Google Enterprise Network

# Enterprise WiFi using open APIs

## OpenConfig for WiFi

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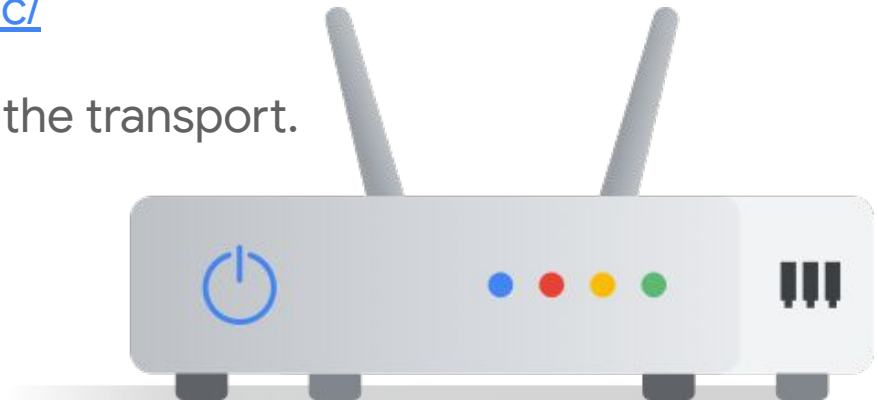
OPENCONFIG

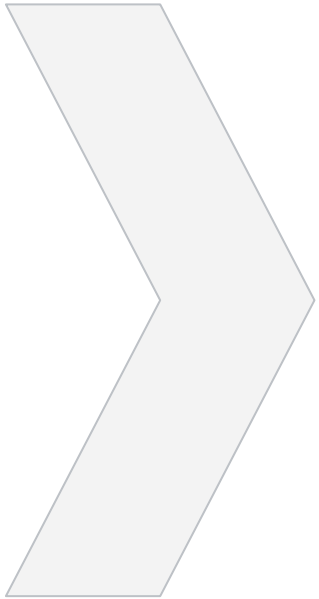
# What is OpenConfig?

- A set of vendor-neutral data models for interacting with the network; authored by network engineers.
- Informal, structured like open source: https://github.com/openconfig/public/
- OpenConfig is the schema. gNMI is the transport.



# Current OpenConfig participants

www.openconfig.net/about/participants/



Google

AT&T

Microsoft

British Telecom

Facebook

Comcast

Level 3

Cox Communications

Yahoo!

Apple

Jive Communications

Deutsche Telekom / Terastream

Bell

SK telecom

Bloomberg

OPENCONFIG

# Why? What problems did it solve?

| | | |
|---|---|---|
| 1 | We needed **Telemetry** (radio-data) and we needed it fast. | Ops Impact |
| 2 | We wanted to move away from translation layers. (We tried them. They were difficult & error-prone.) | Tools Impact |
| 3 | We need **programmatic access** and structured APIs for **everything**. | Deploy & Ops Impact |

# How does it solve them?

## Telemetry

- Streaming telemetry is a big part of Openconfig

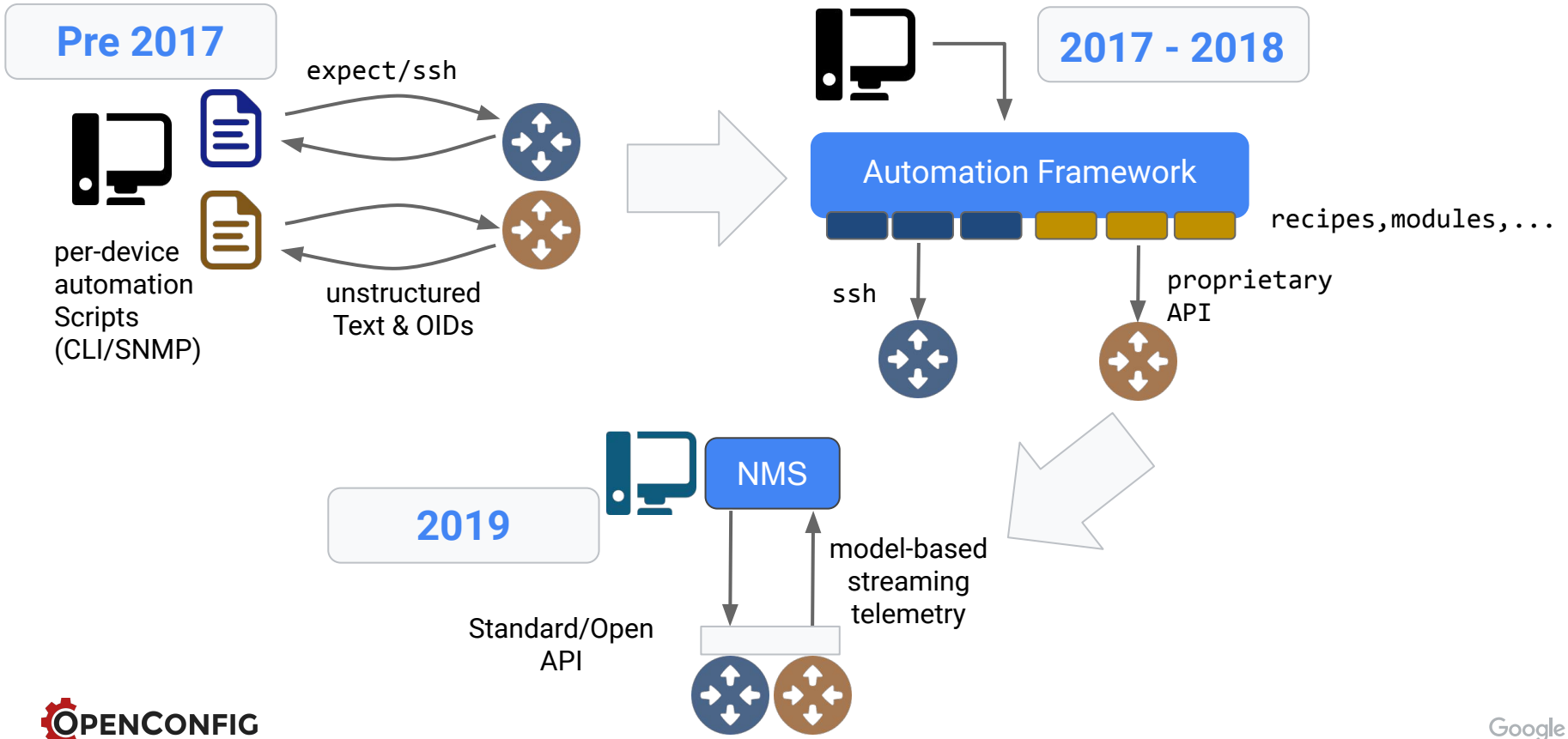
## Translation Layers

- Everyone adheres to one schema.
- See: https://github.com/openconfig

## Programmatic Access

- Entirely API driven, through gNMI / gRPC.
- 0 native access.

# Evolution of network element interaction



# Pre-OpenConfig Network

- **Physical controllers** -- like everywhere.
  - Multiple physical management points. Configure them, Operate them, LCM them
  - No programmatic access
- **Centralized data plane** (lots of tunnels in network to solve mgmt-plane)
  - Large failure domains (WLC goes down -- so did a lot of APs)

- **Configuration management**
  - CLI access needed to make changes
- **Too much human input** (CLI based)
  - To push config
  - To operate
- **Non granular telemetry**
  - SNMP based
  - Not fast enough

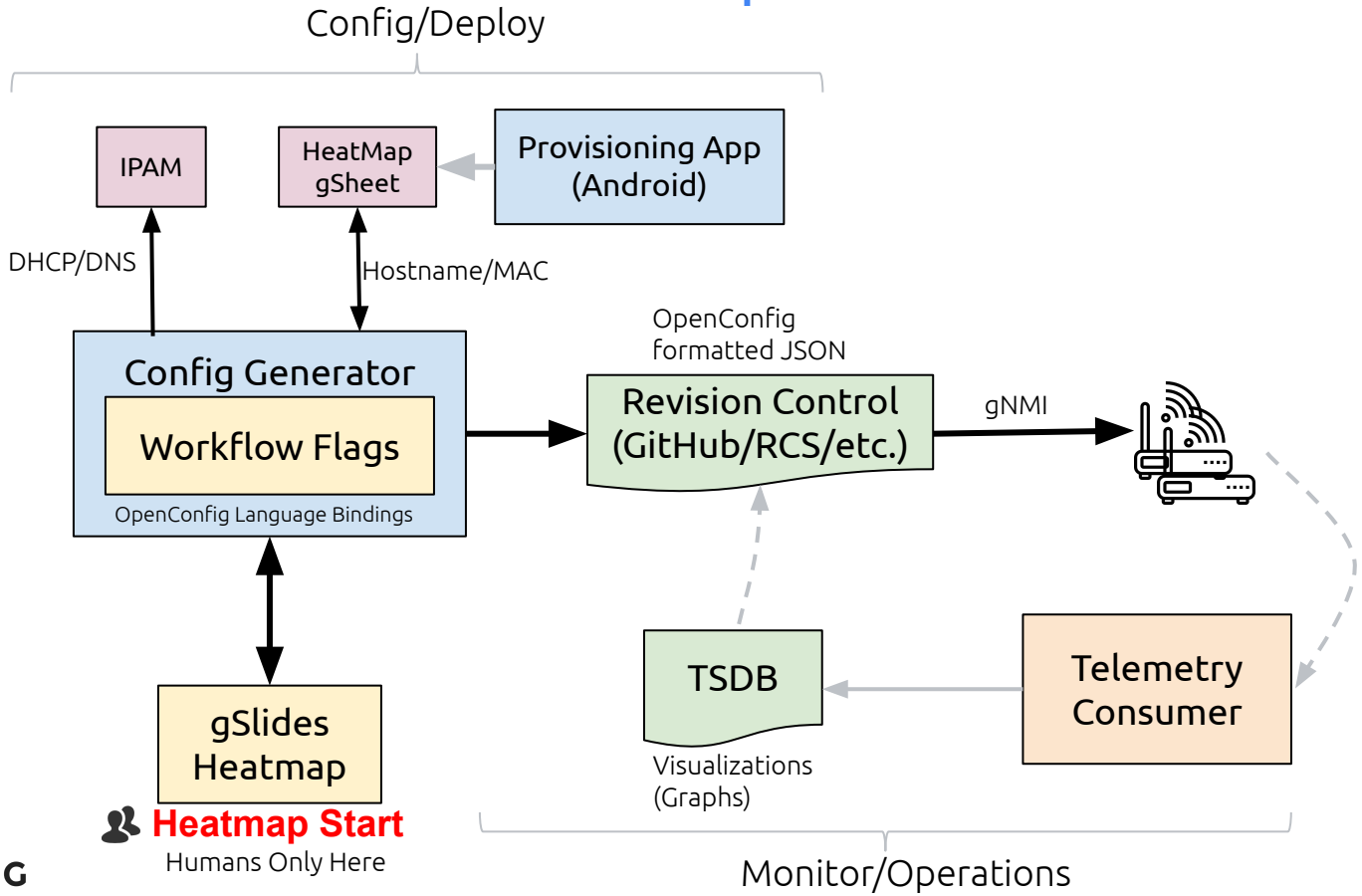
# OpenConfig Network

- **Controllers; only where required**
  - Data-plane out-of-scope.
  - Programmatic access.
- **Configuration management**
  - Standard APIs used to configure & monitor
- **No human input for config/operate**
  - To push config
  - To operate
- **Granular telemetry**
  - Publisher/Subscriber (pub/sub); not polling
  - Fast, encrypted by default

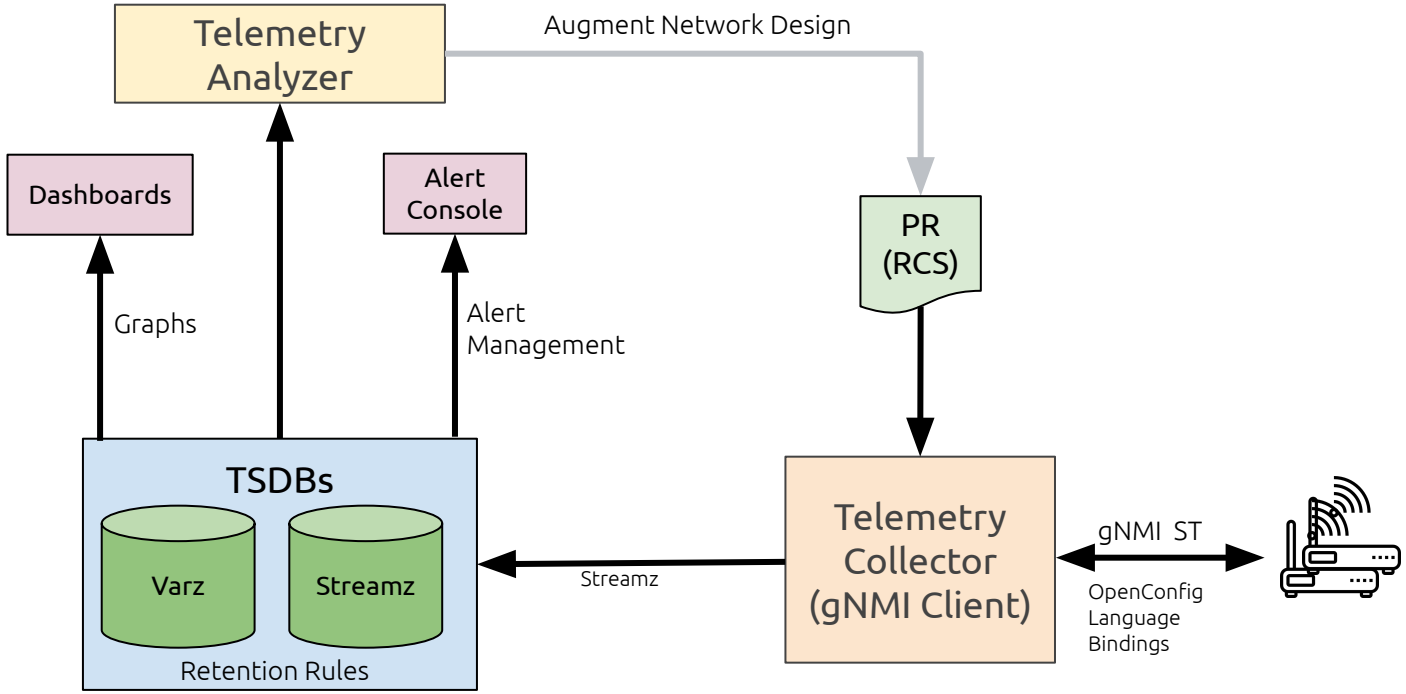
# How do we use it?

- Intent is populated by **automation** (inferred from design rules in heatmap).
- **No direct human interaction** with network elements (no CLI or direct access).
- Network admin **modifies design rules** (heatmap) to trigger configuration changes.
- Network operator only uses **vendor-independent UI** (eg TSDB visualizations) No CLI or direct access to operate the network.
- Network operator **does not know** which vendor's network element is in use.

# E2E Automated Toolchain Example



# Respond to conditions




Demo

# Questions?

Contact albanom@google.com or shimol@google.com