



Webinar Series

NAIADES Project Exploitation Webinar




SEPT 23, 2022
10-11.30 CET



ONLINE

Join Us!

Some info

 This session will be entirely recorded and published on the NAIADES channels.

 Feel free to post your questions in the chat.



Please feel free to share your thoughts about the workshop on Twitter, via:

@naiadesproject, using
#NAIADESwebinars



NAIADES

Webinar Series



 NAIADES

 **SEPT 23, 2022**
10-11.30 CEST

 **ONLINE**

NAIADES Project Exploitation Webinar

Join Us at
<https://bit.ly/3enGVYq>

PITCH SESSION (60')

- NAIADES Integrated Platform**
Simona Bica, *SIMAVI*
- Water Consumption Awareness Hub**
Evangelia Anagnostopoulou, *ICCS*
- NAIADES Decision Support System**
Iosif Sklavidis, *Konnektable*
- Weather Forecasting Tool**
Thanasis Anagnostis, *CERTH*
- Data collection and aggregation**
Manuel Fernández, *ADVANTICSYS*

Q&A (15')

FEEDBACK FROM AUDIENCE (10')



Agenda

SESSION 1 – Introduction to NAIADES ecosystem and exploitation routes

(José J. de las Heras, ADVANTICSYS)

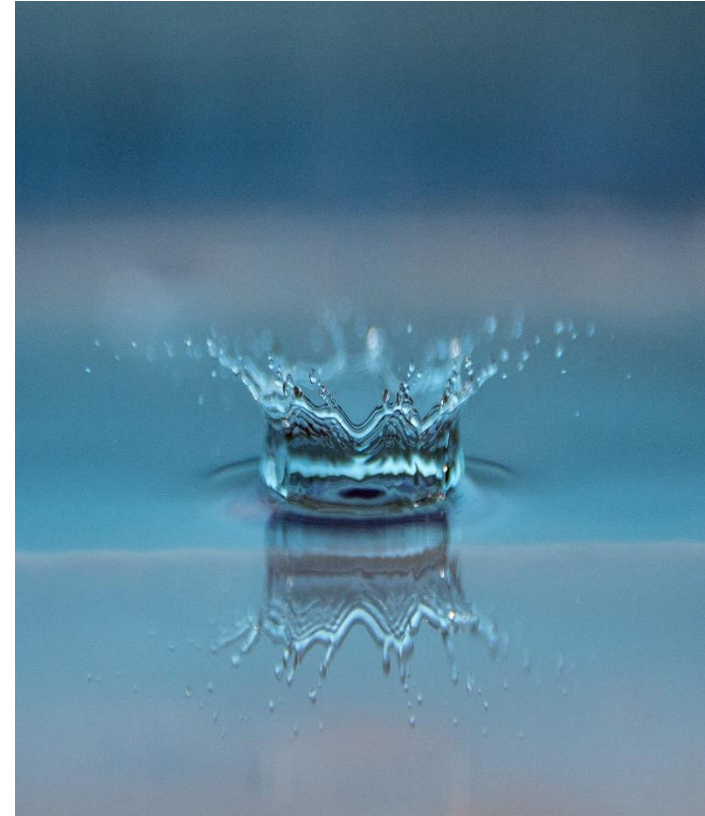
SESSION 2 – Pitch session

- NAIADES Integrated Platform (Simona Bica, SIMAVI)
- Water Consumption Awareness Hub (Evangelia Anagnostopoulou, ICCS)
- NAIADES Decision Support System (Iosif Sklavidis, KT)
- Weather Forecasting Tool (Thanasis Anagnostis, CERTH)
- Data collection and aggregation (Manuel Fernández, ADVANTICSYS)

Q&A + Feedback from audience

A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

Session 1: Introduction to NAIADES ecosystem and exploitation routes



- **A holistic water ecosystem for digitisation of urban water sector**
- **Coordinator: Centre for Research and Technology, Hellas**
- **Beneficiaries: 18**, (8 Research Institutes, 6 SMEs, 1 University, 1 Municipality (Ville Carouge) and 2 water utilities (AMAEM, CUP Braila)
- **EU contribution: € 4,999,980.13**
- **Duration: 06/2019-11/2022**

NAIADES concept




- Smart Water Management for Sustainable Development Goals
- <https://naiades-project.eu/>

NAIADES supports digitization of the water sector by providing a holistic solution for the control and management of water ecosystems and sustainable and eco-friendly water management



Pilots and developed solutions

Pilots cases and solutions validation matrix

Pilot Area	Problems Addressed and NAIADES Services		
<p>Water Utility managing the urban water cycle of Alicante and the surrounding municipalities</p> 	<ul style="list-style-type: none"> - NAIADES DSS - AI consumption monitoring - Weather forecast - Water demand prediction - Data models, Open APIs and data infrastructure, Security framework <p>Water demand prediction</p>	<ul style="list-style-type: none"> - NAIADES DSS - Failure and leakage prediction - Weather forecast - Data models, Open APIs and data infrastructure, Security framework <p>Saline Intrusion Detection</p>	<ul style="list-style-type: none"> - Consumption Awareness Dashboard for Water Management Companies & Public officials - Water Consumers Awareness Dashboard - Data models, Open APIs and data infrastructure, Security framework <p>Water consumption awareness and Behavioural change support</p>
<p>Public water company managing the water infrastructure and network in Braila and surrounding regions</p> 	<ul style="list-style-type: none"> - NAIADES DSS - Urban Water Models - AI consumption monitoring - Weather forecast - Water demand prediction - Data models, Open APIs and data infrastructure, Security framework <p>Water demand forecast</p>	<ul style="list-style-type: none"> - NAIADES DSS - Urban Water Models - Weather forecast - Failure and leakage prediction - Data models, Open APIs and data infrastructure, Security framework <p>Leakage reduction</p>	<ul style="list-style-type: none"> - NAIADES DSS - Water Treatment Models - Weather forecast - AI future water quality prediction - Data models, Open APIs and data infrastructure, Security framework <p>Treatments prediction</p>
<p>City with a complete network and IT infrastructure for the Smart City that faces various water problems</p> 		<ul style="list-style-type: none"> - Consumption Awareness Dashboard for Public Employees - Weather forecast - AI consumption monitoring - Water demand prediction - Data models, Open APIs and data infrastructure, Security framework <p>Watering</p>	<ul style="list-style-type: none"> - NAIADES DSS - AI future water quality prediction - Weather forecast - Data models, Open APIs and data infrastructure, Security framework <p>Fountains</p>

Exploitation plan

- ❑ Two kinds of Key Exploitable Results (KERs):
 - ❑ NAIADES Ecosystem (joint exploitation)
 - ❑ **A product / service (A):** An implementation of the NAIADES ecosystem & approach i.e. an as-is implementation that mirrors the NAIADES instantiation. This would be provided as a product or a service (NAIADES-as-a-Service). This would have a basic tiered access that incorporate the NAIADES basic platform for data collection, fusion and operational alerts and dashboards interfaces. Beyond these specific services such as leakage detection, personalised behavioural change support tool or Weather Forecasting Toolkit would be additional paid services.
 - ❑ **A reference architecture / approach (B):** In this case the approach and architecture would be made available as FIWARE-compatible modules/services enabling third-party developers to make use of this architecture and publish new tools in the NAIADES marketplace for a data-driven exploitation.

Exploitation plan

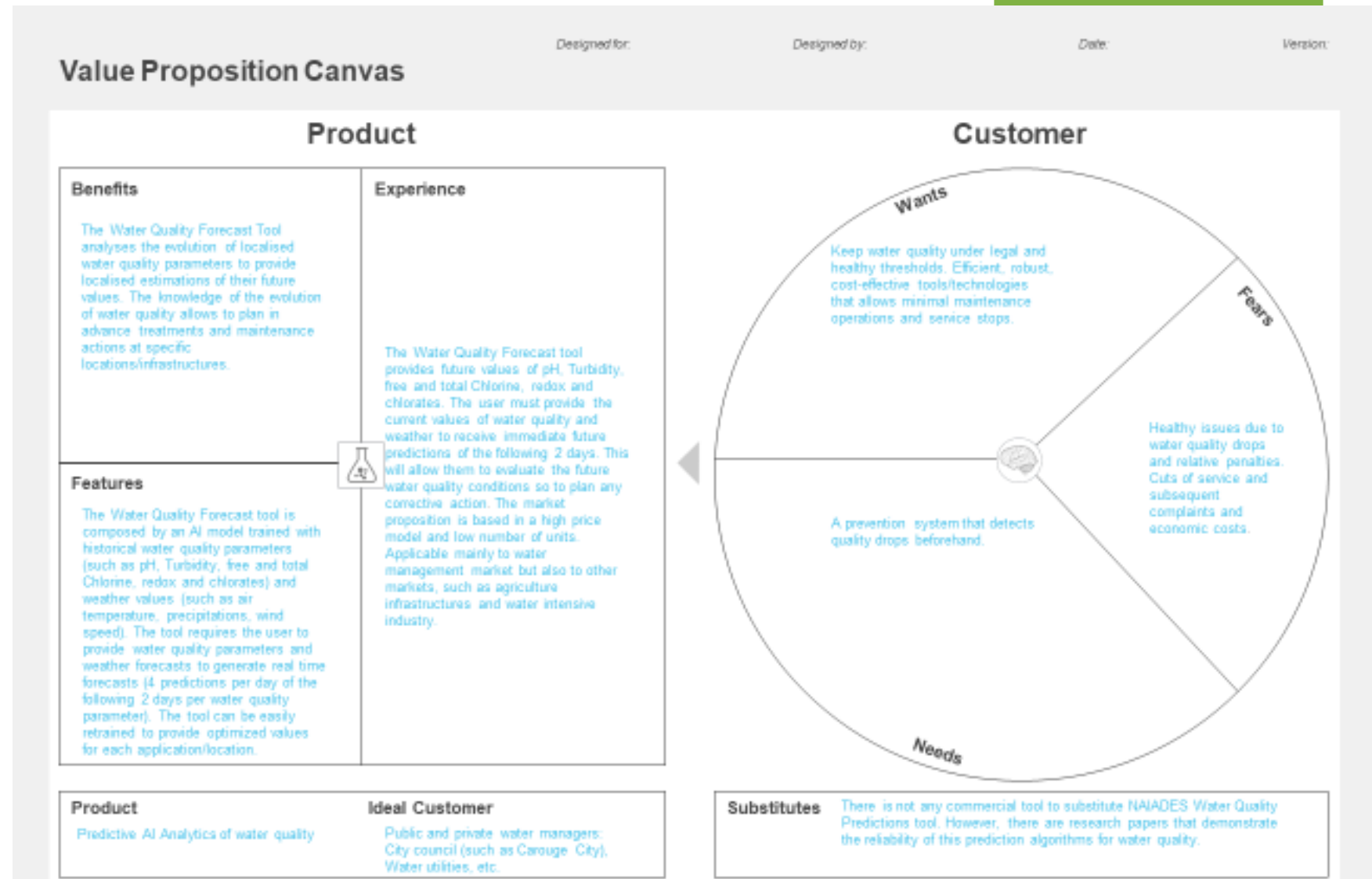


- ❑ Individual KERs
 - ❑ Initial analysis made through questionnaires
 - ❑ Pitch session organized during the 1st Plenary meeting

POTENTIAL EXPLOITABLE RESULT													
Project Acronym	G-1	NIAADES											
INSTRUCTIONS	COLOR CODE →	← Please do not edit	← If required	← Mandatory field									
GENERAL DESCRIPTION OF THE RESULT													
This number will be used to organize multiple results by the same partner	D-1	Number	1										
Please consider to put something meaningful!	D-2	Title											
Which WPs allowed the development of this result?	D-3	WPs											
List the deliverables where and when details can be identified.	D-4	Deliverables											
The lead partner is usually the partner willing to exploit the result, the best positioned.	D-5	Partner Name								Contact Person →			
Select from the list	D-6	Nature of the result	Product										
How close is this result as compared to the objective as set in the DoW? in %	D-7	Level of achievement (Select from the drop-down menu)	0%										
Please consider to tell us when you think the result will be exploited	D-8	Expected Completion date. Use DDDMMYYYY format please →	30/01/2021										
Select from the list	I-1	Partners interested in exploitation											
Select from the list	I-2	Partners with background for this result											
Select from the list	I-3	Partners with foreground for this result											
Provide a paragraph that explains for technical readers the potential/benefit of this result	E-1	Description of the result											
Explain to a wider community the potential of this result	E-2	Brief description											
EXPLOITATION													
Result may be exploited by different partners in different ways		For each exploitation provide the nature and forms (use the drop-menu to select)	Exploitation-1	Exploitation-2	Exploitation-3	Exploitation-4	Exploitation-5	Exploitation-6	Exploitation-7				
This information allows knowing which organisation is behind an exploitation. An organisation may have several plans of exploitation	F-1	Organisation											
Result may be exploited in various form. Select from the list	F-2	Natures of the exploitation											
Select from the list	F-3	Form of the exploitation											

Exploitation plan

- Value proposition canvas



Exploitation plan

- Identification of Key Exploitable Results (KERs)

#	Short Description	IPR Holder / Responsible partner
1	NAIADES integrated platform	SIMAVI, all partners
2	Long-term Water Demand Prediction	KT
3	Water Management Decision Support System	KT
4	Model for Predictive AI Analytics of water quality	AIMEN
5	Event detection system from urban water	EUT
6	Spatio-Temporal IoT Data Pipeline and Transformator Tool	DISY
7	AI services for stakeholders in water sector	JSI
8	Data Fusion layer	ADSYS
9	Awareness and behavioural change support hub	ICCS
10	Cloud based IoT Platform for Data Interoperability	UDGA
11	Weather Forecasting Toolkit	CERTH
12	DataCollectionAndAggregation (DCA)	SIMAVI
13	Marketplace	SIMAVI
14	Dynamic Water Treatment Support Tool	AIMEN
16	Blockchain based log signing and audit	GT
17	Methodology for SDGs Compliance	MI
18	Model-based big data generation of critical events for water distribution system optimisation	IHE
19	Behavioural change measures to support ICT interventions	IHE

A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

Session 2: Pitch session

A vertical strip on the right side of the slide showing a high-speed photograph of a water splash on a reflective surface, with the splash and its reflection clearly visible.



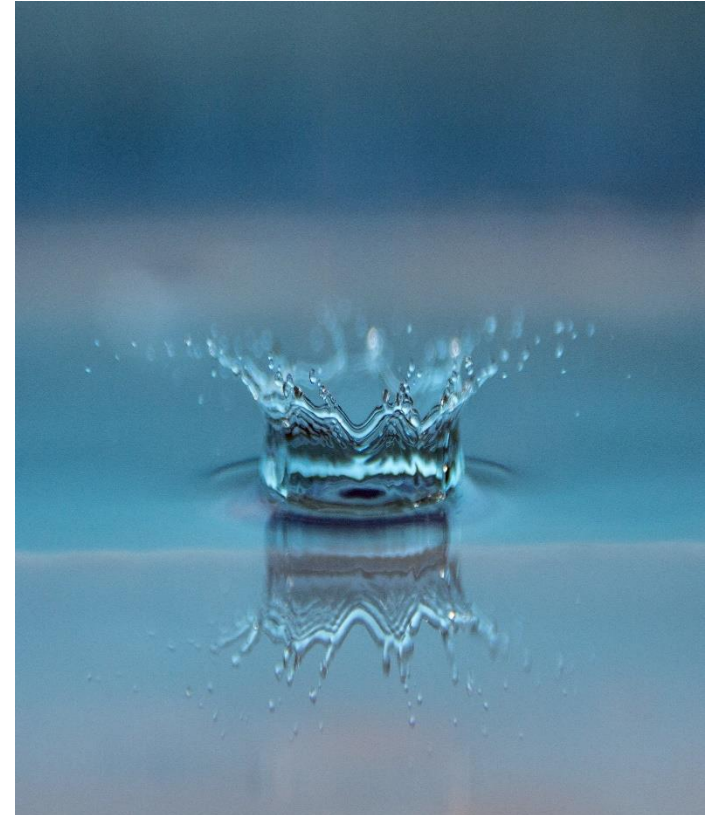
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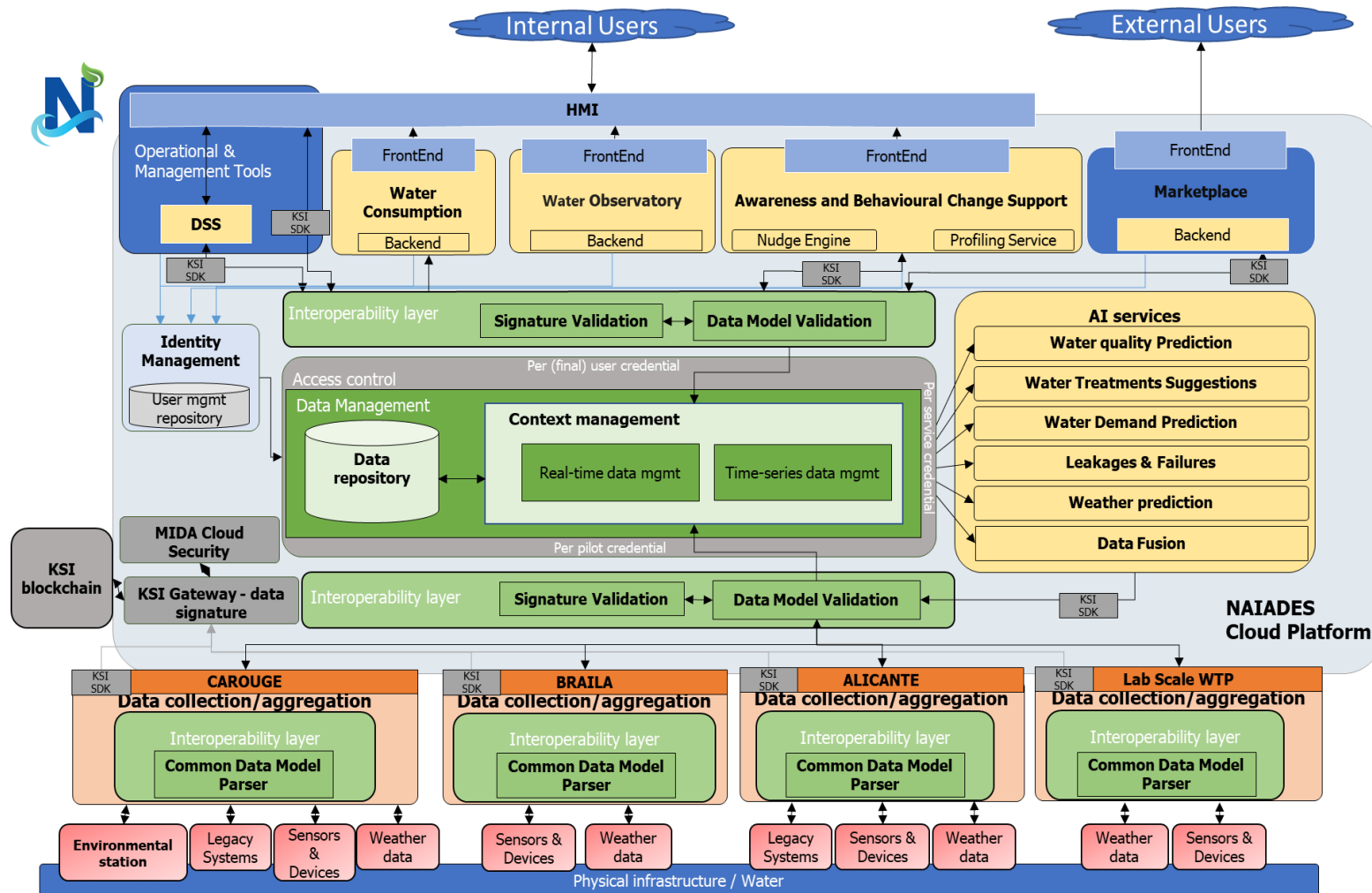
NAIADES

Integrated Platform

Simona Bica, SIMAVI



NAIADES Integrated Platform: Innovative approach in designing the technical solution



NAIADES Integrated Platform: Innovative approach in designing the technical solution



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- Architectural solution compliant with state-of-the art reference architectures already validated in industrial and smart cities sectors (e.g. RAMI4.0, FIWARE);
- Complex architectural design based on business interconnections, interoperability requirements, big data infrastructure and management, communication and security;
- NAI ADES solution is based on innovative micro services architecture which allow the facile maintainability, flexibility and an improved stability of the platform;
- Integrated solution based on IoT architecture, providing the water utilities to easily access services to speed up decision-making due to efficient data analysis and processing;
- NAI ADES interoperability - open and future-proof platform based on innovative technologies.

NAIADES Integrated Platform: Major components and functionalities



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NAIADES – a Water Utilities oriented solution has the major components:

- Data collection and storage from a large number of devices from the field (Data Collection and Aggregation);
- Water consumption monitoring;
- Water observatory;
- Awareness and Behavioural Change Support;
- Environmental Monitoring;
- Weather Forecasting;
- Water Demand Forecast;
- Water Quality Parameters Forecast (WQF);
- Dynamical Treatment Suggestions (DTS);
- Failure and Leakage Prediction (Leakages & Failures);
- Decision Support System (DSS);
- Human Machine Interface (HMI);
- Marketplace.

NAIADES Integrated Platform: Major components and functionalities



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Key features:

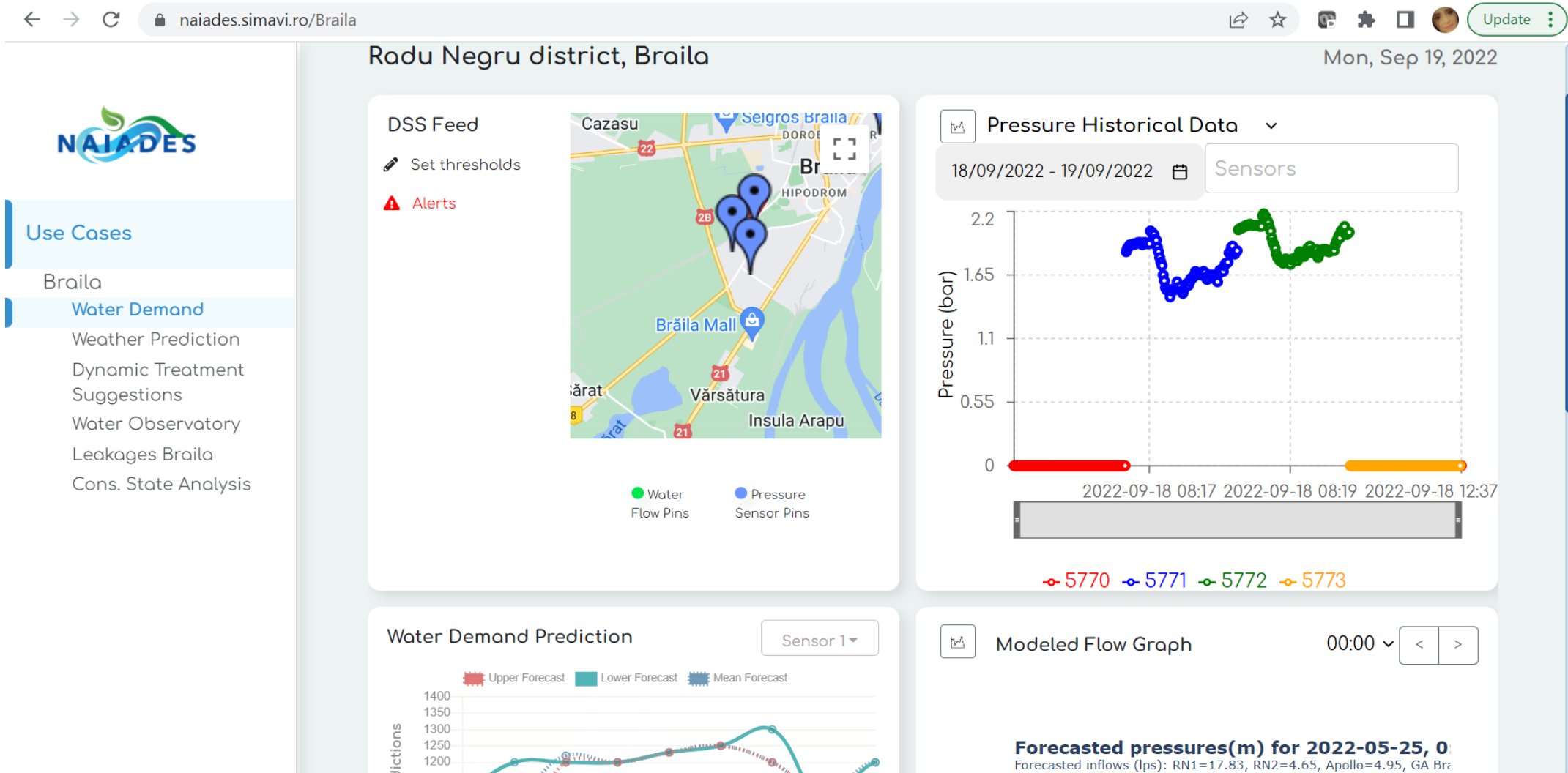
- Monitoring and detection;
- Data modelling and fusion;
- Smartening the water utilities infrastructure and processes;
- Forecasting & Analytics;
- Optimization;
- Alerts (based on AI-driven algorithms and models).

NAIADES Integrated Platform: Major components and functionalities



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HMI: Graphical representation of Water Demand



NAIADES Integrated Platform: Major components and functionalities



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HMI: Graphical representation of Failures&Leakages

The screenshot displays the NAIANES web application interface. The browser address bar shows 'naiades.simavi.ro/leakages'. The page title is 'Braila detection leakages' and the date is 'Mon, Sep 19, 2022'. A dropdown menu shows 'Possible Locations'. The left sidebar contains the NAIANES logo and a 'Use Cases' menu with options: Braila, Water Demand, Weather Prediction, Dynamic Treatment Suggestions, Water Observatory, Leakages Braila (highlighted), and Cons. State Analysis. The main content area features a list of noise sensors with their current locations and values:

- Noise Sensors
- Current locations
- Noise sensor (5982): 12.0
- Noise sensor (5981): 11.0
- Noise sensor (2182): 15.0
- Noise sensor (5980): 7.0

Below the list is a horizontal line. To the right is a map of Braila, Romania, showing a cluster of colorful pins (green, blue, red) representing sensor locations. The map includes labels for 'Braila', 'HIPODROM', 'Donald's', 'Calea Calarasilor', 'Grădina Zoologică a Brăilei', and 'Brăila Mall'. The map interface includes 'Map' and 'Satellite' tabs, a 'Map data ©2022' footer, and a scale bar.

Business Model and Value Proposition

Multi-stakeholder Business Model

Stakeholder	Role
Governance (ministries, agencies, other organizations)	<ul style="list-style-type: none"> • Set policies and strategies
Water services providers, utility providers	<ul style="list-style-type: none"> • Customer / beneficiary
Municipality/local representative	<ul style="list-style-type: none"> • Customer / beneficiary • Lobbyist / Facilitator
Technology providers (scientific community, non-profit organizations, technology and services, industry, cloud computing and orchestration cloud service, industry big data/ machine learning/ artificial intelligence)	<ul style="list-style-type: none"> • Strategic / Key partner • Customer / beneficiary
EU Institutions (EC, European Science Foundation, MEPs), National public authorities (industrial committees, national regulation authorities, ministry and regional councils), Standardization bodies, Related EU-funded projects, Organizations & EU alliances in topics addressed by NAIADES, European technology platforms and respective clusters, Public bodies & organizations	<ul style="list-style-type: none"> • Lobbyist / Facilitator • Key partner

Business Model and Value Proposition

Value Proposition

- NAIADES Integrated Platform helps the Water services providers who want to get smart capabilities in the water management by minimizing technical infrastructure and financial risks.
- The solution ensures a better forecast of the water demand, water quality and water losses.
- Innovative and smart solution for water management (Water services providers oriented solution).
- Innovative business model, designed to build the NAIADES ecosystem.

NAIADES Integrated platform: Challenges and Benefits

Challenges and benefits of implementing NAI ADES

- Monitoring and detection;
- Optimizing the water consumption and reducing the energy consumption;
- Reducing water losses and waste;
- Forecasting water demand;
- Alerts (based on smart algorithms and models);
- Increasing the quality of water (quality parameters forecast and treatment suggestions);
- Optimizing the management of the water utilities infrastructures and time of staff and operators;
- Ensuring the process transparency and clarity of roles and responsibilities.



NAIADES Integrated platform: Focus on results and achievements

Why to be part of NAI ADES ecosystem?

Value Proposition to Stakeholders:

- An integrated platform that enables Smart capability in water management for water services providers.
- Smart capability on forecasting the water demand and water quality.
- Smart capability on water consumption and water losses.

Solution Offered to Stakeholders:

“Smart, safe and reliable”

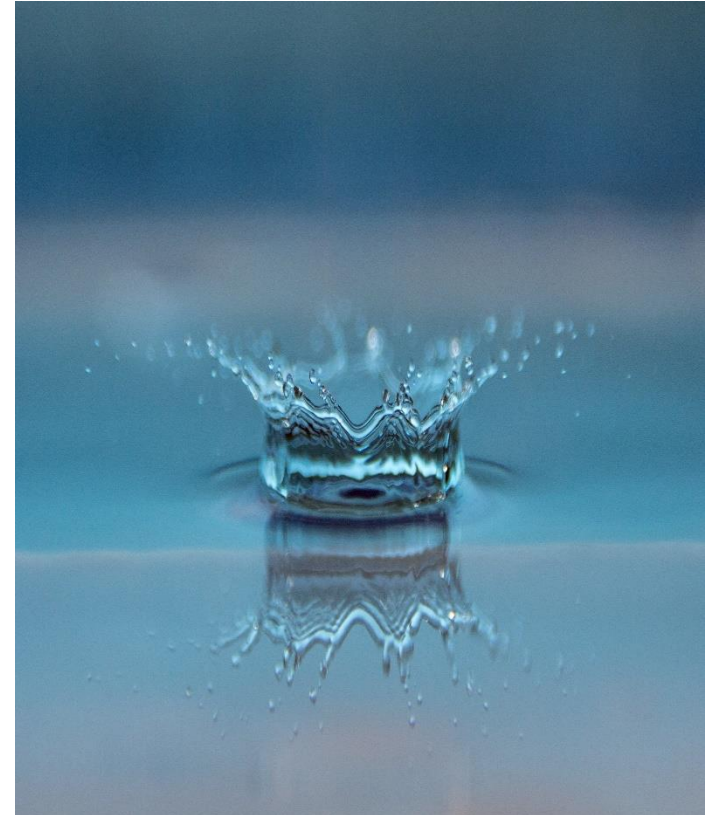
- Smart metering solution to support infrastructure and processes of water services providers.
- Water consumption optimisation, monitoring and trustful control tool.
- Dedicated intuitive User Interface for end-users.



A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

Water Consumers Awareness Hub

Evangelia Anagnostopoulou, ICCS



Water consumption awareness for cities

- Water management companies & public officials need water consumption awareness tools and mechanisms to better understand available consumption data
- We have developed a holistic water consumption awareness dashboard that supports public officials to:
 - monitor and understand how water is consumed in a specific area or consumption point (schools, sport facilities, gardens, other buildings) in the course of time
 - compare consumption across various dimensions, including per groups of consumers, areas, types of consumption points and time periods.
 - take decisions regarding water consumption mitigation measures based on such information
 - monitor the impact of consumption mitigation measures after their implementation

Water consumption awareness for cities – Dashboard Overview



City Dashboard

- Dashboard
- Public Gardens
- Fonts
- Municipal offices
- Municipal Sport facilities
- Schools
- Fire Hydrants
- Irrigation hydrants
- Houses
- Other Sport facilities

Dashboard

Home / Dashboard v1

Show: All watering points

Water Consumption

Daily water consumption over the last year

Yearly Water Consumption

Category	Consumption (m³)	Percentage
Public Gardens	501.9	30.46%
Municipal Offices	321.9	18.32%
Schools	201.1	12.20%
Irrigation Hydrants	103.8	6.06%
Hydrants	133.9	7.79%
Fire Hydrants	128.3	7.79%
Sports facilities	3.64%	2.25%
Other Sport facilities	50	3.03%
Fonts	39	2.41%

Public Gardens: ↓12%

Municipal Offices: ↑4%

Schools: ↓0%

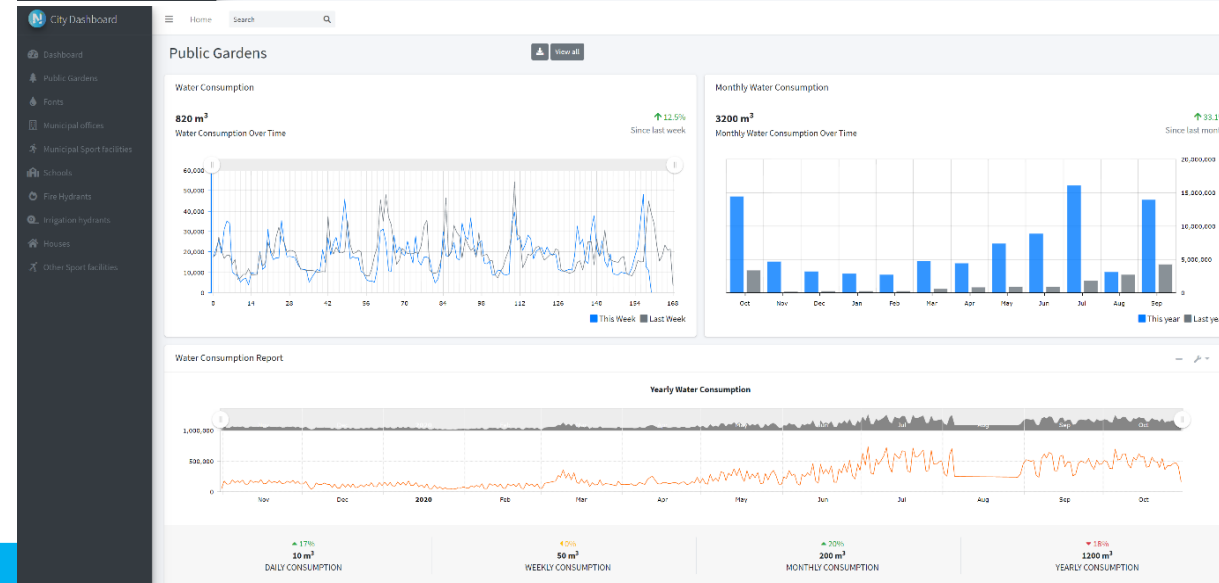
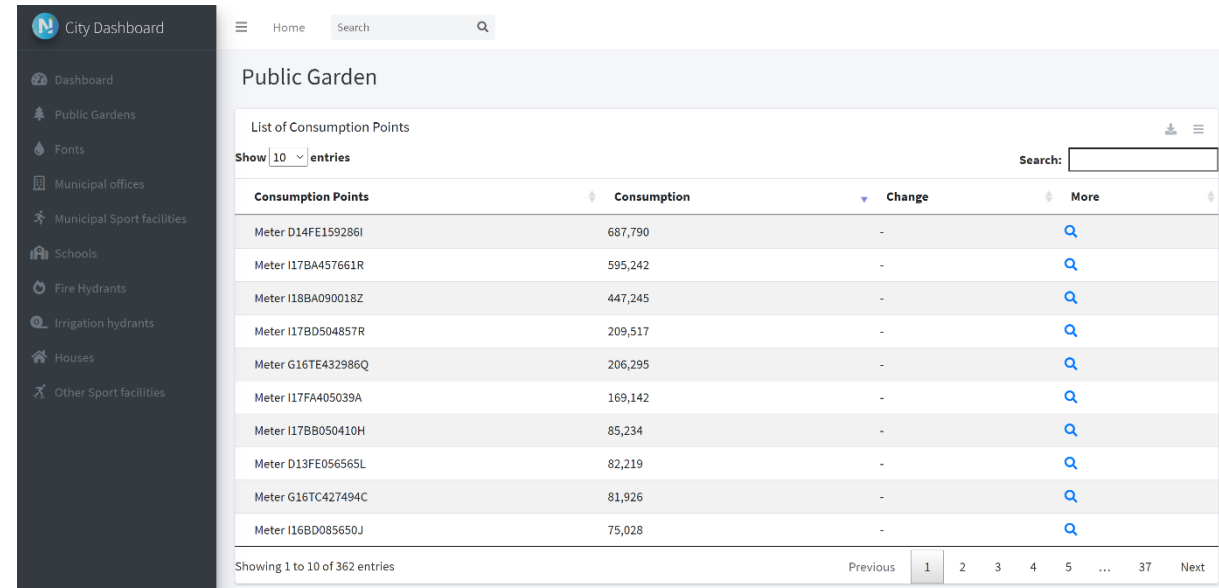
Irrigation Hydrants: ↓2%

Fire Hydrants: ↑5%

- Public officials can see all the watering consumption points in a map
- Consumption points are presented with different colours
 - ranging from green to red, based on the level of their water consumption over the last week
- Users can see the average daily water consumption for all consumption points on a graph view
- The dashboard presents the yearly water consumption in cubic meters per different use
- Users can filter the depicted consumption points on the map based on their type

Water consumption awareness for cities – Dashboard Overview

- List view of all consumption points of the specific type.
- Users can search a consumption point by its name or meter ID, and see more details about each consumption point
 - by clicking the search icon in the “More” column, which redirects to the corresponding consumption point details page
- The details page shows
 - The water consumption during the last week compared to the previous week.
 - The monthly water consumption during this year compared to the previous year.
 - In addition, it presents the daily, weekly, monthly and yearly water consumption change
 - Users can download a pdf report dedicated to the consumption points of a specific type



Water consumption awareness for city workers

- Plants watering commonly leads to unnecessary water consumption and waste of human resources
- We have developed the final version of the watering app, a web-based application
 - for raising awareness on flower boxes watering consumption
 - improving the watering processes efficiency towards water conservation and time savings for public employees



Water consumption awareness for city workers – Main View

User can see the temperature and humidity predictions for the next three days.

This screenshot shows the main interface. At the top, there are weather forecasts for three days: 14.05 (15°C, 55% humidity), 15.05 (8°C, 14°C), and 16.05 (9°C, 16°C). Below the weather is a 'Suggested watering day' dropdown set to 'All'. The main area is split into a map on the left and a list of watering boxes on the right. The map shows several green markers representing watering boxes in the Carouge area. The list on the right shows three boxes with their respective humidity levels, watering dates, and suggested amounts of water.

Box #	Humidity Level	Suggested watering date	Suggested Amount of water
Box #1	0.00	2021-05-14 Today	3 lt
Box #4	0.00	2021-05-14 Today	0.9 lt
Box #2	25.00	2021-05-15 Tomorrow	1 lt

The user can see the boxes, their watering needs for today, tomorrow in a map and list view.

This screenshot shows the same main interface as the first one, but with a pop-up window open over a cluster of boxes on the map. The pop-up window displays details for 'Box #2', including its last watering date and time, soil type (Compost), flower type (Annual), last exposure (Sunny), and current humidity (25.00). There are buttons for 'More Details' and 'Report Problem'.

When the user clicks on a cluster on the map, the list view updates to highlight and present details about the selected cluster. Also, when the user clicks on a cluster on the list view, the pop-up window of the selected cluster is opened on the map.

This screenshot shows the 'View route' page. The 'Suggested watering day' dropdown is set to 'Today'. The map displays a blue route connecting several watering boxes. A list on the right shows the details for the boxes along the route, including their humidity levels, watering dates, and suggested amounts of water.

Box #	Humidity Level	Suggested watering date	Suggested Amount of water
Box #1	0.00	2021-05-14 Today	3 lt
Box #4	0.00	2021-05-14 Today	0.9 lt

The "View route" page shows a suggested itinerary for driving to the boxes that need watering

Water consumption awareness for city workers

City workers provide feedback to the AI module to improve its future suggestions.



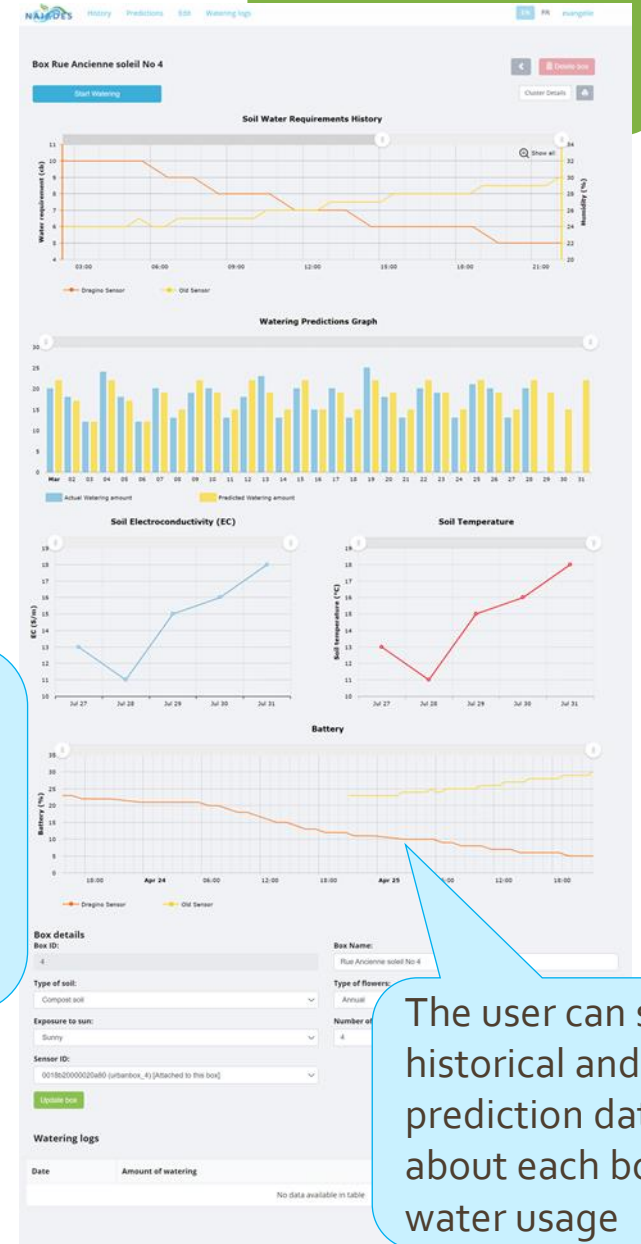
Each time the employee closes the hose, an event is sent from the truck sensor. The Cluster Details page is updated based on the watering sensor values, and the employee views the amount of water that he has used and if this is in the recommended range.

The watering app uses the tracked position to automatically open the "Cluster Details" dashboard, when it senses that the truck is near a cluster which will be watered.

The user can report problems related to the boxes.

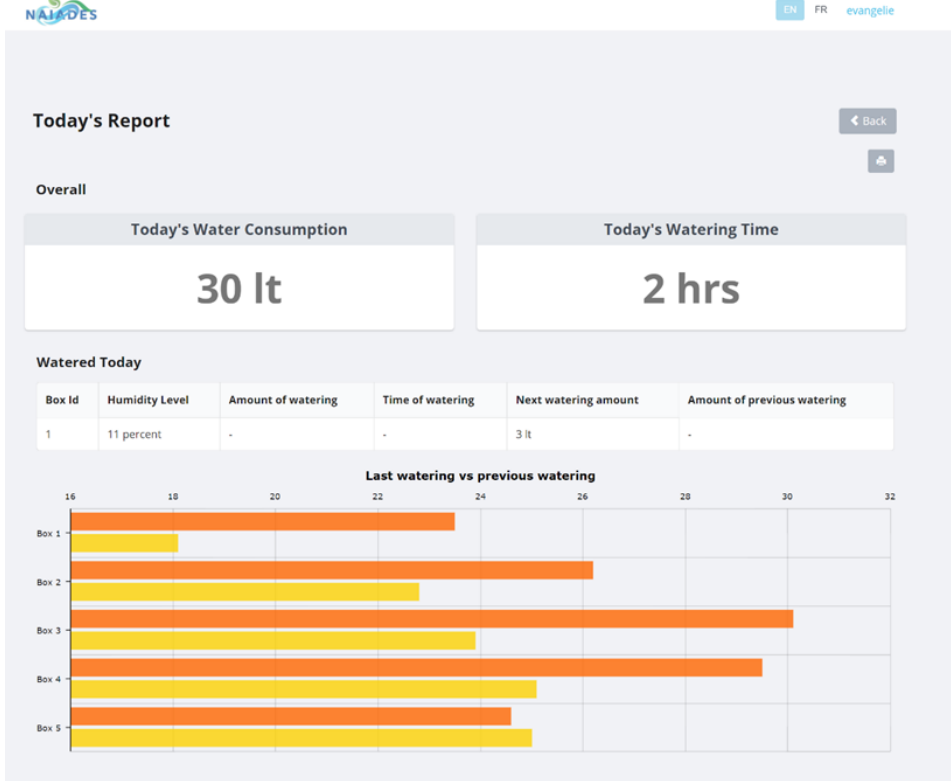
The 'Report a problem' form includes the following elements:

- Issue Type:** Radio buttons for Broken sensor, Dry plants, No watering required, Wrong data, Problem with the box, Flowers destroyed, and Other.
- Description:** A text input field.
- Report:** A submit button.



The user can see historical and prediction data about each box's water usage

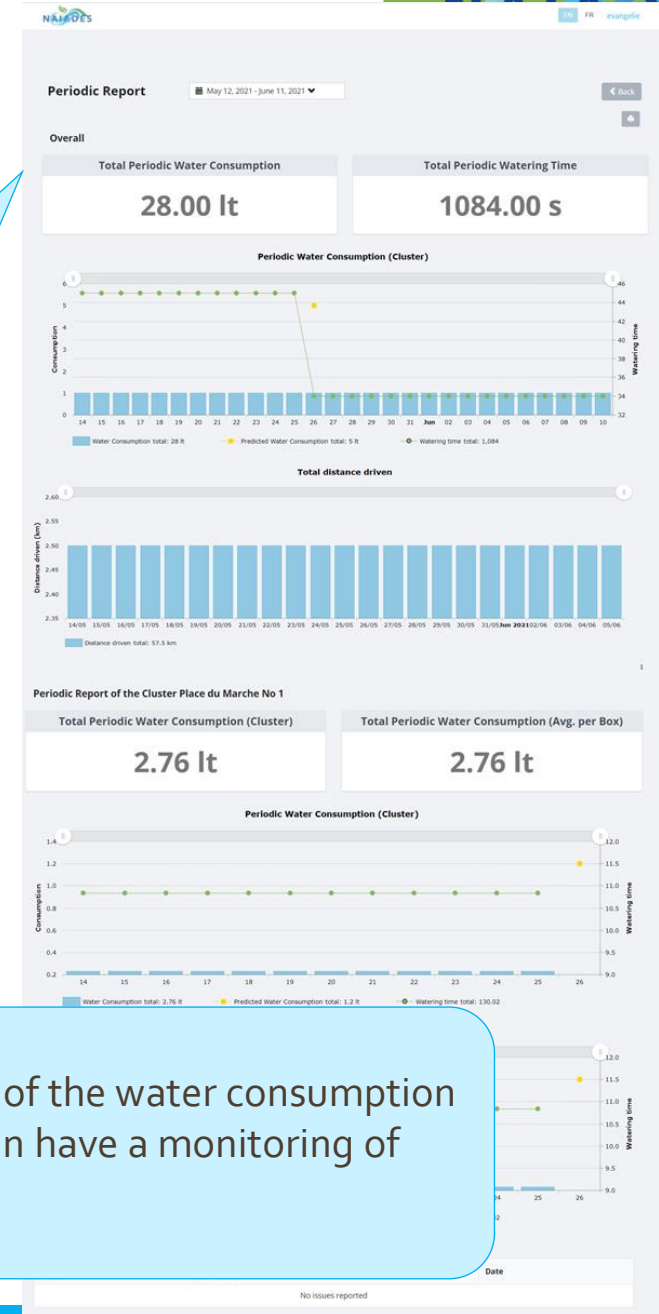
Water consumption awareness for city workers



Users can adjust the timeframe of the periodic report by selecting different time ranges using the datepicker.

City workers can see and download daily reports.

Users can see a monthly report of the water consumption per box and per cluster. They can have a monitoring of the monthly progress.



Behavioural change support for water consumers

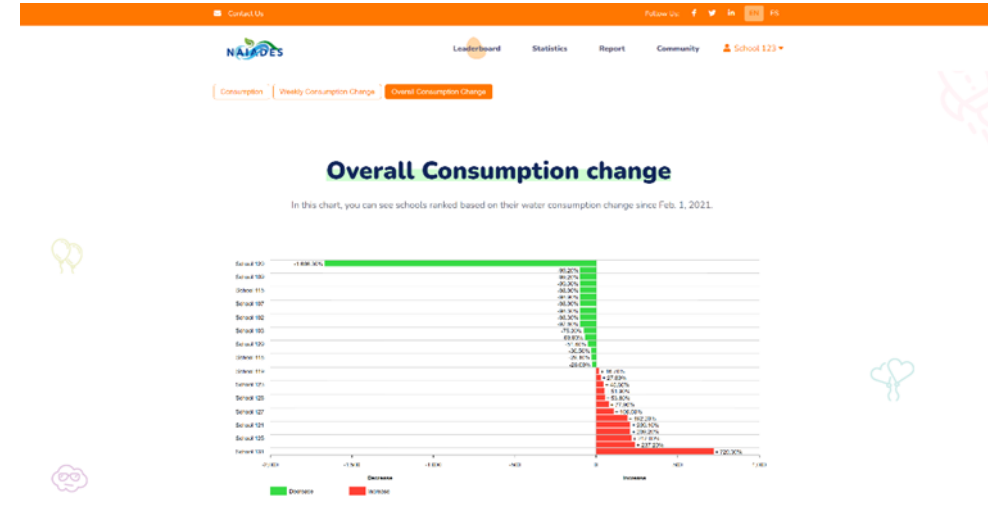
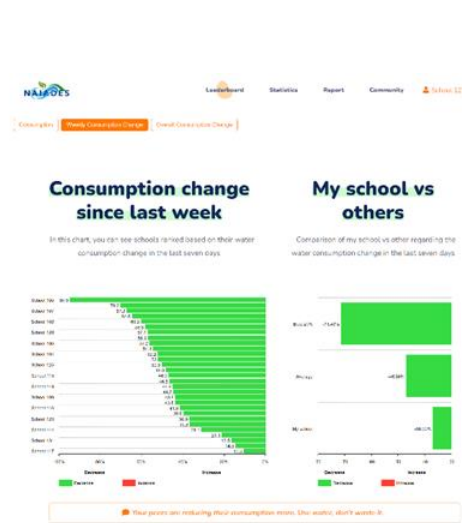
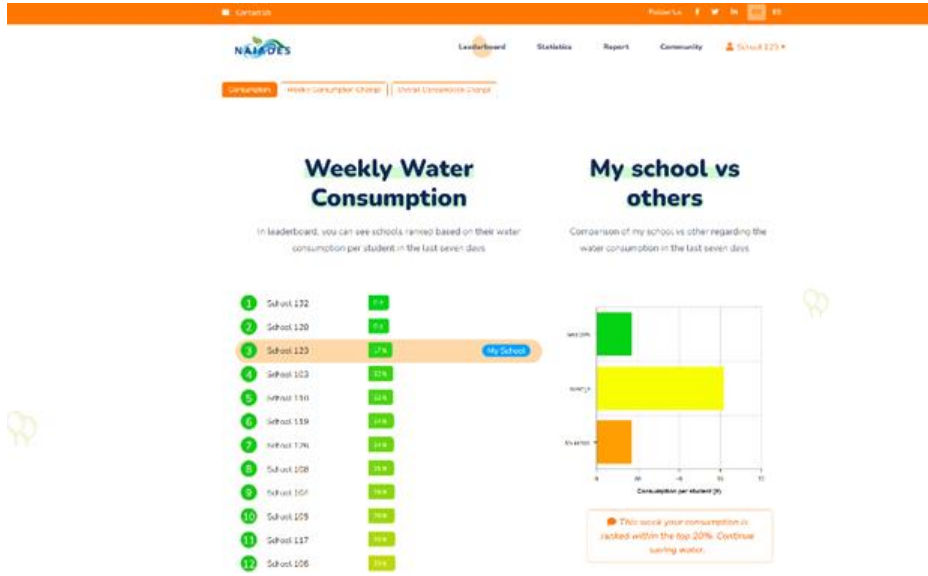
- Motivation: Water utilities need to be able to deploy ICT-supported behavioural change support programmes to engage consumers in water conservation
 - Approach: We have developed a web-based behavioural change support application tailored for interventions at public schools engaging young users with the support of their teachers
- ▶ The application:
- ▶ allows to run behavioural change support campaigns at schools, monitor them and assess their impact
 - ▶ supports different persuasive strategies including self-monitoring and feedback, social comparisons and rewards, suggestions and social norm based messages



Water Consumers Awareness Dashboard - Overview

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Leaderboard that shows the schools ranked based on their water consumption in the last week

Leaderboard that shows the schools ranked based on their water consumption change since last week

Leaderboard that shows the schools ranked based on their water consumption change since the start of the competition

Water Consumers Awareness Dashboard - Overview

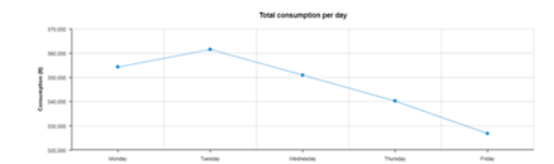
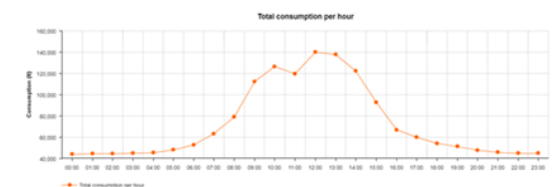
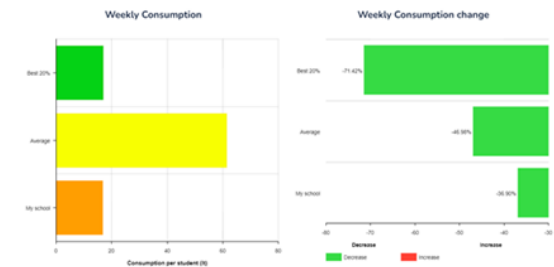
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Water Consumption weekly report

Export To PDF

My School vs Others

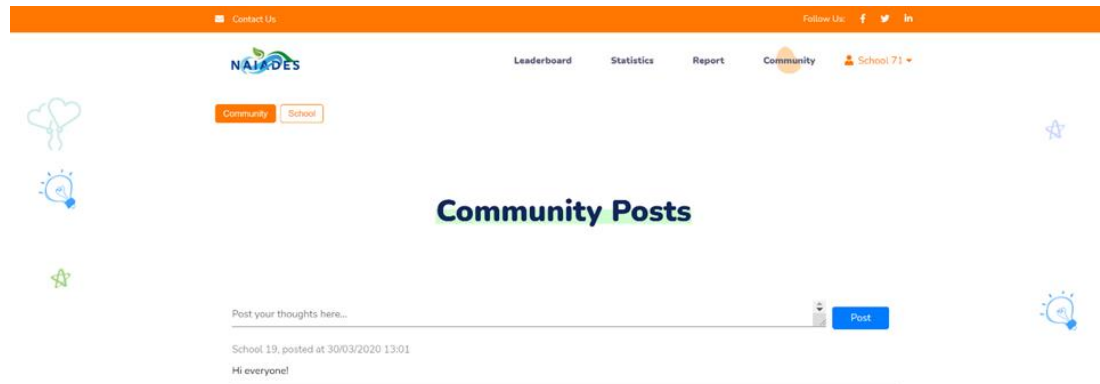


Total water consumption per hour and total water consumption per day of each school is presented in the "Statistics" page

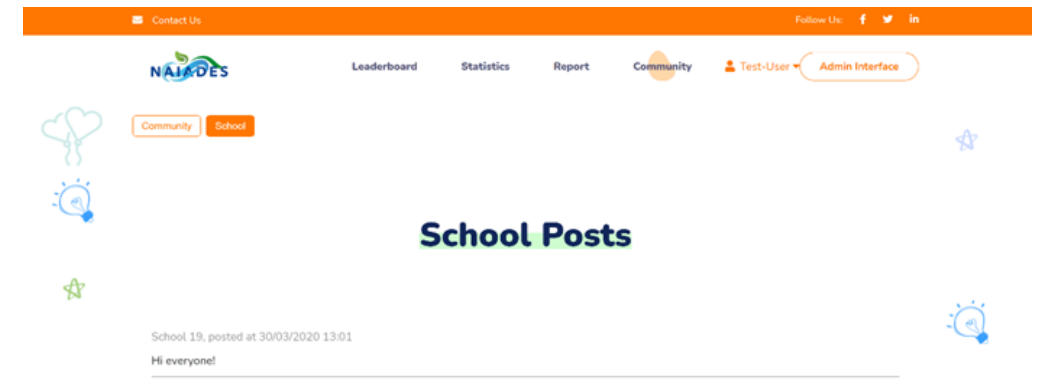
Teachers can export and download consumption reports

Water Consumers Awareness Dashboard - Overview

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The Water Consumers Awareness Dashboard also provides a forum where users can share their posts with other users either from the same school or from other schools



Posts are moderated by the teachers who are responsible to posting in the application

Water Consumers Awareness Hub



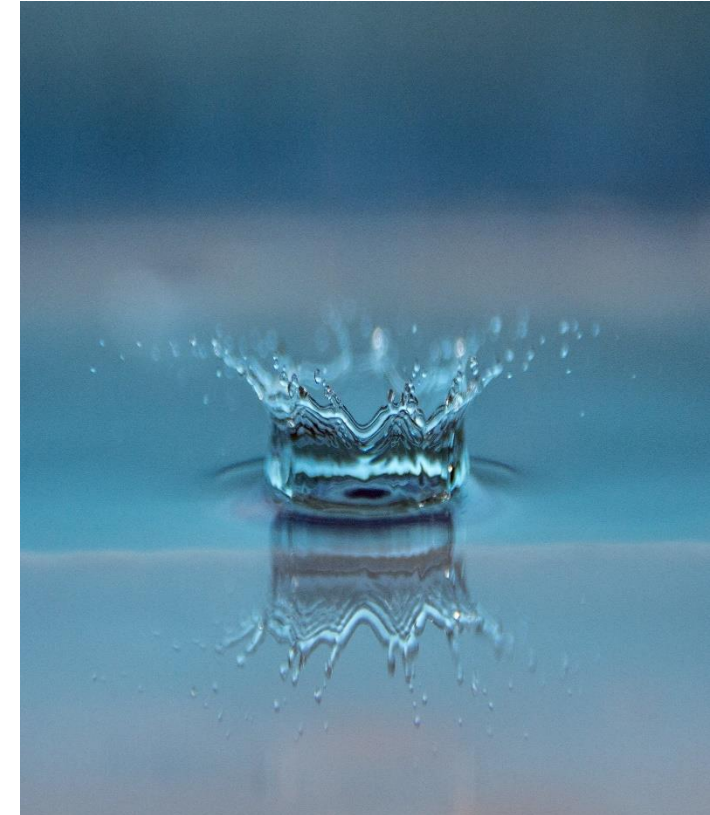
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- NAIADES Watering app will be used by city workers in Carouge
 - aiming at improving the watering processes efficiency towards water conservation and time savings
- Aguas de Alicante collaborate with local schools' authorities to apply the NAIADES approach in the previous academic year to primary and secondary schools
 - aiming at increasing student awareness on water consumption of their schools and engage them in water conservation activities.
- NAIADES City Dashboard will be used by public officials in Alicante
 - to help them monitor and understand how water is consumed in a specific area or consumption point.

A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

HMI & Integrated DSS

Iosif Sklavidis, KT



HMI & Integrated DSS



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Worldwide Problems

- Pollution
- Climate Change
- Energy Consumption

Have a crucial impact to:

- Water Consumption
- Leakages
- Salinity Intrusions

HMI & Integrated DSS



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- Homes
- Schools
- Sport Facilities
- Fountains

Whole cities are in great danger caused by the water over-consumption

HMI & Integrated DSS



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Proposed Solution

A [Human Machine Interface](#) with the aim of detecting:

- Water Consumption Levels
- Leakages
- Anomalies on Water

And providing [recommendations](#) and forecasts on:

- Water Consumption (High Low)
- Weather
- Salinity Intrusion

HMI & Integrated DSS

Leakages Détection



Use Cases

Braila

- Water Demand
- Weather Prediction
- Dynamic Treatment Suggestions
- Water Observatory
- Leakages Braila**
- Cons. State Analysis

Type in to search...

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Braila detection leakages

Wed, Sep 21, 2022

Original ⌵

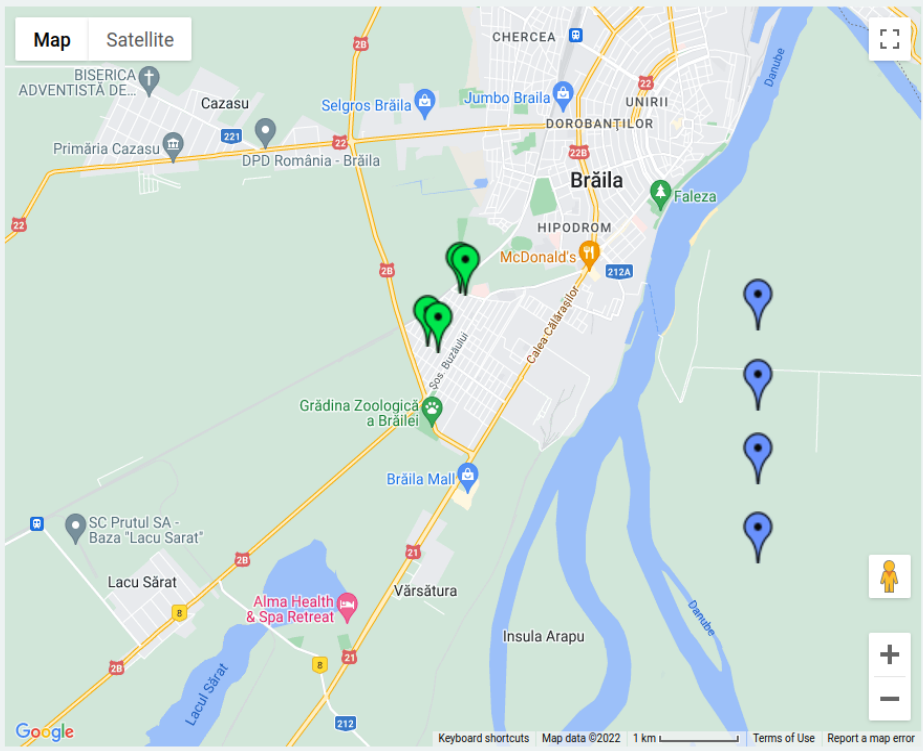
Noise Sensors

Current locations

- Noise sensor (5982): 12.0
- Noise sensor (5981): 11.0
- Noise sensor (2182): 9.0
- Noise sensor (5980): 7.0

Suggestions for new locations

Send New Locations




The map displays the city of Braila, Romania, with the Danube River on the right. It shows several noise sensor locations marked with green pins and their corresponding noise levels. A vertical column of four blue pins on the right side of the map represents suggestions for new sensor locations. The map interface includes a search bar at the top, a language dropdown (EN), settings, and user profile icons. The map itself has a 'Map' and 'Satellite' toggle, a search bar, and a scale bar at the bottom.

HMI & Integrated DSS



Webinar Series

Fountains - Water Quality Forecast



EN ▾
⚙️
🔔
👤

Fountain des Tours ▾
Wed, September 21, 2022

Water Quality Forecast
📊 Graphs
Local Station ▾

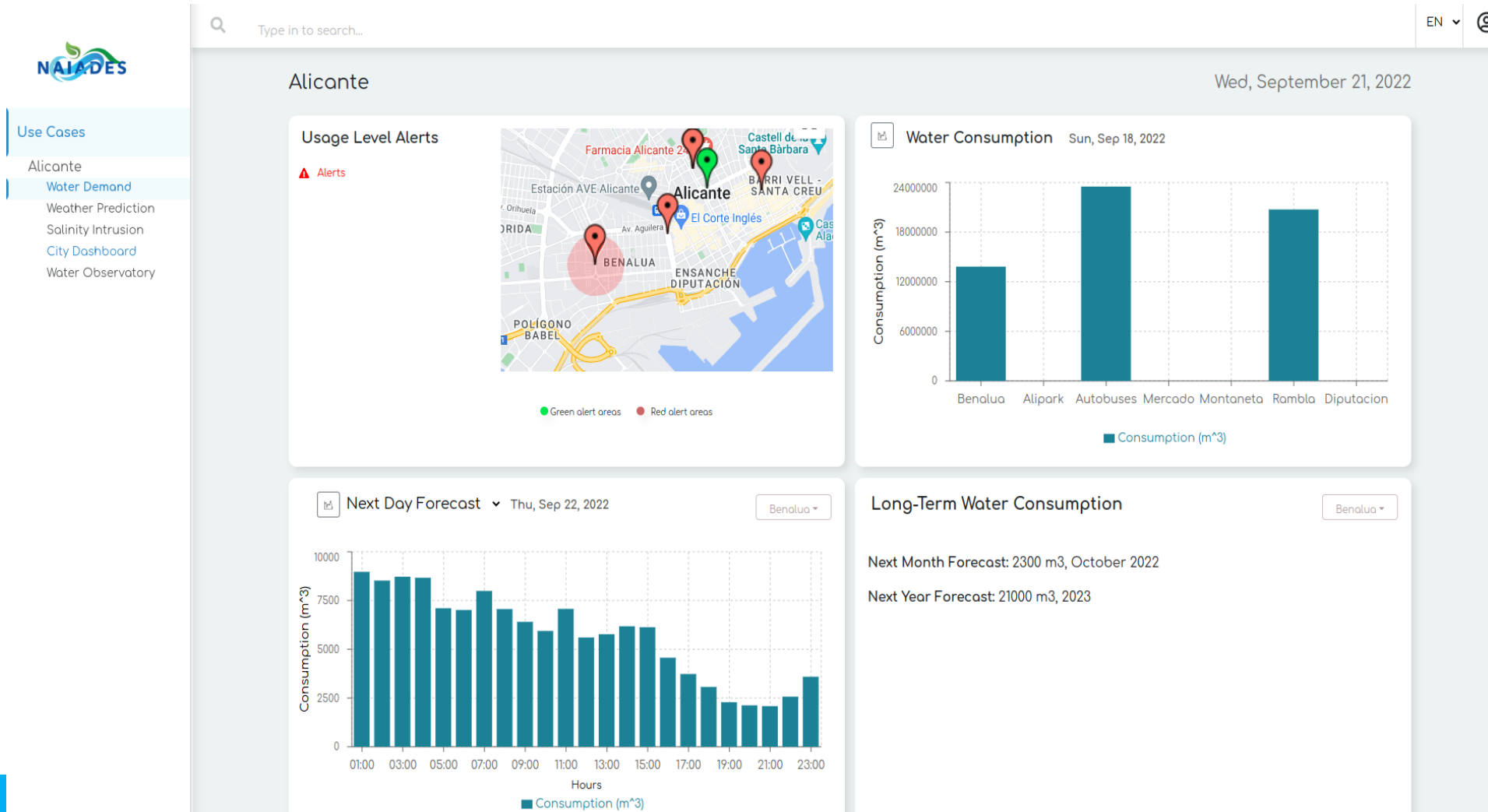
	Real Time (Wed 21/09/2022 23:45)	+6h (Wed 21/09/2022 23:45)	+12h (Thu 22/09/2022 05:45)	+18h (Thu 22/09/2022 11:45)	+24h (Thu 22/09/2022 17:45)	+30h (Thu 22/09/2022 23:45)	+36h (Fri 23/09/2022 05:45)	+42h (Fri 23/09/2022 11:45)	+48h (Fri 23/09/2022 17:45)	Hourly average	Daily average
pH	8.06	7.69↓	7.63↓	7.63↓	7.70↓	7.67↓	7.68↓	7.71↓	7.70↓	8.06	7.99
Free Chlorine (mg/L)	0.18	0.21↑	0.20↑	0.20↑	0.20↑	0.20↑	0.20↑	0.20↑	0.19↑	0.18	0.18
Total Chlorine (mg/L)	0.79	0.90↑	1.17↑	1.12↑	1.05↑	0.75↓	0.83↑	0.92↑	0.73↓	0.79	0.63
Chlorate (mg/L)	1.66	1.49↓	1.44↓	1.46↓	1.31↓	1.29↓	1.34↓	1.29↓	1.20↓	1.77	1.66
Temperature (°C)	16.4	21.37↑	20.00↑	19.21↑	19.72↑	21.77↑	21.69↑	20.70↑	20.00↑	16.38	17.56
Turbidity (NTU)	3	0.00↓	0.00↓	0.00↓	0.00↓	0.00↓	0.00↓	0.00↓	0.00↓	3.07	3.00
Redox (V)	0.504	0.59↑	0.58↑	0.62↑	0.59↑	0.65↑	0.61↑	0.64↑	0.68↑	0.53	0.50

Use Cases

- Braila
 - Water Demand
 - Weather Prediction
 - Dynamic Treatment Suggestions
 - Water Observatory
 - Leakages Braila
 - Cons. State Analysis
- Carouge
 - Watering
 - Fountains
 - Water Observatory
- Alicante
 - Water Demand
 - Weather Prediction
 - Salinity Intrusion

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Water Demand



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Wa



Use Cases

- Alicante
 - Water Demand
 - Weather Prediction
 - Salinity Intrusion
 - City Dashboard
 - Water Observatory

Alerts

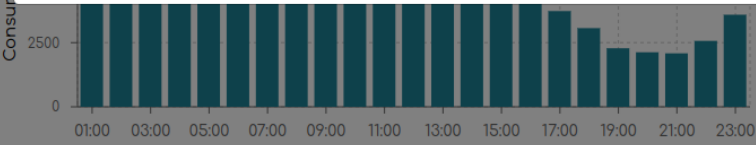
Leakage Detection

- 21/9/2022 08:49
● Possible Leakage Detected in area: Alipark
- 21/9/2022 08:49
● Possible Leakage Detected in area: Autobuses
- 21/9/2022 08:49
● Possible Leakage Detected in area: Rambla
- 21/9/2022 08:49
● Possible Leakage Detected in area: Benalua
- 21/9/2022 08:49
● Possible Leakage Detected in area: Mercado

Consumption Levels

- 21/9/2022 08:49
● High Consumption to: Alipark
- 21/9/2022 08:49
● High Consumption to: Autobuses
- 21/9/2022 08:49
● Low Consumption to: Rambla
- 21/9/2022 08:49
● High Consumption to: Benalua
- 21/9/2022 08:49
● High Consumption to: Mercado
- 21/9/2022 08:49
● Low Consumption to: Montaneta

Consumption (m³)



Hours

Consumption (m³)

Wed, September 21, 2022

EN

Montaneta Rambla Diputacion

Benalua

Area	Consumption Level
Alipark	High
Autobuses	High
Rambla	Low
Benalua	High
Mercado	High
Montaneta	Low

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Salinity Intrusion - DSS Alerts

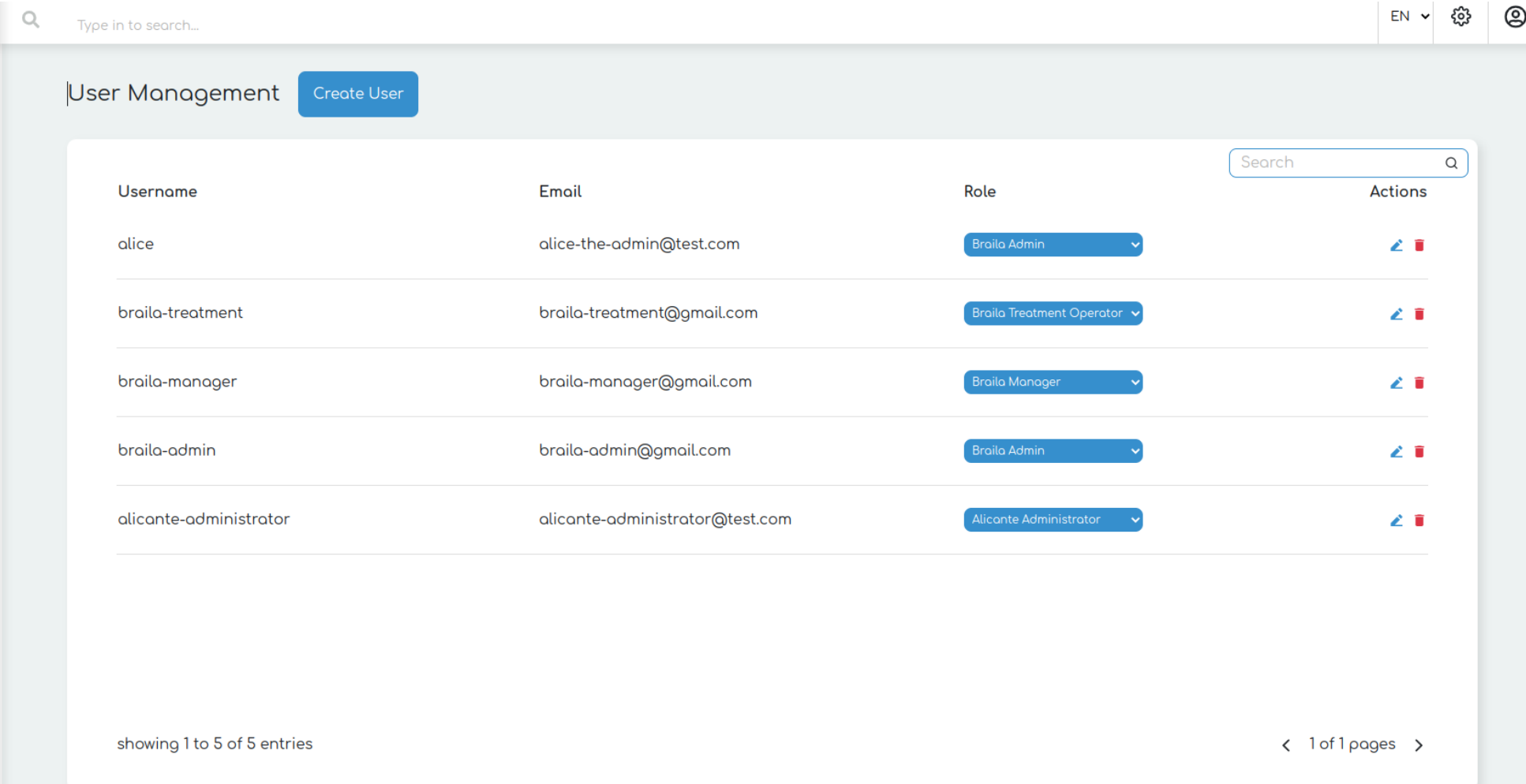
The screenshot displays the NAIADDES HMI interface for Alicante. On the left, a sidebar lists 'Use Cases' including Alicante, Water Demand, Weather Prediction, Solinity Intrusion (highlighted), City Dashboard, and Water Observatory. The main content area is titled 'Alicante' and shows the date 'Wed, September 21, 2022'. It features two time-series charts: 'Anomaly Detection' for 'Conductivity Level' (EA003-36) and 'Flow Level' (EA001-36). The conductivity chart shows a steady line at approximately 5000 $\mu\text{S}/\text{cm}$. The flow level chart shows high-frequency oscillations between 70 and 280 m^3/h . Below the charts is a 'DSS Feed' section with four alerts from 19/09/2022 16:33, each stating that low conductivity is likely due to saline dilution from rainfall events. On the right, a map of Alicante shows a red-shaded area in the Benalua district, with various landmarks and a search bar at the top.

HMI & Integrated DSS











NAIADES

Webinar Series

User Management - Creation of Users



The screenshot displays the NAIADES User Management interface. On the left, there is a sidebar with the NAIADES logo and a 'Use Cases' menu containing: Braila, Water Demand, Weather Prediction, Dynamic Treatment Suggestions, Water Observatory, Leakages Braila, and Cons. State Analysis. The main content area is titled 'User Management' and includes a 'Create User' button. A search bar is located at the top right of the user list. The user list is a table with the following data:

Username	Email	Role	Actions
alice	alice-the-admin@test.com	Braila Admin	 
braila-treatment	braila-treatment@gmail.com	Braila Treatment Operator	 
braila-manager	braila-manager@gmail.com	Braila Manager	 
braila-admin	braila-admin@gmail.com	Braila Admin	 
alicante-administrator	alicante-administrator@test.com	Alicante Administrator	 

At the bottom of the interface, it indicates 'showing 1 to 5 of 5 entries' and '1 of 1 pages'.

HMI & Integrated DSS



Webinar Series

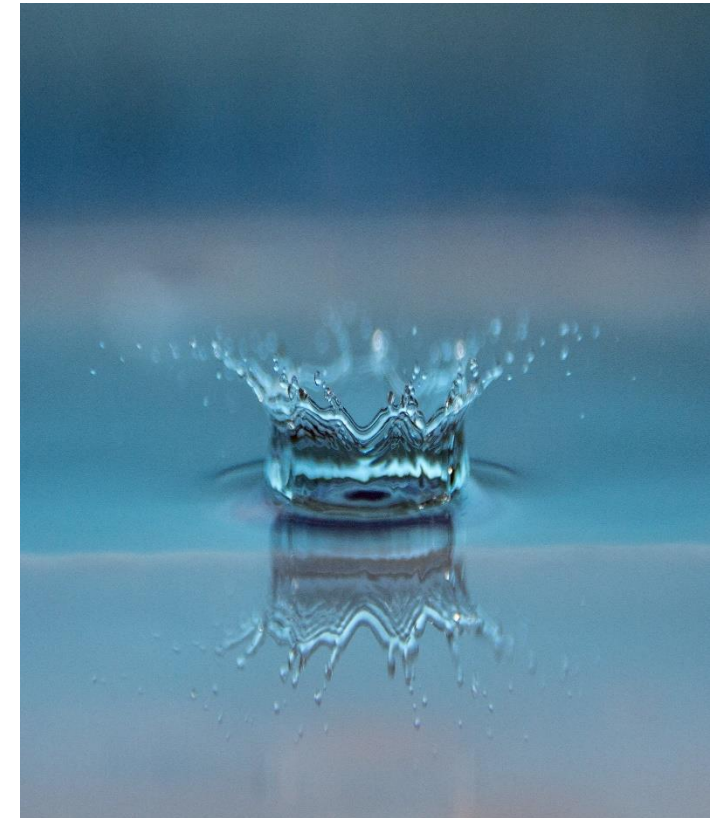
HMI & DSS offers:

- Continuous Situation Awareness
- Real-Time Monitoring
- Proposed Solutions

A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

Weather Forecasting Toolkit

Thanasis Anagnostis, CERTH



Numerical weather forecasting



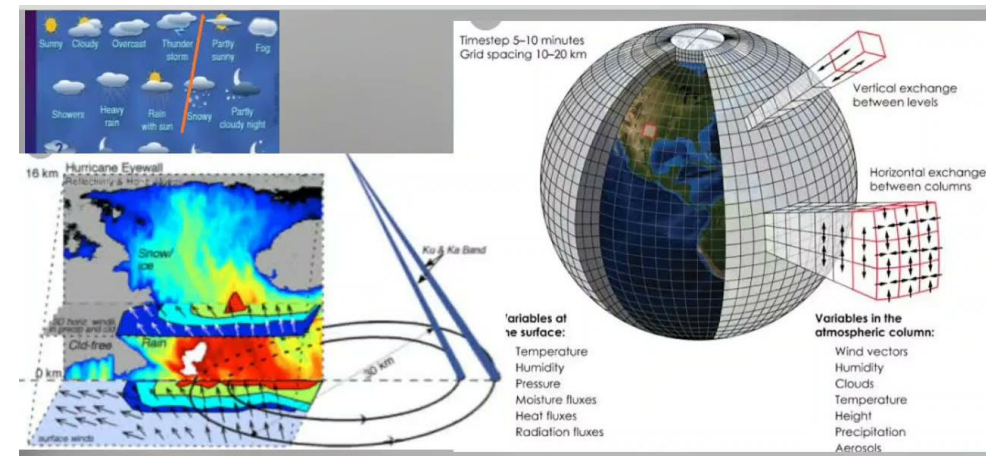
Pros

- Very accurate
- Physics-based
- Considers atmospheric phenomena
- Big-picture insights
- Results can include a wide range of variables

Cons

- Conditionally accurate
- Parameterises micro-scale phenomena
- Time-consuming (long time to run)
- Resource-intensive (needs computing clusters)
- Costly €€€

How do we tackle the cons?



Data driven weather forecasting

- Data-driven weather forecasting employs historical data and AI algorithms to produce predictions.
- AI approaches solve specific problems, based on the collected data.

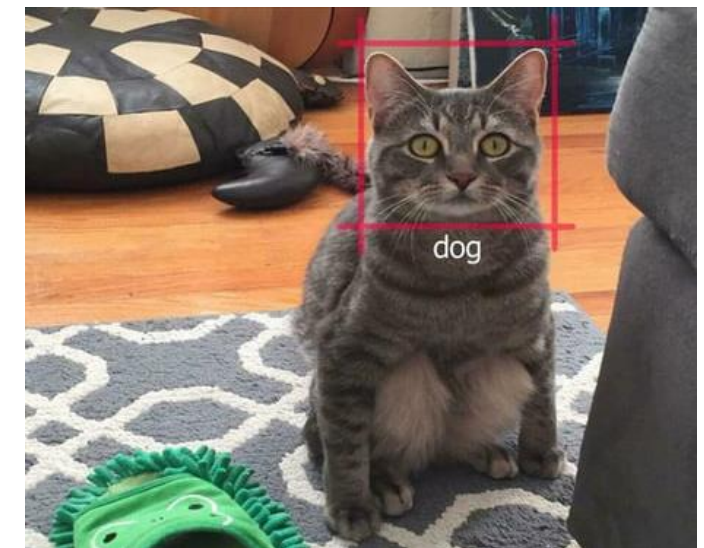
Age of Data



Hardware costs



Mathematics / AI



WHO would want it and WHY?

WHO? (Operational)

- City planning
- Facility management
- Agriculture
- Aviation
- Construction
- Mining
- Event management
- Insurance
- Transportation

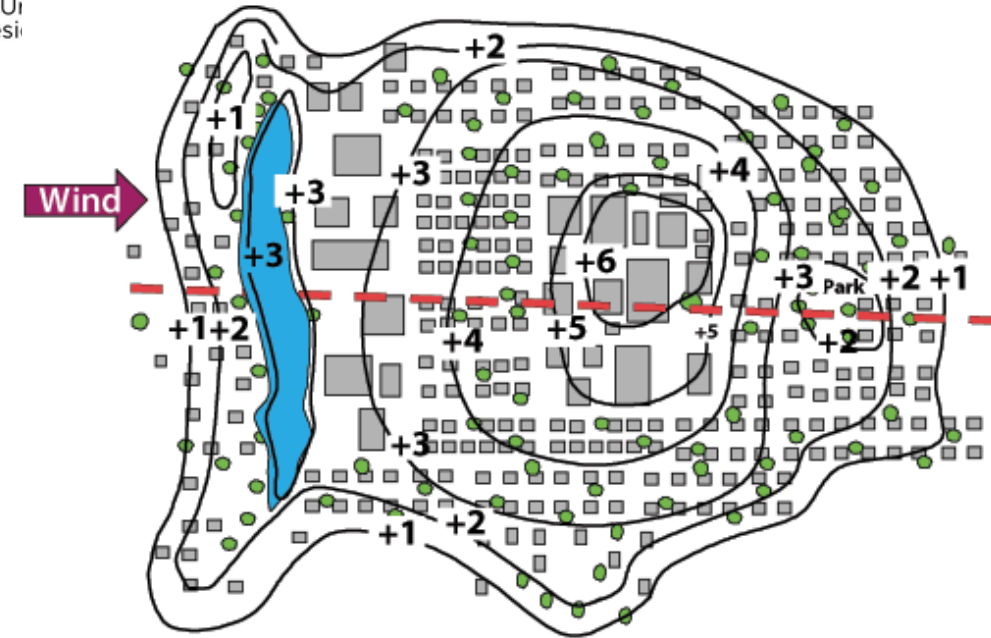
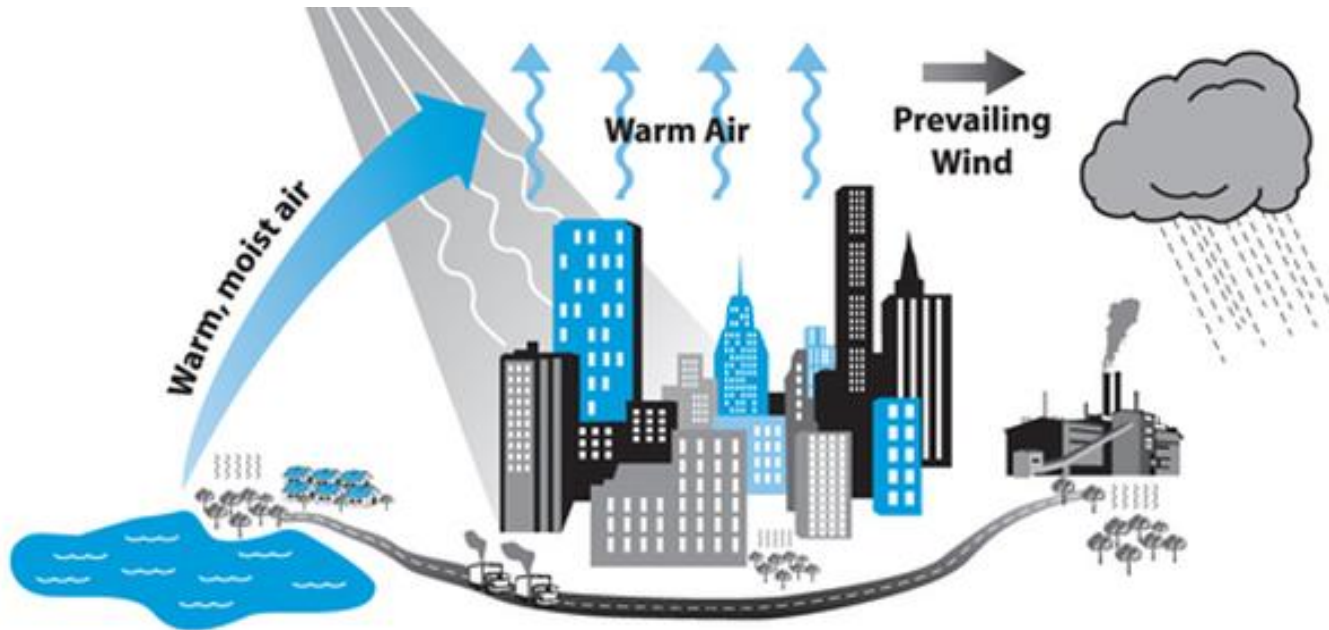
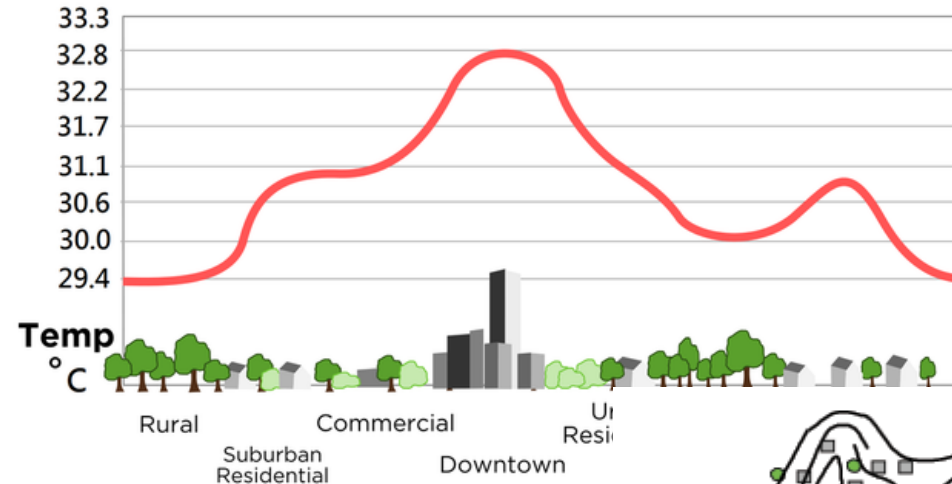
WHY? (Technical)

- Deal with microclimate effects.
- Increase spatial granularity.
- Reduce computational cost.
- Continuously improve through time.
- Add/Remove parameters with ease.
- Utilize heterogenous streams of data.

Hyperlocal weather!

Urban heat island

URBAN HEAT ISLAND PROFILE



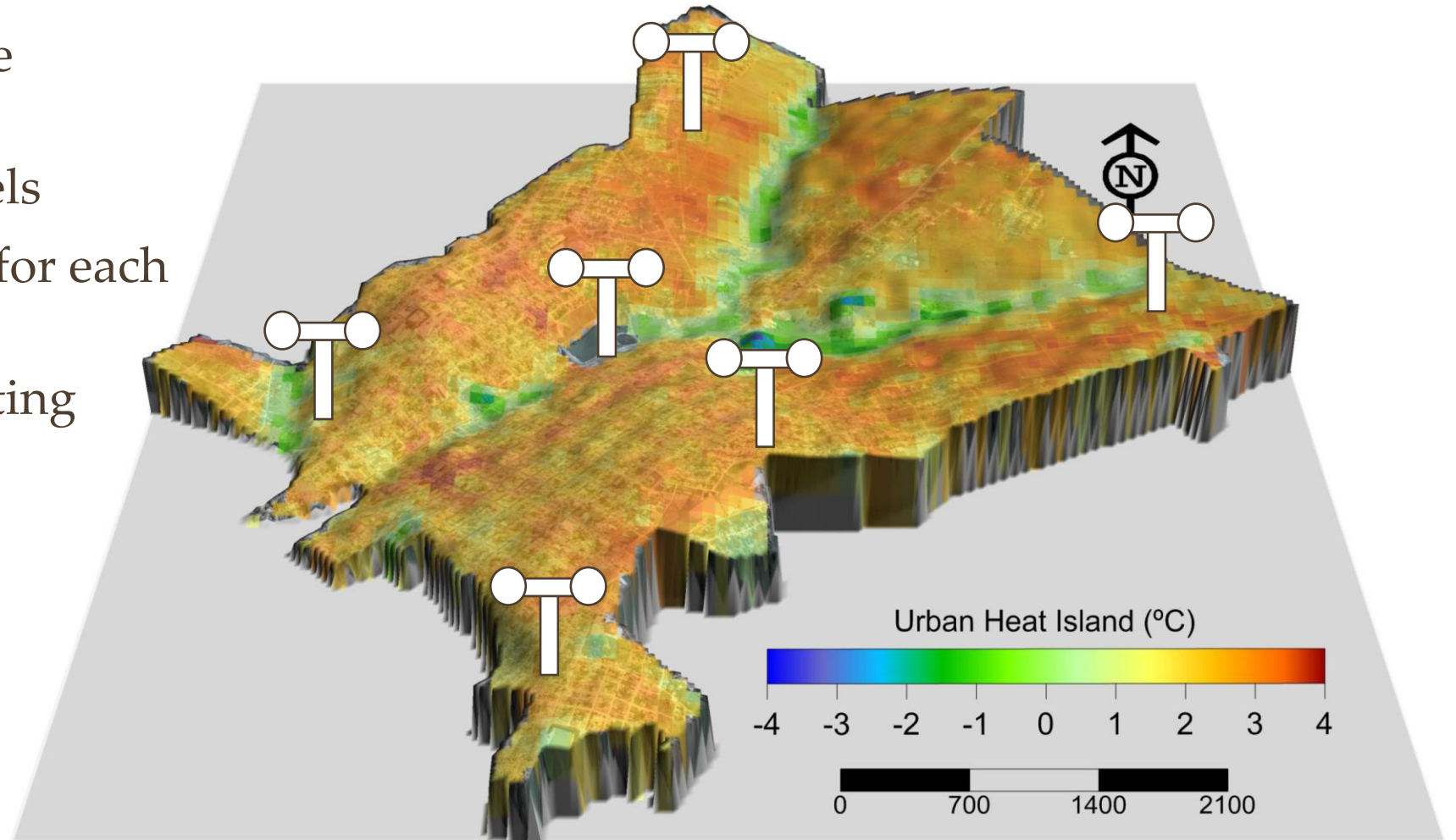
Relevance to the water sector



- Temperature variability in urban environments.
- Water demand/consumption is directly related to weather conditions
- Water utilities / municipalities can plan resources management
- Localized operations, maintenance and infrastructure repairs
- Prepare for extreme weather events (storms, heatwaves, blizzards, floods)
- Implement precision irrigation

NAIADES weather forecasting approach

- Collect data from multiple locations
- Train AI forecasting models
- Predict future conditions for each location
- Create a localized forecasting service



Huge potential!

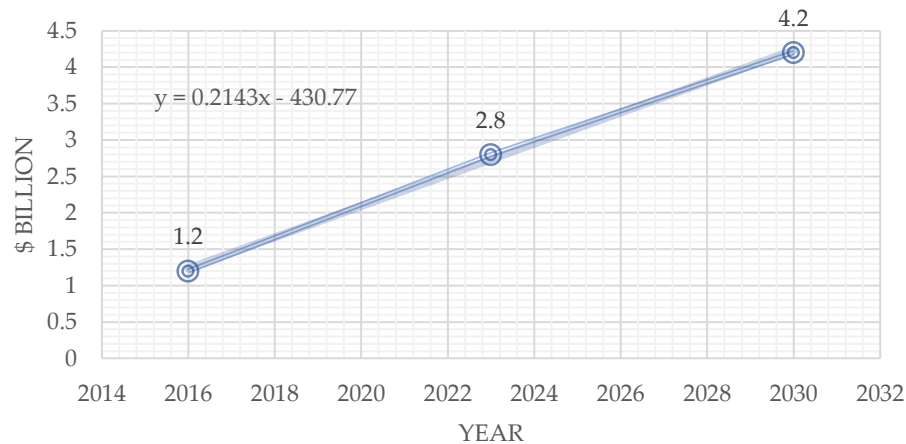
Is there a market in it?

Global Market size* Weather forecasting services

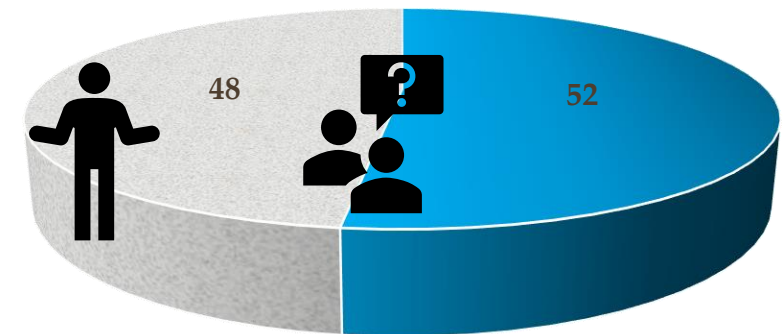
- 2016
 - \$1.2 billion
- 2023
 - \$2.8 billion
- 2030
 - \$4.2 billion

Revenue share of global market in 2016	
Short-term forecasting	52%
Other related services	48%

Market size



Revenue Share



*source: <https://www.alliedmarketresearch.com/weather-forecasting-services-market>

Pilot cities



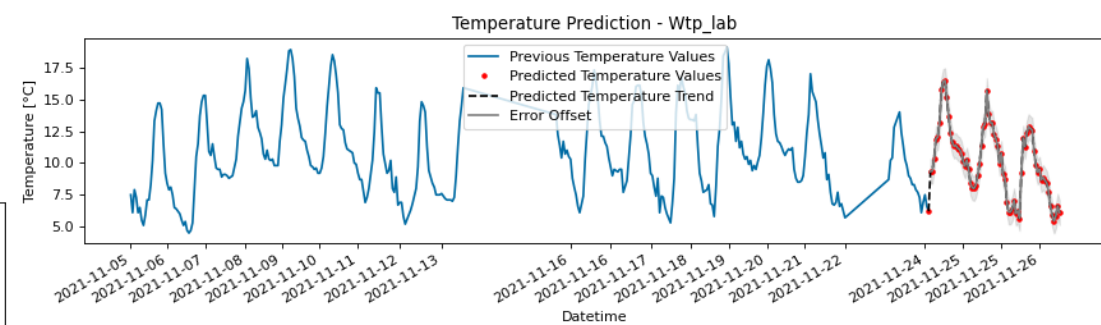
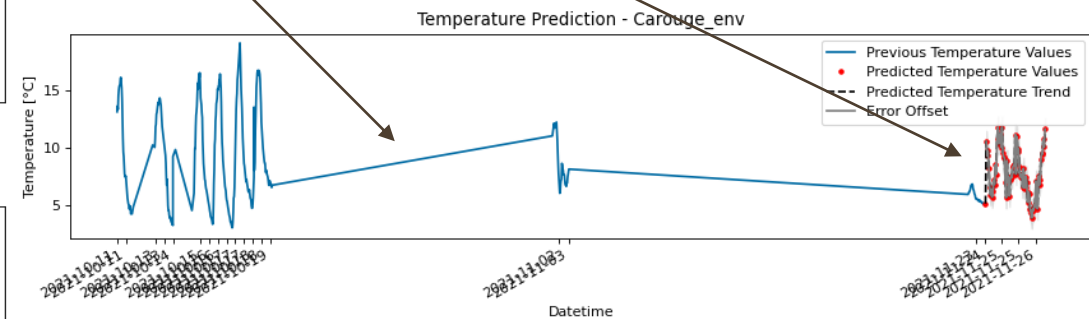
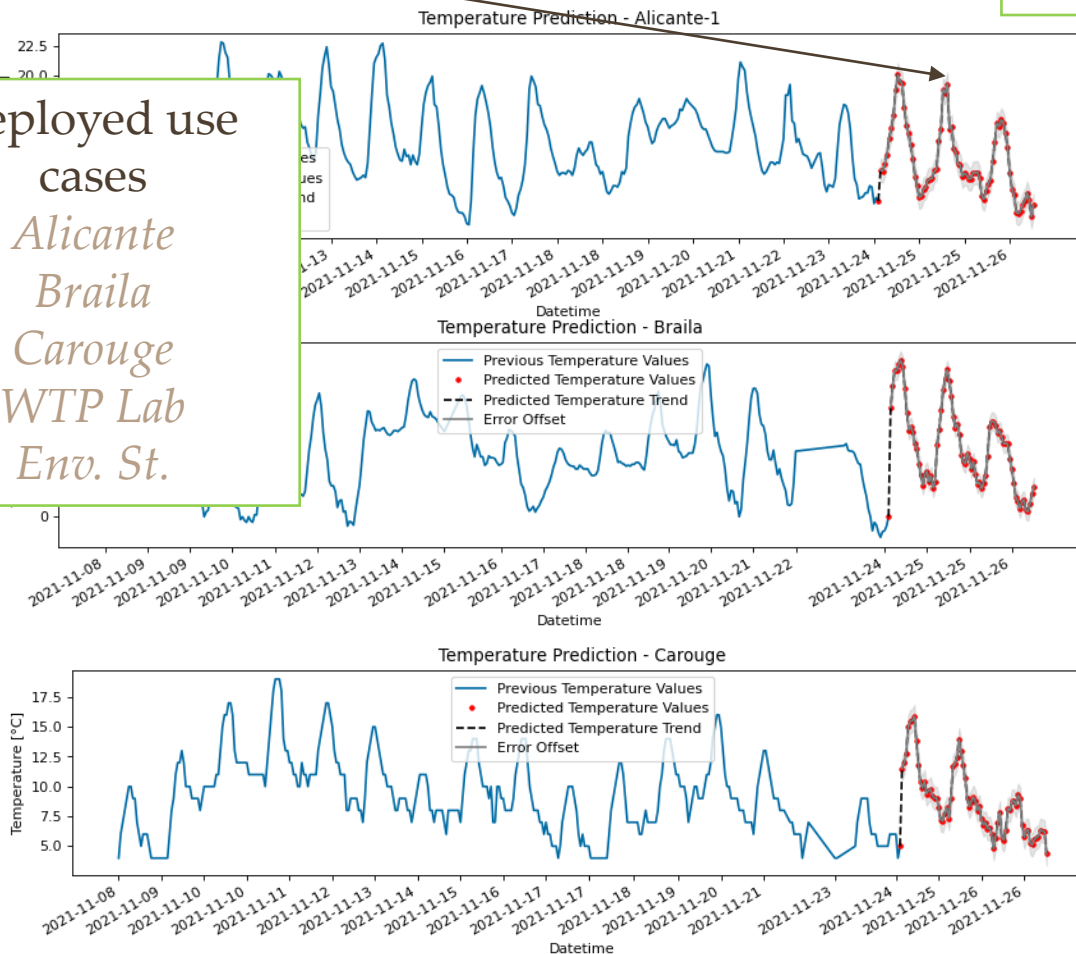
Deployed models in production

Error included from trained model (inference) or from fine-tuned model

Data gap
Anticipated fault

Uninterrupted forecasts
Retrieving last available data further back

Deployed use cases
Alicante
Braila
Carouge
WTP Lab
Env. St.



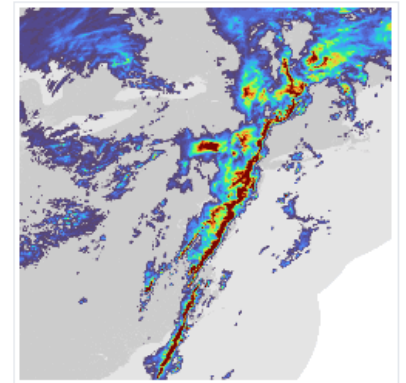
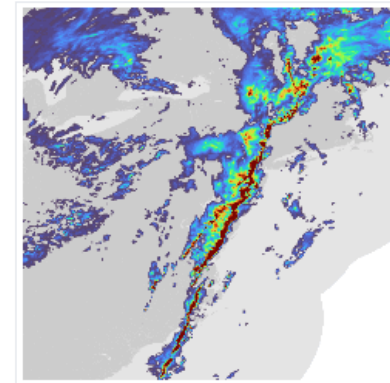
WeatherForecast data model
Averaged forecasts in 6-hour intervals

Competition (weather forecasting)

- Large corporations



- Medium companies



- Startups



Competition (water management)

NAIADES

Webinar Series



Water

**UtiliOS SaaS
for
Smart Water
Metering
Solutions**

Visualise your data.

sphera Why Sphera Solutions Industries Resources About

Customer Care Contact Us

Water Management Software

Transform wastewater emissions data into actionable insights.



Home Water Management Solutions Success Stories Blog Contact Us Partner Program Free Demo

Welcome to WaterApp

THE INTERNET OF WATER

India's 1st IoT Platform for Water Management

No integrated weather forecasting!

Exploitation strategy

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AIaaS: AI as a service → Subscription-based
Modular billing
Tailor made (weather variables)

via NAIADES

- Integrated AI microservice
- Tethered with the NAIADES Environmental Weather Station
- Key component
 - Provides forecasts
 - Used as input for other AI services

standalone

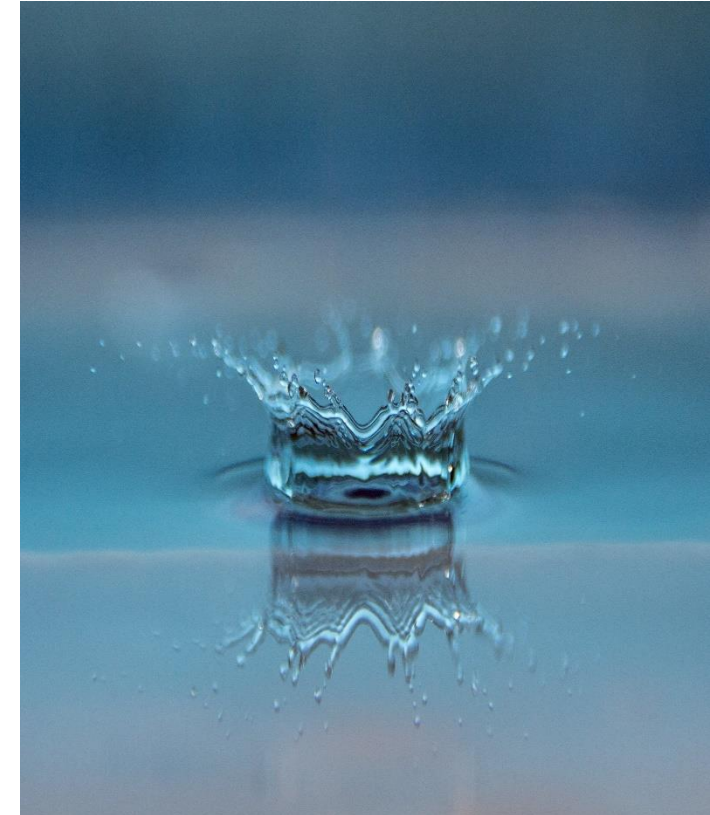
- Domain invariant
- Operational with any data stream
- Weather-only service
 - Limited services in comparison to the...
 - Heavy competition



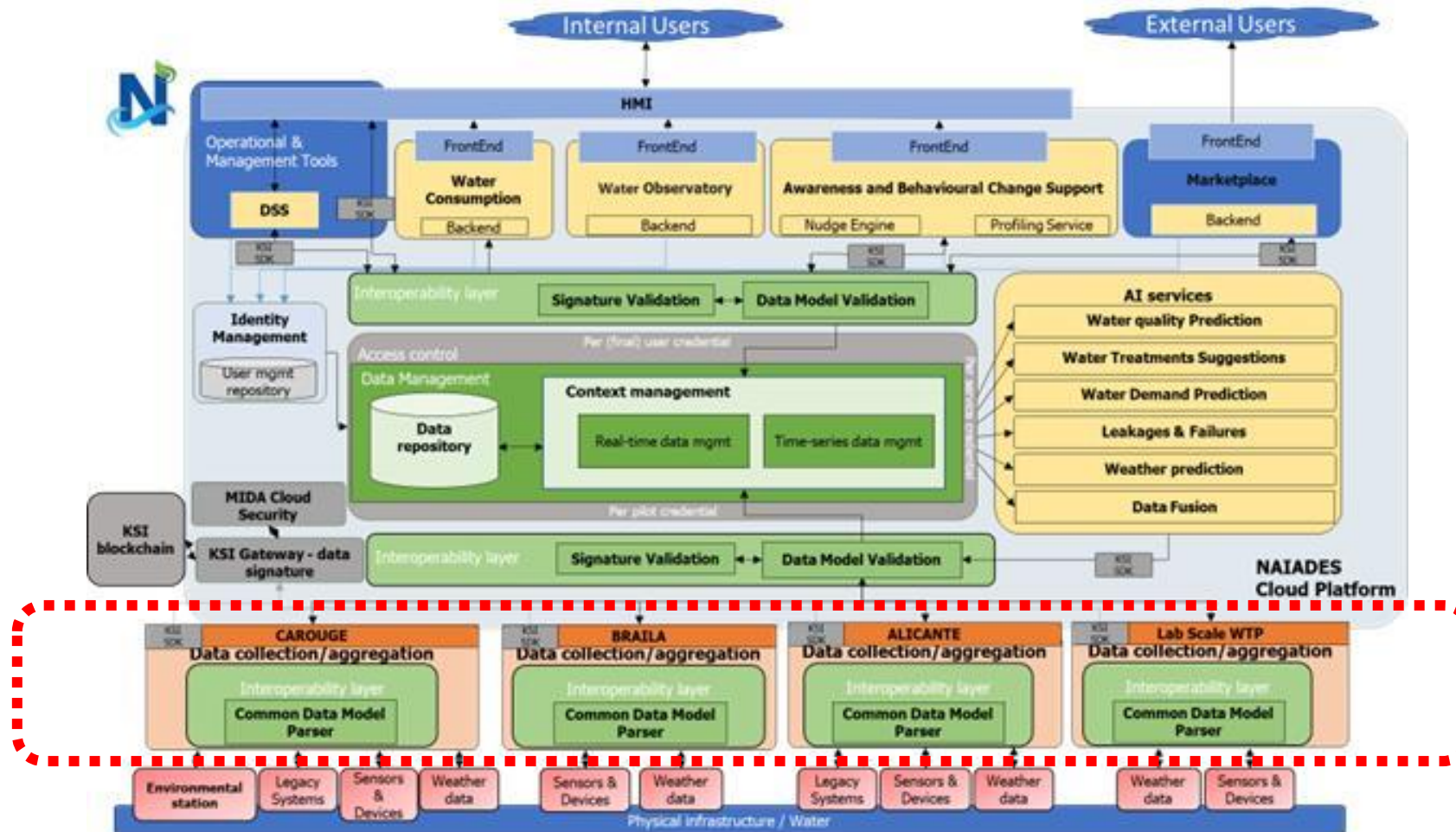
A vertical strip on the left side of the slide showing a close-up of vibrant green grass blades.

Data Collection & Aggregation (DCA)

Manuel Fernández, ADVANTICSYS

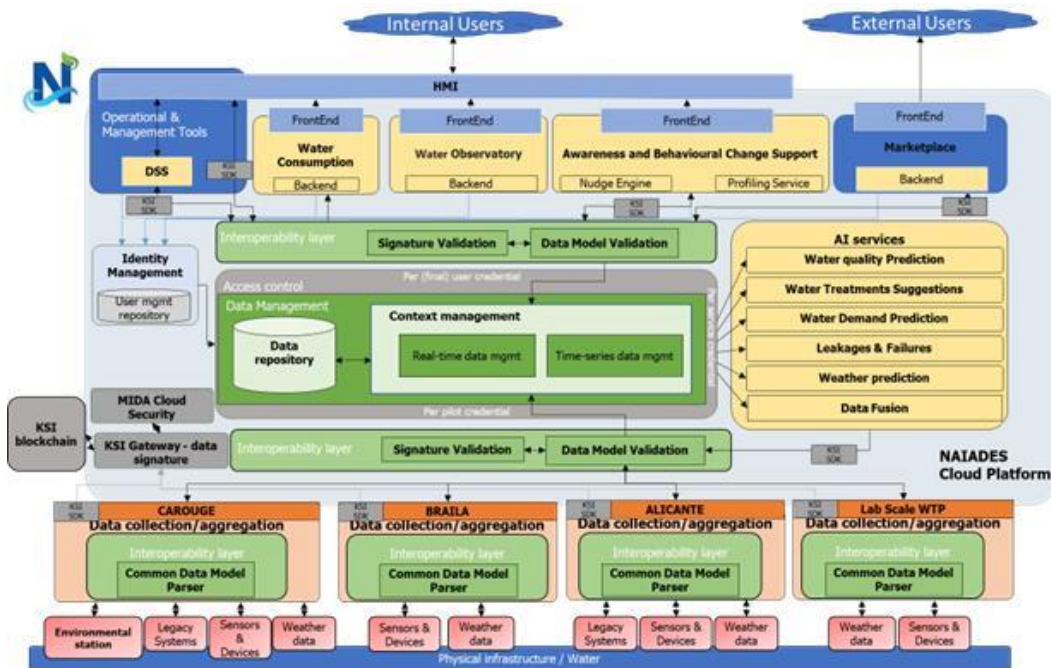


DCA inside NAIADES

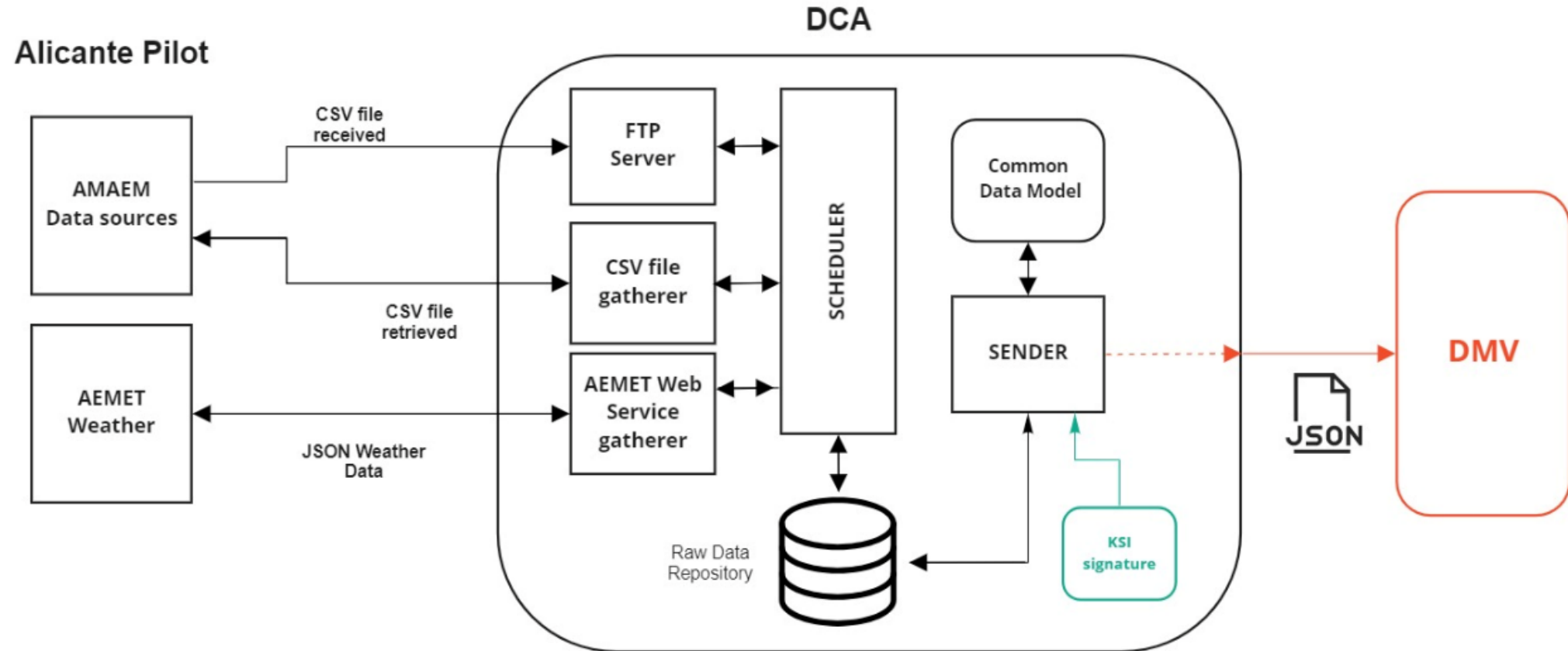


DCA Value proposition

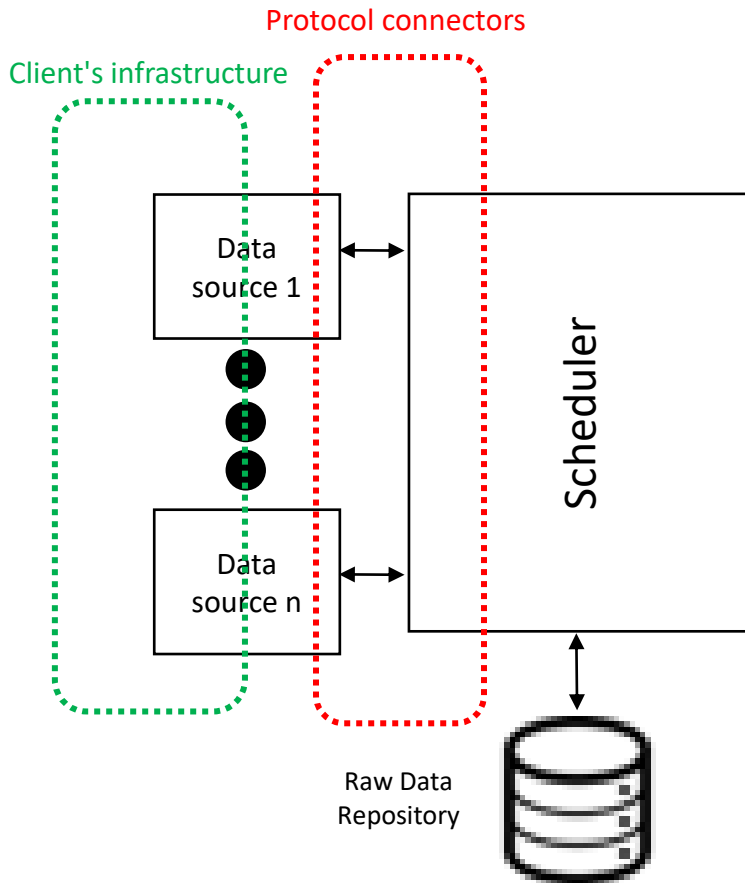
- The DCA is a component that is external to the main NAIANES platform
- Its main role is the connection between the edge and the cloud, the edge being the client's existing devices and the cloud the NAIANES platform
- The idea is to create a component that is highly adaptable to prevent the client from having to devote people and resources to integrate their data with NAIANES



DCA – Component architecture

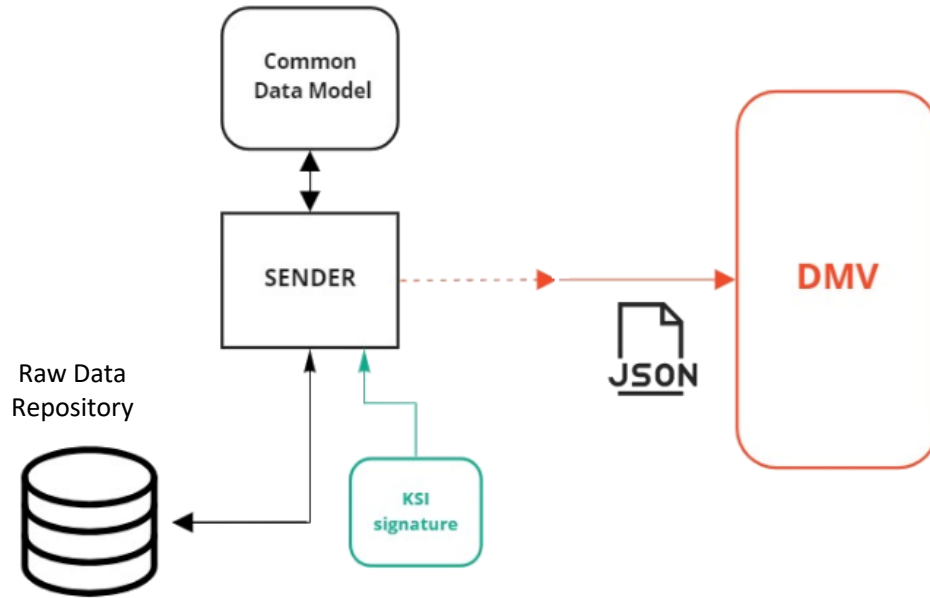


DCA – Sub-component: Scheduler



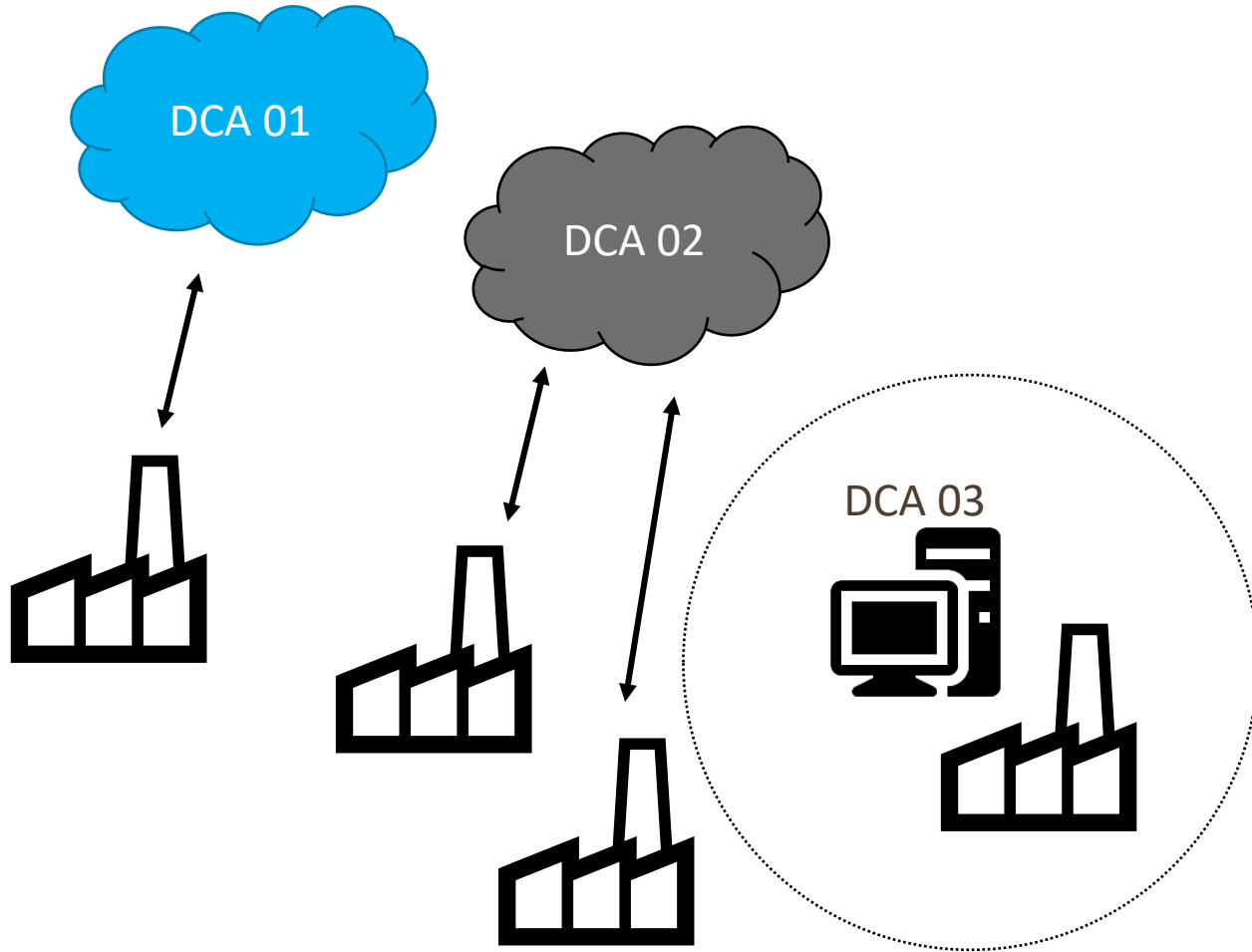
- The Scheduler sub-component connects the DCA to the client's data
- This data can be retrieved in many ways, using different protocols – modular design
- Scheduler performs periodic data retrieval and stores the raw data in the repository
- Repository also stores the needed configurations
- Future integrations may require additional protocol connectors

DCA – Sub-component: Sender



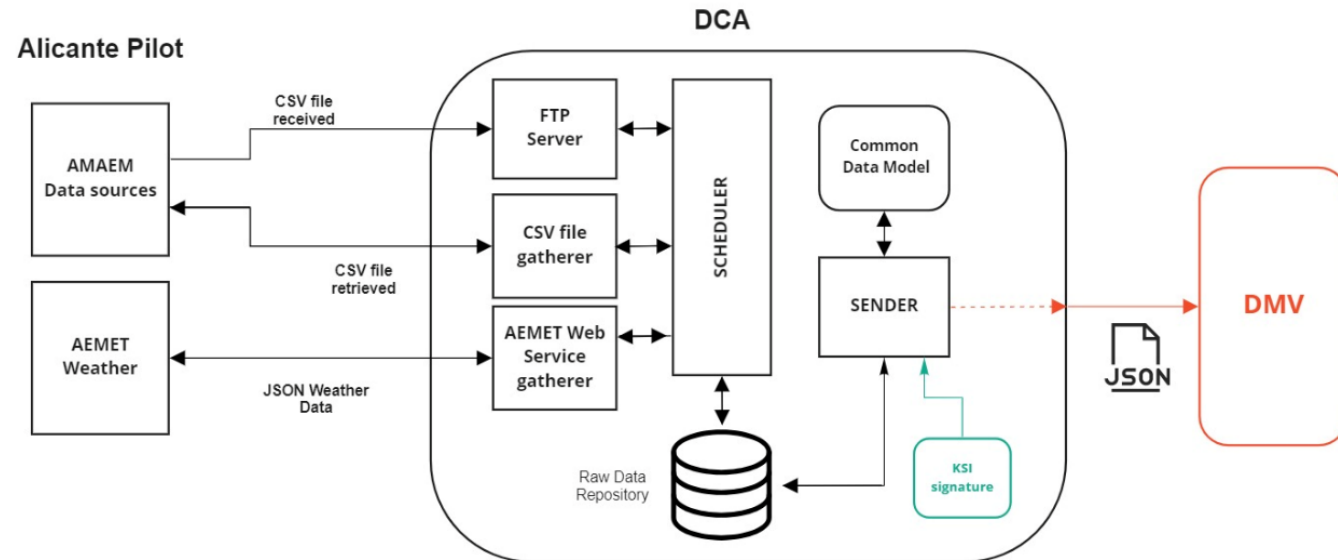
- The sender monitors when new data is available
- Data is retrieved from the raw data repository, and a packet is formatted according to NAIADES Common Data Model
- Packages are signed using blockchain technology (KSI's module)
- Data is sent to the DMV module in NAIADES.
- Repository also stores the sender's needed configurations

DCA – Infrastructure requirements



- The DCA is essentially software
- Potentially, it could be installed on the client's premises
- Ideally it should be installed in any cloud VM for better support and updates
- It is scalable, different instances of the DCA can oversee a set of devices

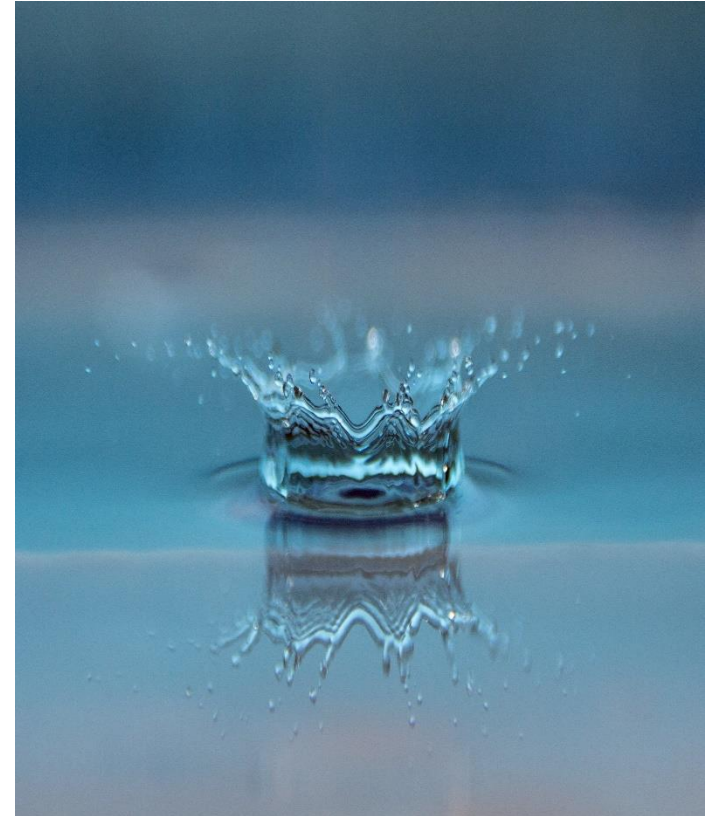
DCA – Alicante Use Cases



- Protocol connectors:
 - CSV File Gatherer
 - FTP File Server
 - Weather service API
- Entity types in NAIADES:
 - WeatherObserved
 - Device
- Samples sent as array of JSON objects



**Q&A
+
Feedback from
audience**



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