NEWSLETTER

Tom Hildebrand: 17,000 clients on Wi-Fi across 330 APs in Toronto

By **Keith Parsons, CWNE #3** · 2026-04-06 · originally on LinkedIn

A large customer in Canada needed a temporary network for a corporate hackathon — 24 hours a day, five days, at the Enercare Center in Toronto. The venue's existing network wasn't going to cut it. The whole thing had to be stood up and torn down in about a week.

This wasn't a conference full of people checking email. The attendees were programmers and UX designers transferring hundreds of gigs of data per day. An MDM pull showed a 50-50 split of 6 GHz-capable clients — M1 and M2 MacBooks — which meant the design could lean on 6 GHz at scale. And because the event was in Canada, they had the full 1,200 MHz of 6 GHz spectrum to work with.

The Enercare Center is about half a kilometer long — more airplane hangar than convention center. Big steel building, concrete floors, zero RF dividers. The fabric partitions between areas weren't going to attenuate anything. The venue agreed to disable their own APs in exchange for adding their SSID to the event network, which gave the team a completely clear RF environment.

The design requirement called for 15,000 clients across 6,500 people in the main venue and 2,000 in an auxiliary building. They blew past that. The event peaked at 17,000 clients on Wi-Fi with 27,000 unique clients and over 28,000 unique MAC addresses recorded.

The open space was the core design challenge. Omnidirectional APs would radiate everywhere in a building with no RF absorption. Hildebrand's team took directional antennas — the kind you'd normally mount on the side of a building to cover an outdoor plaza — and aimed them straight down from the trusses.

"Directional antennas overhead are an absolute cheat code for any sort of big open space."

Think of them like spotlights instead of typical radios. Each one covers a small cell anchored above desks and co-working spaces — three or four people on a couch, ten at desks. The overlap stays tight, but density stays high. Directional APs went on the trusses and on tripods in the hallways. Omnidirectional APs were reserved for the smaller breakout rooms.

The survey was done in advance using Sidos, with 330 APs requiring PoE++ placed across the floor plan. Channel strategy was 20 MHz on 2.4 GHz (used sparingly), 20 MHz on 5 GHz, and initially 40 MHz on 6 GHz. They switched to 80 MHz channels on 6 GHz on day two — the directional antennas kept co-channel interference low enough that wider channels worked, and the high-performance users needed the throughput. Speed tests to their servers came in around 300 Mbps, which was enough for their work.

The network also had to coexist with latency-sensitive non-Wi-Fi traffic already running on the wire — Dante audio, 100 universes of streaming ACN lighting, and Bolero intercom systems.

SSID configuration was where a lot of the airtime preservation happened. The customer had originally set up separate 5 and 6 GHz SSIDs, and users were clustering on 5 GHz because they didn't recognize the 6G network. Collapsing to a single SSID with WPA3 fixed that immediately. They enabled proxy ARP, set high minimum data rates on 5 GHz, turned on client isolation and minimum RSSI thresholds, and used a multicast/broadcast blocker that restricted broadcasts to only the DHCP server MAC addresses — killing multicast across all Wi-Fi VLANs.

One discovery during surveying: in a building with zero attenuation, iPhones were getting probe responses from APs on the opposite side of the venue. Hildebrand described it as a "sort of DOS for the actual air time." Blocking probe responses made a noticeable difference.

The WAN side had its own scale problem. Tens of thousands of clients means tens of thousands of NAT states, and no single gateway was going to handle that. The MSP ordered three 10 Gbps pipes from three different providers, all connecting directly to the Toronto Internet Exchange — 30 Gbps of total WAN capacity. Traffic was distributed across nine gateways — three per provider, plus a cold spare — using a random RADIUS-assigned VLAN

approach. When a client joined the network, the RADIUS server picked a random VLAN, which routed through one of the nine gateways. No gateway got overloaded.

By the morning of day two, a Grafana dashboard showed 2,400 clients already connected with 17,000 individual roam events just from people walking in, and aggregate over-the-air bandwidth had already hit a gigabit. They also deployed more edge switching on day two to give users the option to plug in.

"The best wireless user is one not on your wireless at all."

By the end of the event, the physical infrastructure included 3 aggregation switches, 130 rack switches, and 880 eight-port edge switches. The final numbers: over 28,000 unique MACs, 38,700 square meters of coverage, 150 TB of data transferred over four days, 8 Gbps peak WAN consumption with ~3 Gbps average sustained throughput, and less than 1 ms latency to critical cloud services.

The deployment also fed directly back into Ubiquiti's product roadmap. Hildebrand listed several features that came out of lessons learned at this event: an auto RRM solution (now publicly available), AP names in beacon frames for easier surveying (coming in Network 10.1), a Pro Installer mode for selecting non-PSC channels on 6 GHz, improved multicast management over the wire for AV networks, and a network configuration API for queuing and scheduling changes.

Hildebrand's closing point: when you increase channel width on 6 GHz, the constant SNR balance means you can also increase your max TX power — a relationship worth remembering for any high-density 6 GHz design. But the most important takeaway wasn't about technology at all. It was about the people — the ongoing coordination between the vendor, the MSP, the customer, and the surveyors. Walking the floor on day one, adjusting channels and transmit power as bodies attenuated signal, and building a NOC with both focus and collaboration spaces.

"Don't forget about the human and collaborative element."

🎥 Watch the full talk: https://www.youtube.com/watch?v=0apgiKipZG8

#WLPC Express — Mountain View, April 13 & 14

WLPC Express is coming to the Computer History Museum in Mountain View, California on April 13 and 14 — co-located with Wi-Fi World Congress USA 2026.

This is a WLANPros Wi-Fi Troubleshooting mini boot camp with 12+ hands-on, instructor-led labs. Attendees receive a WLANPi R4, two Wi-Fi 6E NICs, WLANPros laminated checklists and resources, digital class materials, NetViews Pro for MacOS, and temporary software licenses.

Full schedule and registration: https://www.thewlpc.com/express/mountain-view-express

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