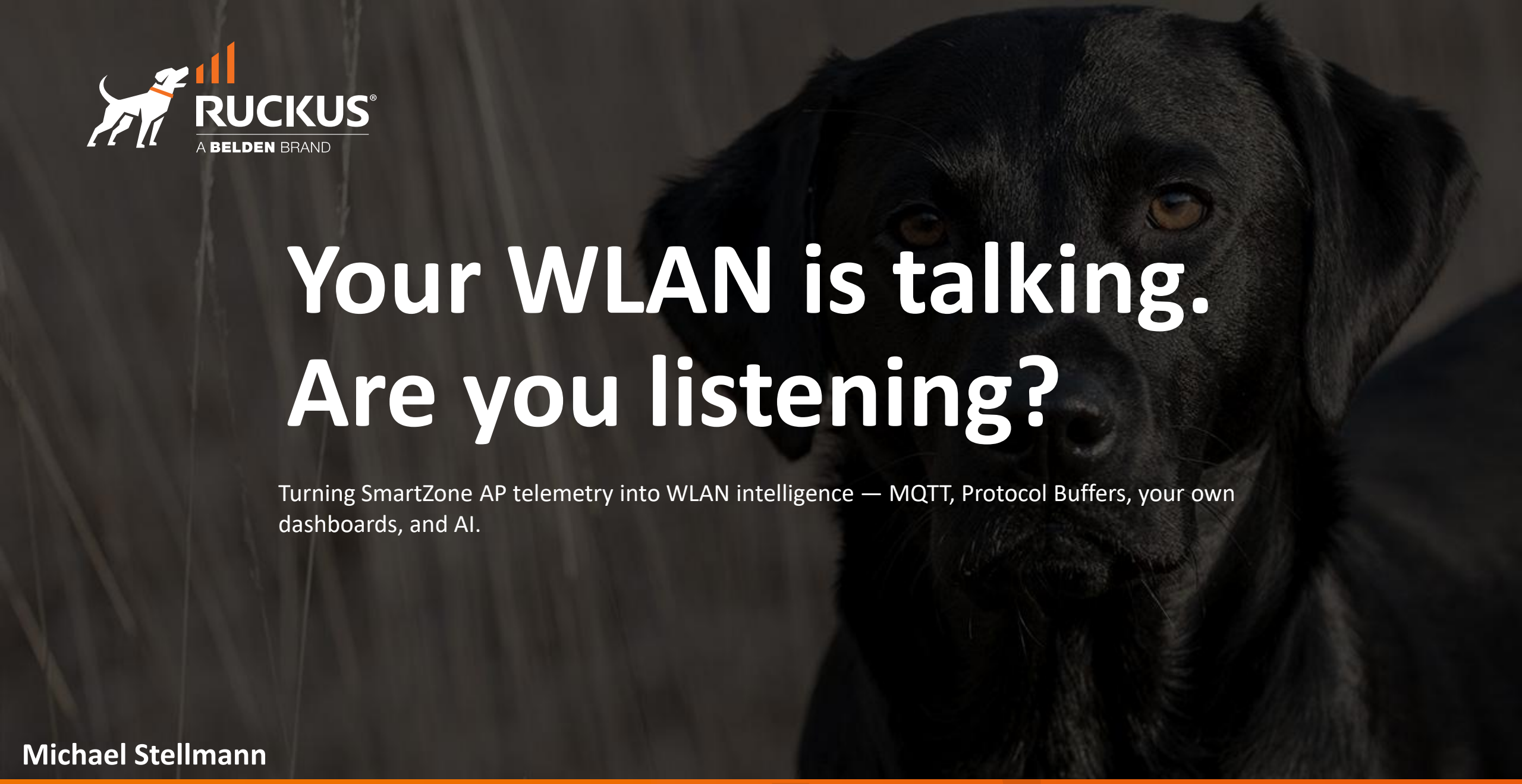


Your WLAN is talking. Are you listening?

Turning SmartZone AP telemetry into WLAN intelligence — MQTT, Protocol Buffers, your own dashboards, and AI.

Michael Stellmann

Consulting Systems Engineer RUCKUS @ Belden
CWNE #251

THE GAP

We are drowning in telemetry and starving for answers

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More data than ever

Radio, client, roaming, airtime, application. Every release adds counters — E.g. SmartZone 7.2 added per-client DNS and ARP round-trip times.

The same first question

“Is it the Wi-Fi?” — still answered with intuition, a screenshot and a gut feeling.

Dashboards are not insight

A wall of green tiles that turns red after the user has already complained is a post-mortem, not an alert.

Telemetry volume is not the bottleneck. Interpretation is.

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Four steps from noise to action

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01

DATA

Raw counters.
RSSI, retries,
airtime, roam events.

›

02

CONTEXT

Joined to place, time,
identity and intent.

›

03

INSIGHT

“This AP pair ping-pongs
40 clients every
lunch break.”

›

04

ACTION

Change something.
Automatically, or with
one click.

Most of us live on step 1 and buy step 4. The value is created on step 2.

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Context could be four joins

PLACE

AP → floor, room, zone, neighbour set, antenna, mounting height

TIME

The same minute last week. Shift start. Lecture slot. Housekeeping round.

IDENTITY

OS, chipset, driver version, role, owner, business criticality

INTENT

What this WLAN was promised to deliver — voice, scanners, guest

Do those four joins, and the counters you already have start to expose:

Roaming pathologies

Client-side faults

RF that only breaks on Tuesdays

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BUY IT

Path A — your platform already climbs the ladder

What contextualised telemetry looks like when the vendor does the joins for you. RUCKUS One and RUCKUS AI as the example I know best.

Incidents

Continuously detected, classified P1–P4 by impact on the network and on clients, each with a recommended remediation.

AI-Driven RRM

Radio resource management driven by learned behaviour rather than a static channel plan.

Service Validation

Synthetic checks that answer the only question that matters: does the service actually work here?

Configuration Change

Correlates what you changed with what got worse or better

Digital Systems Engineer

Your super agent that you can talk to

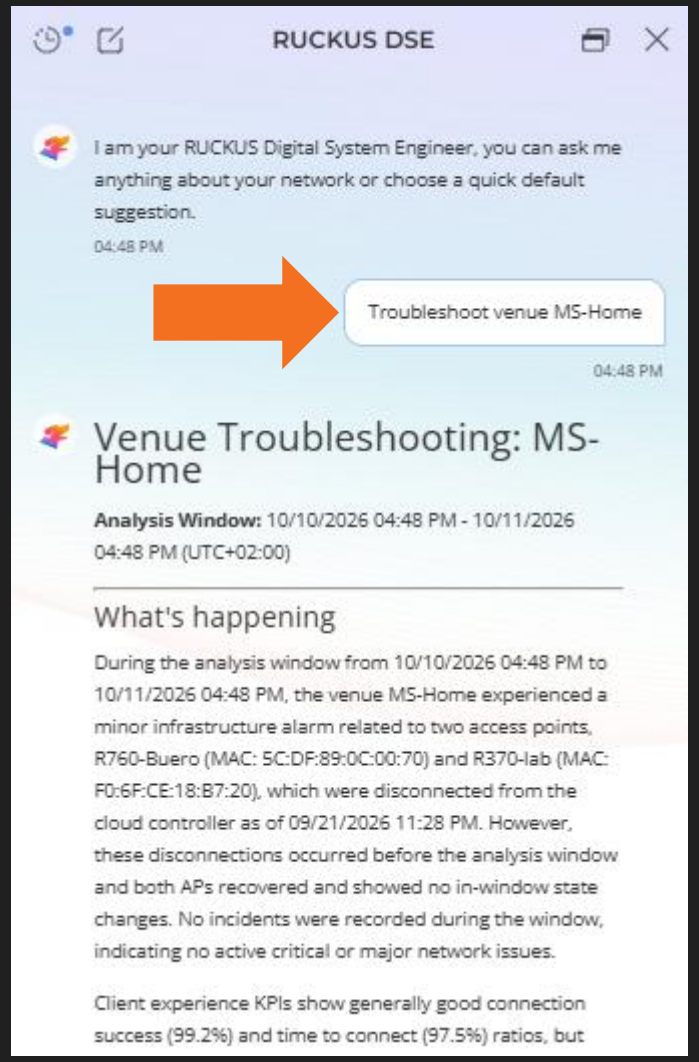
AI Operations

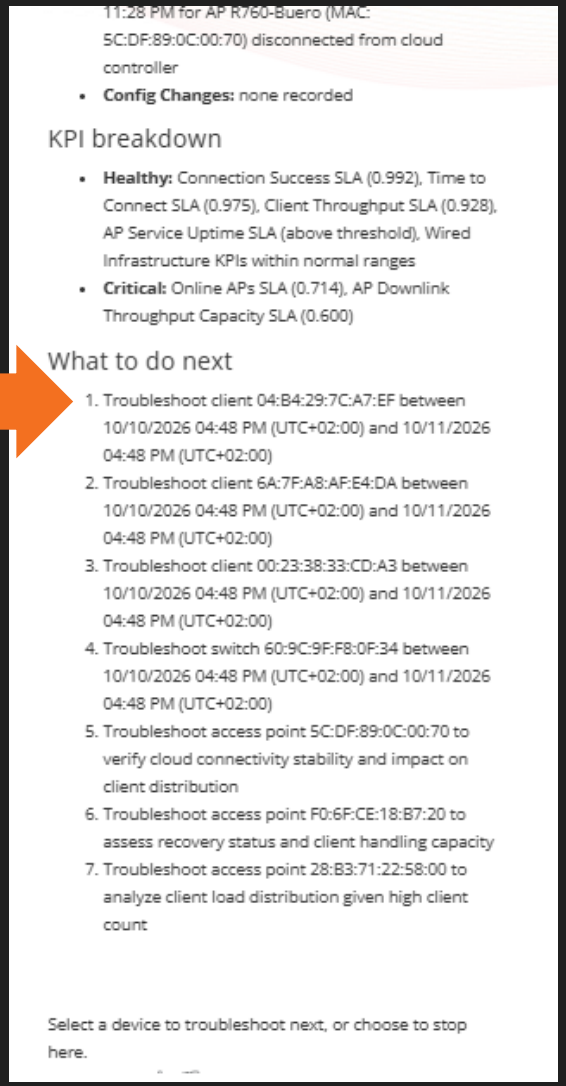
Recommendations reduced to a binary choice — apply, or don’t.

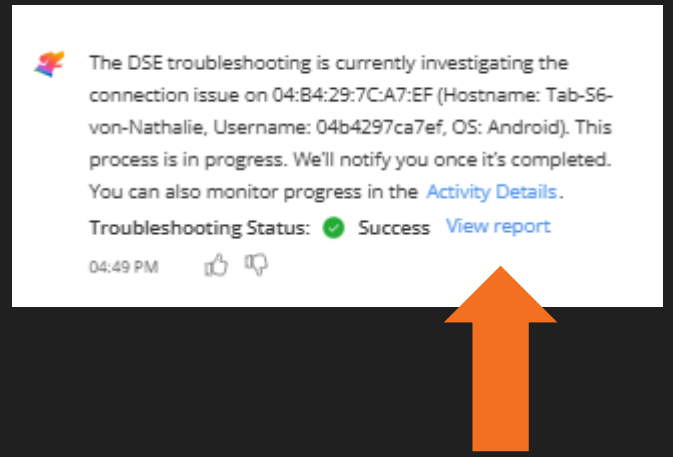
No extra sensors. The APs were always talking — the platform just listens properly.

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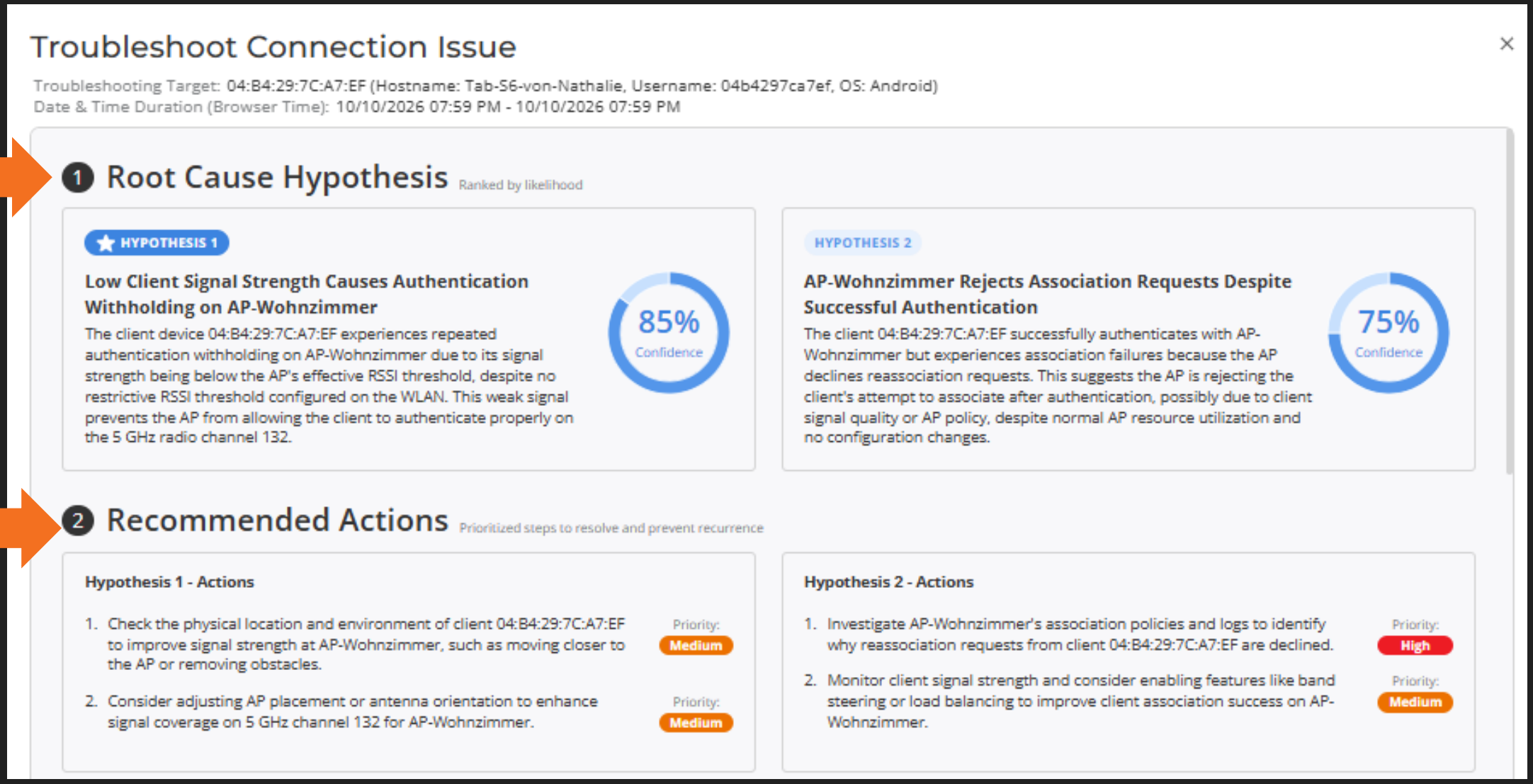
Troubleshooting with a vendor agent



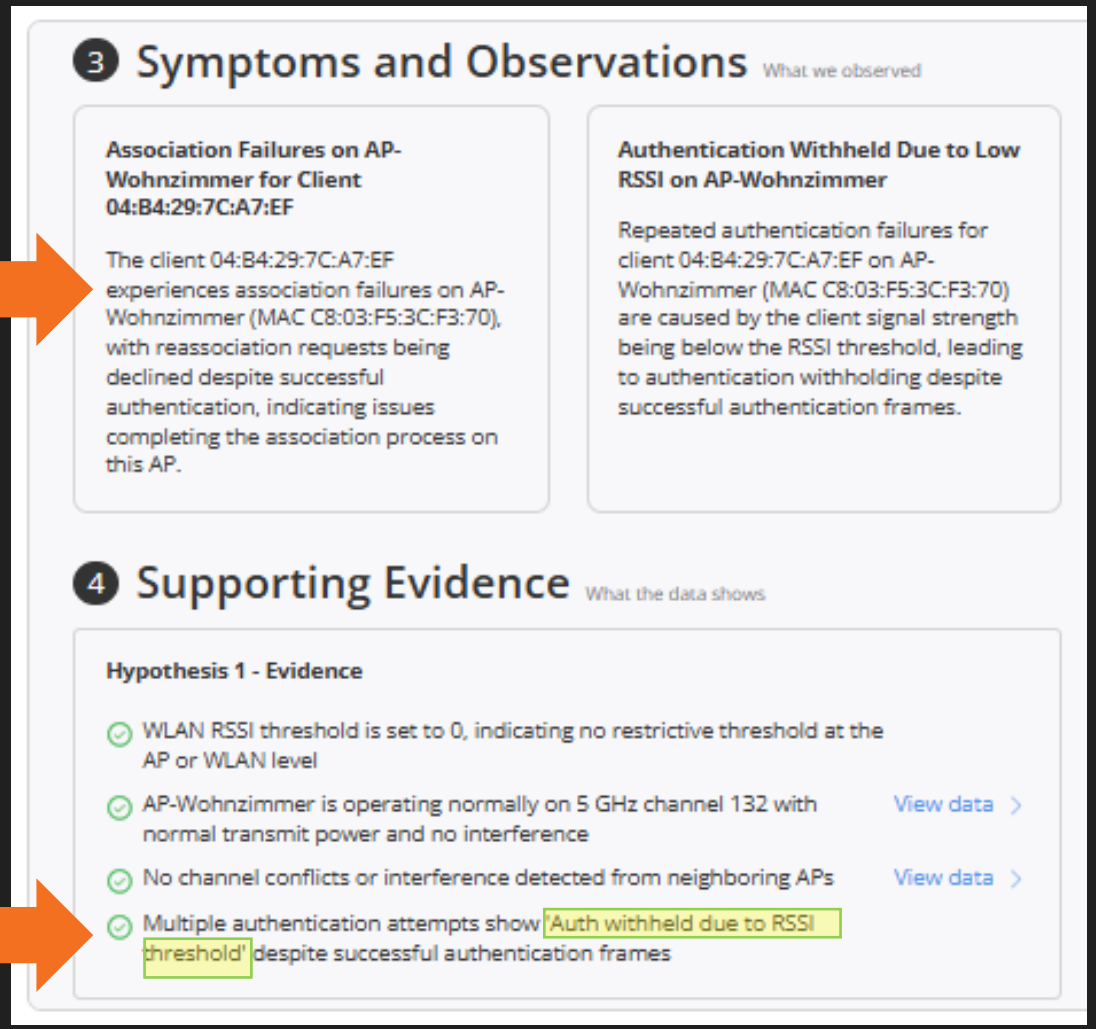




Troubleshooting with a vendor agent



Troubleshooting with a vendor agent



3 Symptoms and Observations

What we observed

Association Failures on AP-Wohnzimmer for Client 04:B4:29:7C:A7:EF

The client 04:B4:29:7C:A7:EF experiences association failures on AP-Wohnzimmer (MAC C8:03:F5:3C:F3:70), with reassociation requests being declined despite successful authentication, indicating issues completing the association process on this AP.

Authentication Withheld Due to Low RSSI on AP-Wohnzimmer

Repeated authentication failures for client 04:B4:29:7C:A7:EF on AP-Wohnzimmer (MAC C8:03:F5:3C:F3:70) are caused by the client signal strength being below the RSSI threshold, leading to authentication withholding despite successful authentication frames.

4 Supporting Evidence

What the data shows

Hypothesis 1 - Evidence

- WLAN RSSI threshold is set to 0, indicating no restrictive threshold at the AP or WLAN level
- AP-Wohnzimmer is operating normally on 5 GHz channel 132 with normal transmit power and no interference — View data
- No channel conflicts or interference detected from neighboring APs — View data
- Multiple authentication attempts show 'Auth withheld due to RSSI threshold' despite successful authentication frames

SO WHY BUILD ANYTHING YOURSELF?

The platform knows your network. Does it know your context?

- Exam week starts at 08:00 in room C.214.
- Those 300 barcode scanners are what pays the bills.
- The MRI kills channel 100 every second afternoon
- Your ticket system already knows who complained.

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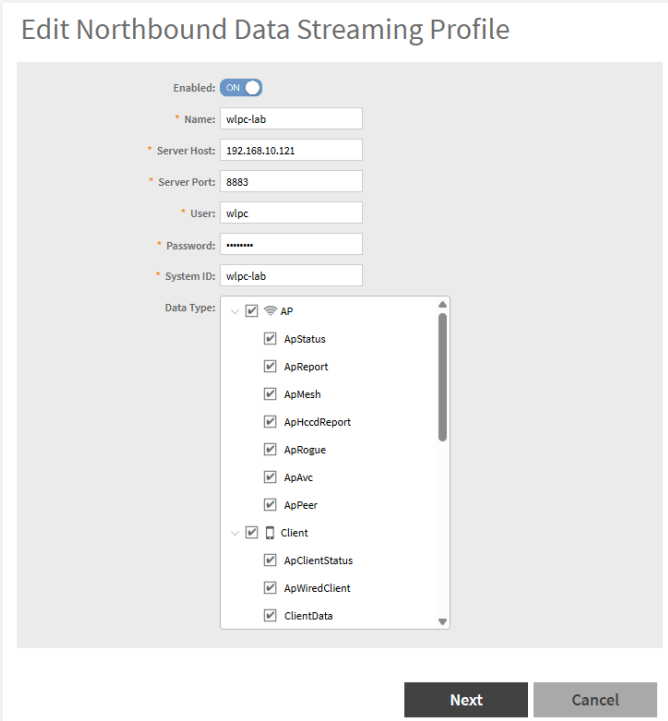
Path B — take the raw feed yourself

SmartZone has streamed this for years. It is a documented, supported interface

Turn it on

Administration › External Services › Data Streaming

- You supply the MQTT broker. SmartZone is the publisher.
- Pick the zones you want.
- Pick telemetry you want
- Payload is Google Protocol Buffers — .proto files are a support download, versioned per release

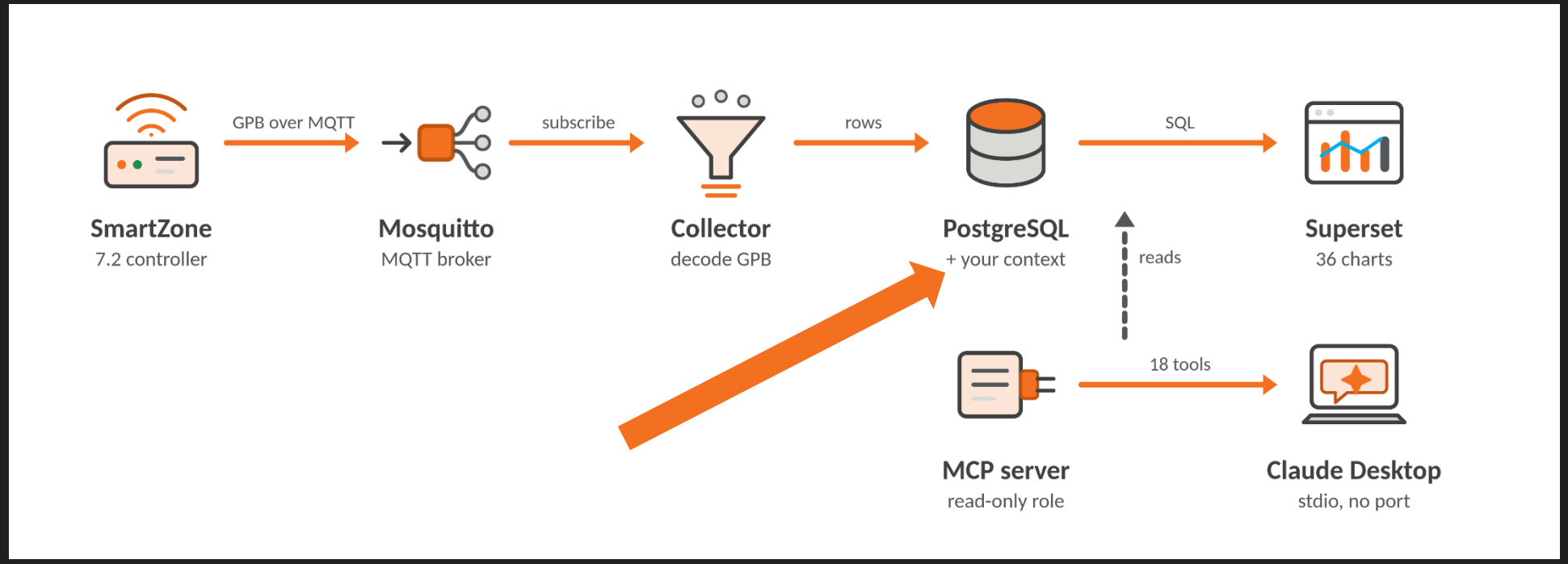


What is actually in there (excerpt)

ap_report · ap_client · ap_status · ap_rogue · ap_mesh · sci_event · switches

`stickyWeak`	the AP already flags sticky clients
`isRoaming`	was this session a roam or a fresh join
`roamingSuccessCount`	and roamingFailureCount, per WLAN
`staSmartRoamDisconCnt`	disconnects caused by smart roaming
`dns_rtt_average_msec_r`	DNS round-trip, per client (new in 7.2)
`arp_rtt_average_msec_r`	ARP round-trip, per client (new in 7.2)
`txRetryRate · airtime · latency`	the RF side of the same story

The whole thing fits on a laptop



Runs on Windows

Docker Desktop, one compose file. No lab, no appliance, no licence.

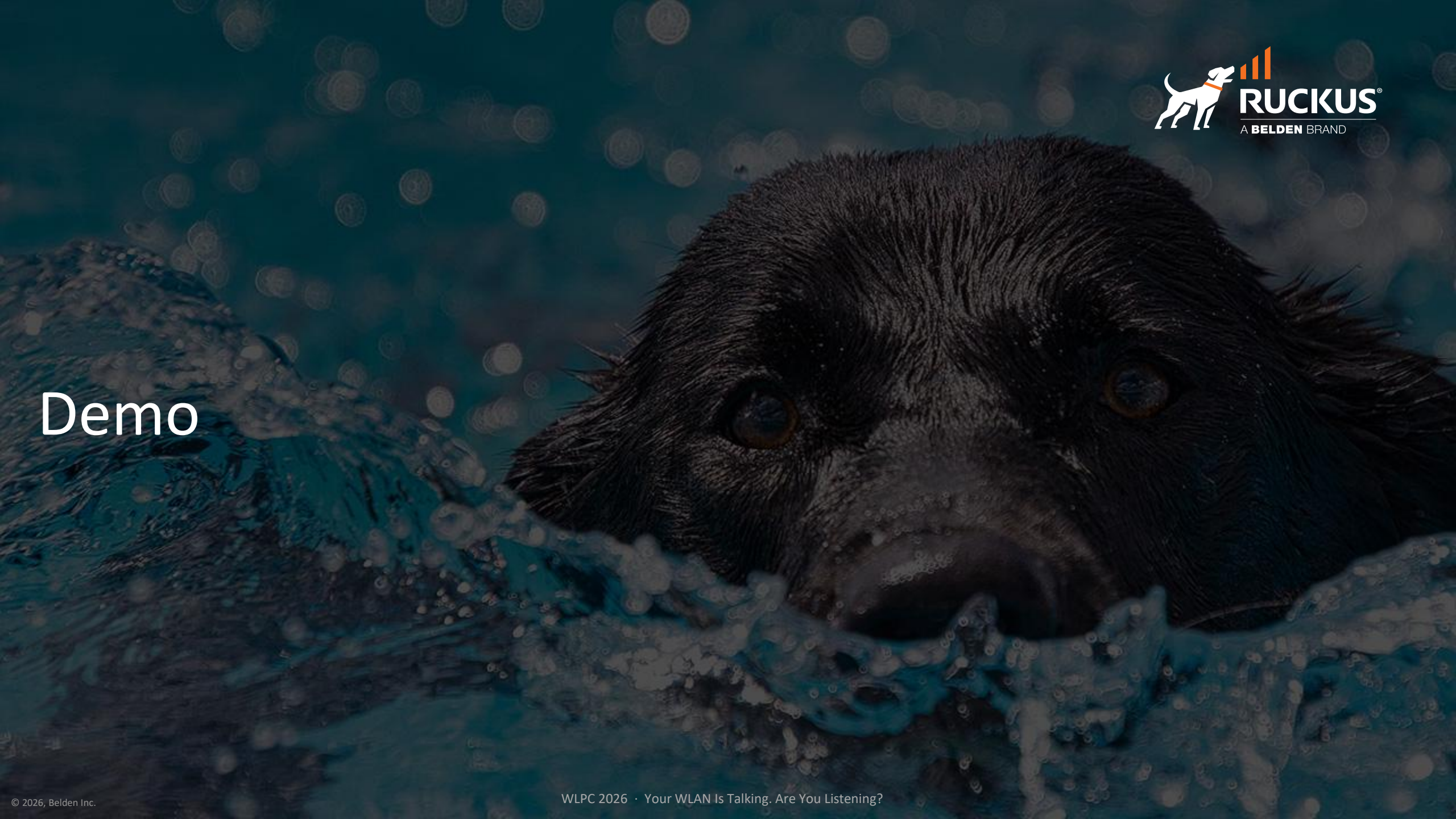
The join lives in SQL

Your floor plan, your client inventory, your calendar — three ordinary tables.

Open source, replaceable

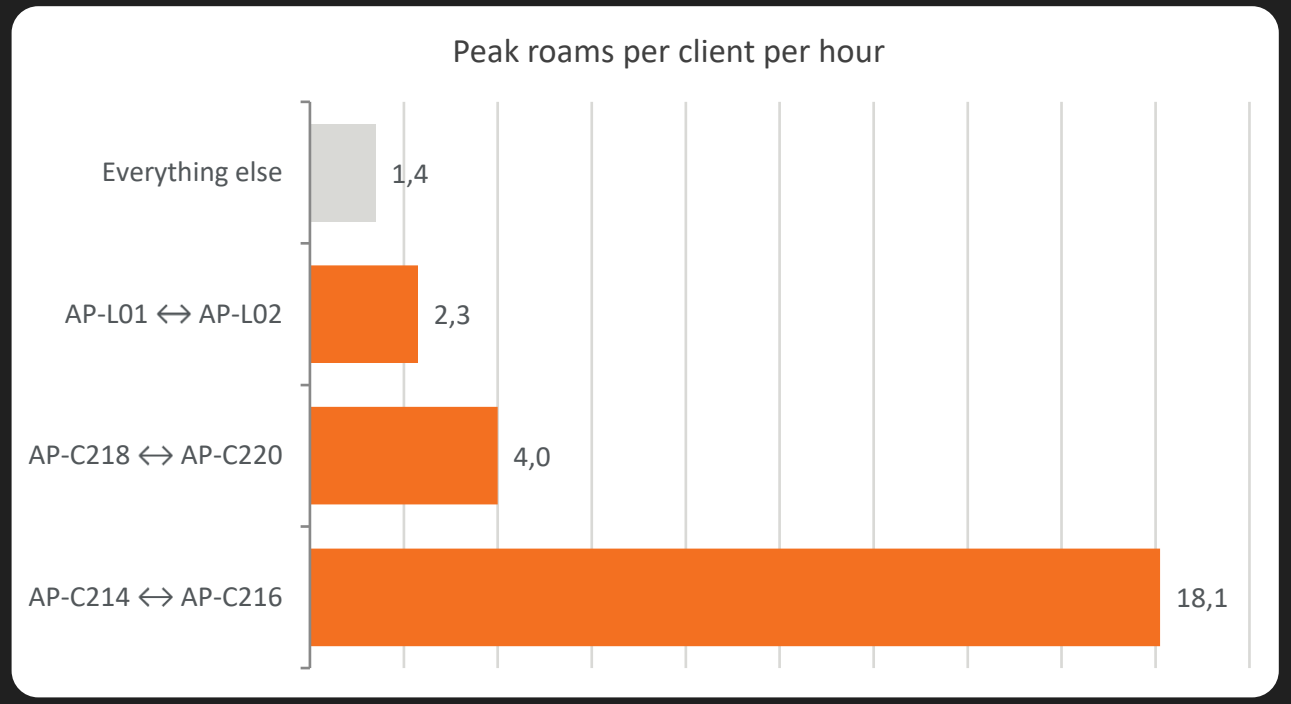
Swap Superset for Grafana, Postgres for anything, SZ or vendor WLC. The pattern survives.

Demo



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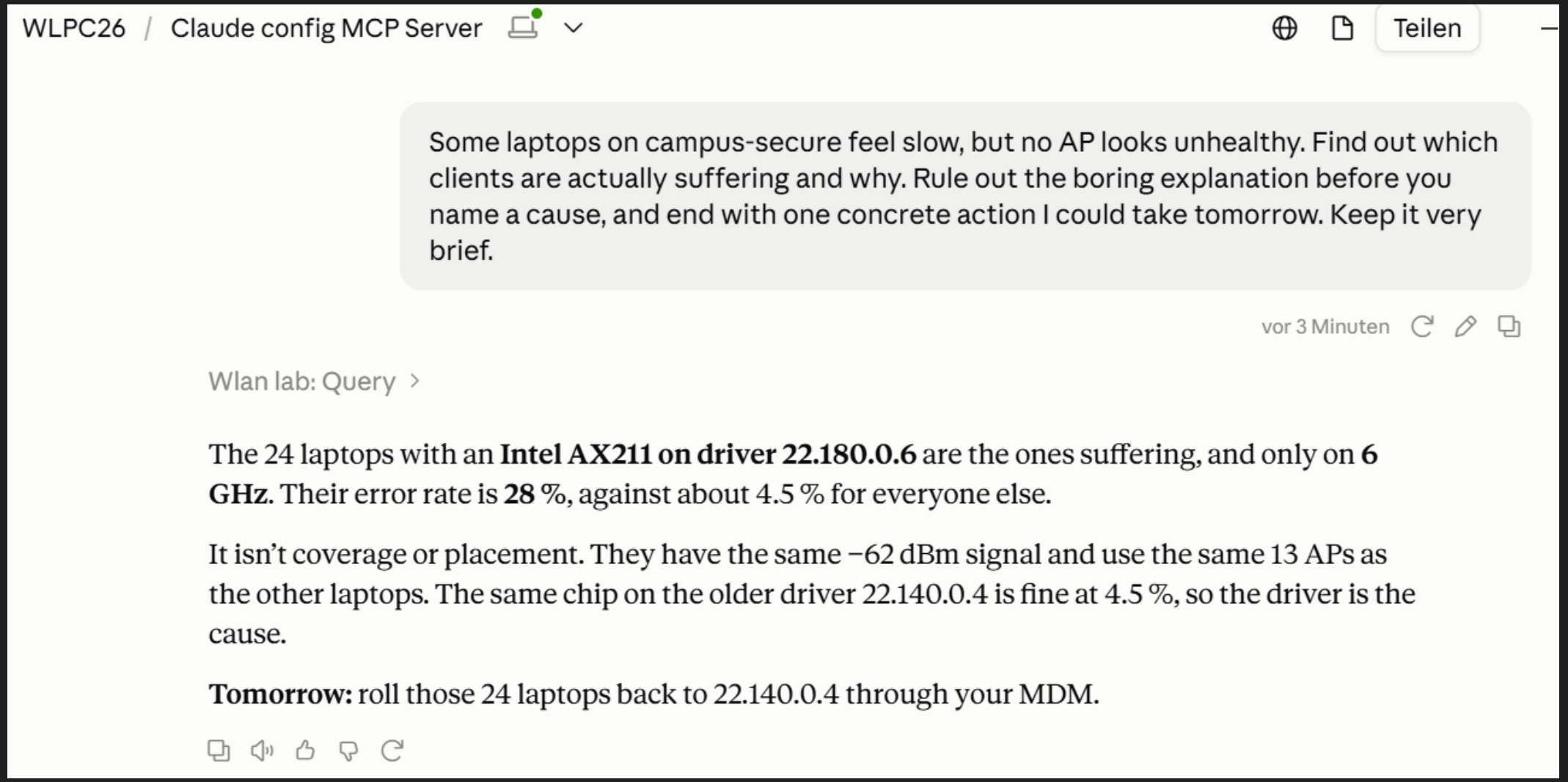
Demo Fallback, just in case



Roaming	Two APs ping-ponging the same clients. Per AP both look healthy; per client over time it looks different
Client	One driver revision retrying 6.3× the fleet median — and only on 6 GHz.
RF	A radar event. Every weekday, 14:10.
Noise	80% of all events came from three APs. Fix those and the NOC goes quiet.

Same counters the controller always had. New questions asked of them.

Put AI on data that knows your context via MCP



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Your WLAN is talking.

Start listening on Monday.

01

Turn on the feed

One streaming profile.
One zone. Read-only.

02

Add some joins

Map AP to
location and additional context

03

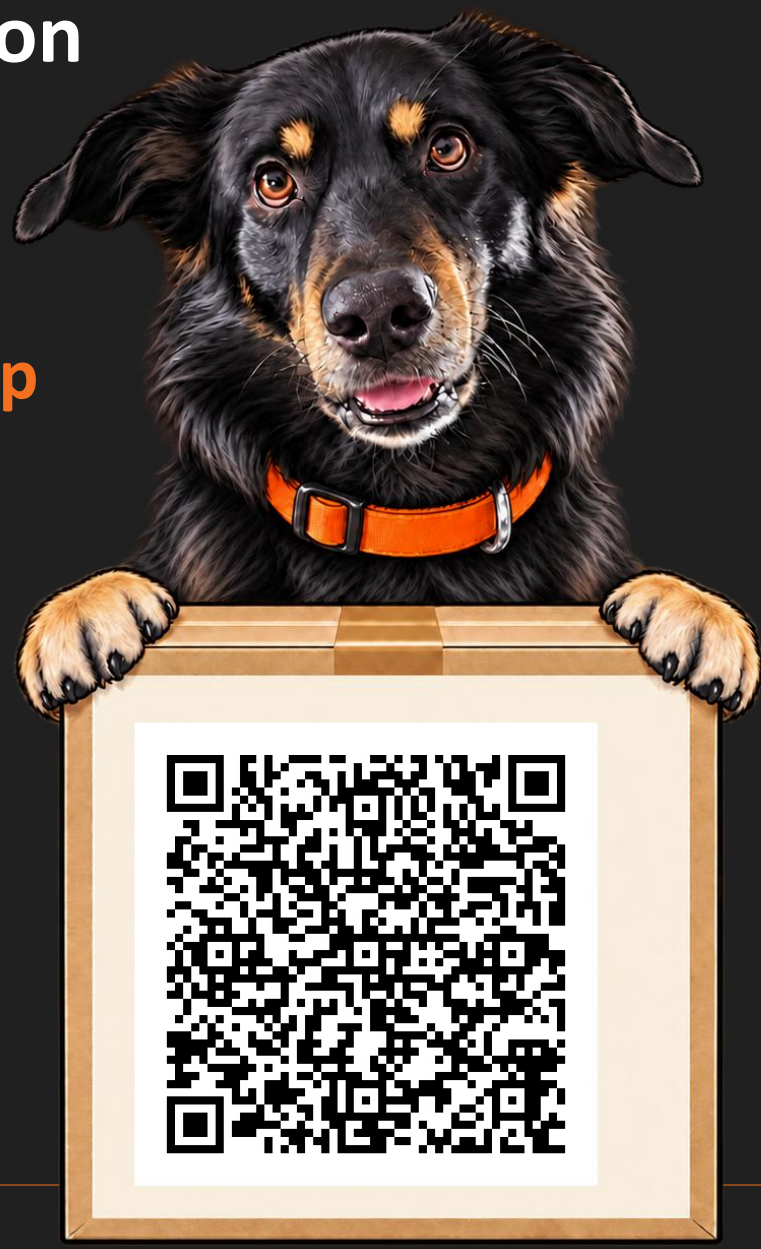
Ask one question

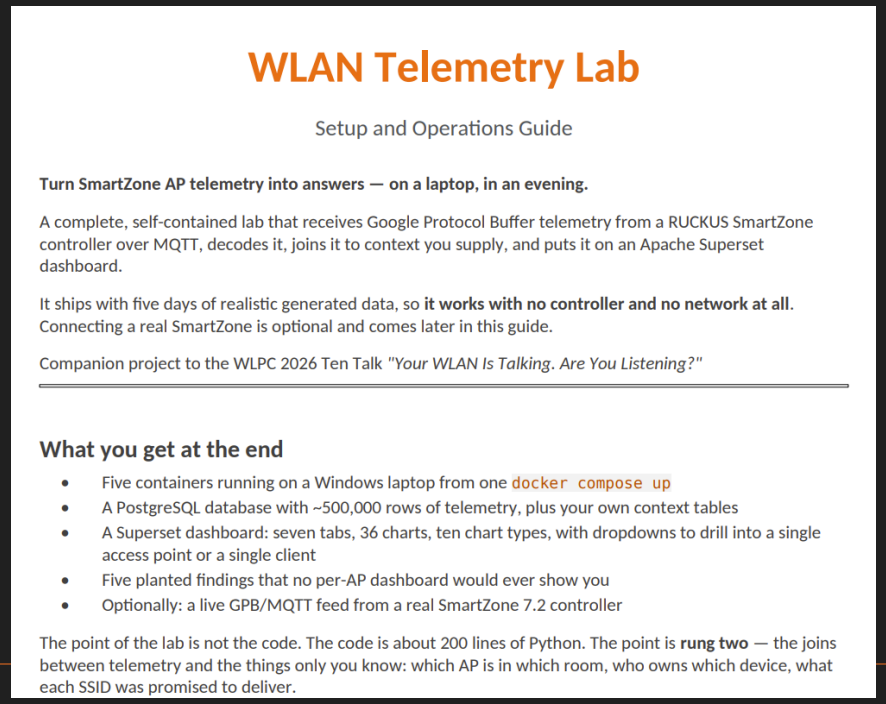
The one you currently guess at. Let the data answer instead.

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Project and documentation available for download

includes **collector, compose file, sample data, step by step guide, slide deck**





WLAN Telemetry Lab

Setup and Operations Guide

Turn SmartZone AP telemetry into answers — on a laptop, in an evening.

A complete, self-contained lab that receives Google Protocol Buffer telemetry from a RUCKUS SmartZone controller over MQTT, decodes it, joins it to context you supply, and puts it on an Apache Superset dashboard.

It ships with five days of realistic generated data, so **it works with no controller and no network at all**. Connecting a real SmartZone is optional and comes later in this guide.

Companion project to the WLPC 2026 Ten Talk *"Your WLAN Is Talking. Are You Listening?"*

What you get at the end

- Five containers running on a Windows laptop from one `docker compose up`
- A PostgreSQL database with ~500,000 rows of telemetry, plus your own context tables
- A Superset dashboard: seven tabs, 36 charts, ten chart types, with dropdowns to drill into a single access point or a single client
- Five planted findings that no per-AP dashboard would ever show you
- Optionally: a live GPB/MQTT feed from a real SmartZone 7.2 controller

The point of the lab is not the code. The code is about 200 lines of Python. The point is **rung two** — the joins between telemetry and the things only you know: which AP is in which room, who owns which device, what each SSID was promised to deliver.

Let's connect

between sessions, during the **RUCKUS vendor slot** or on LinkedIn

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