

# Artificial Intelligence + Water for a Sustainable Future

ADB's 2nd e-Marketplace for a Water-Secure and Resilient Asia and the Pacific



ASIAN DEVELOPMENT BANK

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## 1 BuntPlanet, The Company

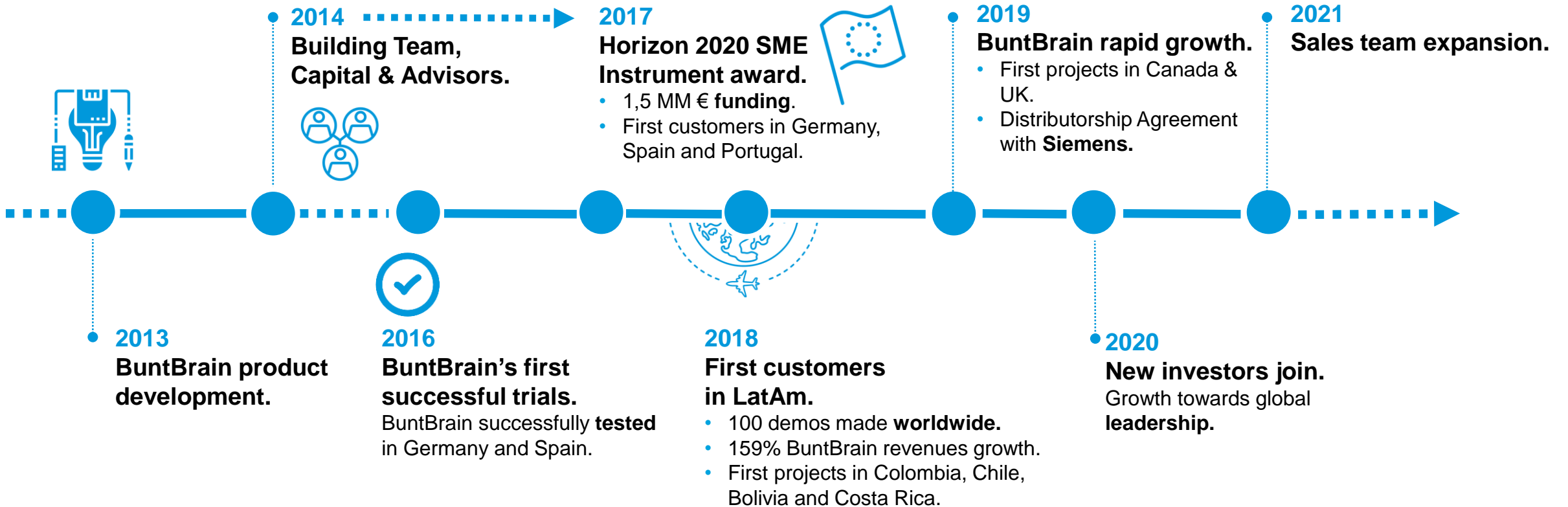
## 2 BuntBrain, The Platform and Products

1

# BuntPlanet, The Company

# BuntPlanet's History

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# BuntPlanet, Disruptive Solutions to Avoid Non-Revenue Water and Anomalies in Water Distribution Networks

## Physical Losses



**Produced and transported  
but not consumed water.**

## Commercial Losses



**Consumed but not registered  
water**

# Unique Combination of Technologies

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**Artificial Intelligence**



**Virtual DMAs (sectors)**



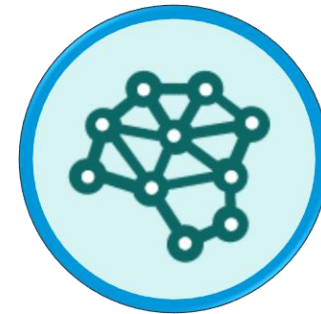
**Hydraulic Simulation**



**Metrology Knowledge &  
Optimum Sensor Positioning**



**Digital Twin**



**Big Data**

# Awards Received

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Co-funded by the European Union  
SME Instrument Programme



IBM Business  
Partner Award  
2014  
Beacon Finalist



STARTUP  
EUROPE



donostia  
weekINN

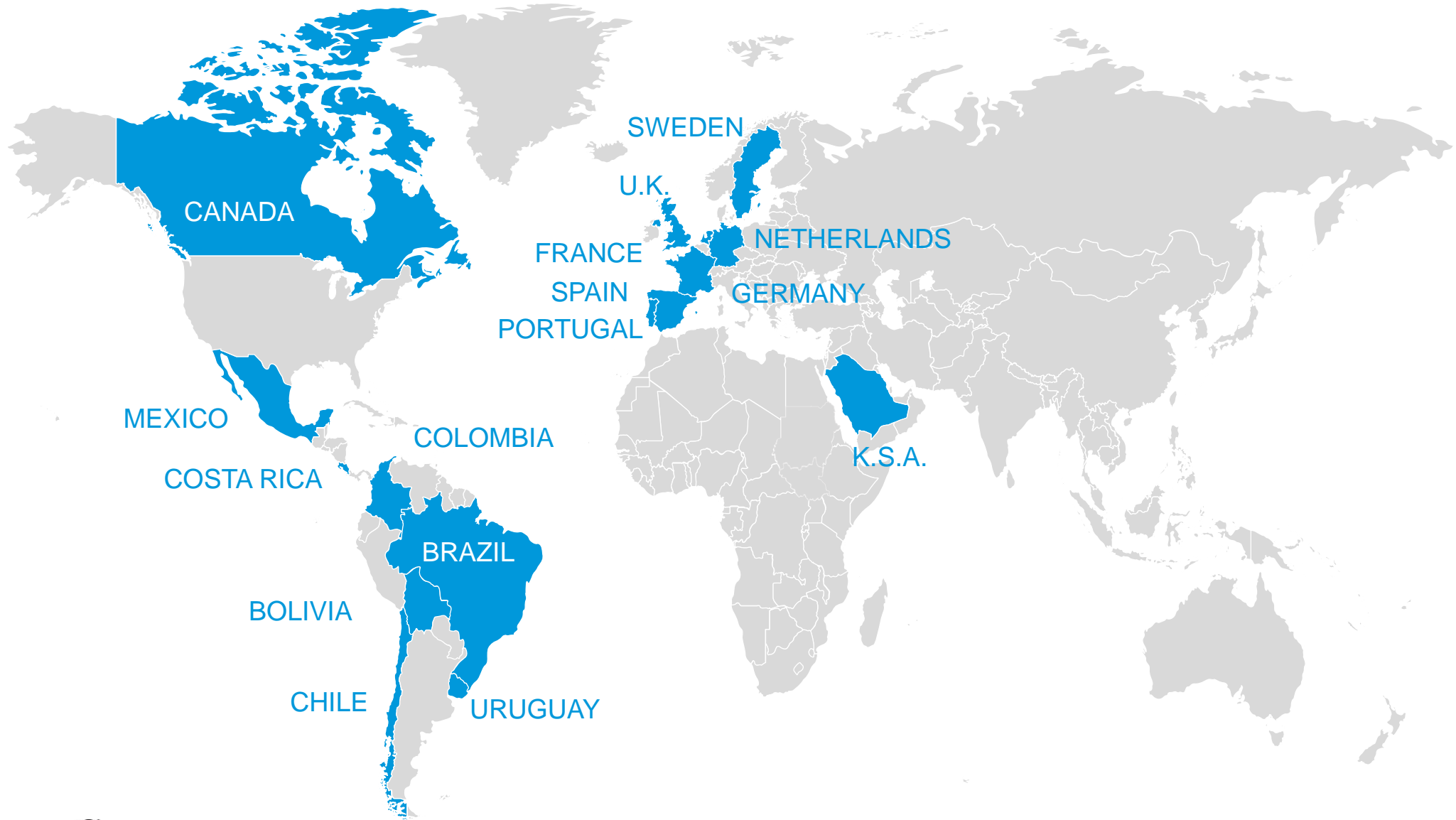


Climate-KIC is supported by the  
EIT, a body of the European Union



# Countries where BuntBrain Has Been Implemented

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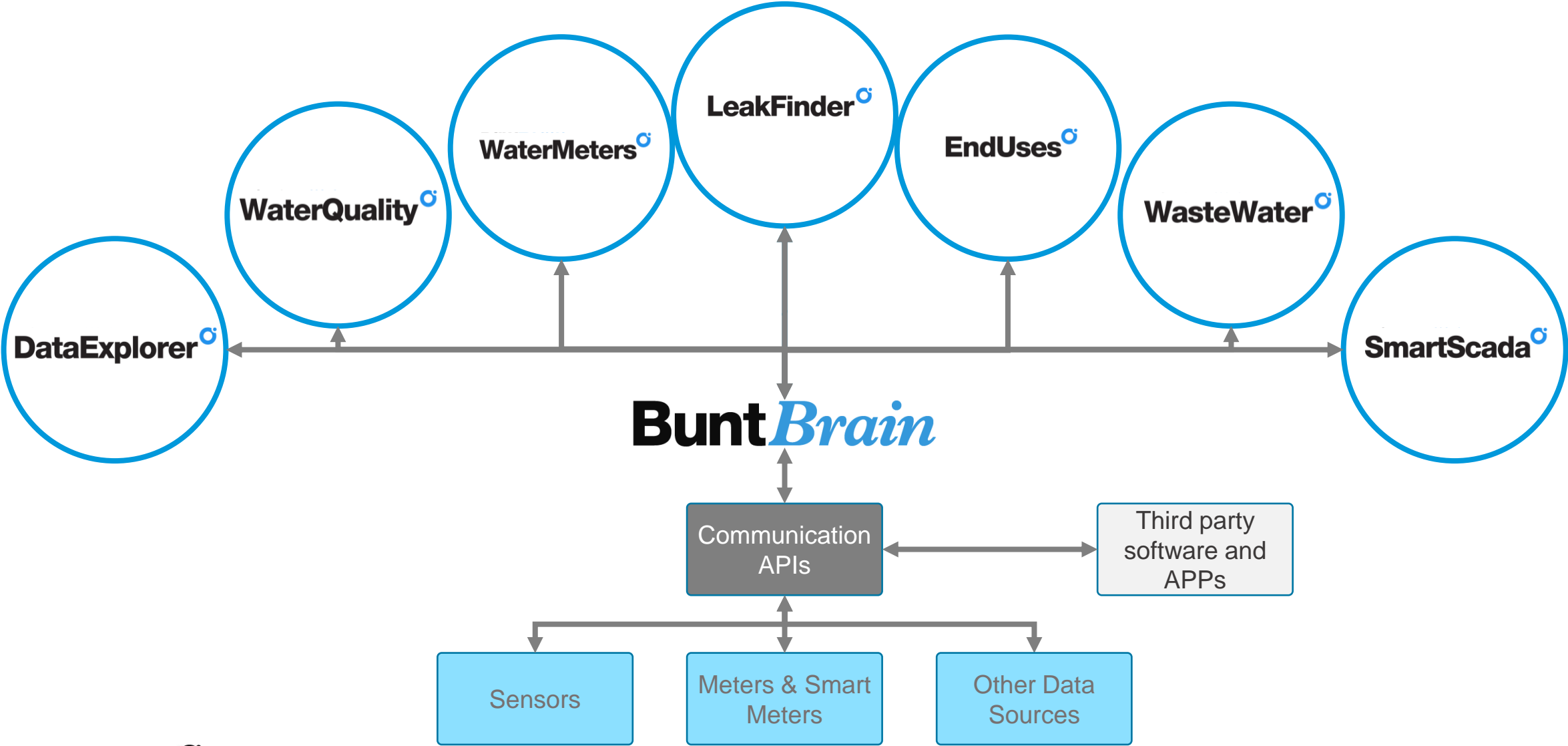
**2**

# **BuntBrain, the Platform**

# **Artificial Intelligence + Water for a Sustainable Future**

# BuntBrain Ecosystem

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# Where to Host it?

You will be able to choose your preferred option, always secured.

## On Cloud

Hosted in Amazon Web Services in Frankfurt, Germany.



## On Premise

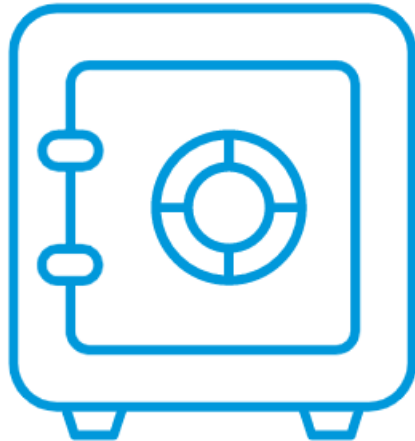
Hosted in clients' own data centre.



# Enhanced Cybersecurity

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## 2 Factor Authentication Secured Access



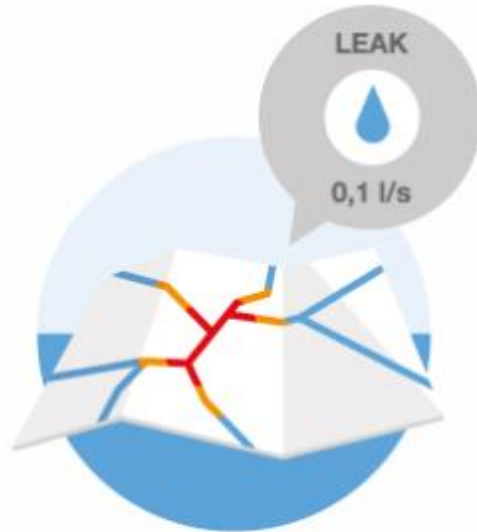
## ISO27001



Safety of data and systems is critical for our clients and for ourselves.

## Physical Losses

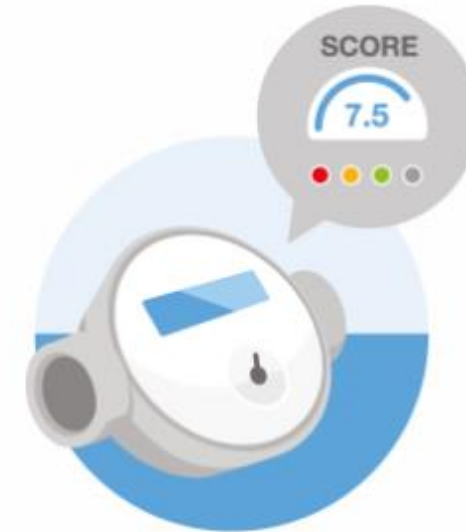
Bunt*Brain*  
**LeakFinder**



Early detection and location of leaks  
and anomalies in the network

## Commercial Losses

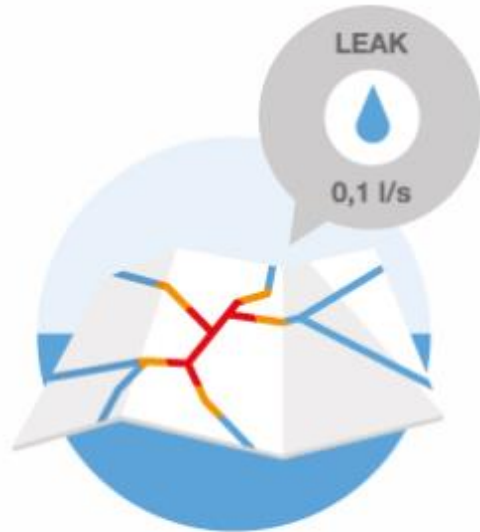
Bunt*Brain*  
**WaterMeters**



Smart water meter data  
management

## Physical Losses

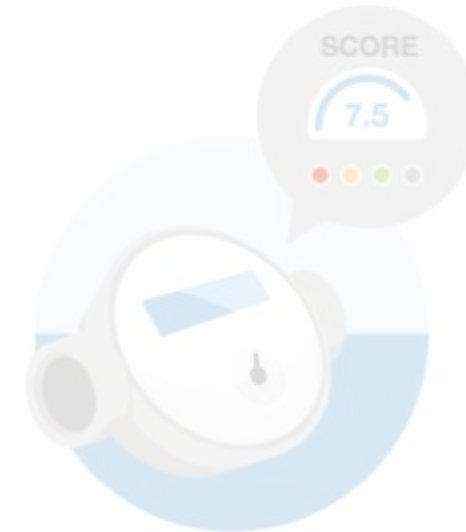
BuntBrain  
LeakFinder<sup>o</sup>



Early detection and location of leaks  
and anomalies in the network

## Commercial Losses

BuntBrain  
WaterMeters<sup>o</sup>



Smart water meter data  
management

# How Does it work?

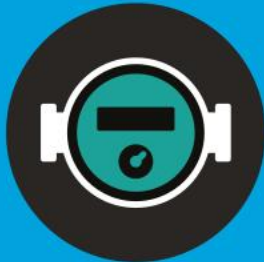
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## INPUTS

**SENSORS** (Flow, pressure, noise, tank level, ...)



**Smart Meters**



**GIS, hydraulic model, offline geodata**

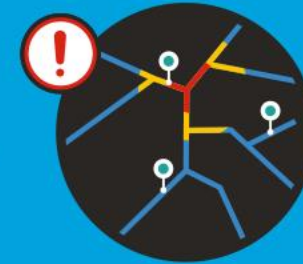


**LeakFinder**<sup>o</sup>

Periodic Data Sent

## OUTPUTS

**EVENTS** (leak, burst, breach, pressure drop, asset failure, sensor failure, ...)



**Operational KPIs**



# Leak Detection

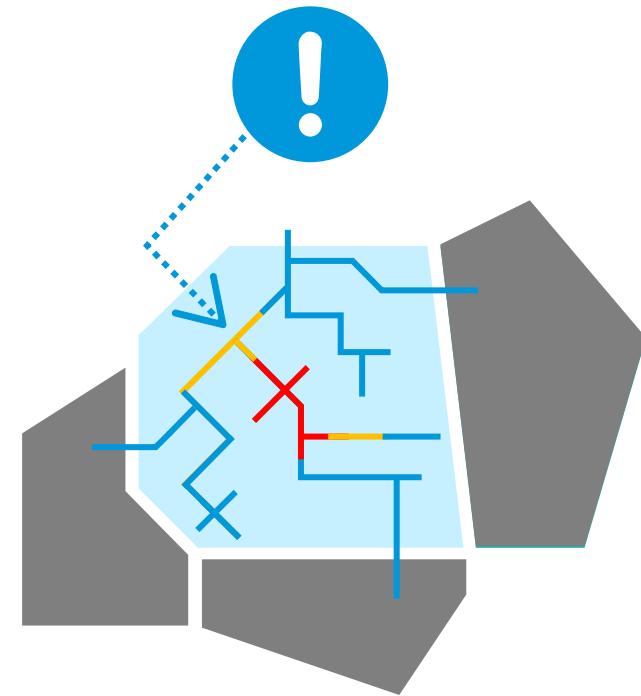
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**DMA** based pre-location



IA detects and pre-locates events at **DMA level**.

**Virtual DMA** based pre-location



IA detects and pre-locates events at **pipe level**.



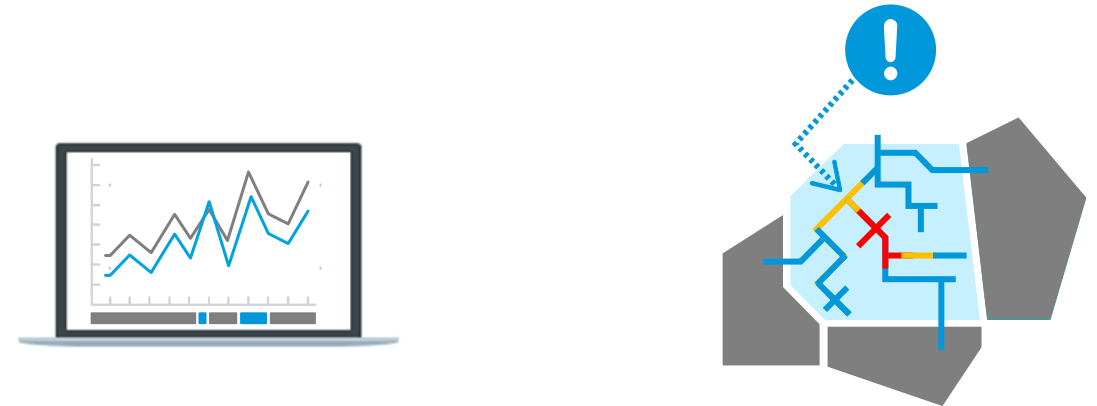
# Different Versions Adapted to Every Water Network Requirement

## Standard DMA



- Artificial Intelligence to identify and locate leaks
- **Simple** hydraulic model simulation
- Leaks pre-location at **DMA level**

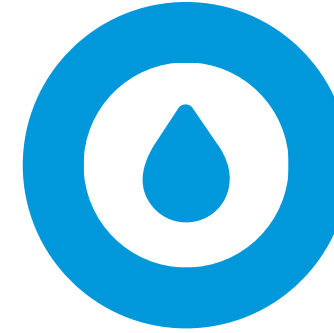
## Virtual DMA



- Artificial Intelligence to identify and locate leaks
- **Calibrated** hydraulic model simulation
- Leaks pre-location at **Pipe level**



- It **reduces CAPEX** and **OPEX**.
- **High Return on Investment** and **short payback**
- **Reduction of water production costs**



- **Reduction of water consumption**
- **Early and remote leak detection and location.**
- **Avoids bursts.**

# Obtained Technical Results

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- More than **50% water loss reduction in already optimized networks.**
- Identifies leaks at their initial state (**<0.3l/s**) before they cause further damage or losses.
- Detection and **management of thousands of events.**



- Average **leak detection** and confirmation time **< 26 hours.**
- Average **leak location** time **< 5 hours** and within **<300m.**

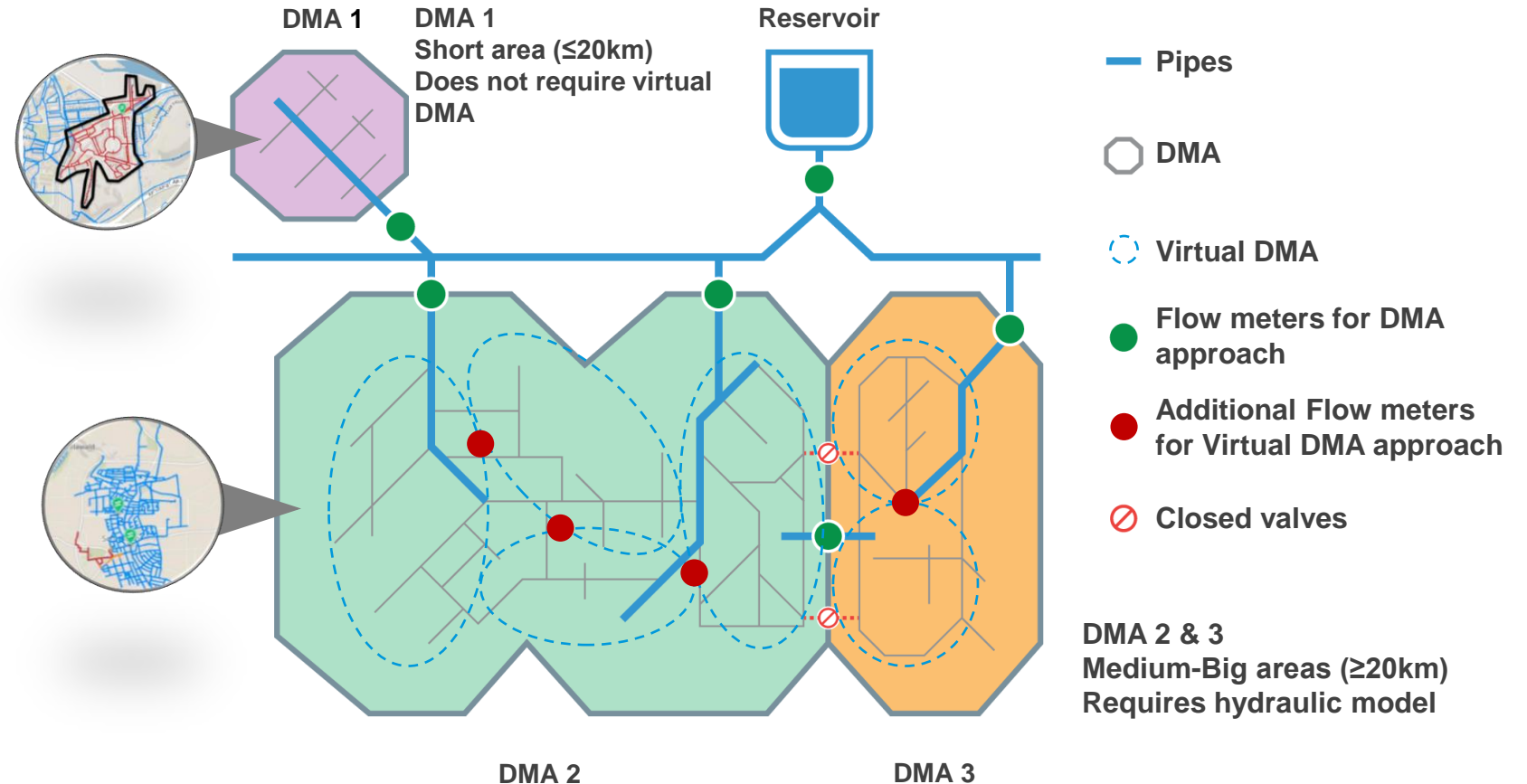
# A Disruptive Innovation

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Features	Event Management Software	Noise Loggers Manufacturers	Satellite-based Leak Detection	Water Meters Manufacturers	BuntPlanet
Artificial Intelligence	✓	✗	✓	✗	✓
Large DMAs	✗	✓	✓	✗	✓
Any weather /noise condition	✓	✗	✗	✗	✓
Any pipe material	✓	✗	✓	✗	✓
Measurement error	✗	✗	✗	✓	✓
Neutrality	✓	✓	✓	✗	✓

# Introduction to Virtual DMAs supported by the Advanced Version

- Allows the detection and pre-location of small leaks in medium/**big DMAs**.
- Location accuracy of **<300m**.



# Real Time Monitoring of Areas (DMAs)

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The screenshot displays the LeakFinder web application interface. At the top, there are navigation tabs for 'Events', 'Sensors', 'Areas', 'Area Maintenance', 'Models', and 'Custom alarms BETA'. The user is logged in as 'sttz' under 'Bunt Planet'. Below the navigation, there are filters for 'All Areas', 'AREA', 'SENSOR STATUS', 'MORE', and 'IF SORTED BY' (set to 'Nº De Ev...').

The left sidebar shows a list of 56 areas. The selected area is 'SIBA-05 Centro' with 4 events. Other areas listed include SIBA-04 (7 events), SIBA-01 (6 events), SBUE-01 (5 events), SBUE-05 (4 events), SIBA-01 (4 events), SBUE-02 (4 events), SBUE-04 (4 events), SIPE-03 (4 events), SIPB-03 (4 events), and SIPA-03 (4 events).

The main map view shows a street map of the 'SIBA-05 Centro' area. A red outline highlights the specific DMA boundary. A black circle with the number '2' is placed on the map, indicating the number of events. The map includes various landmarks and street names.

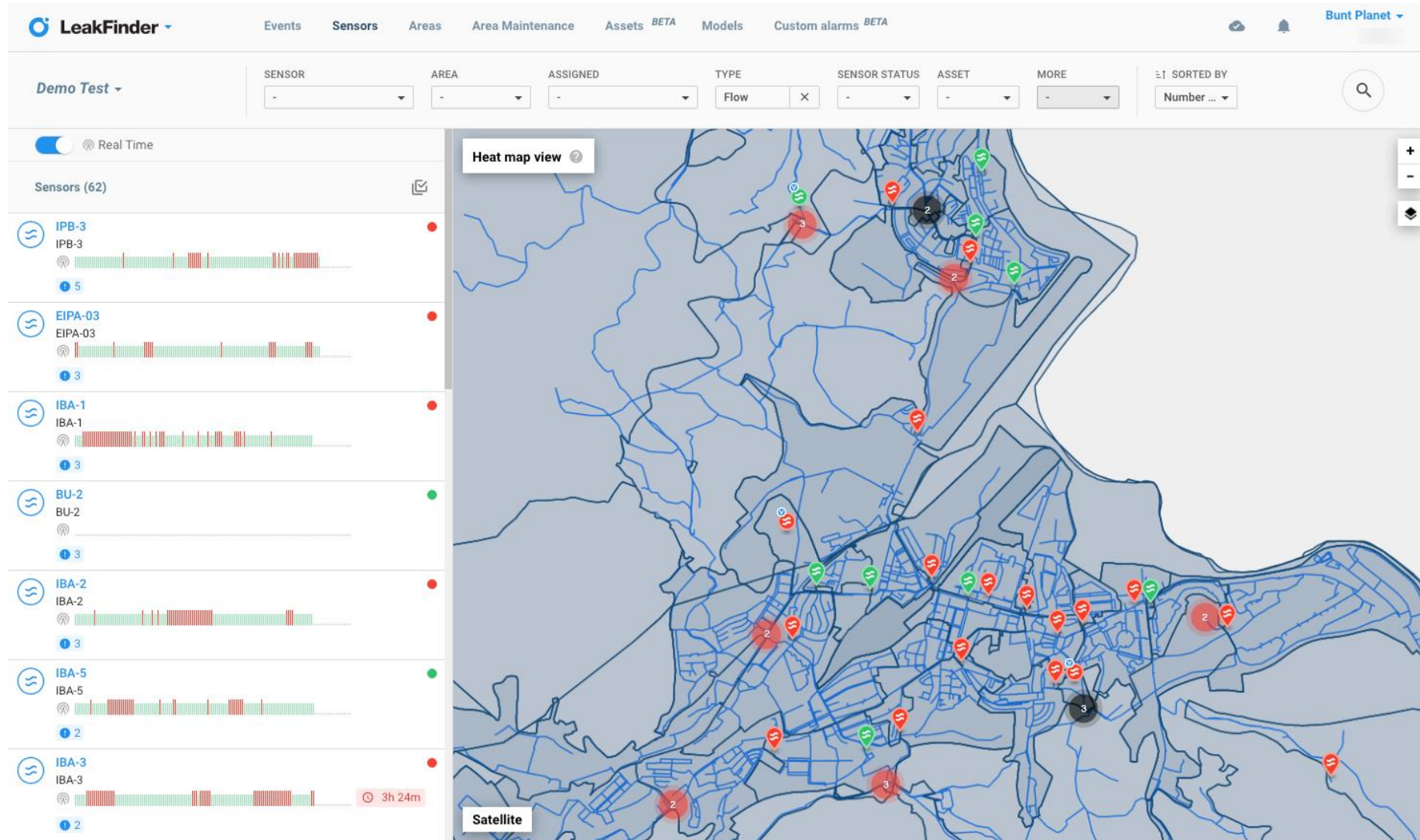
The right-hand panel provides detailed information for the selected area:

- Status Overview:** Shows 'Sensor Status' as green (2) and 'Open Events (high priority)' as 2. There are icons for water and gas leaks, each with a '2' next to it. A link 'Open in events' is provided.
- Night Flow Average:** A line chart showing flow data for the last 3 months.
- Area sensors:** Lists 'Flow (1)' and 'Pressure (1)' with dropdown arrows.
- Net sensor:** Shows 'IBA-5' with a green status indicator.
- History:** Includes a text input field for 'Add your comment' and a note 'No timeline data'.



# Real time monitoring

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# Integrated Hydraulic Model

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**LeakFinder** | Eventos | Sensores | Áreas | Áreas en Mantenimiento | Modelos | Alarmas personalizadas BETA | Demo User demo

← Ondonea tank area for simulations | Componentes de la red

- Conexiones: 2,381
- Tanques: 2
- Tuberías: 2,413
- Válvulas: 51

### Tuberías L1505

Nudo final	12273
Longitud	664
Diámetro	400
Coficiente de Rugosidad	0.8
Coficiente de Pérdidas Menores	0
Estado	<input checked="" type="radio"/> Abierto <input type="radio"/> Cerrado

#### Resultados de simulación

CAUDAL	17.289 l/s
VELOCIDAD	0.138 m/s
PÉRDIDA UNITARIA	0.064 / 1000m

CAUDAL VELOCIDAD PÉRDIDA UNITARIA

08:00:00  
42.143 l/s

**Presión (m)**

- 3.130 to 35.961
- 35.961 to 46.886
- 46.886 to 56.464
- 56.464 to 62.057
- 62.057 to 66.570

**Caudal (l/s)**

- 0 to 0.010
- 0.010 to 0.058
- 0.058 to 0.225
- 0.225 to 0.776
- 0.776 to 17.289

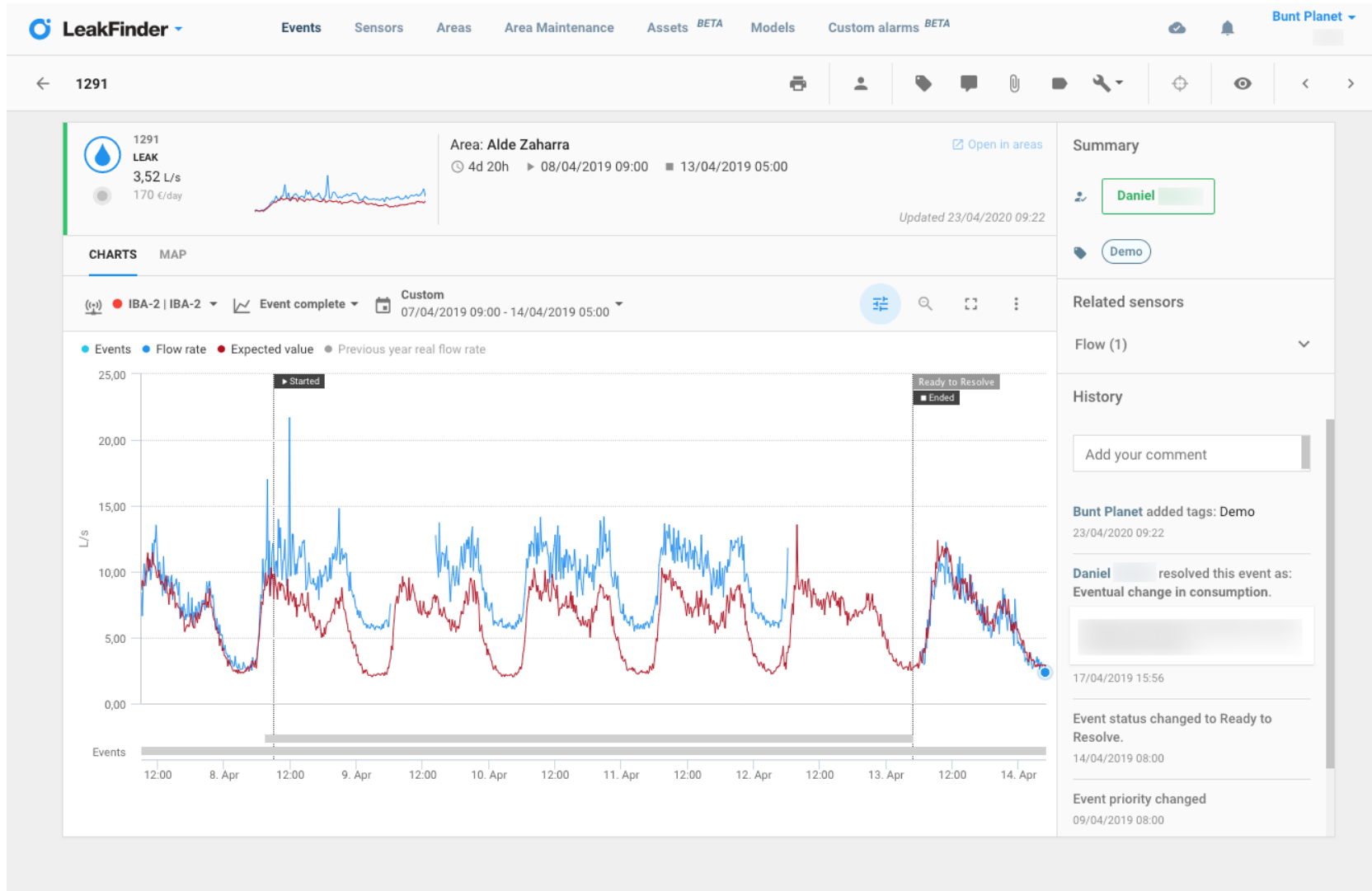
Configuración de rangos

3D Satélite



# Event detail

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# LeakFinder Features summary

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1. Proved leak detection and location time reduction
2. Minimum investment for best results
3. Easy and fast to implement
4. High security standards
5. Increases accuracy over time
6. Available on cloud or on premise
7. Integration with third party software (Business Intelligence, Sales tools, GIS, Scada, Work orders management Systems, ...)
8. Automatic event detection (leak, burst, anomaly, pressure drop, asset failure, ....) and management system
9. Hydraulic digital twin (automatic hydraulic model) calibration and simulation)
10. Minimize collateral infrastructure damages and costs
11. Suitable for any size of DMA, pipe material and environment conditions
12. Virtual DMA (detection and pre-location of small leaks in large DMAs)
13. Model allows “What if” scenarios
14. Avoids the increase of Minimum Night Flow levels
15. Real time analysis and Metainformation management (tags, comments, ...)
16. Integrated Scada web.
17. Automatic data normalization and cleaning
18. Compatible with any sensor type and communication system
19. KPIs calculation for Areas, Assets, Events, Sensors
20. Customised dashboards
21. Smart metering integration
22. Predictions are used to fill the data gaps
23. Automatic configuration of new sensors
24. Pipe isolation proposal
25. User defined notifications/alarms and scheduling

## Physical Losses

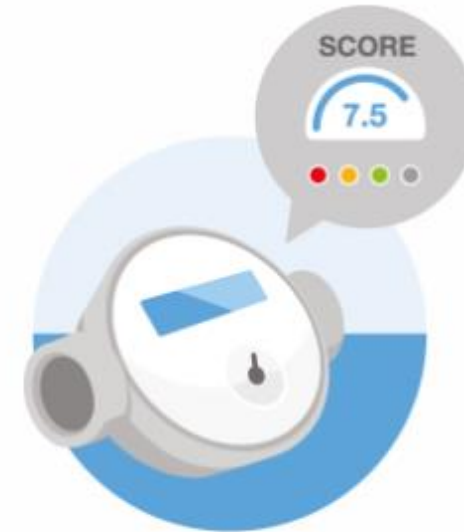
BuntBrain  
LeakFinder<sup>o</sup>



Early detection and location of leaks  
and anomalies in the network

## Commercial Losses

BuntBrain  
WaterMeters<sup>o</sup>



Smart water meter data  
management

# What Is it and How Does it work?

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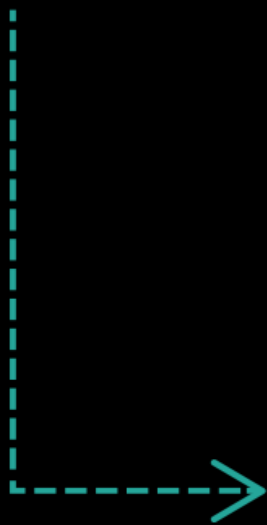
- BuntBrain **WaterMeters** is web-based software to **reduce commercial losses** in the water supply network.
- Applies big data, metrology and machine learning, to identify **which meters should be checked and/or replaced** based on their performance and return on investment, not their age.
- Monitors **under-metering** constantly by calculating current water meter measurement error against optimal meter error based on error degradation patterns for each water meter.



# How Does it work?

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**INPUT**  
METER TYPE  
NOMINAL DIAMETER  
CONSUMPTION  
ACTIVITY  
ETC.



**OUTPUT**  
METER ANALYSIS

CONSUMPTION



METER TYPE  
SINGLE JET - 13mm

RELEVANCE



SCORE  
TOTAL

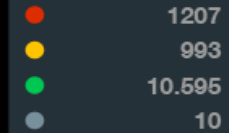


DETAIL

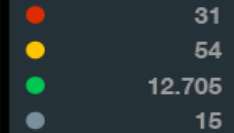


GLOBAL SCORE / PKIs

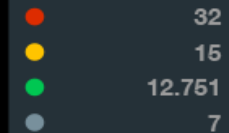
REPLACEMENT



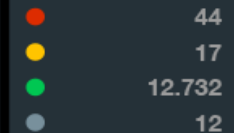
STOPPED METER PROBABILITY



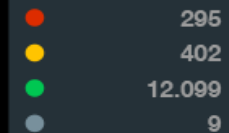
SIZING



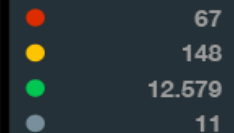
ABNORMAL CONSUMPTION



INTERNAL LEAK PROBABILITY



DATA RELIABILITY



# Benefits

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## Financial Savings

- **Increase revenues and reduce commercial losses** by charging more accurately to the customers.
- Generates **financial savings** by optimizing meter replacement plan through its end of life and performance calculation.
- **Tariffs modelling**



## Auditing & Transitioning Tool

- **Fraud detection** by identifying water theft. (If combined with LeakFinder software)
- Facilitates **transit to a smart metering network** as it prioritises meters replacement.
- Serves as **independent analysis** to audit meters' status.

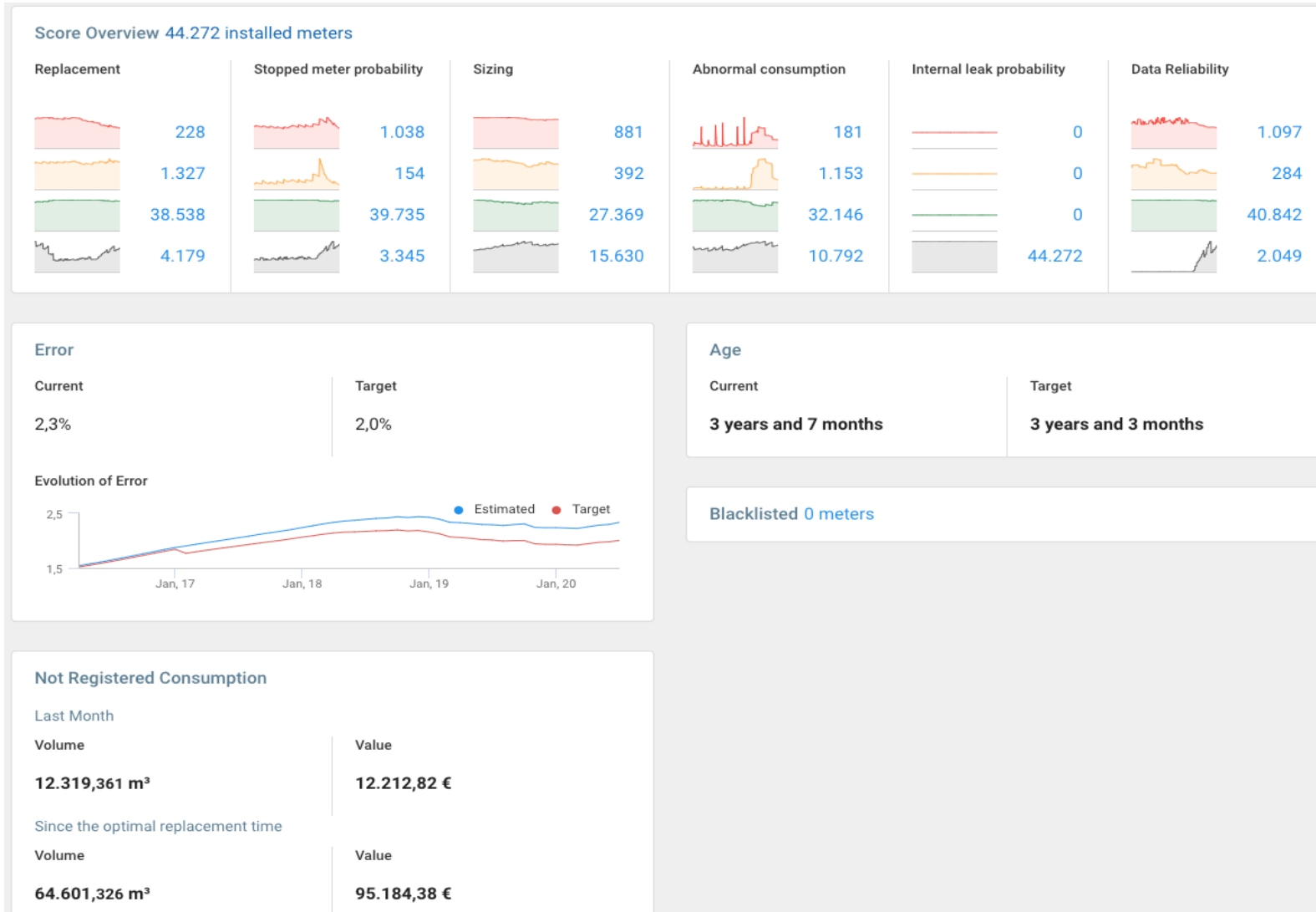


## Performance Enhancement

- Meter **data integration** (MDM & MDA functionality), including smart meters.
- **Automatic water balance** calculation.
- Simple report: **constant meters' performance monitoring and improvement** through indicators.
- Water **demand analysis**.
- Meters' performance **comparison**.
- Generates **periodic reports** to the management team.
- Replicability of the analyses.

# Main Dashboard

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# Meters Overview

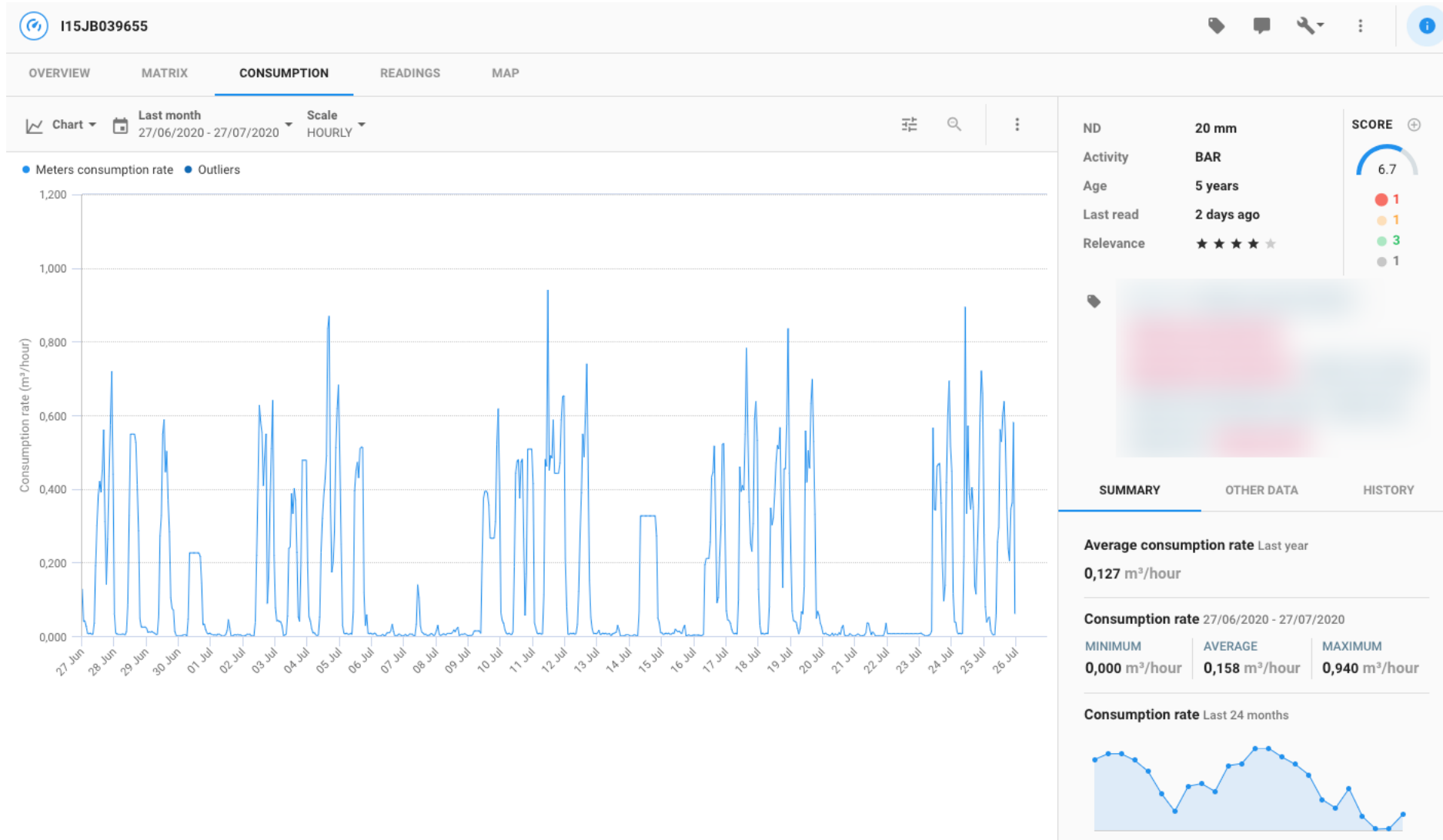
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The screenshot displays the 'WaterMeters' dashboard interface. At the top, there are navigation tabs for 'Dashboard', 'Analysis', and 'Custom alarms BETA'. The user is logged in as 'sttz' under the 'Bunt Planet' account. A search bar shows 'New analysis' with filters for 'Nominal diameter' and 'Sorted By Avg consumption rate last year'. A date range of 'LAST YEAR 27/07/2019 - 27/07/2020' is selected. The main area shows a map of meters with a sidebar on the left containing a filter for 'Meters' (44,272 selected) and a list of nominal diameters (N/A, 13 mm, 15 mm, 20 mm, 25 mm, 30 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm, 150 mm). The map is in 'Heat map view' and shows numerous meter locations marked with blue pins and numbered circles. A pop-up window for a specific meter (D16UG004283) is open, showing a photo of a restaurant and identifying it as 'RESTAURANTE' with a 65 mm nominal diameter. The map includes labels for various locations like ZOKOBURU, HENDAYE, and BELTIZENEA.




# Meter Detail

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# Drag & Drop Analysis Creation

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 **New analysis** ✕

---

**FILTERS**

- > Installation 8
- > Commercial 8
- > Supply network 2
- > Meter status 7
- > Master meters and submeters 4
- > Information added by user 2
- > Consumption 13
- > Readings 1
- > Geo 4
- > Communication module 2
- ▼ Work orders 2

Work order No.

Work order request status

**Define your search criteria** ?

✕ Nominal diameter : 13 or 15

✕ Activity : BAR

Include removed meters

**Choose a date range**

The chosen date range acts as a filter only if you use any of the filters with the calendar icon (📅).

Last three months ▾

**Customize visualization** ?

Adjust how you want the results to be displayed. These settings do not modify the analysis result in any case.

**Group meter list by** ?

✕ Brand/Model

**Sort meter list by** ?

✕ Total consumption desc ▾

Cancel Analyze ▾

# Configurable Data Display

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Data can be displayed in different manners: meter list; data matrix; map view; heat map; consumption view; ...

## Matrix Display

1,015 meters selected

OVERVIEW **MATRIX** CONSUMPTION READINGS HARDWARE ALARMS MAP OTHER DATA

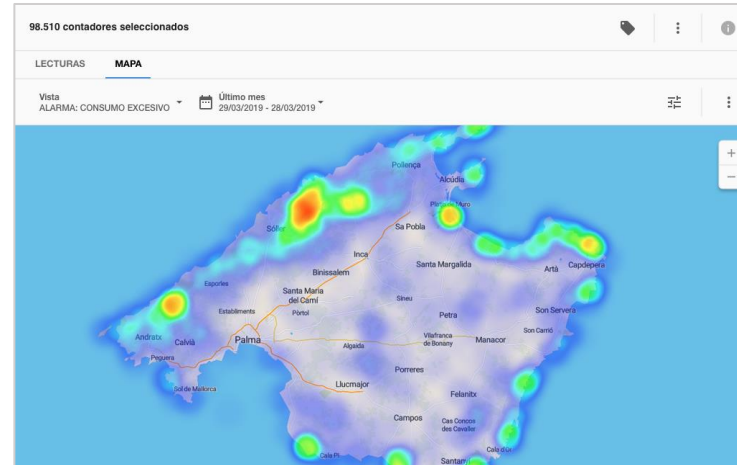
View: Vertical axis | Horizontal axis: NOMINAL DIAMETER | Variable: NO. OF METERS

ALARM TYPE

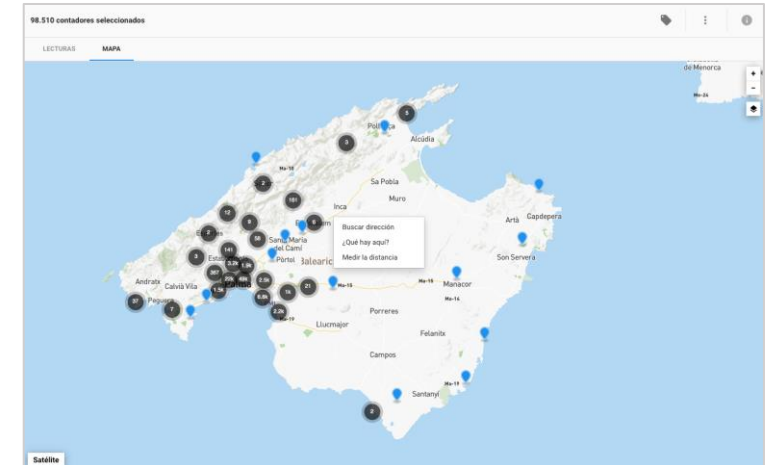
One or more counters could appear in different cells of the matrix

	N/A	13 mm	15 mm	20 mm	25 mm	30 mm	32 mm	40 mm	50 mm	65 mm
Communication failure	0	23 meters	1	0	0	0	0	0	1	0
Leak	0	Nominal d.L.	13 mm	0	0	0	1	0	0	0
Maximum flow	0	Alarm type	Night consumption	1	0	0	0	0	2	0
Minimum flow	0	0	0	0	0	1	0	0	0	0
Night consumption	0	5	3	3	1	0	0	0	2	1
Overpressure	0	0	0	0	0	0	0	0	0	0
Reverse consumption	0	0	0	0	0	0	0	0	0	0
Stopped meter	0	1	0	1	0	0	0	0	0	0
Tampering	0	6	0	0	0	0	0	0	0	0
Threshold exceeded	0	0	0	0	0	0	0	0	0	0
TOTAL	0	48	3	6	1	0	2	0	3	3

## Heat Map Display



## Map Display



# WaterMeters Features summary

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1. Reduces commercial losses.
2. Optimises meter replacement plan according to their performance.
3. Detects fraud. (In combination with LeakFinder and Smart Metering)
4. Integration with third party software (Business Intelligence, Sales tools, Work orders System, ...).
5. Integration with any water meter manufacturer and communication system.
6. Strong state-of-the-art security.
7. Available on cloud or on premise.
8. Automatic data normalization and cleaning.
9. Customised dashboards with KPIs monitoring (Score, Replacement, Sizing, Abnormal consumption, Internal leak, Stopped, ...)
10. Drag & Drop analysis creation tool.
11. User defined notifications/alarms and scheduling.
12. Meter information enhancements (tags, comments, ...).
13. Advanced analytics:
  - a) Calculation of water meters measurement error
  - b) Calculation of economically profitable error
  - c) Monitor difference between master meter and submeters
  - d) Different data views (meter list; data matrix; map view; heat map; consumption view; ...)
  - e) Early detection of anomalies

## Bunt*Brain* EndUses<sup>o</sup>



Identify the end uses of water consumption

# Introduction to EndUses

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## What is it?

Is an extraordinary tool to analyse the final uses of water by breaking down its consumption into its essential components (washing machine, dishwasher, tap, cistern, shower, etc.).

## Who is interested in such tool?

Governments, public entities and water utilities that aim to assess the way citizens consume water.

## Why? Benefits:

- Increases knowledge about water usage in a catchment area.
- Measures consumption efficiency in catchment area to determine potential savings.
- Assists in demand description and forecasting.
- Analyses effectiveness of specific water saving strategies, communications and instruments.
- Supports long-term actions planning to prevent water stress situations.

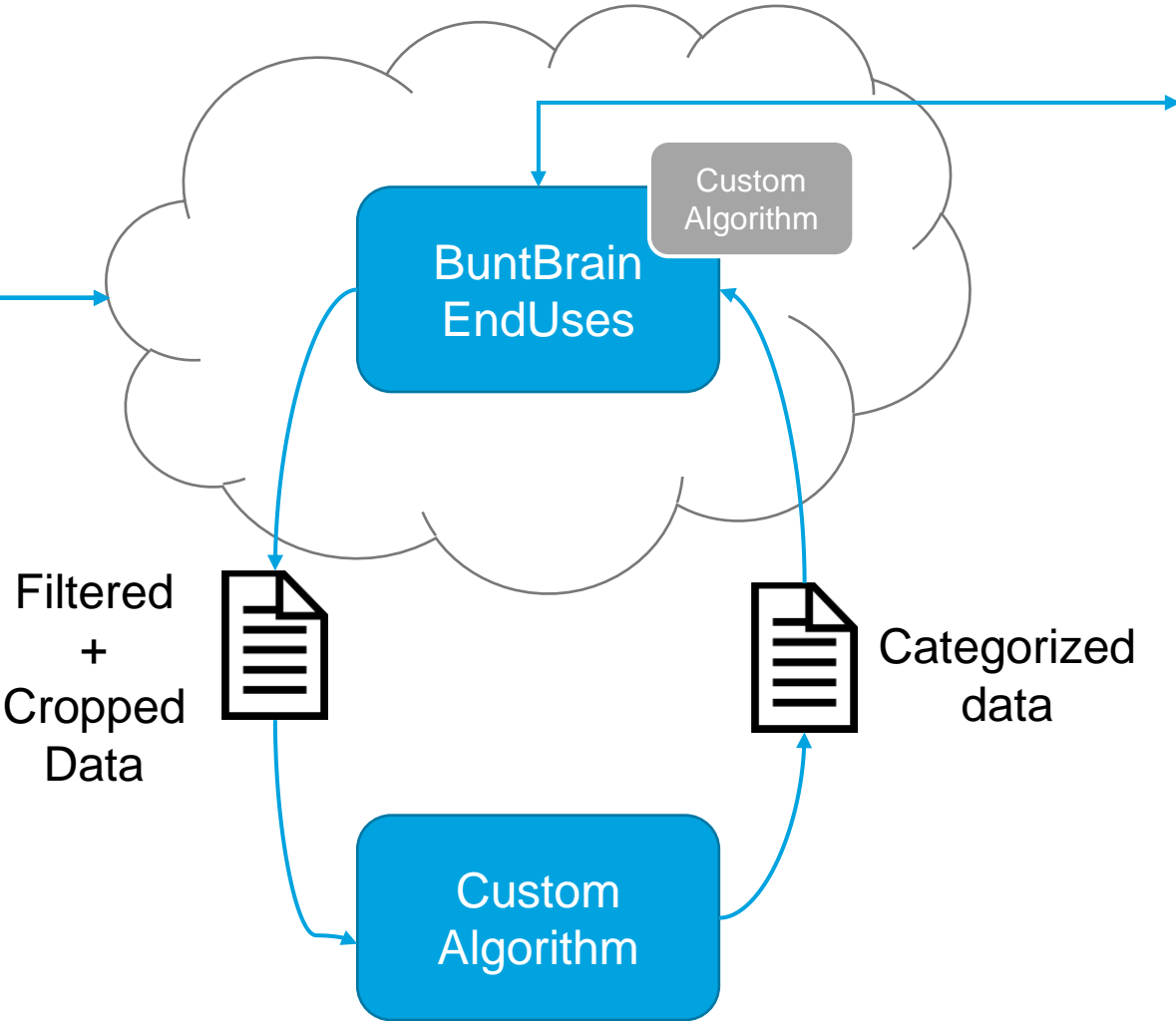
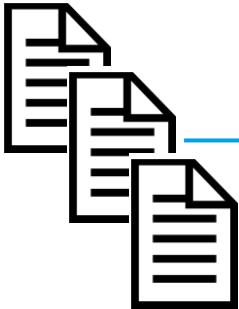
# EndUses Open Architecture

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Smart Meters



Surveys



- Review
- Summarize
- Export
- ...

# EndUses Consumer Overview

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EndUses
Bunt Planet

← Demo Campaign / CAS0006L3

Change status ▾ View survey data Export ▾
Edit pulses ▾

**CAS0006L3**  
2 meters in customer

▲ Meter: CAS0006L3-0 **IN PROGRESS** ▾ Target: 12/30 days

▲ Meter: CAS0006L3-1 **NOT EDITED** ▾ Target: 0/30 days

Customer overview during campaign

**DAILY CONSUMPTION**

THURSDAY 13 / 10 / 2016

- CAS0006L3-0: 366.800 L
- CAS0006L3-1: 0.000 L

Survey data

View survey data

End Uses distribution for all meters in customer

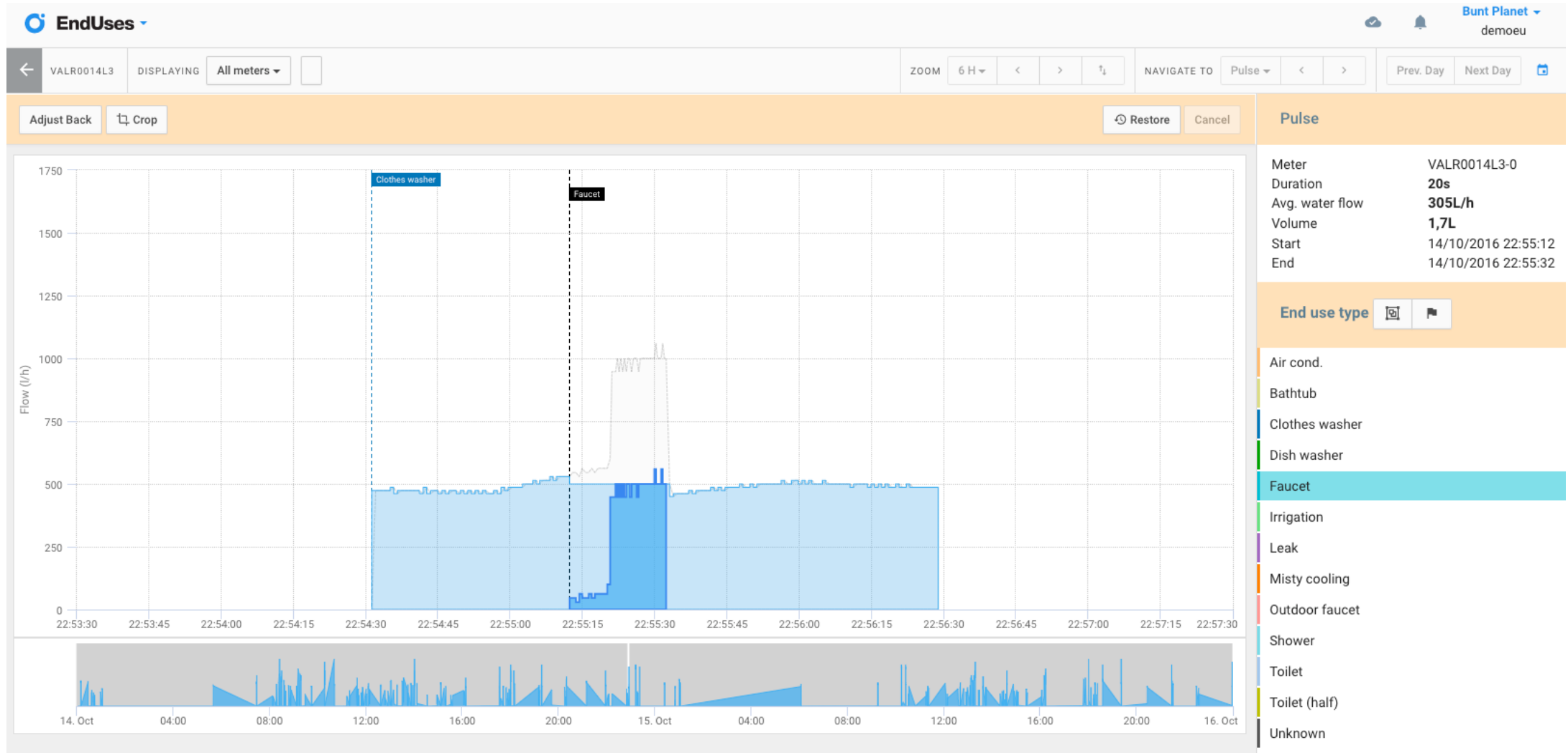
END USE	DAILY CONSUMPTION	
Air cond.	0	0 l/day
Bathtub	0	0 l/day
Clothes washer	59.8%	55.6 l/day
Dish washer	0	0 l/day
Faucet	6.9%	6.4 l/day
Irrigation	0	0 l/day
Leak	0.6%	0.6 l/day
Misty cooling	0	0 l/day
Outdoor faucet	0	0 l/day
Shower	0	0 l/day
Toilet	25.9%	24.1 l/day
Toilet (half)	6.8%	6.3 l/day
Unknown	0	0 l/day

End Uses distribution by meter



# EndUses Consumption Details

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# EndUses Features Summary

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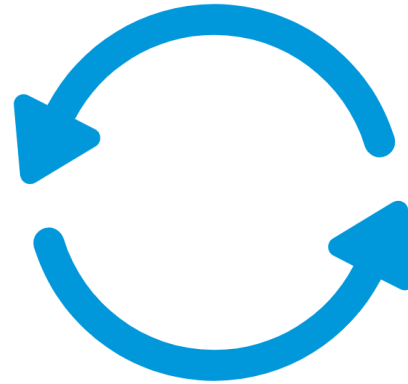
- Automatic data normalization, cleaning and categorization.
- Open architecture: customised algorithms.
- Configuration of measurement campaigns.
- Support for multiple meters/signals per customer.
- Integration of survey data (characteristic of end-user and point of consumption)
- Summary of water usage per customer or aggregated by selected users.
- Histogram of consumption pattern.
- Integration with third party software.
- Available on cloud or on premise.

# Software as a Service (SAAS) Business Model

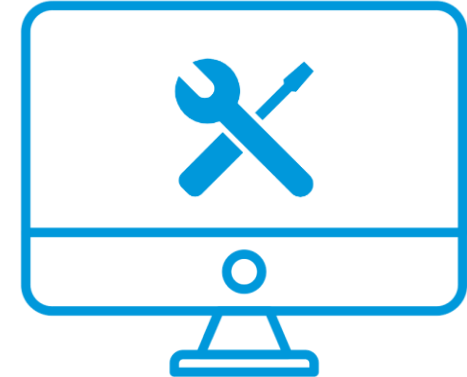
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**TIME  
INSTALLATION FEE**

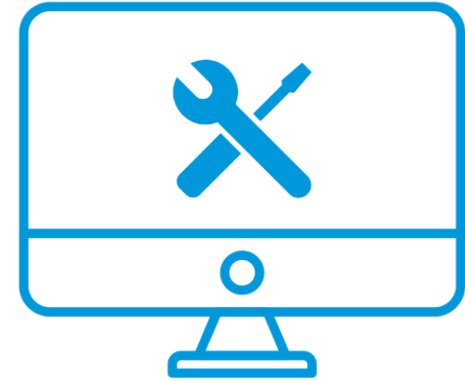
**RECURRING  
ANNUAL FEE**

**SERVICES  
(OPTIONAL)**

# Our Services

CONFIDENTIAL

- Hydraulic models generation and calibration.
- A.I. based sensor positioning optimization.
- Smart metering implementation planning and water meter replacement optimization.
- Metering tests comparison and analysis.
- Fraud detection.
- Water balance reporting.
- Consumption forecasting.
- Tariff recommendations.
- Customised software for companies.



# Thank you

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**Key Account Manager**

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