100162.0pt100

- No unified air po-
- **Public Health Threat**: Air qua-

Core Problem: Bogotá residents lack timely access to interest-

Primary Objective:

Design and validate

4-layer architecture.

Python APScheduler-based Data Pipeline

- **Polling Frequency**: 10-

PostgreSQL 12+ with 3NF Normalized Schema

FastAPI REST API with Intelligent Caching

- **Framework**: FastAPI

Interactive User Dashboard

Technology Stack: React/Vue.js with responsive design

Entity	Descri
Station	Geogra lat/lon,
Pollutant	PM2.5, CO wit

Performance Targets: Sub-100ms latency on 85,000+ readings

Query 1: Latest readings by station

Baseline: 85,000 air quality readings across 6 stations and 4

Effect of Temporal Partitioning

Scenario 1: Ingestion vs. Dashboard Reads

Current Deployment (Baseline):

- Peak concurrent users: 50–

1. **Normalized 3NF Schema**: 8-entity design enforcing referential

Short-term (6 months):

- TimescaleDB hyper-tables for native time-

Provides a *replicable, open-source foundation* for urban air qua-

Thank You

Questions?

Contact:
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