PORTFOLIO OF DIGITAL SOLUTIONS

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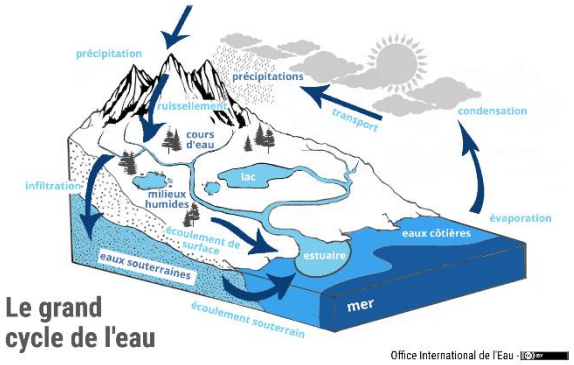
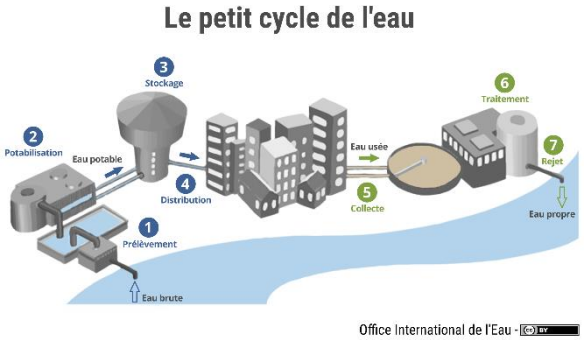
What is digital water?

A NOVEL CONCEPT

➔ Digital transformation of the whole water sector





BASED ON 5 PILLARS

1- Physical systems (sources of data: sensors)

2- Internet of Things (network of sensors)

3- Internet Services (online access and process of data)

4- Big and Small Data Analytics (algorithms to develop smart management tools)

5- Cyber Security (prevent online attacks)

Artificial Intelligence

Machine Mearning

Reinforced Learning…

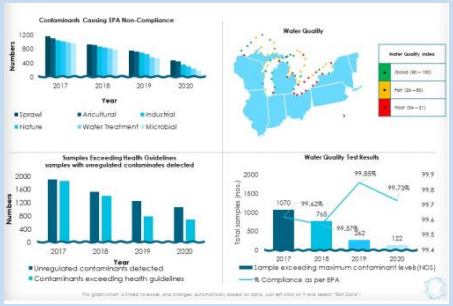
Usefull for who?

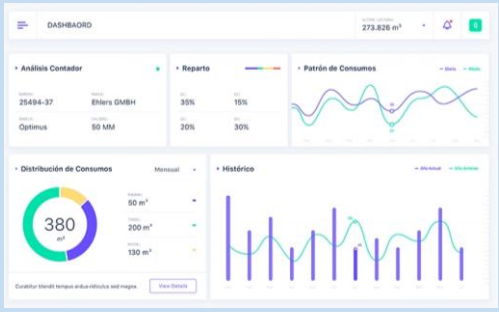
Session 1

Technical solutions

FOR WATER MANAGERS

➔ To manage efficiently water resources





- real-time water monitoring (quality and quantity)
- water availability assessment
- water demand forecast
- early warning systems for leak detection
- Etc…

Session 2

NON Technical solutions

Local Water Forum

FOR THE WHOLE SOCIETY

➔ Because protecting water is a societal challenge for all, including cities and citizens

➔ Especially under current Climate Change

Examples of digital solutions for the water sector

RAW WATER SUPPLY

Need expressed: Upgrade the supervisory system for water quality and flow in the conveyence system

Solution developped:

Legacy system

- Water Company of Athens's (EYDAP)

- external raw water supply system serves the city of Athens (5.000.000 inhabitants) with 420 hm^3/y

- 250 km of aqueducts, and 4 major water reservoirs

- network of water quantity and quality sensors + NESSIE system (calculations)

+

Elements added/developped

- 5 level meter stations installed in 1 aqueduct

- 1 web platform (based on F4W free architecture)

- IT connectors to allow communication between NESSIE and F4W platform

- Algorithms and APIs

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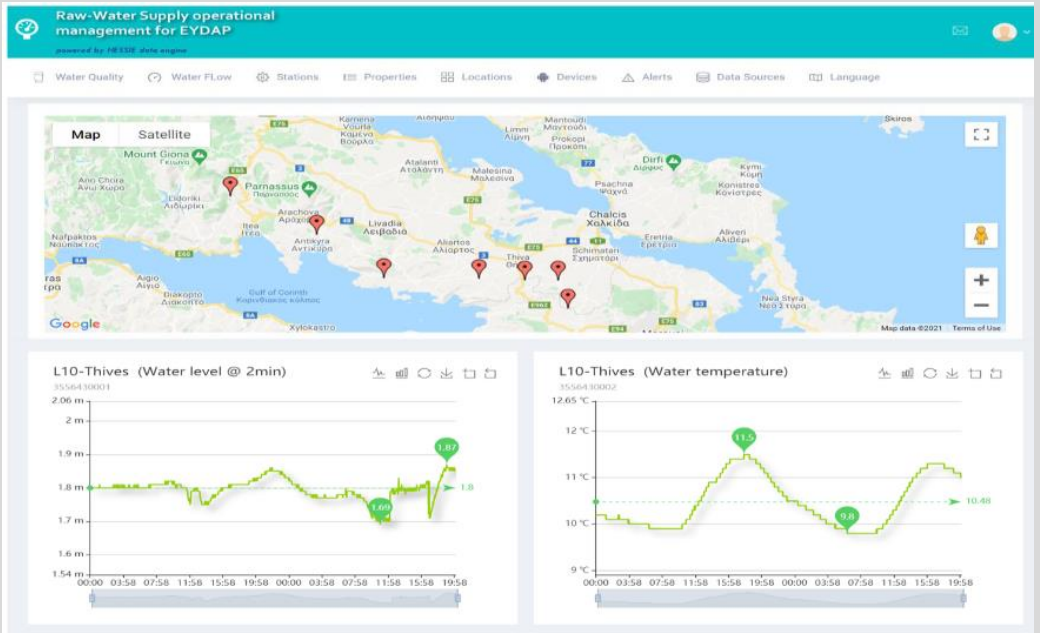
Digital Solution

2 dashboards to visualise real-time data either for water quality or for water flow -> provide feedback to operation staff



Examples of digital solutions for the water sector

DRINKING WATER SUPPLY AND DISTRIBUTION

Need expressed: Leakage detection on the distribution network

Solution developped:

Legacy system

- SUEZ Eau France for SICASIL (South FR)
- drinking water supply service in 8 municipalities, including Cannes
- From 181,000 permanent inhab. to 500,000 during the peak season
- 987 km of supply network, production of 26 hm^3/y on average
- network of sensors + AQUADVANCED® softwares (calculations)

+

Elements added/developped

- 4 S::CAN multiparameter nanostations installed in the distribution network
- Collection of historical and real-time data
- Algorithms and « black-box » model

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Digital Solution

Inclusion of a new leak detection module into AQUADVANCED® Water Networks solution

Examples of digital solutions for the water sector

WASTEWATER TREATMENT

Need expressed: Improve operational efficiency - reduction of N_2O emissions

Solution developped:

Legacy system

- WATERNET's Wastewater Treatment Plant West of Amsterdam

- capacity: 1 Million population equivalent

- of 7 treatment lanes -> 1 dedicated to investigate AI based process control strategy

- Legacy system: network of sensors + SCADA + calculations (PIMS) + dashboards

+

Elements added/developped

- Installation of 25 new sensors + calculation of soft sensors (= virtual calculated sensors)

- Dev of an automated Data Validation framework (to ensure data robustness)

- IT connectors to allow communication between legacy system and F4W platform

- NGSI-LD data models based on historical and real-time data

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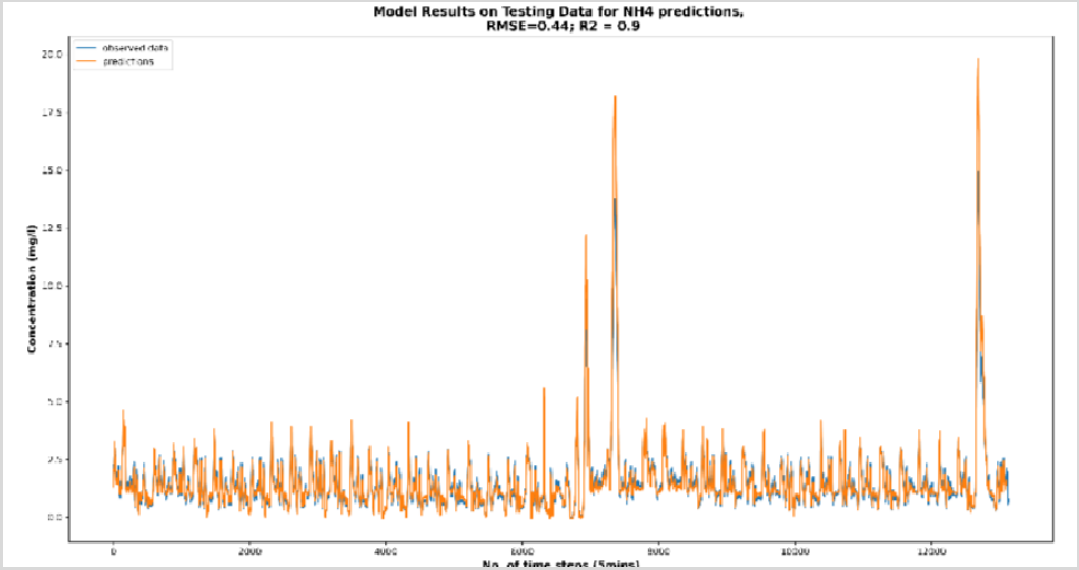
Digital Solution

40 parameters measured and transmit online

NH_4 prediction modelised in relation with waste water quality



Examples of digital solutions for the water sector

CITIZEN ENGAGEMENT IN A MORE WATER-EFFICIENT CONSUMPTION

Need expressed: Raise awareness and engage citizens in water efficiency practices

Solution developped:

- South West Water (SWW) the Water Utility for the South West of the UK
- 1 District Metered Area (DMA) serving a population of circa 5000 people
- 2,000 smart meters, flow and pressure meters at the entrance of the DMA, and a data transmission & management system.
- lump-sum bill for drinking water

+

Elements added/developped

- 100+ smartmeters installed in households
- 1 web platform (based on F4W free architecture) to collect/analyse data
- 1 new API for SWW to follow water real consumption and detect leaks
- 1 mobile app for citizens

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Digital Solutions

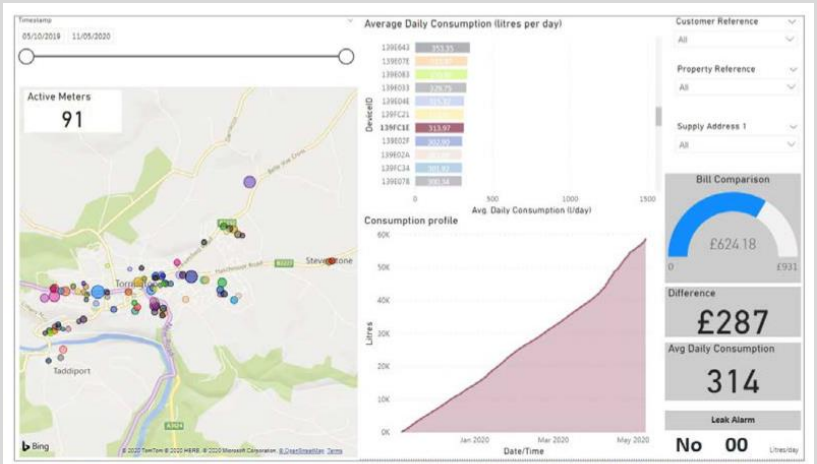


Figure 3: prototype utilities web application showing water consumption from customers

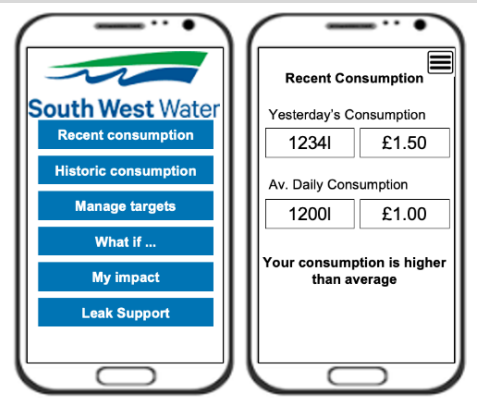


Figure 4: wireframe design of customer mobile app

Examples of digital solutions for the water sector

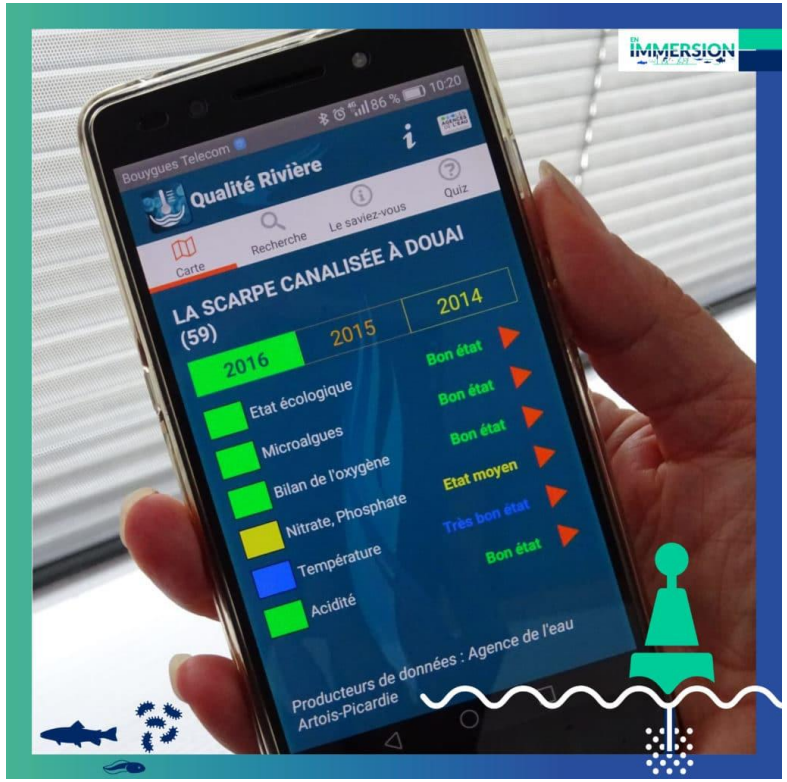
Solution not developped within F4W project

WATER RESOURCES MANAGEMENT

Need expressed: Raise general public awareness about rivers water quality

Solution developped:

- A free mobile application « En immersion »
- Developed by French Water Agencies and OFB (French Office of Biodiversity), in 2015
- https://enimmersion-eau.fr/application-qualite-riviere/
- Allow anyone to know:
  * the ecological status of a FR river,
  * the species of fish living in,
  * know the quality of supervised bathing waters



This is an example of digital solution developped by the French river basin agencies.

I hope that further examples will be provided during the discussion!!

Thank you for your attention

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