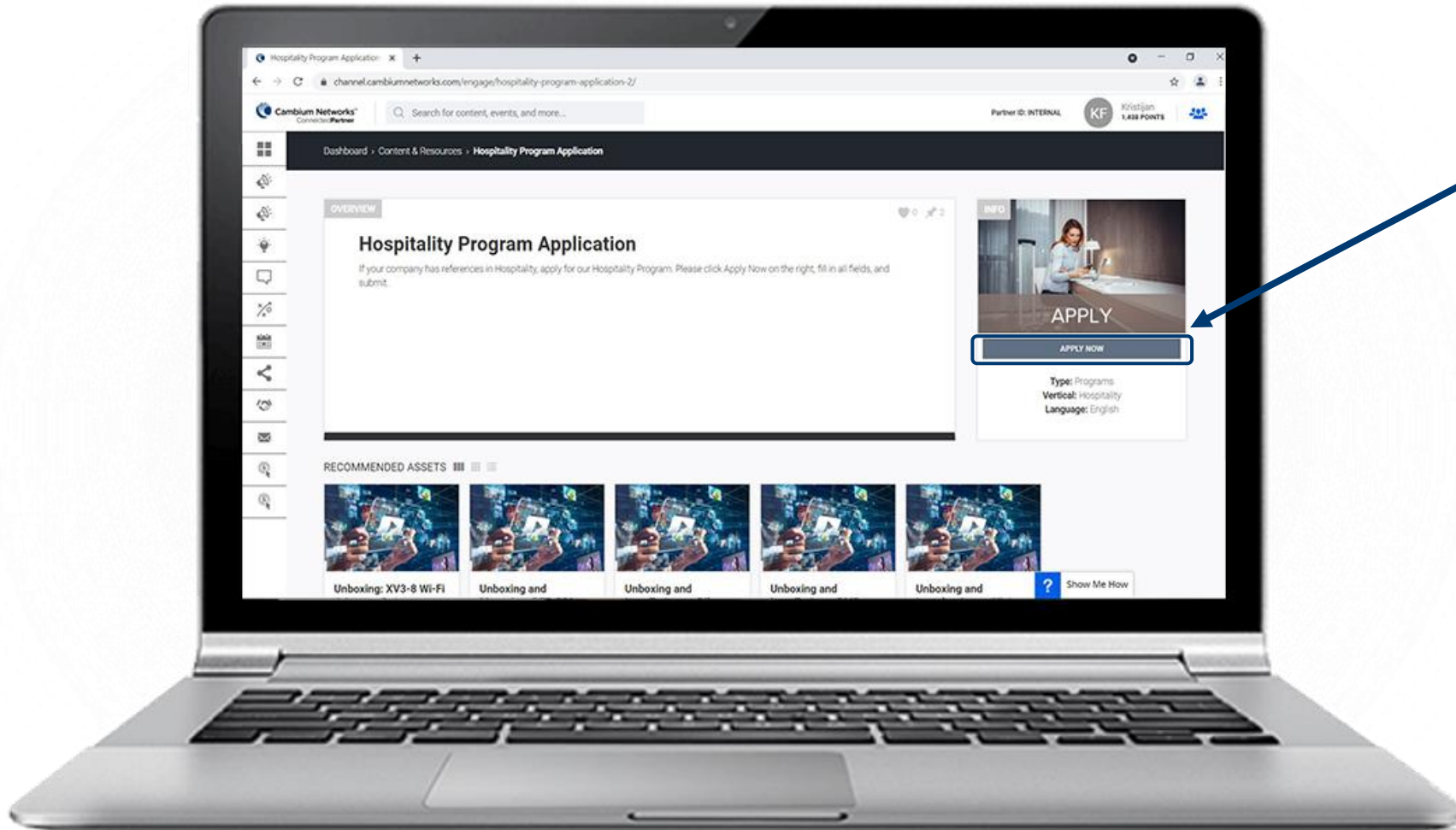


<https://channel.cambiumnetworks.com/engage/hospitality-program-application-2/>



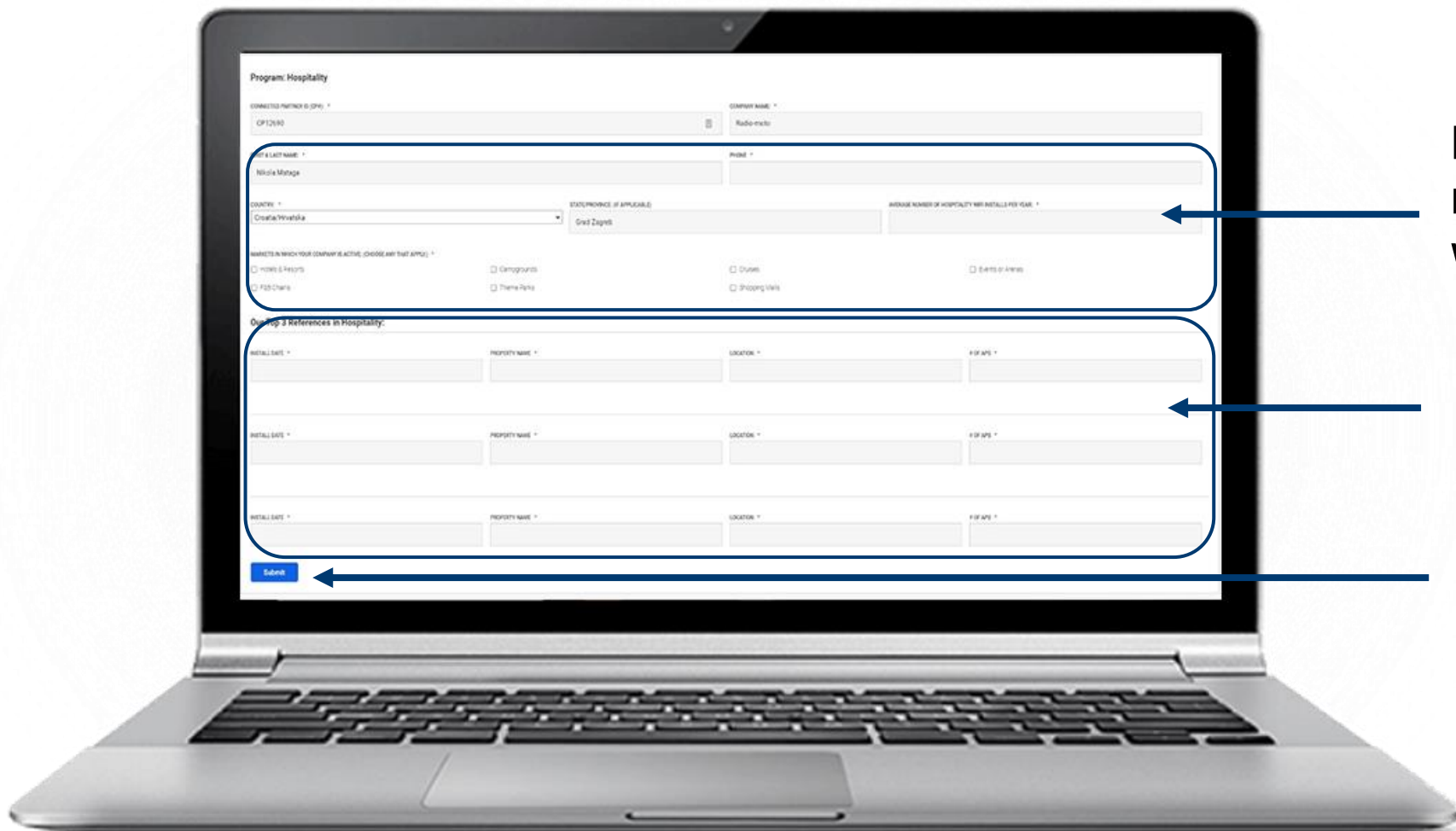
<https://channel.cambiumnetworks.com/engage/education-program-application-2/>

Step 3



Click on „Apply now”

Step 4



Fill in the basic information and mark the types of users you work with

Fill in the information on the three (3) references from the vertical you are applying to

Click on „Submit“



A1 ICT Distribucija



Cambium Networks™

Market Development Funds (MDF)
Program

Eligibility

- All ConnectedPartners

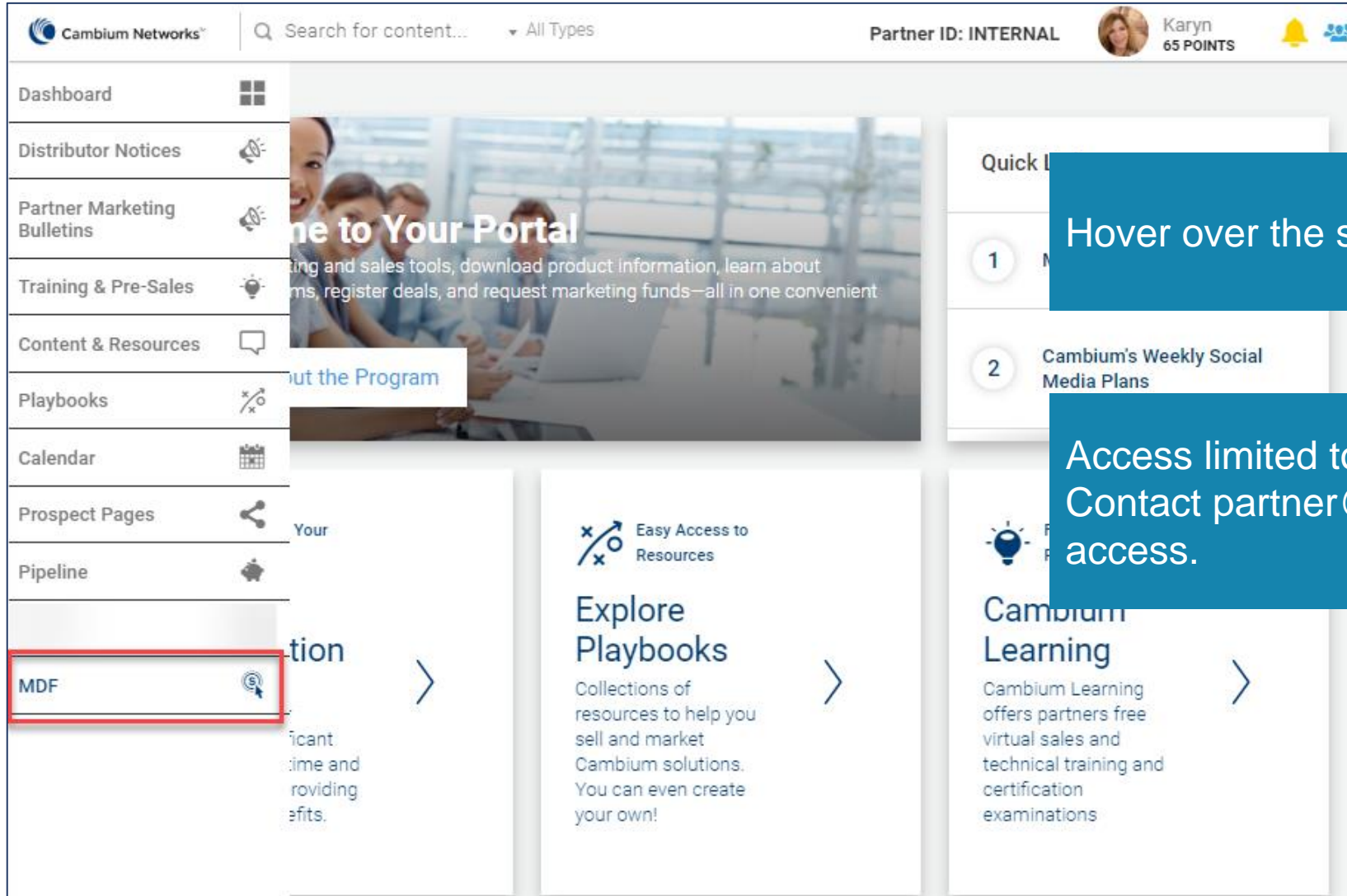
3-Step Process

1. Obtain a Prior Approval for an eligible activity.
2. Complete the activity.
3. Submit a Claim for reimbursement.

Funds

- ConnectedPartners with current Cambium technical certifications are eligible for up to 50% of allowed costs.
- ConnectedPartners without certification are eligible for 25%.
- Funds must be claimed within 60 days of the activity completion date or by 5 pm Central, December 23, 2023, whichever comes first.
- Typical coverage is 50% of activity cost (see [Guidelines](#)).

Program Access



Dashboard

Distributor Notices

Partner Marketing Bulletins

Training & Pre-Sales

Content & Resources

Playbooks

Calendar

Prospect Pages

Pipeline

MDF

Partner ID: INTERNAL

Karyn
65 POINTS

Search for content... All Types

Welcome to Your Portal

1

2 Cambium's Weekly Social Media Plans

Easy Access to Resources

Explore Playbooks

Cambium Learning

ation

Hover over the sidebar and choose MDF.

Access limited to one person per partner company. Contact partner@cambiumnetworks.com if you need access.

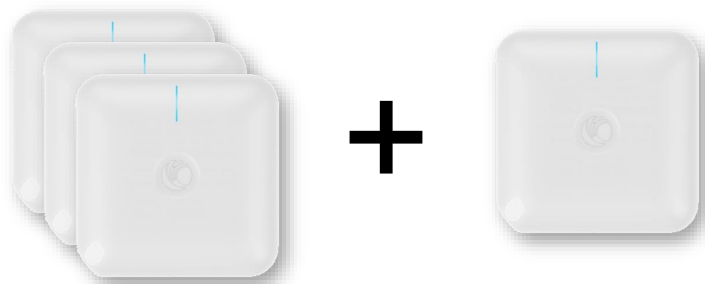
- Brochures, printed materials
- Promotional gadgets for events and trainings
- Social media advertisement, Google campaigns
- Paid ads in IT media
- Training
- Conferences
- Attending 3rd party events



Cambium Networks™

A1

Campaigns

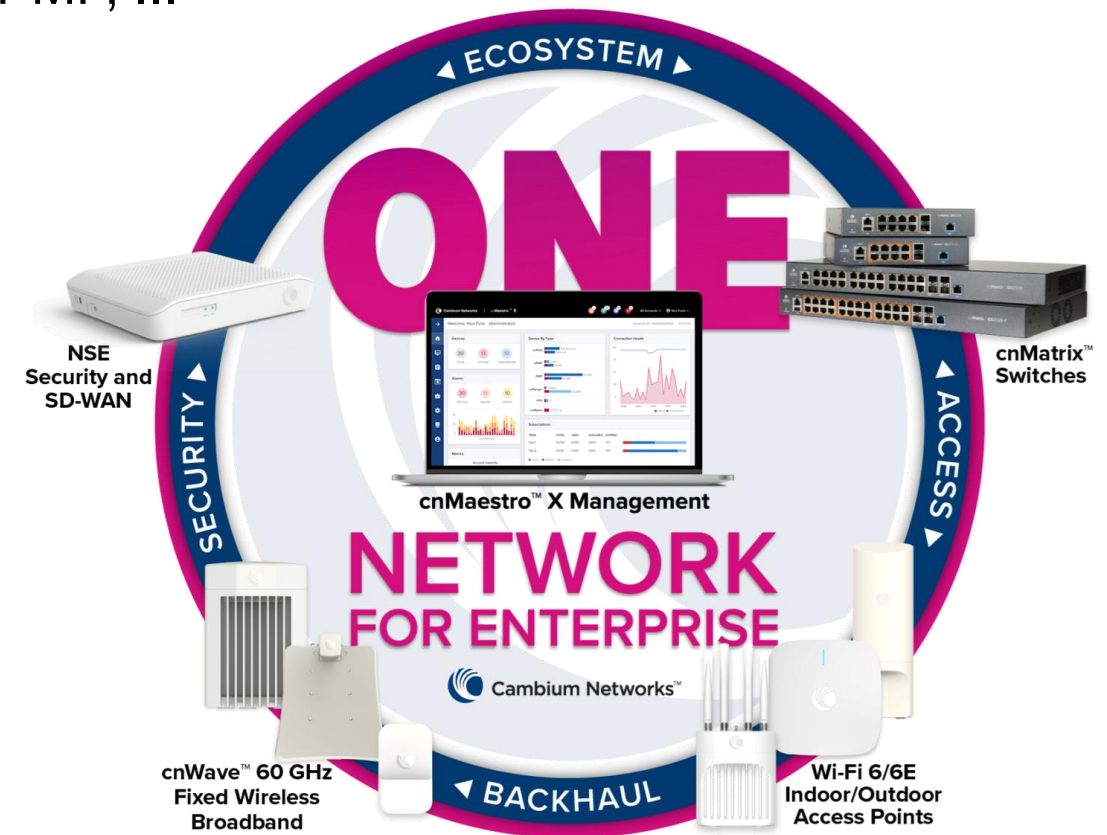


- ob naročilu 3 kosov cnPilot E410 – 1 kos gratis
- višji rabati v primeru kombiniranega naročila EX2000 stikal, WiFi6 opreme in cnMaestro X licenc



Zakaj je Cambium Networks najboljša izbira?

- Širok portfelj, Wifi6, stikala, security naprave, PTP, PMP, ...
- Vse naprave so dobavljive
- Brezplačna dostava
- Brezplačen in zmogljiv oblačni kontroler
- 5-letna garancija
- Brezplačna podpora s strani proizvajalca
- Optimalno razmerje med ceno in kvaliteto
- Zagotovljena zaščita projekta
- NFR program – visoki popusti
- MDF program – marketinška podpora





Tehnična delavnica v aprilu

The logo consists of a large, 3D-style red letter 'A' with a white '1' positioned to its upper right. The background is a vibrant red with abstract, overlapping geometric shapes in lighter shades of red and white, creating a modern, dynamic feel.

A1

**Thank
you**

A1 ICT Distribucija

E ict-partners@A1.si
M 040 440 373