



Pilot Metrology Cloud with IOT Sensor Network THB for SIM Region





1 Team members

2 Methodology

3 Integration, FAIR and digitalization

4 Transfer process and data base

5 Web App and Cloud Structure

6 CONCLUSION AND FUTURE WORK

7 ACKNOWLEDGMENTS



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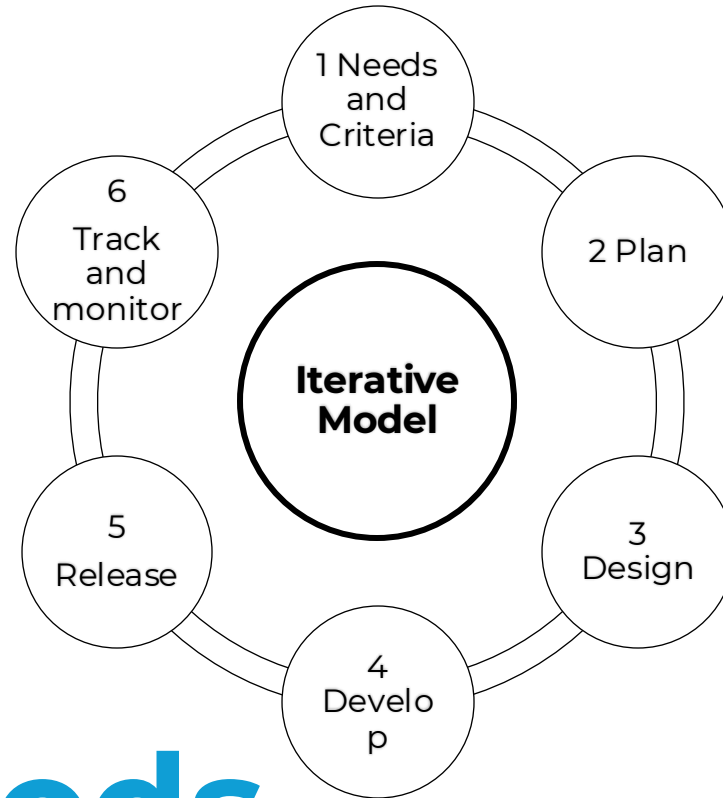


**Digital
Transformation**

SIM

Agile

Methods



**Metrology
4.0**

Multidisciplinary

Iterative

M4DT



Epic

Features

Story

Metrology CLOUD Featuring IOT-THB

Propose a pilot example of metrology cloud using the delivery of the IOT SIM-IDB-THB project to enable a network of sensors in different NMI's and work in the harmonization of the FAIR Data Transfer that could be considered to develop algorithms, tools and systems that can share secure information among SIM region. The proposals should benefit most of SIM NMIs potentially (can begin with some NMIs but should have a proposal to include the rest of interested NMIs).

Product requirements document

Edited By Aldo CENAM

Metrology CLOUD Featuring IOT-THB

Integration of measurement systems

Digitalization and FAIR

Transferring process

Data Base

Web App

Cloud Structure

Metrology CLOUD Featuring IOT-THB

Information analysis
How data will be collected

Reference Time
Authentication

Harmonization of criteria FAIR data
Middleware development
Various instruments

Device identification
SI-Digital framework

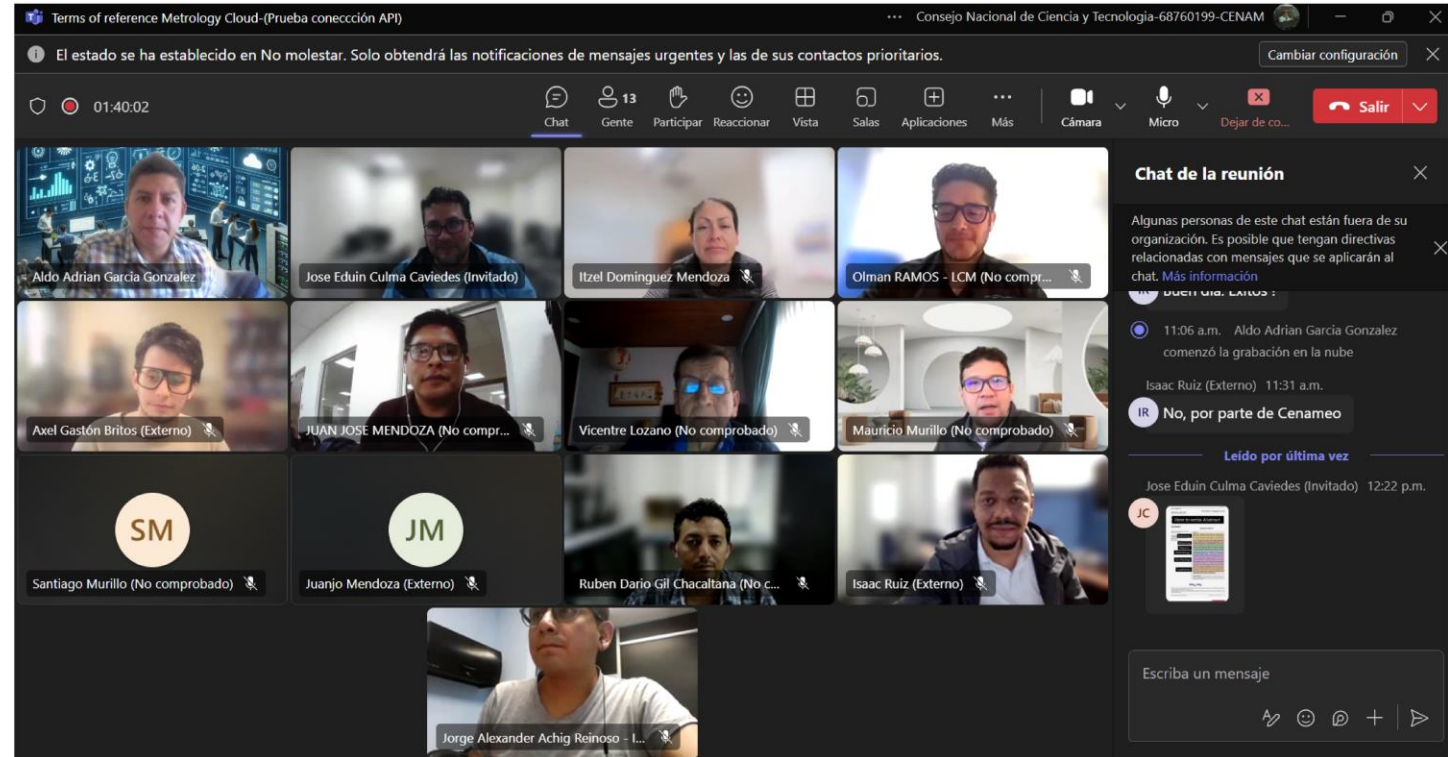
MQTT
WIFI

Data Manager
Data structure to be sent to the database

Design
Definition of architecture

Define use/purpose and possible applications
Develop web page

Cloud Type
Use and Ownership





THB



**Dispositivo
comercial**

Trama

```

$;ROR;THB-510-0004;Temperature;296.61;\kelvin;1970-01-01T00:04:51-05:00;*
$;ROR;THB-510-0004;Humedad;296.61;\Relative Humidity;1970-01-01T00:04:51-05:00;*
$;ROR;THB-510-0004;Pressure;296.61;\Pa;1970-01-01T00:04:51-05:00;*
    
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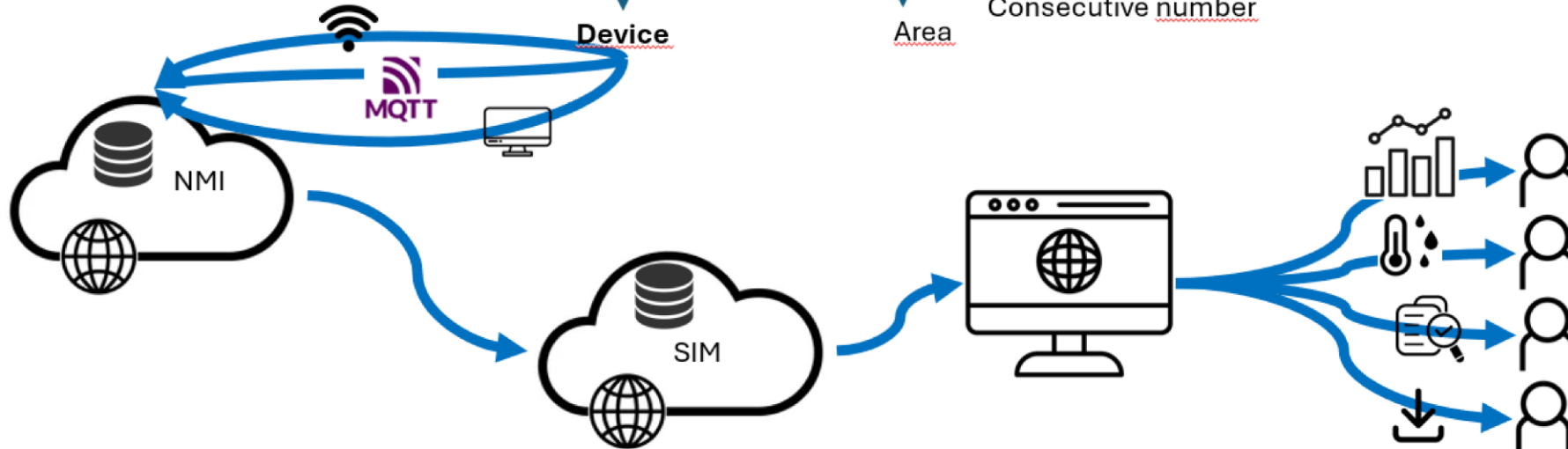
CNM-THB-510-004

NMI

Device

Area

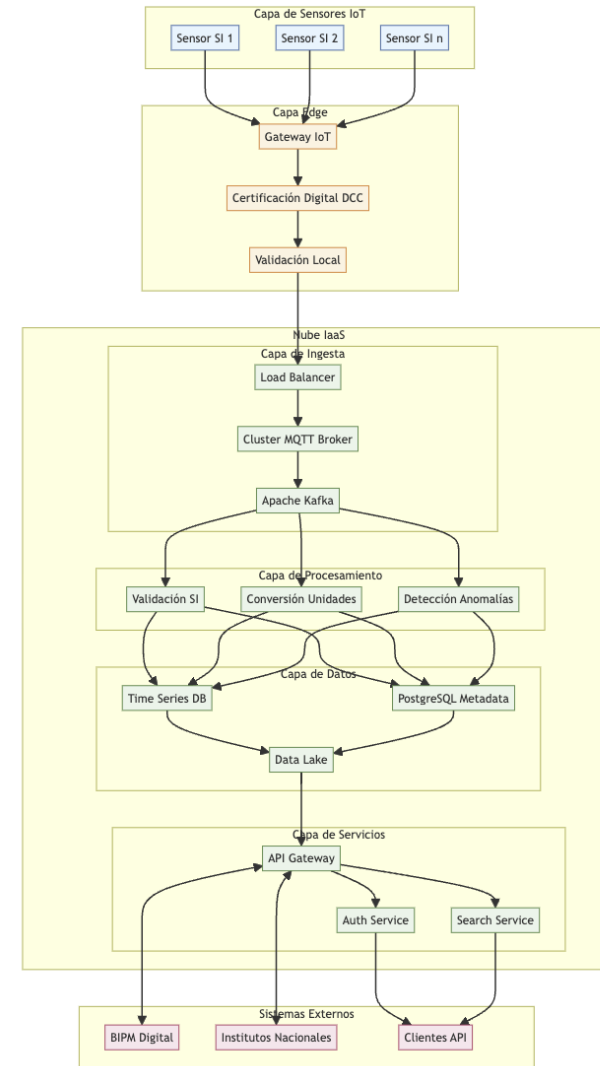
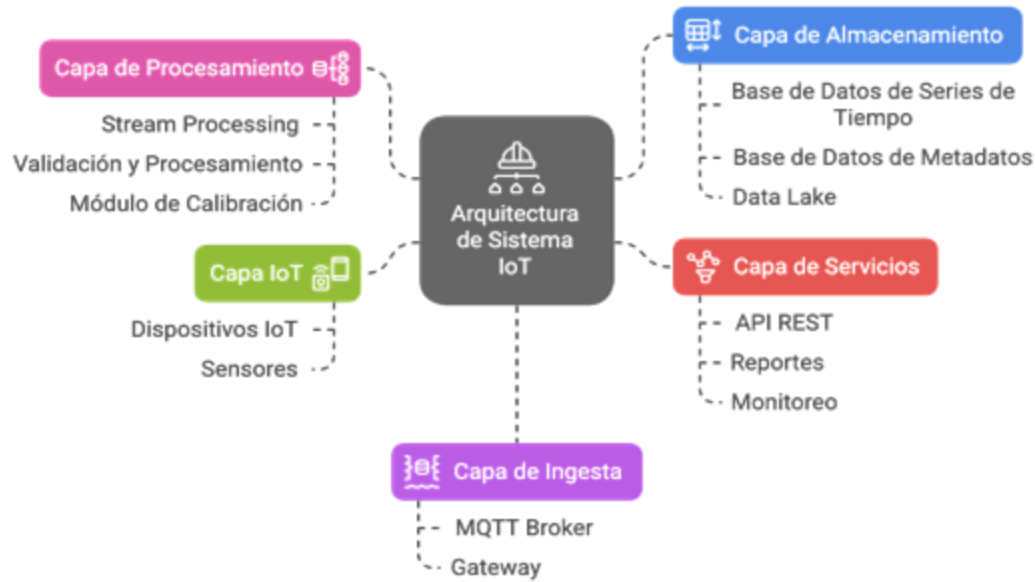
Consecutive number





Design Architecture

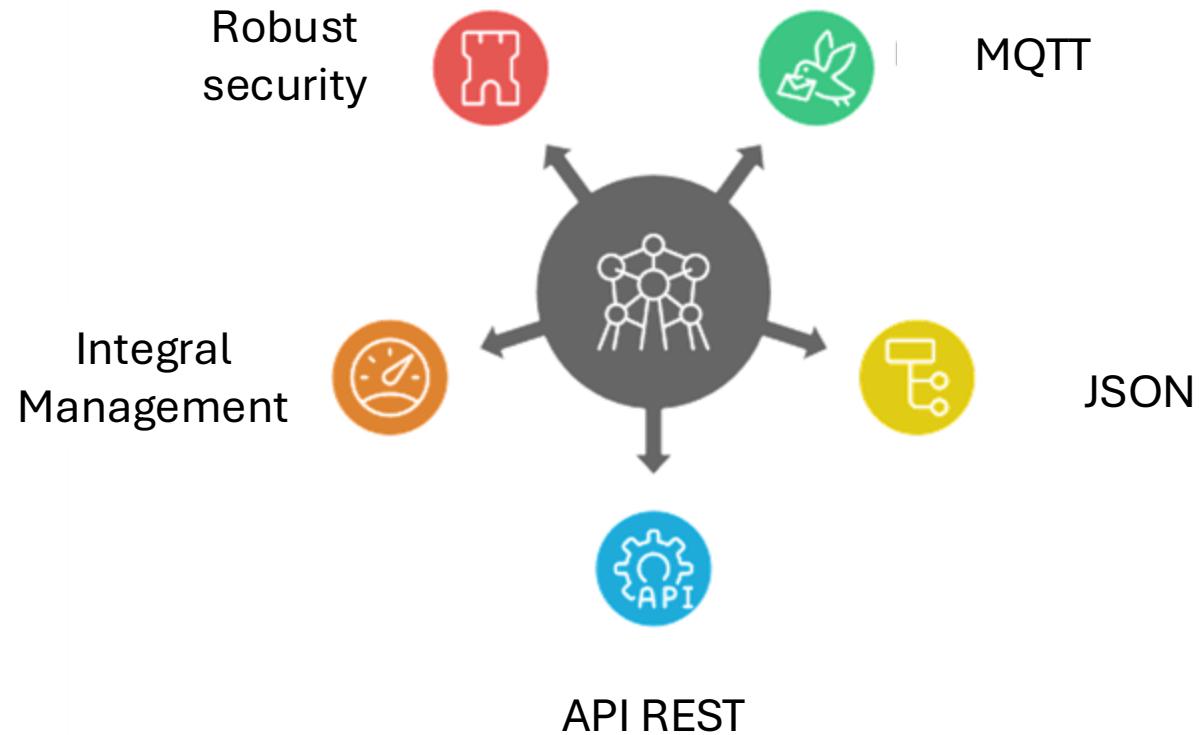
Arquitectura de Sistema IoT



Each of these components is designed to work in harmony, providing a robust, scalable platform that conforms to international metrological standards. The architecture prioritizes measurement accuracy, traceability and reliability, while maintaining the flexibility to evolve with future needs.

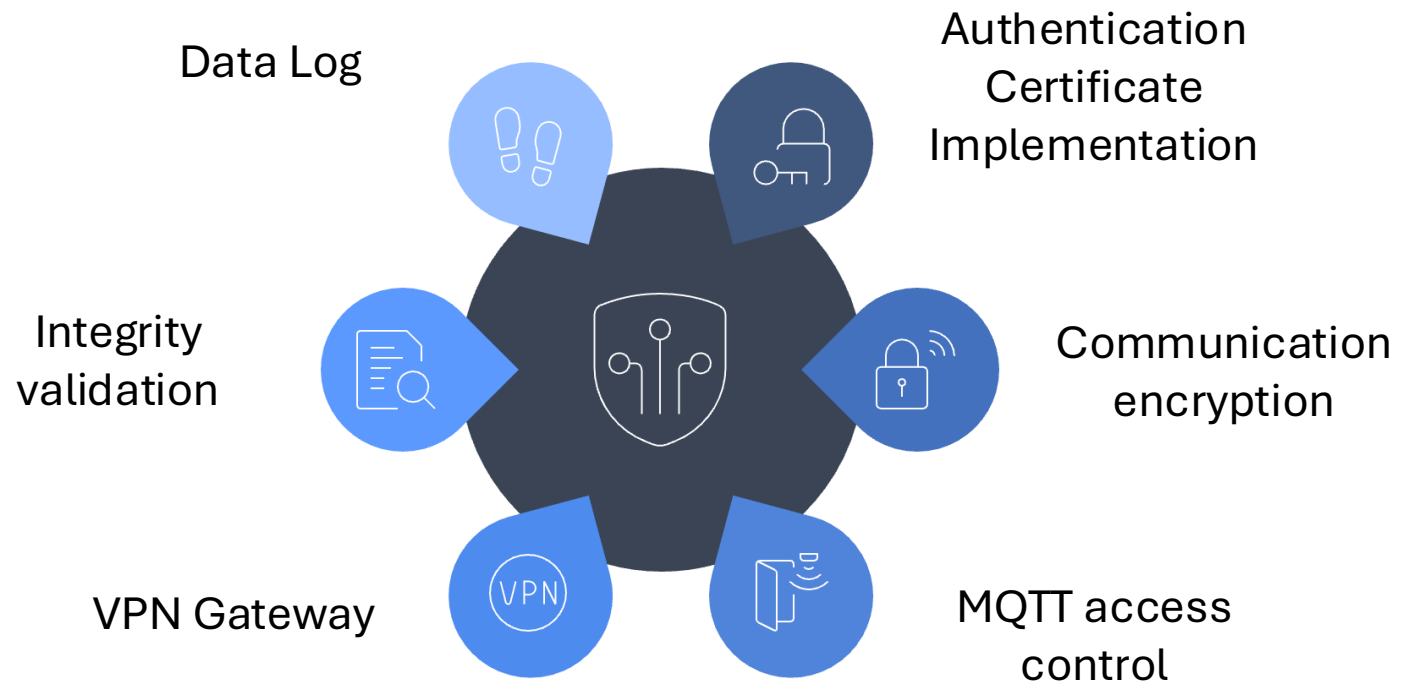


Framework Interoperabilidad





Security

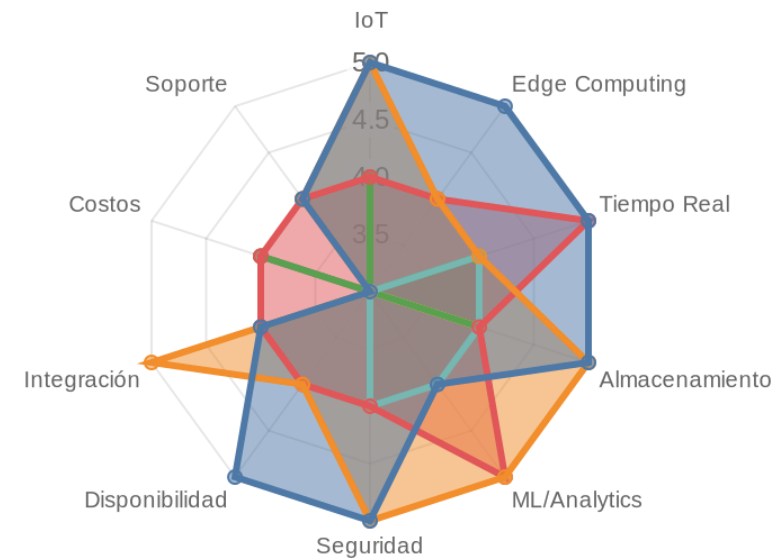




Cloud Infrastructure



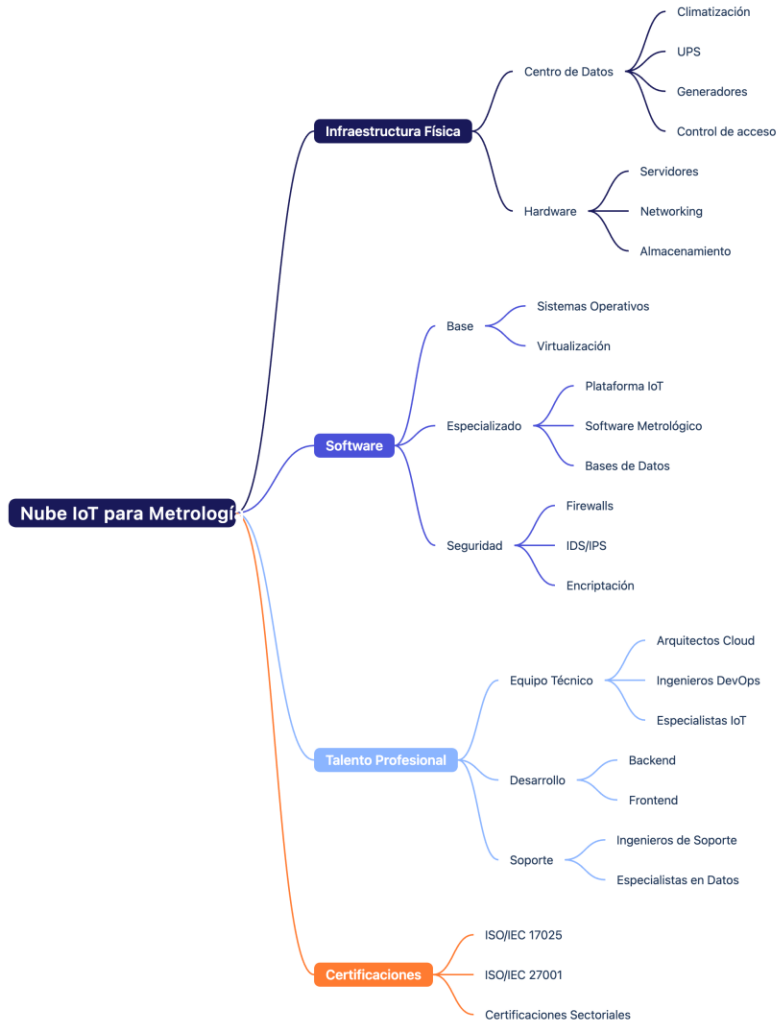
<https://www.gartner.com/en/documents/5851847>



- AWS excels in IoT, Edge Computing and Real-Time Processing
- Azure excels in ML/Analytics and Integration
- Google Cloud maintains a more balanced performance across all categories
- The other vendors show specific strengths but lower overall performance



Cloud Infrastructure



Physical Infrastructure : Data center with climate control, UPS, and backup systems, including high availability servers and redundant network.

Base Hardware : Specialized servers for processing, storage and databases, along with network equipment (routers, switches, firewalls).

Core Software : Operating systems (Linux/Windows Server), IoT platform for device management, and specific metrology software.

Databases : Combination of Time-series, relational and NoSQL databases to handle different types of metrological data.

Security : IDS/IPS systems, firewalls, encryption and identity management to protect sensitive data.

Technical Team : Cloud architects, DevOps engineers, IoT specialists and metrology experts.

Development Team : Backend and frontend developers with expertise in APIs and data visualization.

Support : Team of support engineers and data specialists for maintenance and analysis.

Certifications : Compliance with ISO/IEC 17025 (laboratories) and ISO/IEC 27001 (security).



SIM - Nube Metrológica




Iniciar sesión

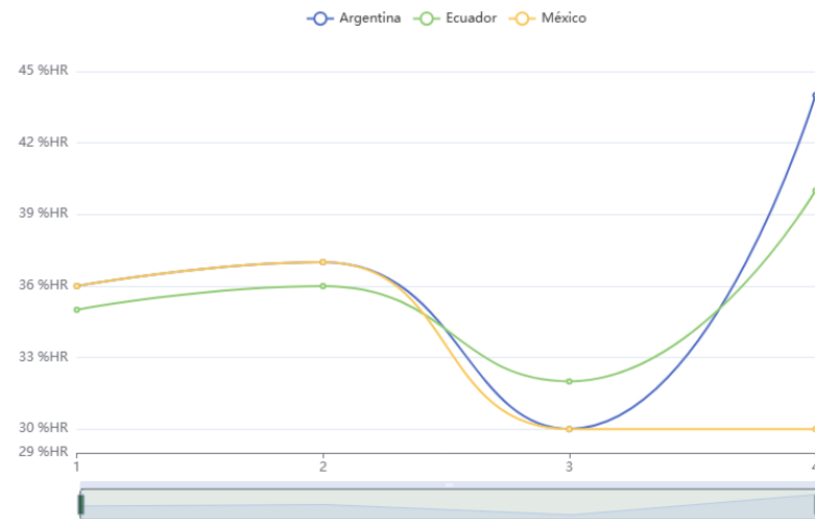
PLATAFORMA INTERAMERICANA

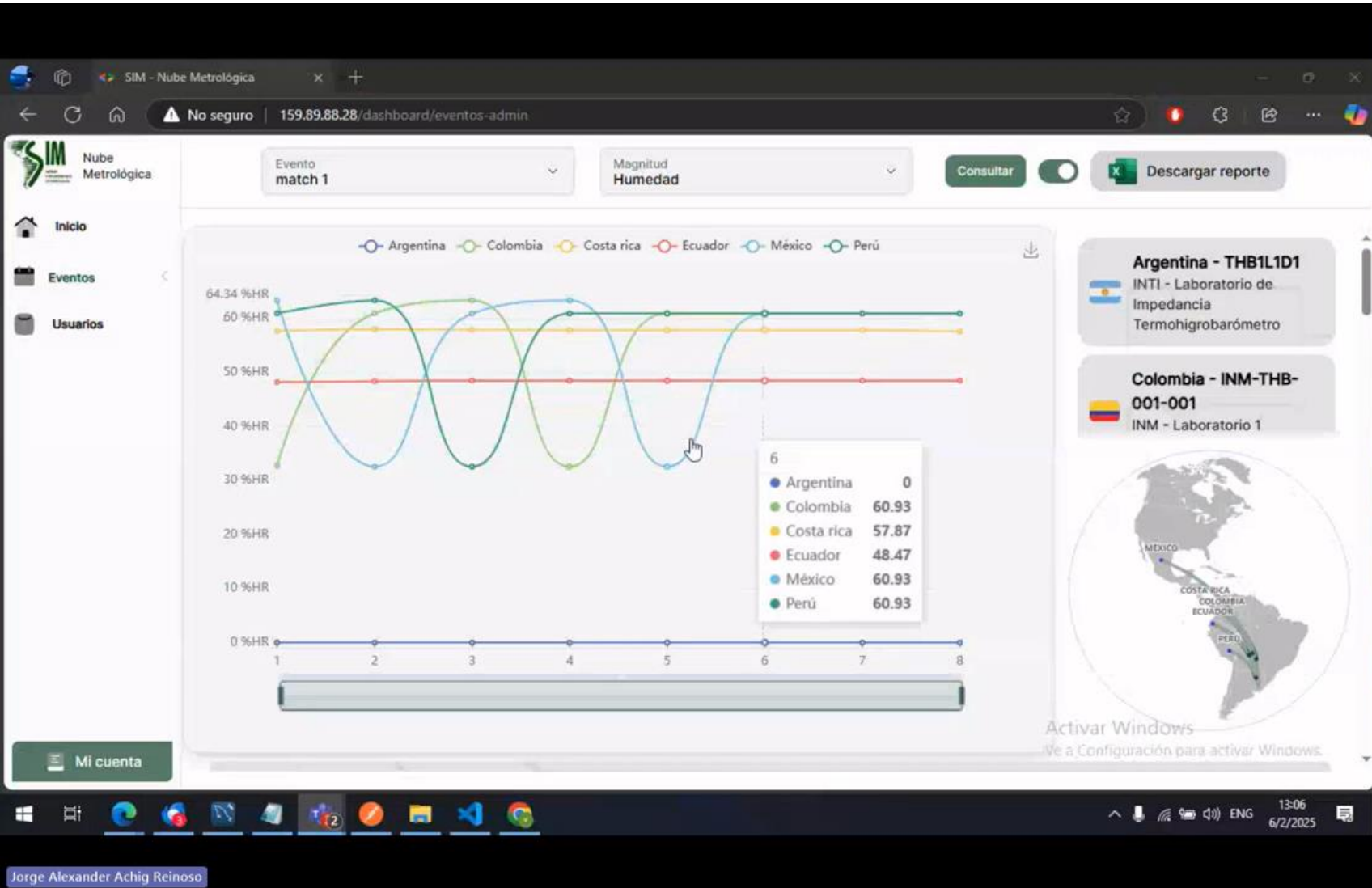
Calibración y Metrología

En trabajo conjunto con: INEN -ECUADOR

Eventos de calibración

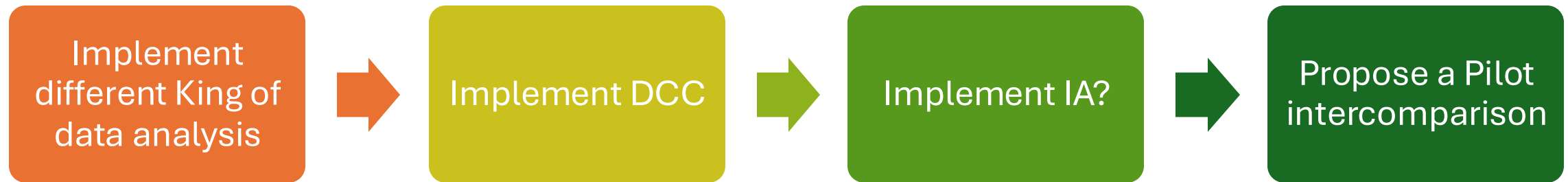
-  **Países**
Lista de participantes
-  **Gráficas**
Datos individuales y conjuntos
-  **Reportes**
Descarga de datos conjuntos







6 Future Work





7 ACKNOWLEDGMENTS



The project outlined in this article was executed using an adapted Agile methodology and developed with collaboration and commitment from technical personnel across various NMI's within SIM, and Inter-American Development Bank (IDB).

