

Workspace Mood Monitor

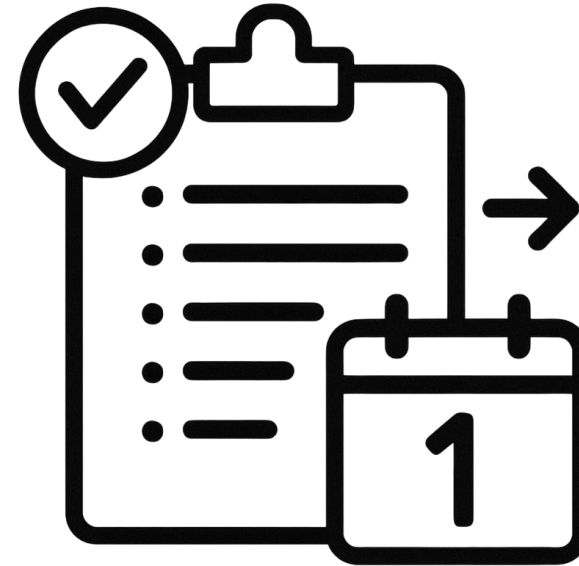
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Agenda

- 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, CO₂, 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

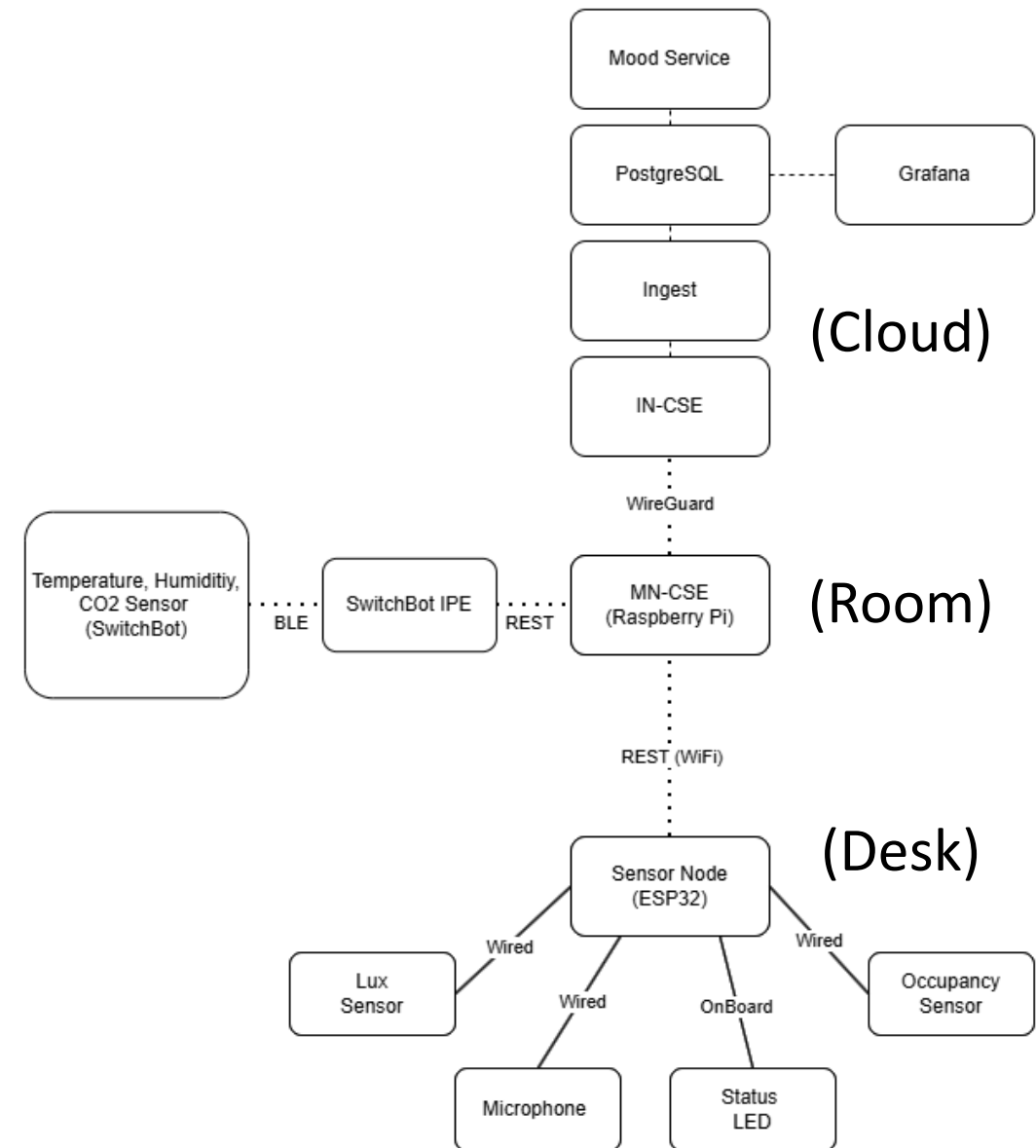
2. Local Layer (Room)

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



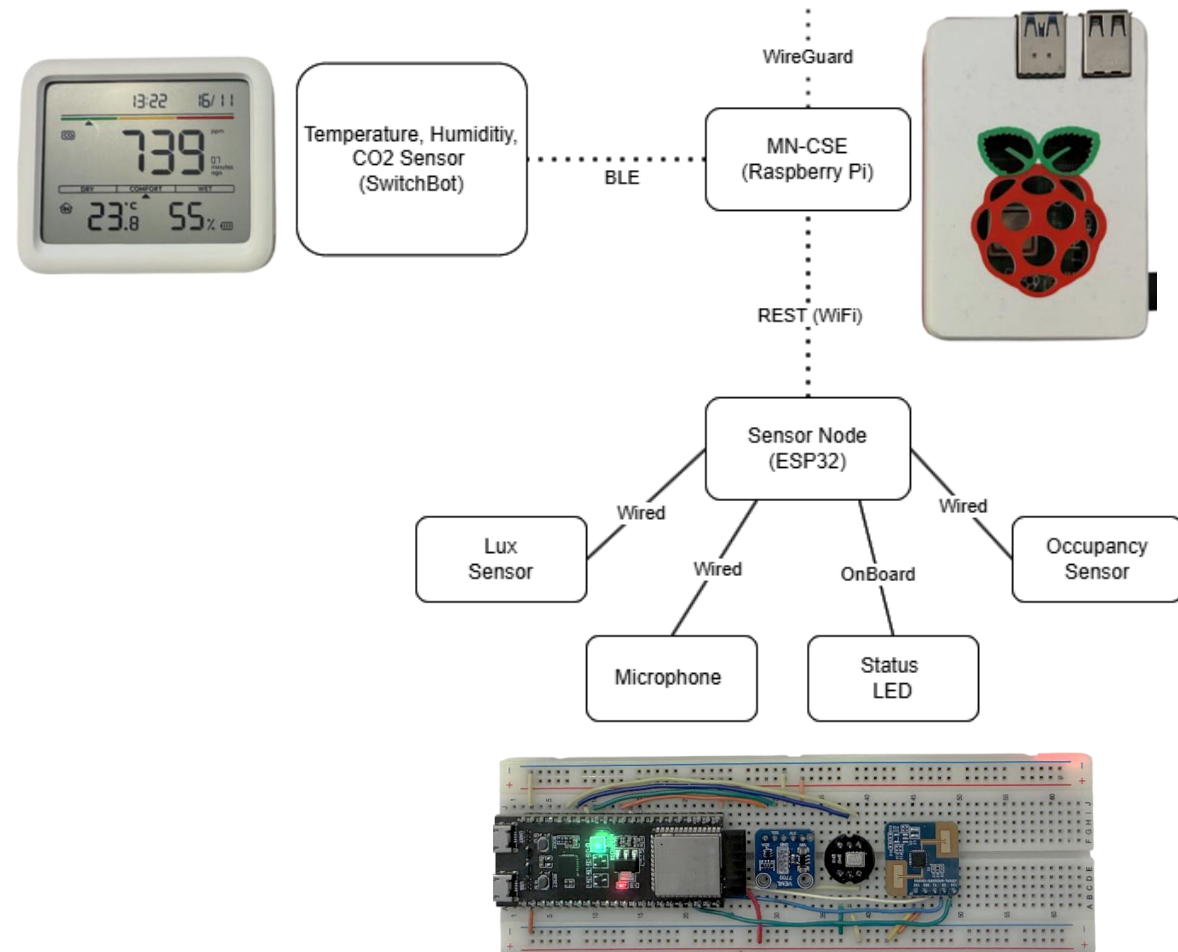
Hardware Implementation

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



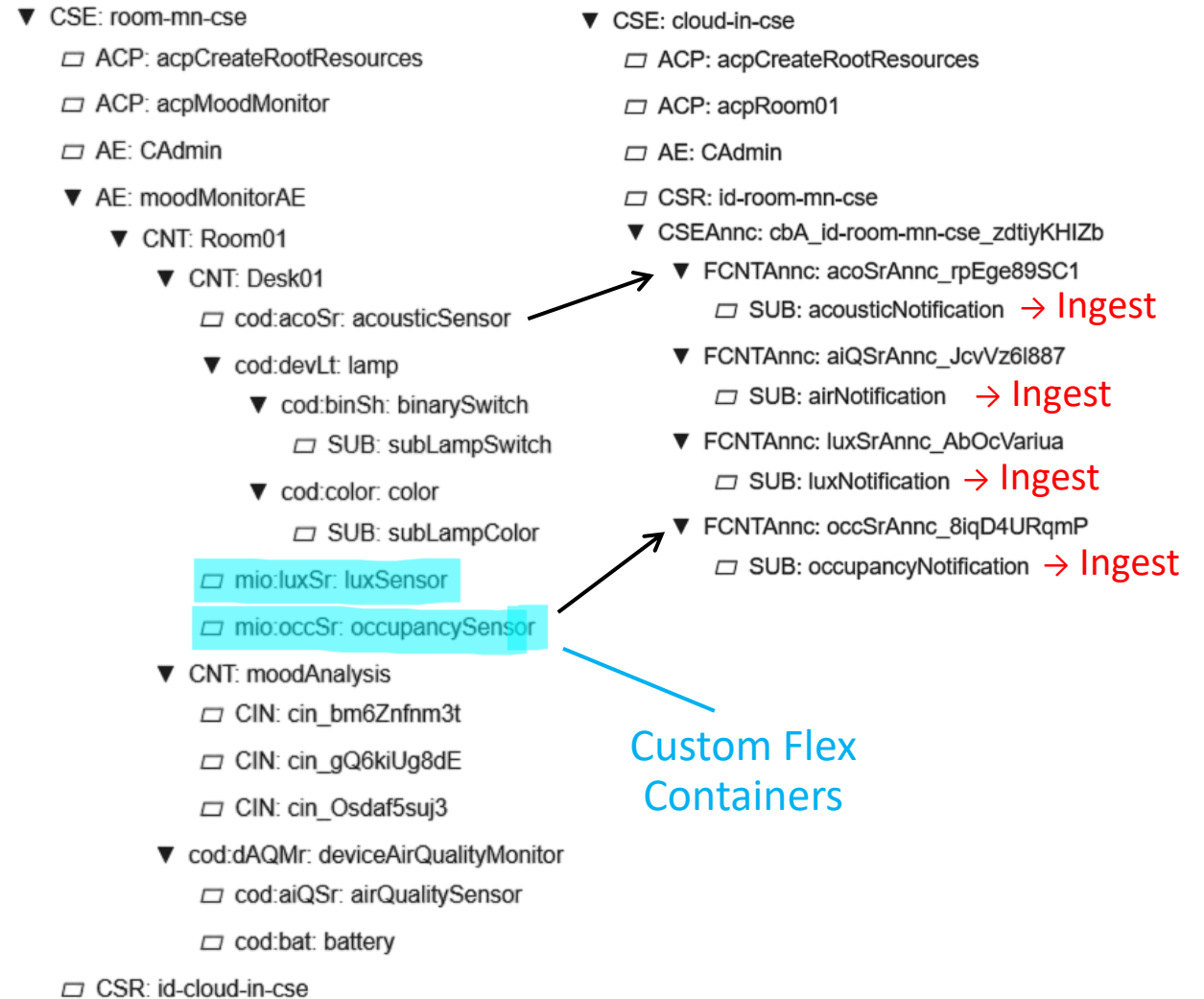
oneM2M Architecture

Resource Creation & Updates

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

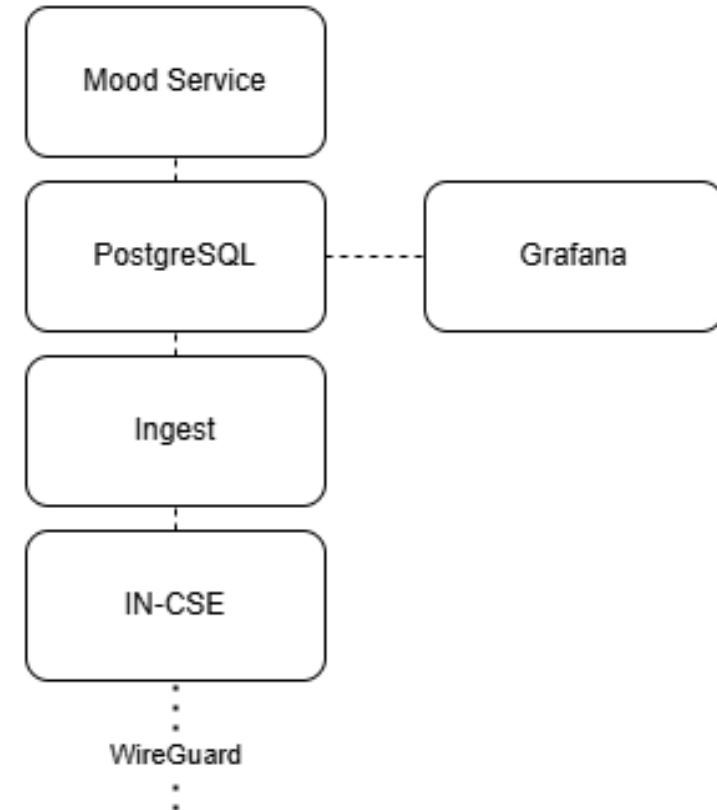
Announcement & Subscription

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

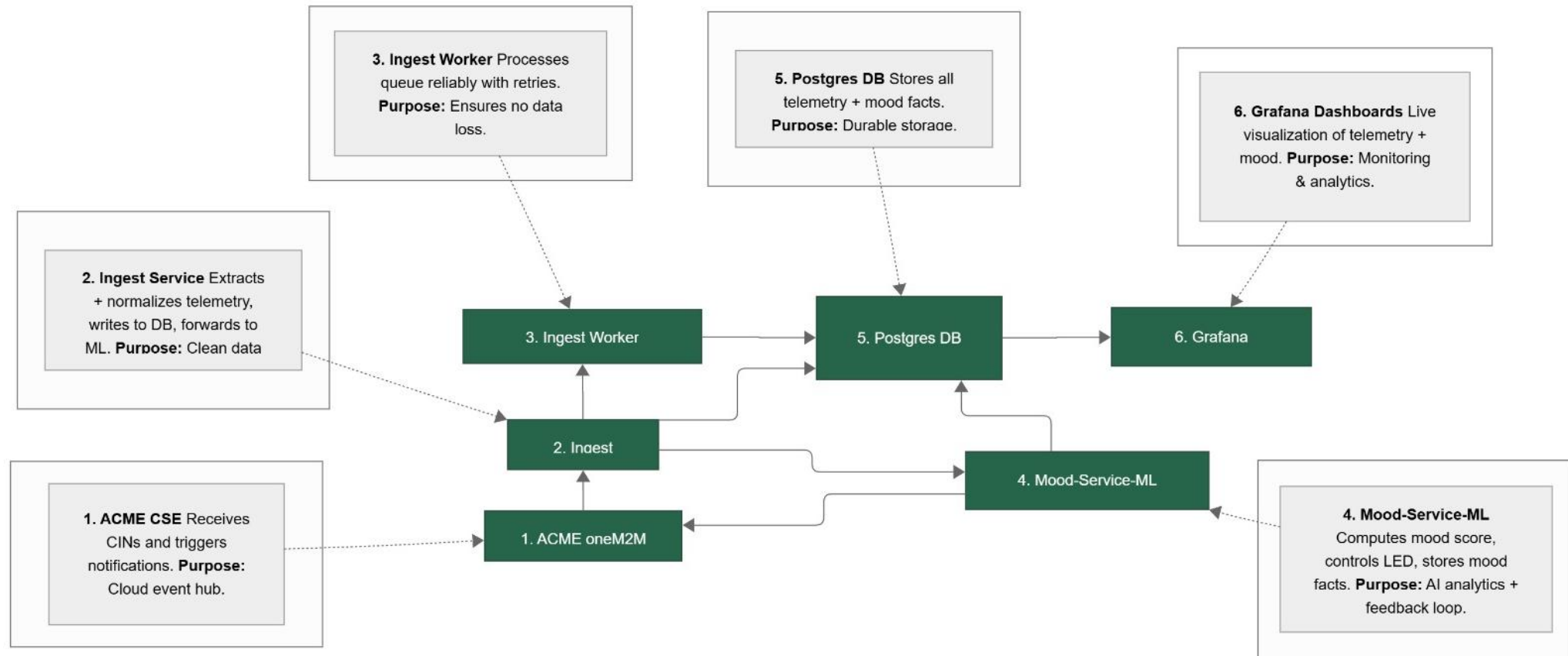


Cloud Infrastructure

- 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?