

# Workspace Mood Monitor

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# Agenda

- The Problem
- Our Solution
- System Architecture
  - Hardware
  - oneM2M
  - Cloud
- Demo



# Problem

- Workspaces can be uncomfortable:
  - bad air, noisy, poorly lit
- Too many parameters to monitor
  - people don't bother
- Small changes impact:
  - focus, mood, and productivity



# Our Solution

- Sensors: Noise, Light, Temperature, Humidity, CO<sub>2</sub>, Occupancy
- Mood Score: Single metric combining all environmental factors
- Real-time Feedback: RGB LED + Grafana dashboards



# System Architecture

## 1. Edge Layer (Desk)

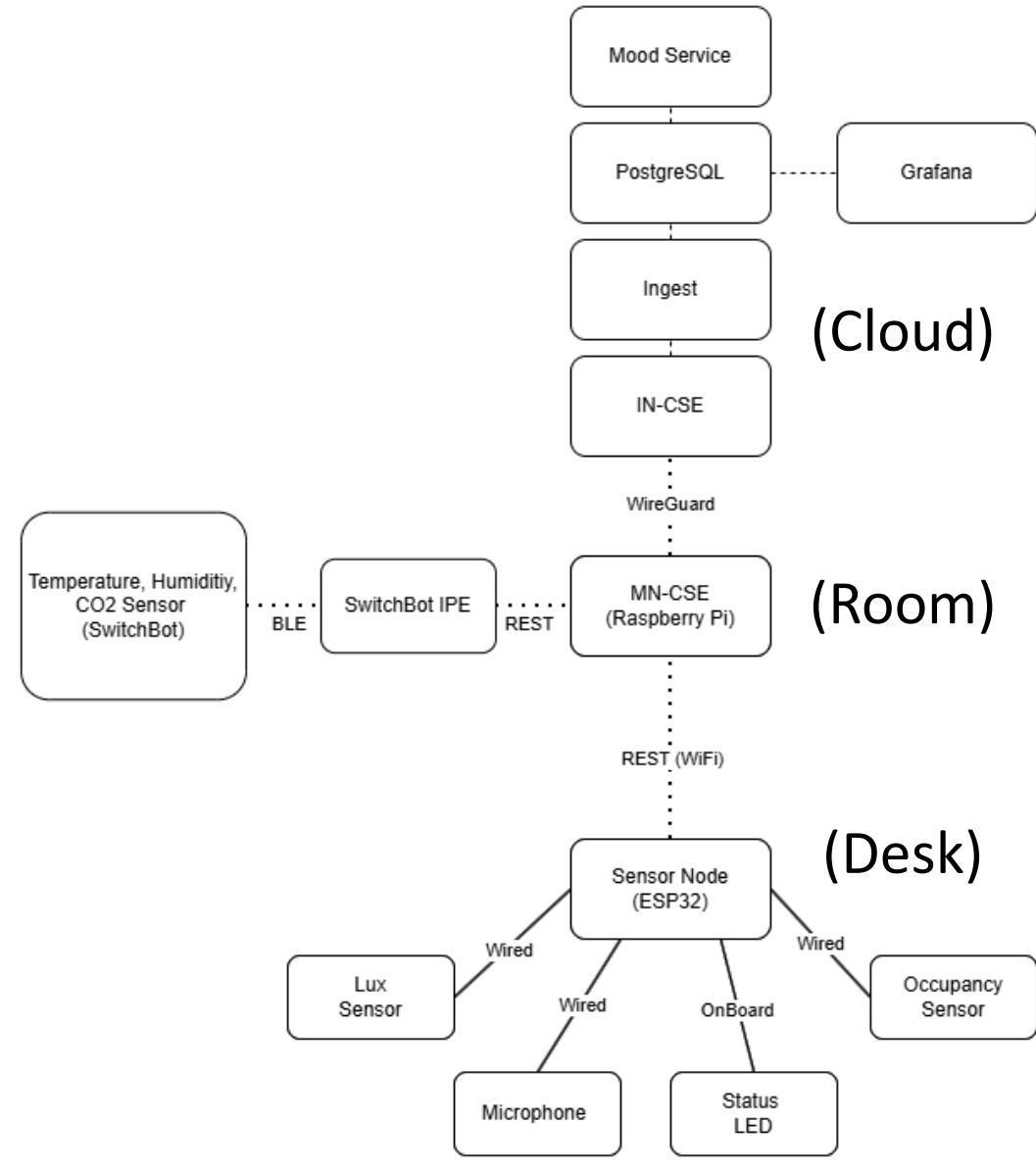
ESP32-S3 with sensors for light, audio, occupancy  
RGB LED using small notification server

## 2. Local Layer (Room)

Raspberry Pi with Docker containers:  
MN-CSE + SwitchBot BLE + WireGuard VPN

## 3. Cloud Layer (Cloud Server)

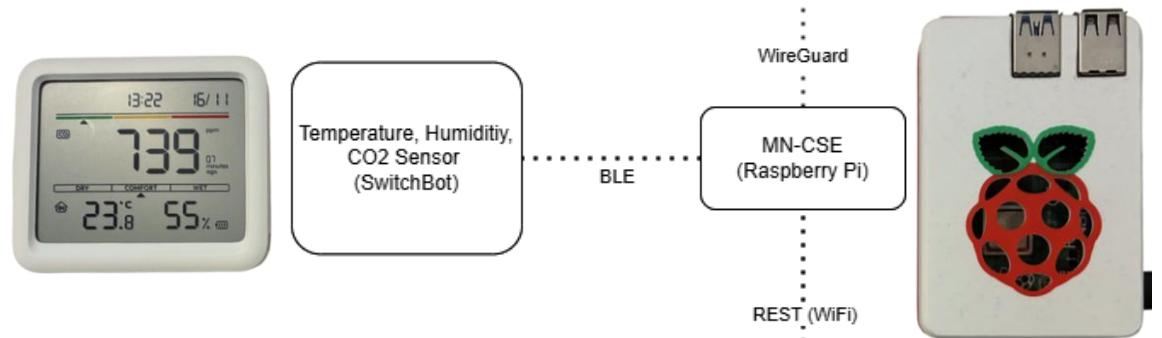
Docker containers:  
IN-CSE + Ingest + Mood Service + PostgreSQL +  
Grafana



# Hardware Implementation

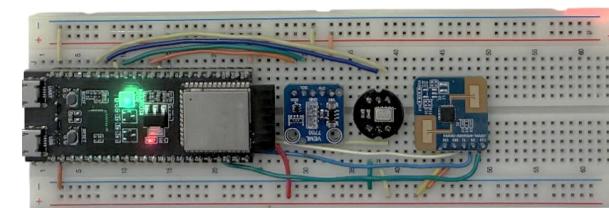
## Raspberry Pi 4

- SwitchBot Meter Plus (BLE)
  - CO2, Humidity, Temperature
- ACME MN-CSE container (OneM2M)
- WireGuard VPN client



## ESP32-S3 DevKit

- VEML7700 light sensor (I2C)
- INMP441 microphone (I2S)
- S3KM1110 mmWave occupancy (UART)
- Built-in RGB LED



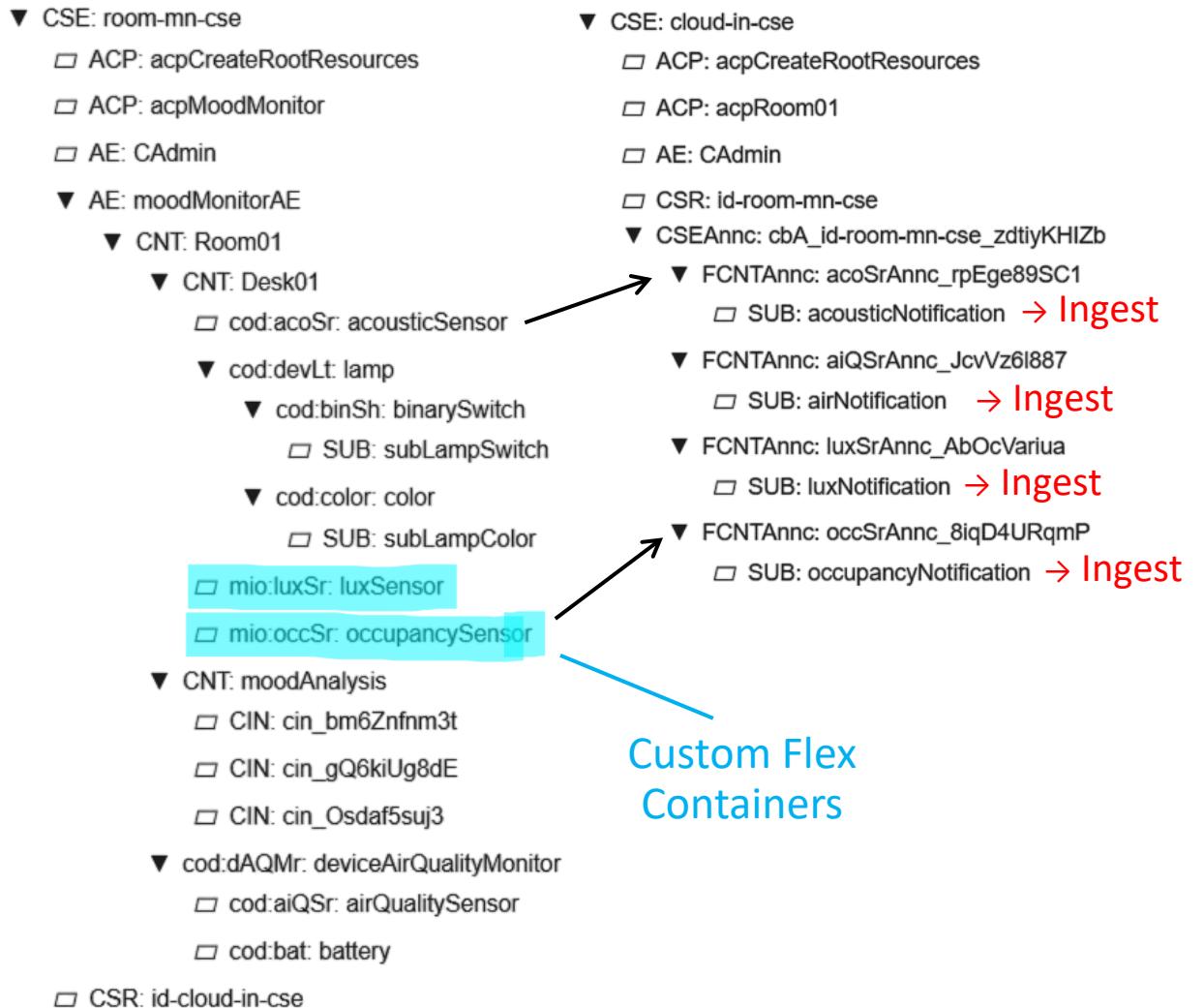
# oneM2M Architecture

## Resource Creation & Updates

- Switchbot Docker container creates AE, room CNT and flex containers
- Reads Switchbot sensor over BLE and updates attributes of an airQualitySensor

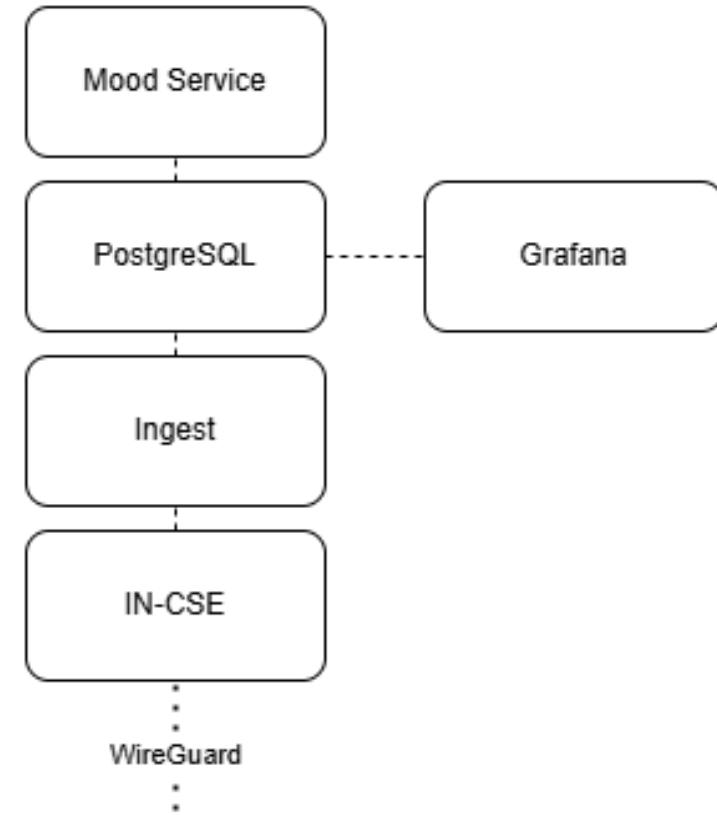
## Announcement & Subscription

- MN-CSE announces resources to IN-CSE (via VPN)
- IN-CSE subscribes to announced resources with Ingest service as the notification server

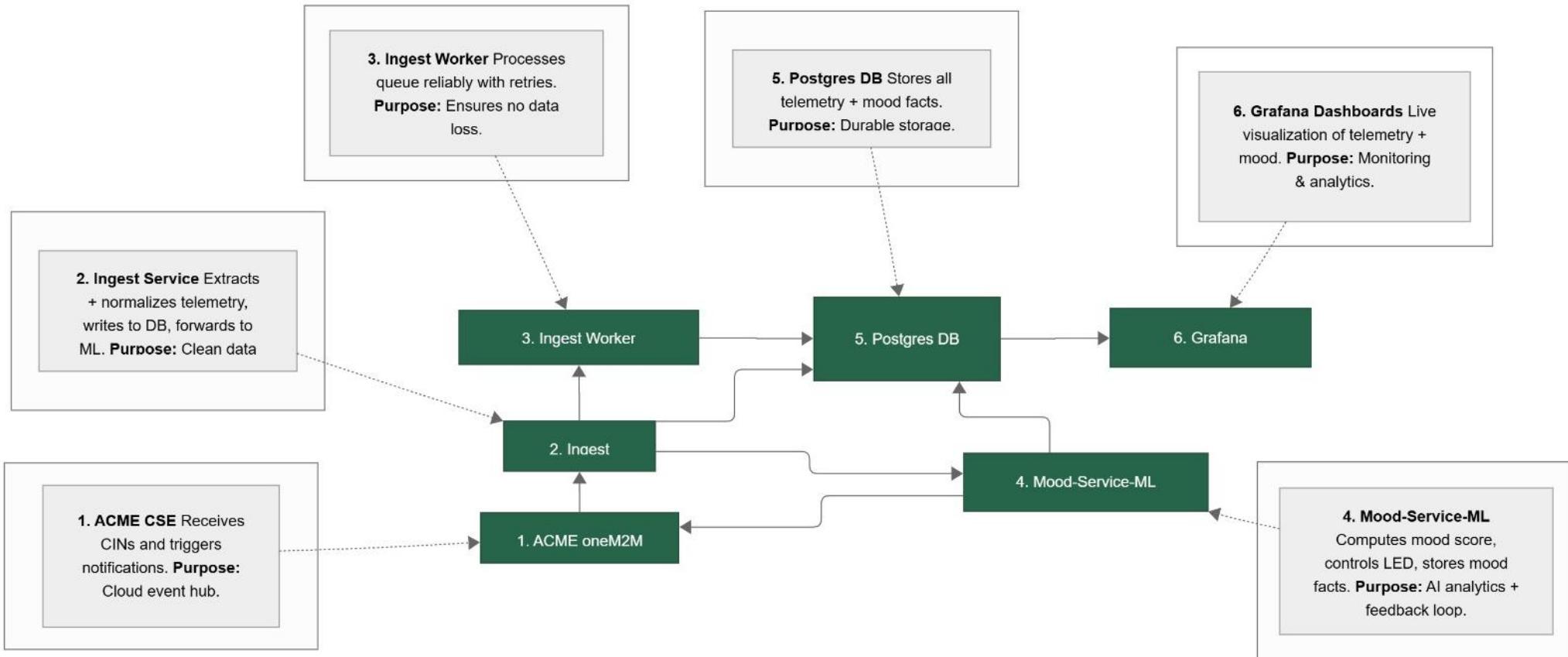


# Cloud Infrastructure

- WireGuard VPN
  - Secure connectivity
- IN-CSE (ACME)
  - Subscriptions to announced resources
- Ingest + Ingest Worker Service (Flask)
  - Notification Server
  - Normalize telemetry and save in PostgreSQL
- Mood ML Service (FastAPI)
  - Compute mood scores
  - Update LED over OneM2M
- Grafana + PostgreSQL
  - Visualize dashboards, store data



# Cloud Data Flowchart



# Demo & Documentation



<https://www.hackster.io/vibetribe/workspace-mood-monitor-c71c26>

Thank you for listening.

Do you have any questions?