



ATLANTA, GA
OCTOBER 11-14

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UNLEASH THE POWER OF LIMITLESS CONNECTIVITY



**2021 Fall
Technical Forum**
SCTE • NCTA • CABLELABS



Wireless Access Network

Realizing the Power of Wi-Fi 6

Bill McFarland

Chief Technology Officer
Plume Design, Inc.

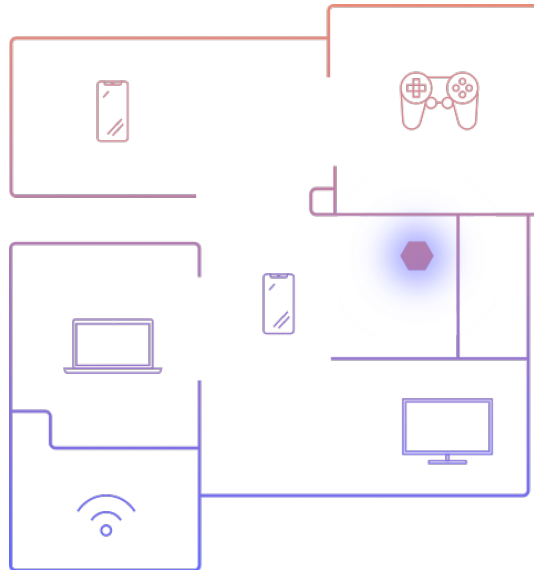
Speed: 160MHz BW, 1024QAM

Efficiency: OFDMA

QoE: Network slicing

Power saving: TWT

Capacity: 6 GHz (WiFi 6E)

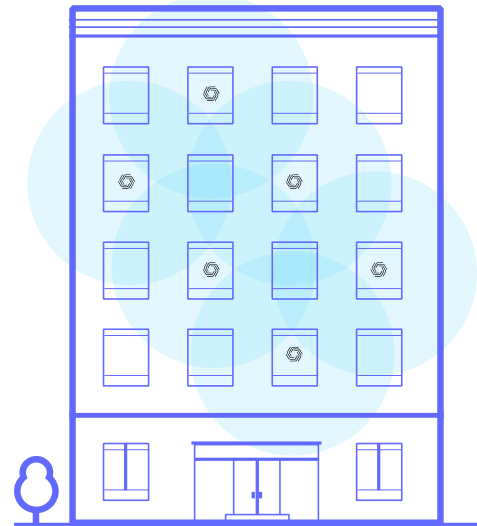


It all works, *in a vacuum*

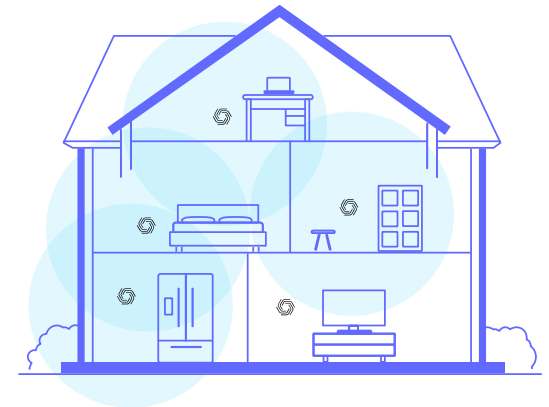
BUT, WIFI DOES NOT OPERATE IN A VACUUM



In neighborhoods

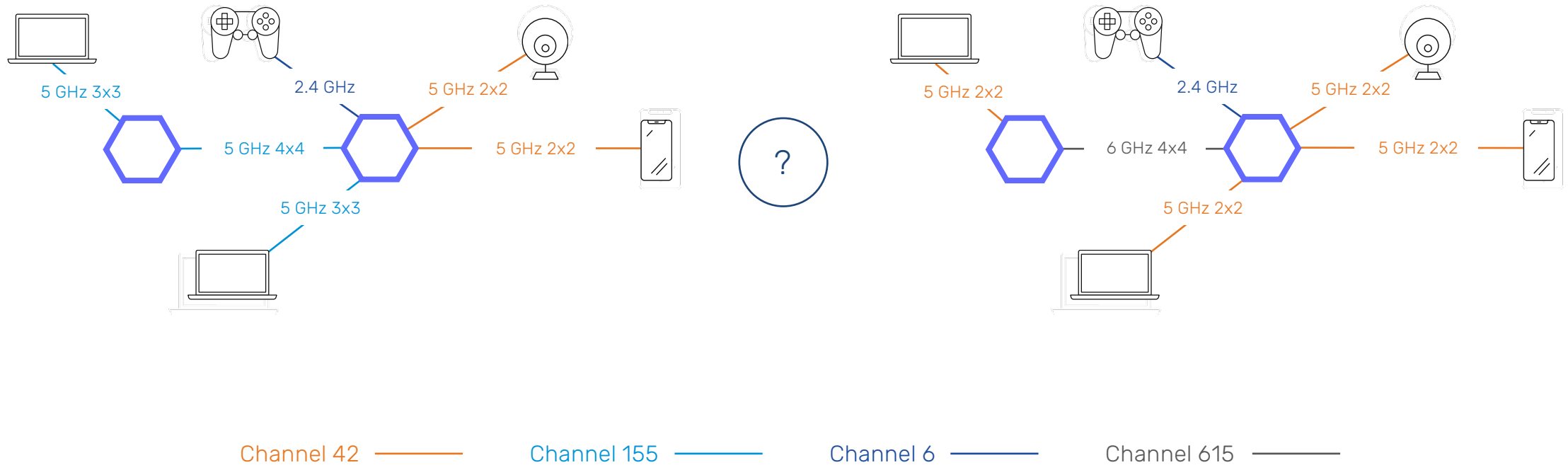


In MDUs



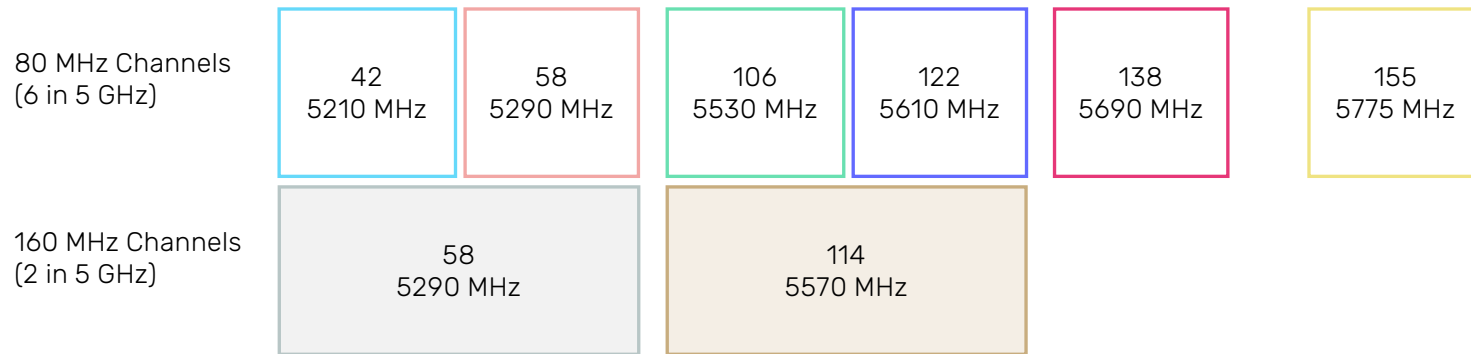
In homes

WiFi 6 requires more management, not less



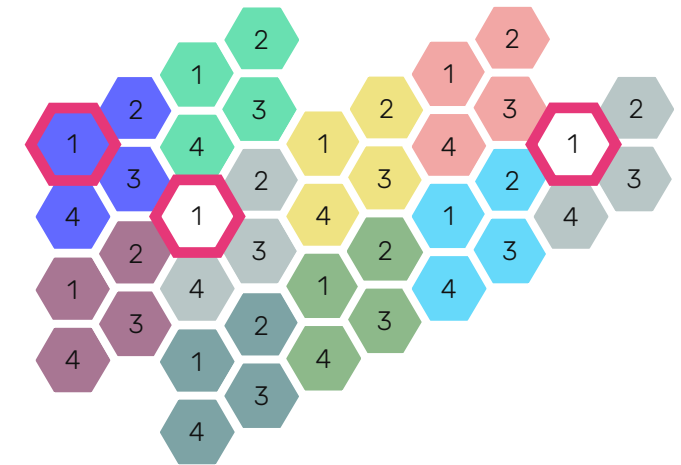
Band planning for tri-band 4x4, 2x2, 2x2 AP

160 MHz Channels



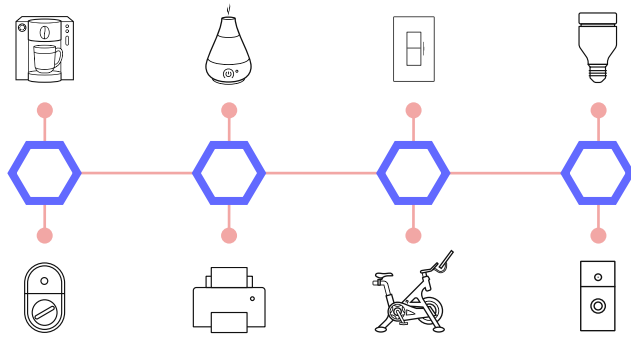
- When to use 160 MHz BW?
- Which homes need it?
- What happens to the neighboring homes?

BSS Color

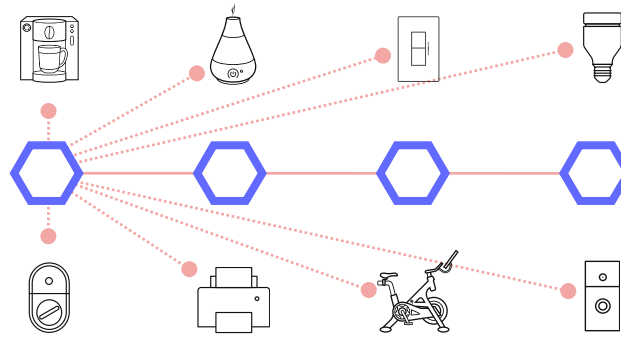


- What channel, what color?
- What sensitivity threshold?
- Which devices gain, which suffer?

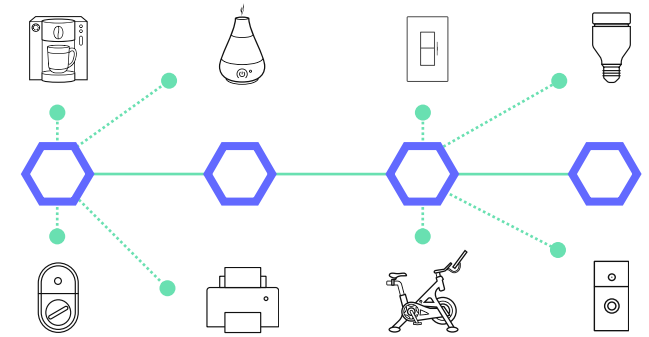
Need rigorous optimization across multiple homes



Too distributed



Too centralized



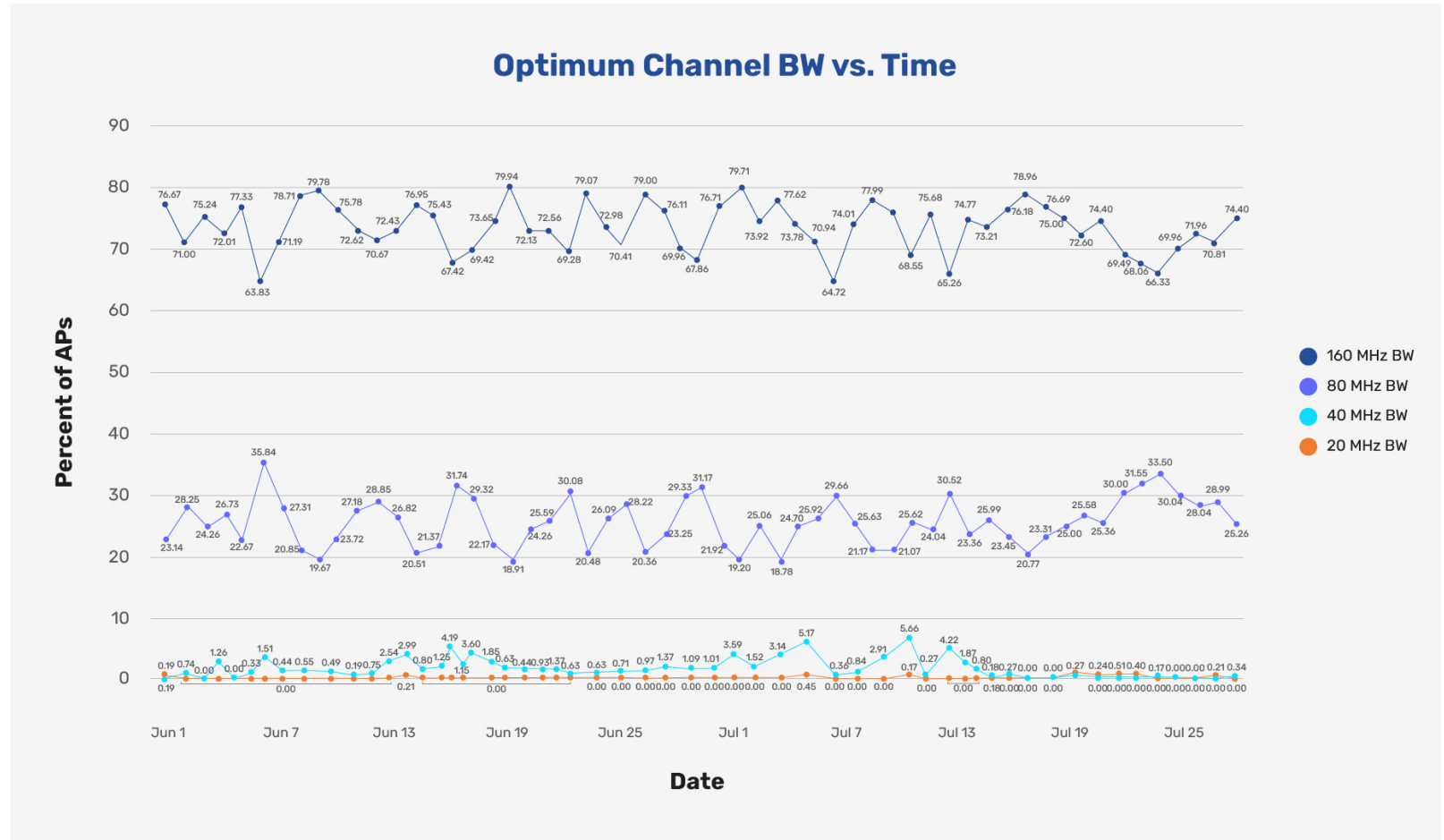
Just right

OFDMA-aware steering

MEASURED RESULTS – WHEN TO USE 160 MHZ

80 MHz performs better in ~25% of locations

Significant variation over time due to varying interference

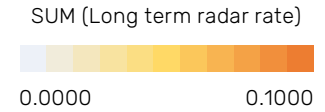


MEASURED RESULTS – RADAR EVENTS

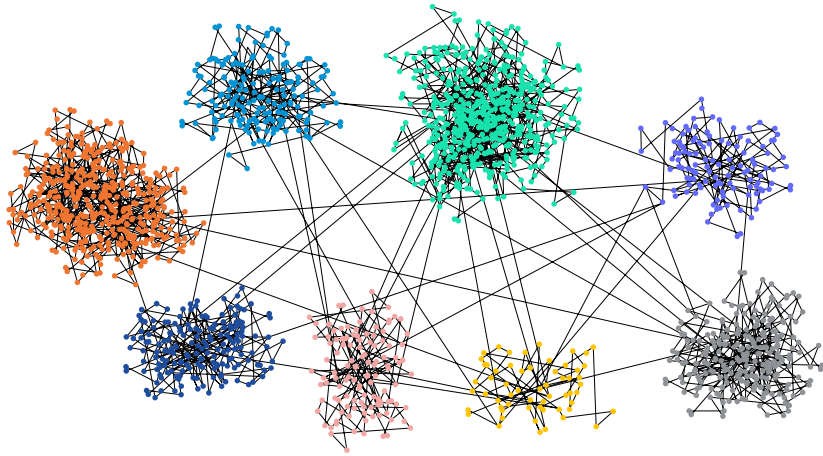
Radar events unevenly distributed among homes and frequencies

Some homes cannot support 160 MHz, but can support 80 MHz if properly positioned

Long Term Radar Rate Per DFS Channel Per AP (Aggregate Learning from July-2021)									
Location ID	Node ID	52	56	60	64	100	104	108	112
58bbb63798c6eff642b1d1a2	EM7F60018C	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
5fbd3b8b66b7453aa7b48808	EM7F300045		0.10	0.10		0.00	0.00	0.01	0.00
5f933d571f6ecf4457c695f0	EM7F600049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	EM7F600065	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	EM7F600083	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
	EM7F600097	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5f9f8d1a4a576e734d231590	EM83A00143				0.49			0.04	0.04
57f3193f3ce0d96ed09d0217	EM7F60014C	0.00	0.00	0.00		0.06	0.06	0.06	0.21
5f920576bfddfc59ee6dd846	EM7F60007B			0.00	0.00			0.00	
	EM7F600024	0.01		0.00	0.00	0.00		0.00	0.00
	EM7F600054					0.00	0.00	0.00	0.00
	EM7F600064	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.10
57f489f83ce0d96ed09d6570	EM7F6000C1		0.00	0.00	0.00	0.00	0.00	0.00	
	EM7F300006	0.00	0.00	0.00	0.00				
	EM7F300040	0.03	0.03	0.05	0.00		0.00	0.00	
	EM7F600119		0.00	0.00		0.00			
60480b07328add3166edda7d	EM7F30001D	0.00	0.01	0.01				0.00	0.00
	EM7F30004D		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	EM7F300001	0.02	0.07	0.07	0.06				
60391ea536d7902c9a44a93c	EM7F6000C6	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.02
	EM7F6000D8	0.00	0.02	0.03	0.01	0.02	0.04	0.03	0.04
	EM7F60012B	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00



MEASURED RESULTS - MDU CLUSTERING

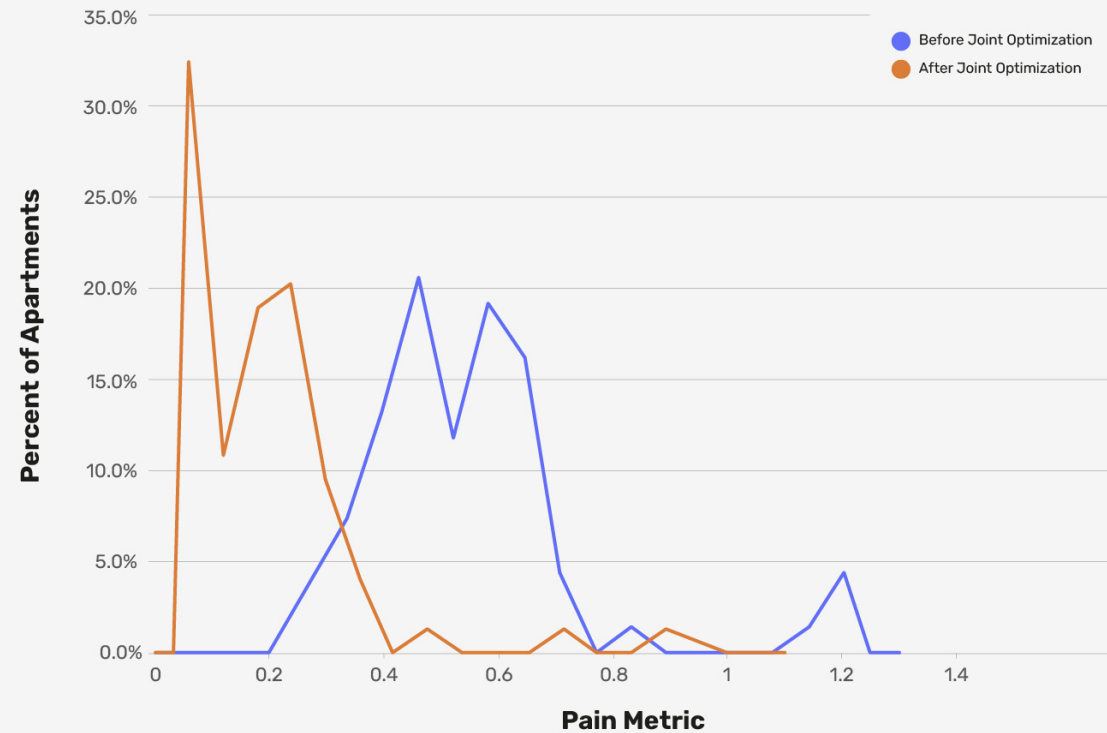


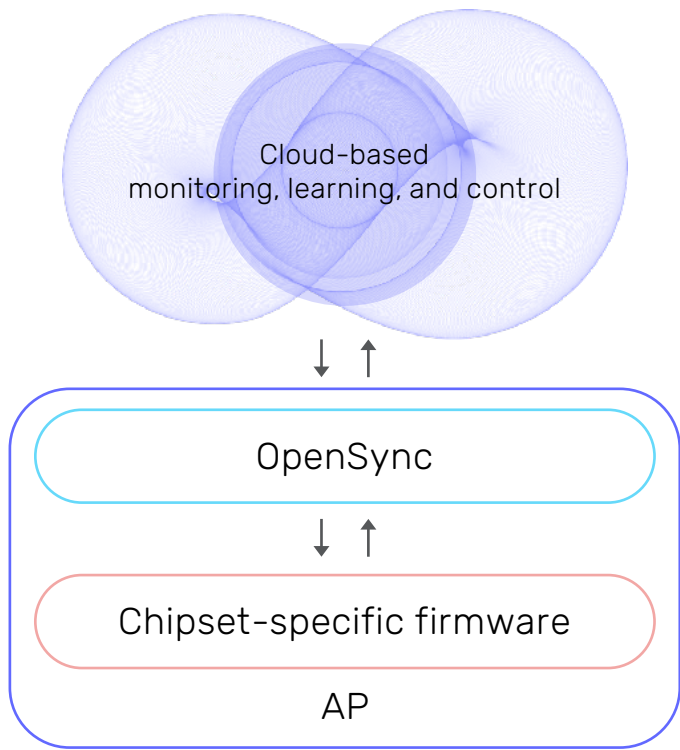
Parameter	Service provider A	Service provider B
Number of Plume managed locations	12,527,567	5,017,865
Total number of clusters	2,012,417	928,133
Size of largest cluster	1,173	412
No. clusters with > 100	8,367	7,049
No. clusters with 50-100 locations	21,633	85,036
No. clusters with 10-50 locations	195,747	74,748
No. clusters with 1-10 locations	1,786,670	760,277

“Pain” metric = neighbor interference x in home load

0.5 Pain = video/audio disruption

Percentage of Apartments vs. Pain Metric





Chipset Mfr.				
Device Mfr.	 	 	 	
CSPs	 	 		

Open sourced (opensync.io), now with support for WiFi 6!



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Thank You!

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