Madrid Smart City Platform

MiNT Madrid Inteligente

Smart City Expo World Congress 2025

BARCELONA, SPAIN **04/11/2025**

SMARTCITY
EXPO WORLD CONGRESS

Part of Madrid City Council's Digital Transformation Strategy

Objetivo estratégico 2: *Inteligencia de Ciudad*

Para impulsar este objetivo estratégico, la Ciudad de Madrid cuenta con distintos proyectos habilitadores e impulsores de la transformación, estructurados en los dos ejes estratégicos:

Eje estratégico 3:

Ciudad segura, resiliente y capacitada

Programa 5. *INTELIGENCIA DIGITAL Y SOSTENIBLE EN LA GESTIÓN*

Plataforma digital de ciudad: Madrid Inteligente

Avanzar sobre el modelo del Ayuntamiento como plataforma, ampliando su alcance funcional para incorporar sensores y actuadores interconectados mediante protocolos estándar, neutros, abiertos e interoperables y así facilitar el despliegue del Internet de las Cosas (IoT), logrando que los activos de la Ciudad estén conectados monitorizados y se incorpore la gestión inteligente.

La conectividad de los activos permite disponer de un inventario vivo, información muy fiable del funcionamiento de la Ciudad, georreferenciación e integración con los procesos de gestión municipales. Para este sistema nervioso periférico desplegado en vía pública se aprovecharán las capacidades de *edge* y *fog computing*, las técnicas de *blockchain* e inteligencia artificial, así como las nuevas redes 5G, que aportan unas funcionalidades avanzadas.

Todo culmina en la integración con la plataforma de Ciudad, con el Cerebro de Ciudad, con el Gemelo de Ciudad y con la unicidad, integridad, consistencia y calidad de los datos.

Medioambiente y movilidad

La aplicación de IA en el ámbito de medioambiente y movilidad tiene un impacto transformador en la construcción de un entorno más sostenible, seguro y eficiente para la ciudad de Madrid. A través de sistemas inteligentes y de análisis de datos, la IA optimiza el uso y la gestión de la energía, la calidad del aire y el transporte.

Gemelo Digital: Terrazas

El proyecto Gemelo Digital de Madrid, dentro de sus actuaciones, permite la identificación de distintos elementos que forman parte del entorno urbano a partir de la captura periódica de imágenes en 3D y del empleo de la inteligencia artificial. Uno de estos elementos urbanos son las terrazas y con este proyecto piloto se pretende mejorar la toma de decisiones en distintos ámbitos de la gestión urbana.

SMARTCITY EXPO WORLD CONGRESS


Capital Digital
MADRID
01.
How did we start?
Madrid Smart City since 2013

The beginnings

In 2013, the Madrid City Council decided to enable a **paradigm shift** in the contracting of Public Services in the city of Madrid, where the City Council goes **from contracting activities to contracting services**.

Pay for Activities → Pay for Services

Ex: cleaning the street

ex: the street is clean

- Unification of service contracts (long-term multi-services)
- Zoning of the city.
- Management and billing by quality indicators and service level agreements.
- Investments contemplated in the economic and financial model of the contracts.

CHALLENGES

- **Systems not prepared for the new management model**
- **Professionals and managers need tools that allow decision-making**
- **Technological renewal**
- **Citizens ask for more participation in the improvement of the city**

Capital Digital
MADRID

The solution was ..... MiNT

Integrated Platform Capabilities

- Functionality
- Integrated process
- Aggregate and Unique Information
- Advanced and interconnected technology

Improvements it offers

- Standardization of tasks
- Integration of professionals and processes
- Unique data shared
- Process traceability
- Individual and aggregated visibility
- Complete, accessible and navigable information
- Information for decision-making
- Remote Access, Mobile

Strategic Objective

Provide a governing body for Urban Public Services (Integral Contracts) through an integrated technological platform that allows a single inventory, exhaustive knowledge of what is happening in the city and facilitates citizen collaboration in the improvement of the city and its services.

SMARTCITY EXPO WORLD CONGRESS

Capital Digital
MADRID

How do you finance a major digital transformation in a city without creating a huge new budget line?

Madrid City Council was changing the model **from activity management** to **service management**.

- Unification of service contracts (long-term multi-service contracts).
- City zoning.
- Management and billing based on quality indicators and service level agreements.
- Investments included in the economic-financial model of the contracts.

	Integral Service Contract	Description	Amount
1	**Movility**	Regulated Parking Service, Vehicules Loading and Unloading, , Access, signage, barriers, bike	**862 € Millions**
2	**Facilities**	Traffic lights, Traffic cameras, M-30, tunnels, Galleries, lighting, and energy	**772 € Millions**
3	**Pavements and civil works**	Pavements and Construction	**261 € Millions**
4	**Peripheral waste**	Collection and transport, bins, containers, recycling points	**681 € Millions**
5	**Cleaning and green areas**	Trees, cleaning, furniture, irrigation, fountains, children's and elderly area	**1.943 € Millions**
6	**Historic and Singular Parks**	Historic parks and singular zones like level 5 services IC for these areas	**278 € Millions**

10,5 € Millions in technological services (+4,5 M€ in extensión procurement)

0,22% of the amount of Integral Contracts that must be managed

+

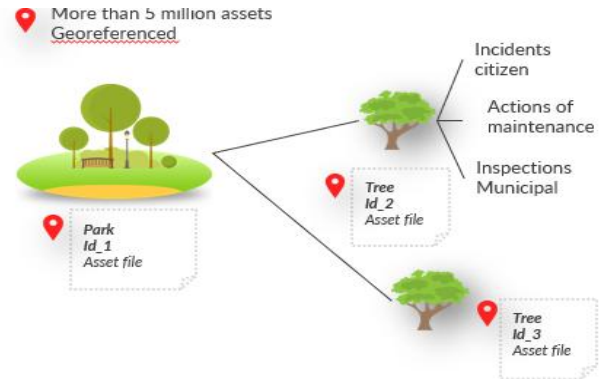
Investment of human resources from IAM and Environment to design and test the platform

SMARTCITY EXPO WORLD CONGRESS

One platform for all city assets & services

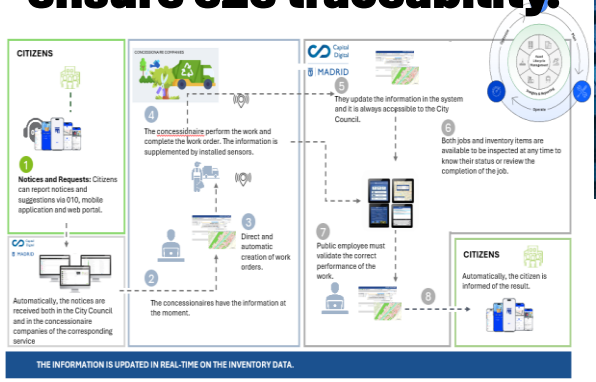
- MiNT is the **technological platform** supporting all urban public services.
- Used by **managers, inspectors, companies, and citizens**.
- Built on a **single municipal asset inventory.**

Single, unified inventory 5 million assets connected.



- **5 million geolocated assets**, including parks, trees, and vehicles.
- Around **3 million vehicle positions** every day.
- **Citizen communication** and management are integrated at the asset level.

Integrated workflows ensure e2e traceability.



- **Citizens** can **report issues** directly to the City Council.
- Service companies **receive, perform, and close work order**s.
- **Real-time updates** validate quality and ensure transparency.

Capital Digital

MADRID

02. Size matters ?

Smart City Expo World Congress 2025

BARCELONA, SPAIN **04/11/2025**

SMARTCITY EXPO WORLD CONGRESS

MADRID - Madrid is not just big — it's complex

City

- 3,5 M — Population
- 181 — Nationalities
- 21/119/9.422 — Districts/Neighborhoods/Streets
- 325 k — Vehicles/day in M30 areas
- 35M/54M — Bus/Metro travelers monthly
- 53.427 — Traffic lights
- 224 k — Vertical road signs
- 745 k — Trees
- 5 M — Floating Population
- 321 k — Companies
- 4.700 km — Streets and roads
- 2.095/219/10.707 — Buses/Lines/Bus Stops (EMT)
- 7,500/611 — Bikes/Stations (EMT)
- >23.000 — Streetlight
- +600 — Sport Venues (Public and Private)
- +4.400 — Parking meters

City Council

- 475/125 — Procedures/Services to the citizen/companies
- 99 — Service and Assistance Offices
- 15/8 — Government and Delegated Areas/Municipal and mixed companies
- 901 — Municipal buildings
- 30.000 — Employees
- > 8.000 — Telecommuting daily employees
- > 22.000 — Mobile corporate lines

Technology

- 410 — Aplication servers
- 60 TB — Monthly traffic data
- 1.546 — Virtual servers
- 83 — Physical servers
- 5 M — Perimeter FW packets/hour
- 50,4 M — Events/hour SIEM
- 865 — Database
- 4437 — TB of storage
- 36 k — Corporate mailboxes


Capital
Digital
MADRID
When you have your smart plan ready...
Smart City Expo World Congress 2025
BARCELONA, SPAIN
04/11/2025
SMARTCITY
EXPO WORLD CONGRESS

Capital Digital
MADRID

Madrid never stops — and neither can we

From complexity .....

Millions of citizens

WHAT DOES IT REALLY TAKE FOR A CITY LIKE MADRID TO WORK EVERY SINGLE DAY?

Thousands of assets.
One city.

SMARTCITY EXPO WORLD CONGRESS

What does it really take to keep a city like Madrid running — even when everything stops?

Capital Digital

MADRID

TURNING URBAN COMPLEXITY INTO QUALITY OF LIFE.

Our purpose is to transform complexity into smart, connected solutions that improve the daily life of Madrid's citizens.

Capital Digital

MADRID

03.

Background, Current Situation and some MINT numbers

Smart City Expo World Congress 2025

BARCELONA, SPAIN **04/11/2025**

SMARTCITY EXPO WORLD CONGRESS

MiNT Platform | Built to Last, Designed to Evolve

Capital Digital | MADRID

Ciudadanos

Relación con ciudadano

- Línea madrid
- Sistema de Interrelación con el ciudadano (SIC)
- Aire de Madrid
- Adopta un Árbol
- Puntos Limpios
- Parkings

Sistemas de Información Centrales

Base Datos Conocimiento

- SIG Corporativo
- Inventarios
- Históricos

Sistema de gobierno

- Módulo Gestión de Indicadores
- Módulo de Inspección (SIMUN)
- Módulo de Análisis de la Información
- Módulo de Certificaciones y relaciones valoradas

Terceros

datos abiertos · DGT · Canal de Isabel II · EMT MADRID · Sensores

Sistema de Integración y orquestación

Empresas de servicios

Sistemas Integrados de gestión de servicios públicos

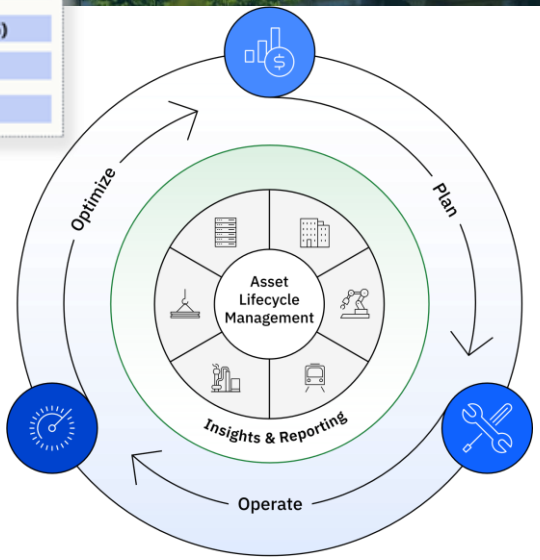
Subsistemas de información sectoriales

- S.S. Alumbrado
- S.S. IHO
- S.S. Tráfico
- S.S. Galerías
- S.S. Túneles
- S.S. Autovías Acceso Madrid
- SS de Calidad del Aire
- SS Contaminación Acústica
- SS Mobiliario Urbano Homologado
- S.S. Áreas Infantiles
- S.S. Mobiliario Urbano y S.S MUPIs
- S.S. Limpieza
- S.S. Riego
- S.S. Zonas Verdes
- S.S. Pavimentos
- S.S. Residuos (Contenerización y recogida)
- S.S. Gestión PTV (tratamiento)*
- S.S. Parques
- S. Ocupación vía Pública (OCUVI)
- S. Gestión Facturación por Consumo (MEGA)
- Conoce Tu Ciudad
- Gestión de Almacenes para Parques
- Paneles de Mensaje Variables
- Aparcamientos
- S. Vigilancia de Calidad del Aire (SIVCA)

Integraciones con otros módulos internos

Otros sistemas del Ayuntamiento

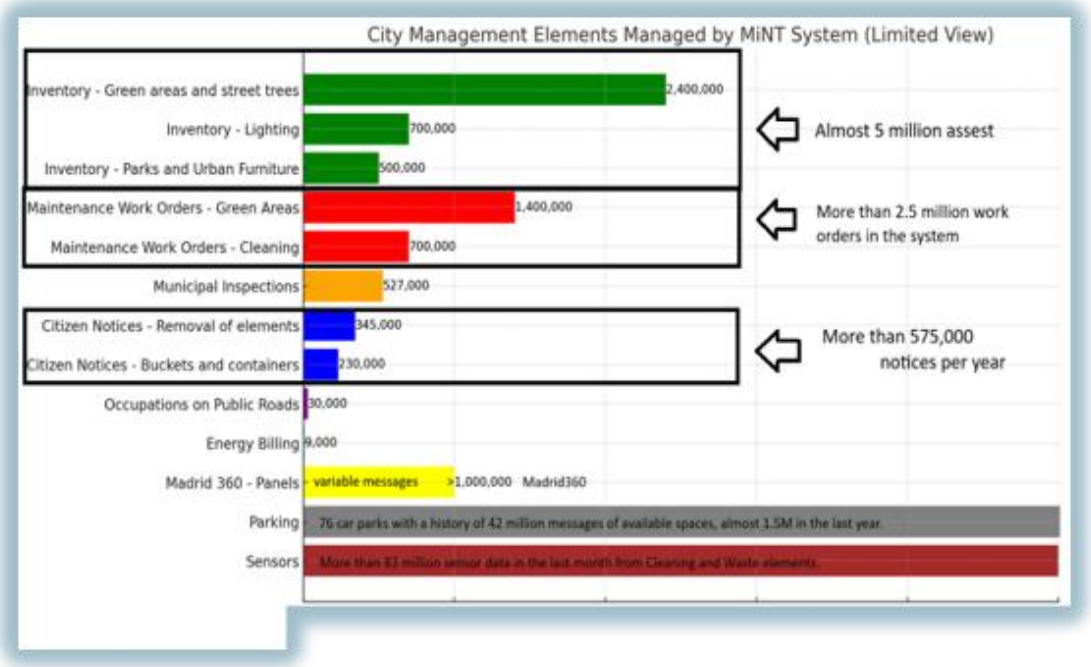
- Archivo Electrónico (ARCHE)
- Portafirmas corporativo
- SAP Financiero y RRHH
- Sistema de Gestión y Tramitación Administrativa
- Callejero (BDC)
- SIG Corporativo (SIGMA)
- Sistema de nivel inferior (PTV)
- Sistema de registro de entrada y salida (BAREG)
- Ciudadano 360 (CID 360)
- ...

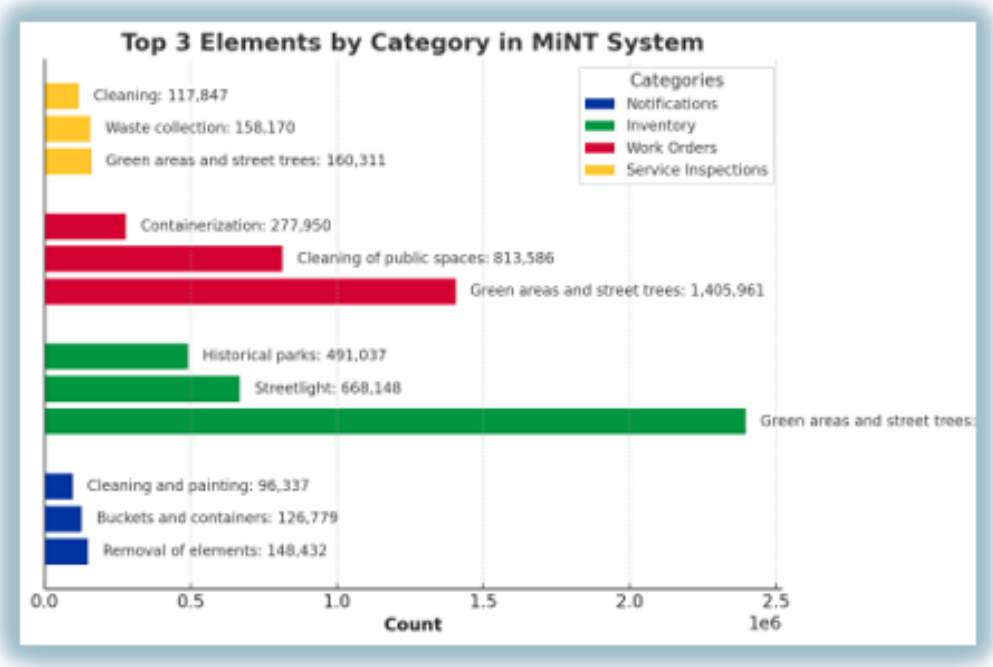


SMARTCITY EXPO WORLD CONGRESS

Building a transparent and data-driven city... some numbers

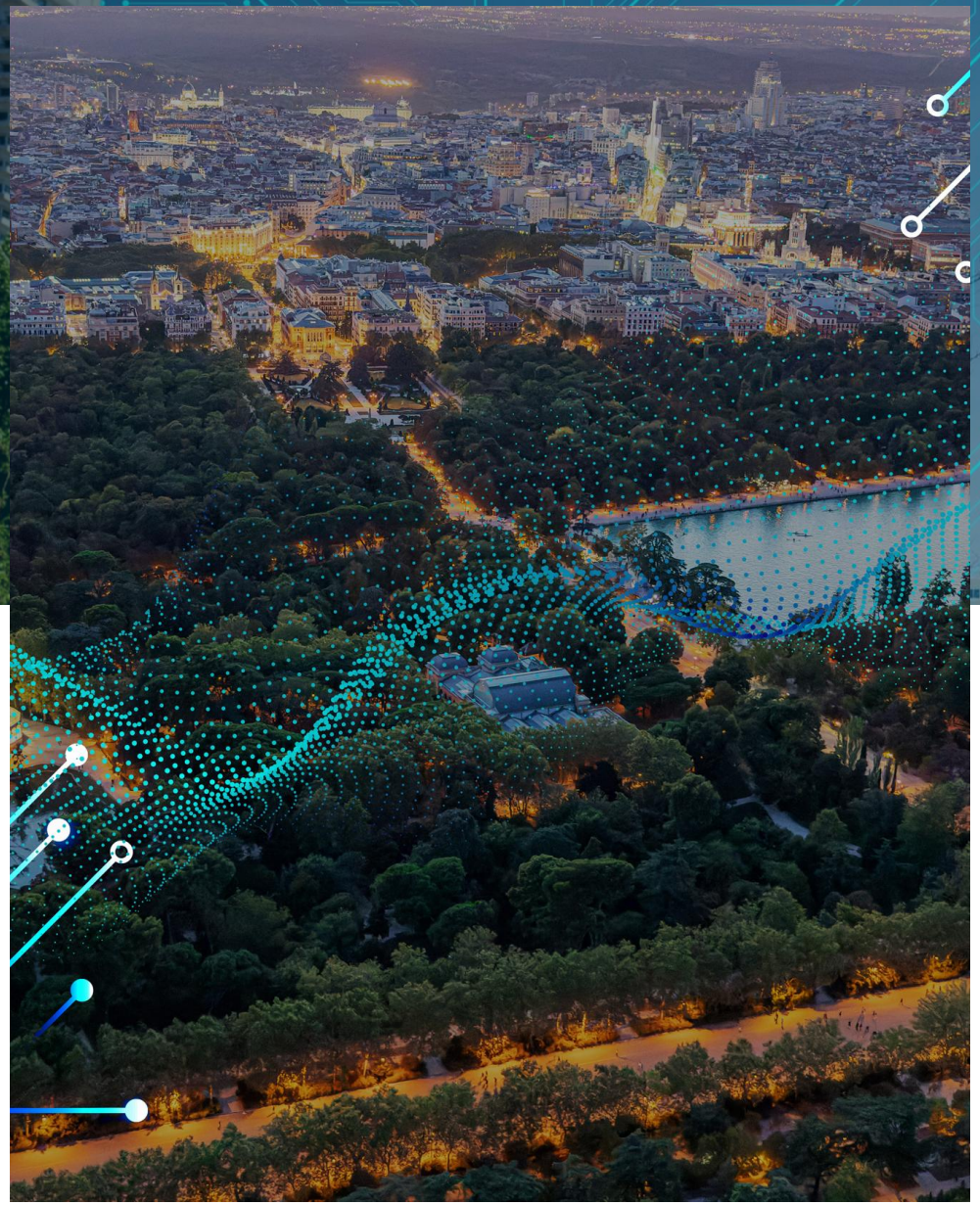
- Provide **real-time visibility** of all city operations.
- **Collect data** from thousands of sensors and service vehicles — over 80 million records every month.
- **Empowers citizens, public employees and government** with open and shared information.
- Promote **efficiency**, **accountability, sustainability, and smarter decision-making.**





Capital Digital

MADRID



GRIOT – NEW IOT PLATFORM

GRIOT is our new **IOT ingestion platform**.

Based on AWS Garnet NGSI-LD native framework and integrated with new BigQuery municipal datalake, provides a new paradigm to integrate rapidly new use cases.

Not only allows us to start creating **new rules and alerts integrating** it with MiNT Sectorial Information Systems automating the creation of warnings or incidents to real equipment inventoried. It has been the first stone to our path to include **AI capabilities** to take advantage of sensor, inventory and **data analytics**.

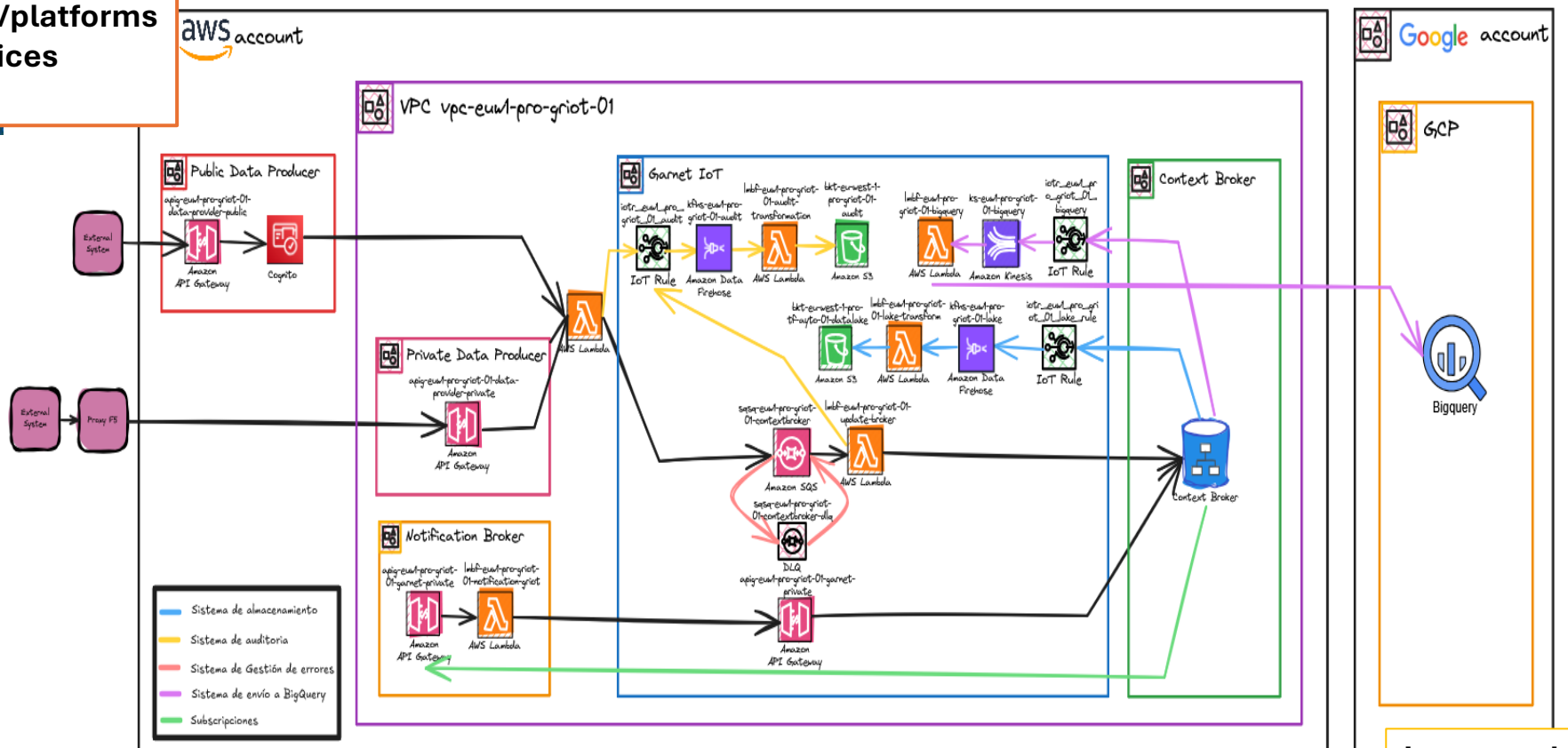
Capital Digital

MADRID

GRIOT: Architecture and capabilities

Data Producer: integrates with IOT devices/platforms from public services companies

Fiware Scorpio Context Broker stores all IOT data to allow rules and decisión making such as notifications



Publish notifications to other systems based on rules over context (ie. Alerts, service requests) or geographical information (GIS)

Integrated with Municipal Datalake in BigQuery

SMARTCITY EXPO WORLD CONGRESS

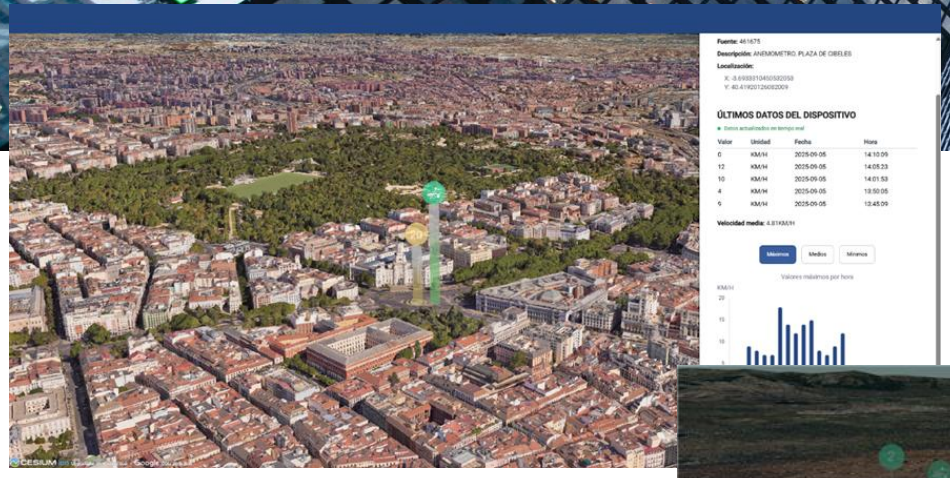
GRIOT: IoT revolution, Sustainable IoT!

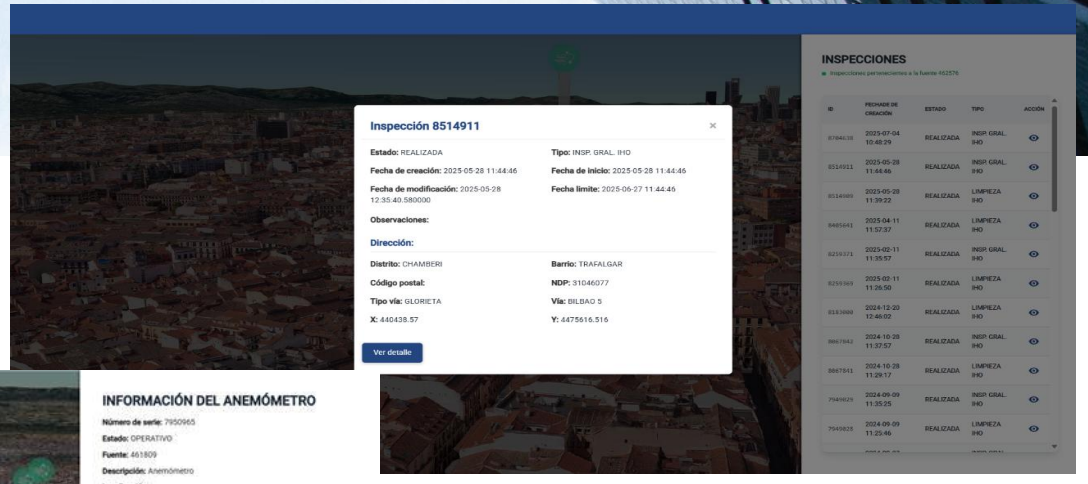
IOT Platform already provides services to:

- Anemometers (historic fountains)
- Load cells on bridges
- Cleaning Vehicles
- Network nodes in municipal network

New use cases under construction:

- Traffic monitoring points
- Waste management vehicles
- Bins
- ...

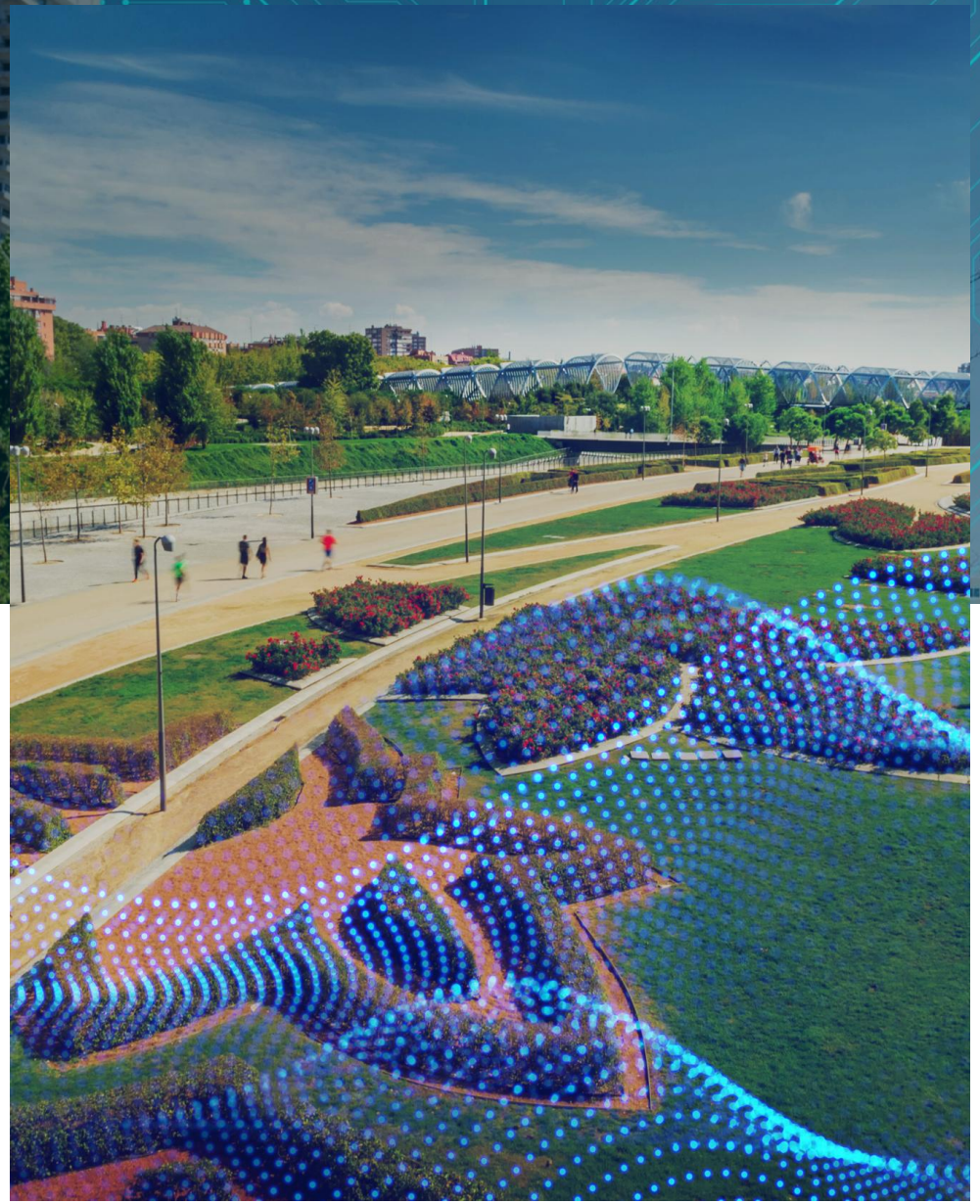




SMARTCITY EXPO WORLD CONGRESS

Capital Digital

MADRID

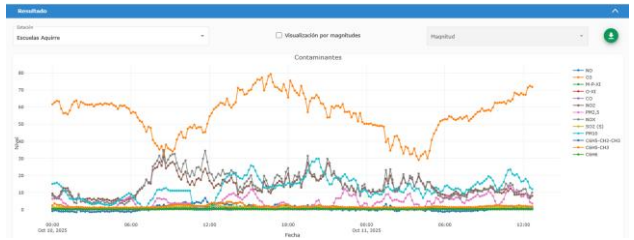


NEW AIR QUALITY MONITORING SYSTEM (SIVCA)

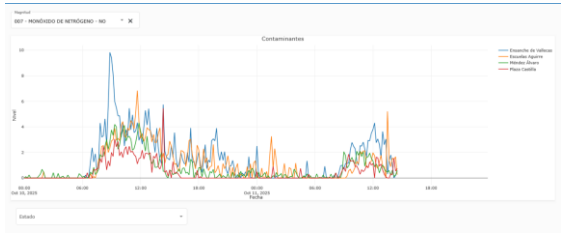
The Air Quality Project was designed to support Madrid City Council efforts **to improve air quality** in the city. The project includes a fully, **municipally-owned** system **integrated with MiNT platform**. This strategic upgrade ensures full operational **independence from external maintenance providers**, enhancing **reliability**, **efficiency**, and long-term **sustainability.**

SMARTCITY
EXPO WORLD CONGRESS

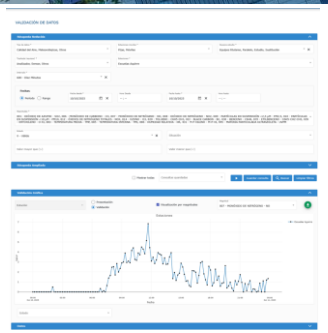
New Air Quality MONITORING SYSTEM OBJECTIVES



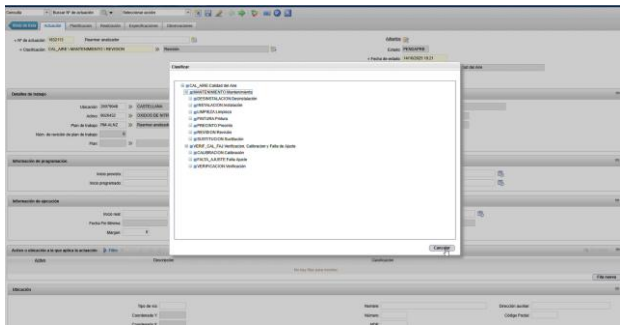
Automated control of the air quality network (fixed and mobile stations)



Enable real-time data capture and database storage of pollutant level measurements



Support the maintenance and validation of air quality data fostering public employees efficiency



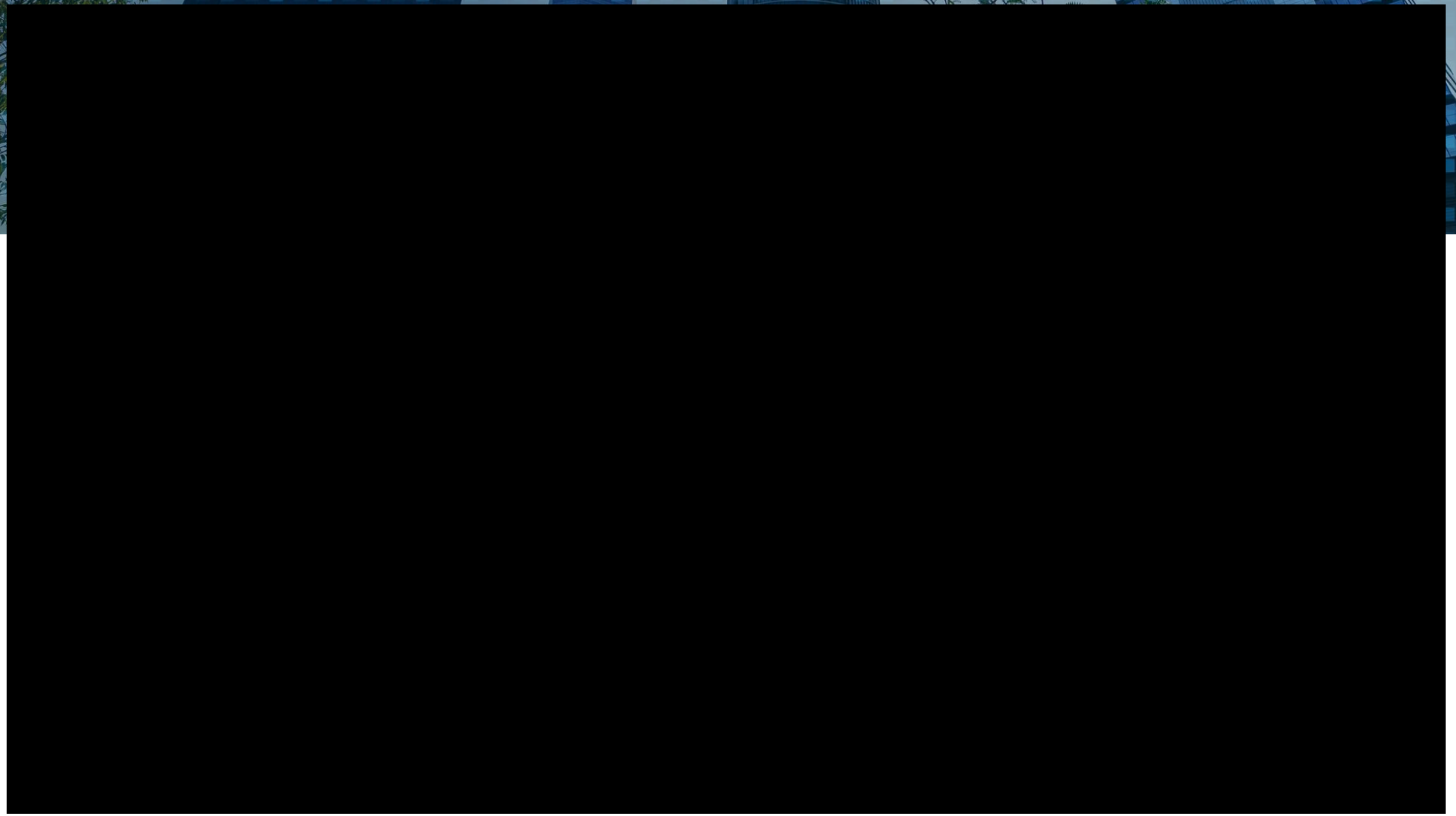
Improve scheduled and corrective maintenance operations and its control

Facilitate automatic generation of data publishing to government agencies and data public datasets

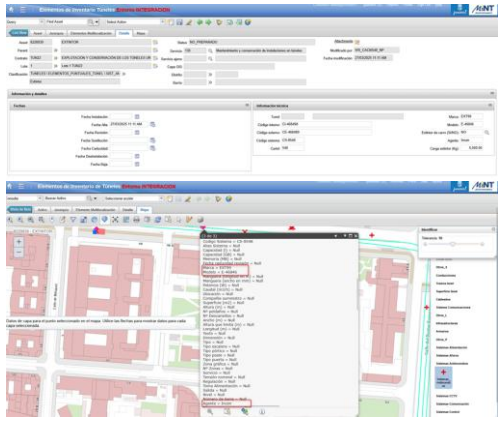
Keep citizens informed through all availables channels: new Aire de Madrid app, push notificatons, website

20

New Air Quality MONITORING SYSTEM OBJECTIVES

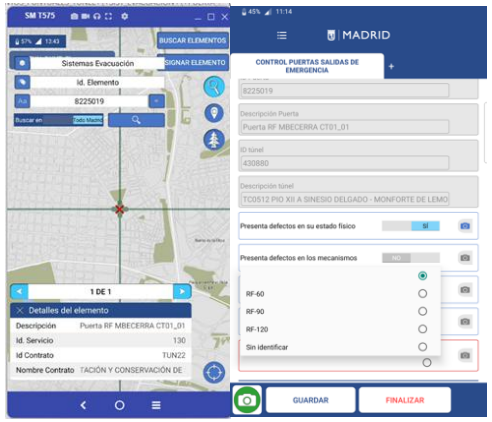


NEW TUNNELS INFORMATION SYSTEM



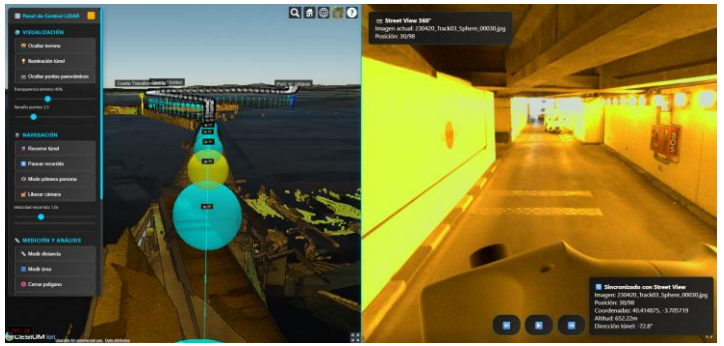
Facilitate Asset Inventory and Management

Starting with the inventory of all the Assets that need to be managed and its processes



Integrated with Inspection App

Municipal workers work on field using their tablets and mobile to inspect elements.



New visualization capabilities

Leveraging digital twin capacities such as 3d visualization

The solution is being **rolled out in phases**, beginning with **inventory and asset management**, **work orders** to track all types of tasks related to those assets, **mobile** support for **inspection** agents, and subsequently adding features that enrich and expand its capabilities, such as analytics in BigQuery/Dashboards, digital twin integration, and IoT.


Capital
Digital
MADRID
Next MiNT is coming!
GRACIAS POR SU ATENCION
Smart City Expo World Congress 2025
BARCELONA, SPAIN
5/11/2025
SMARTCITY
EXPO WORLD CONGRESS