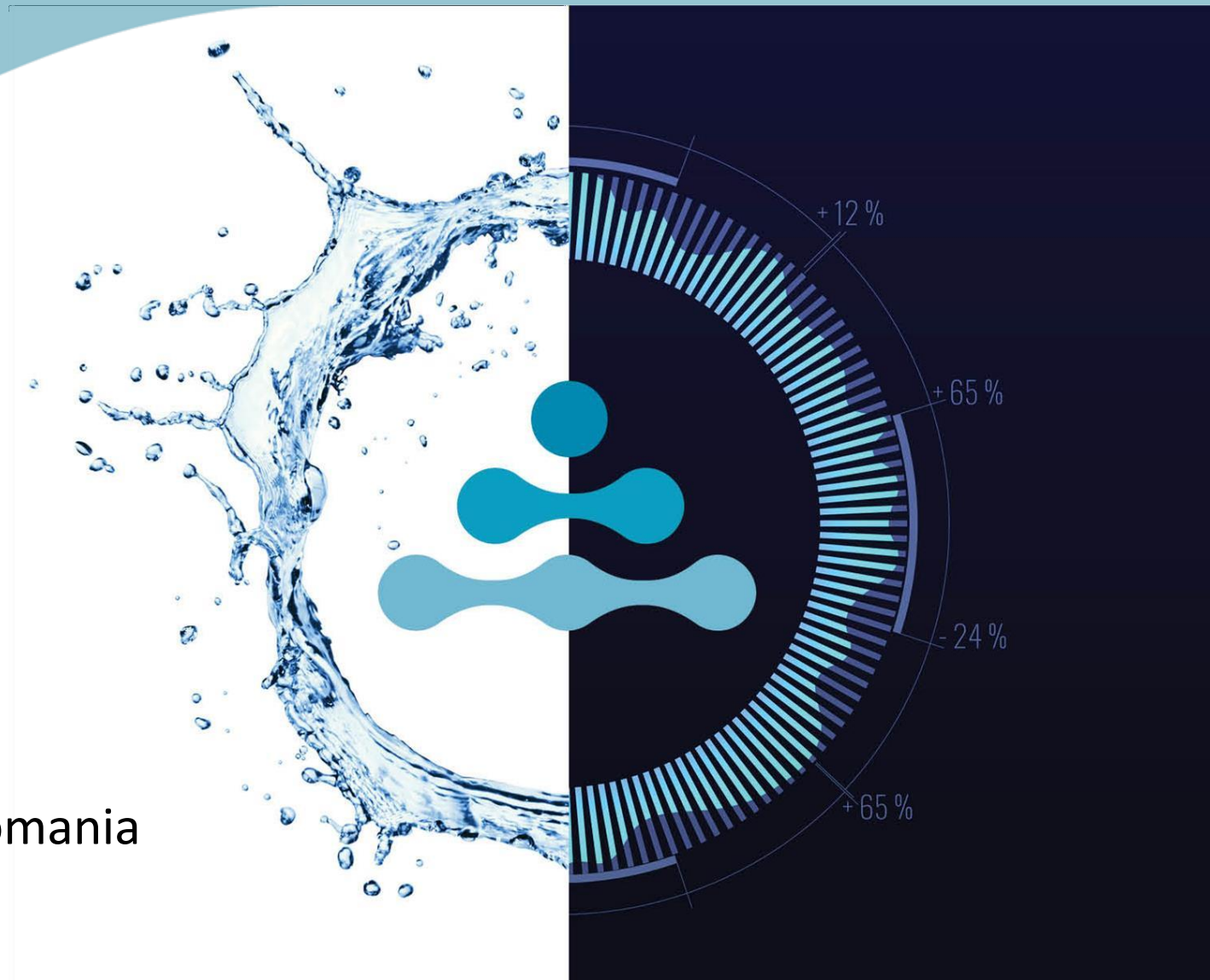


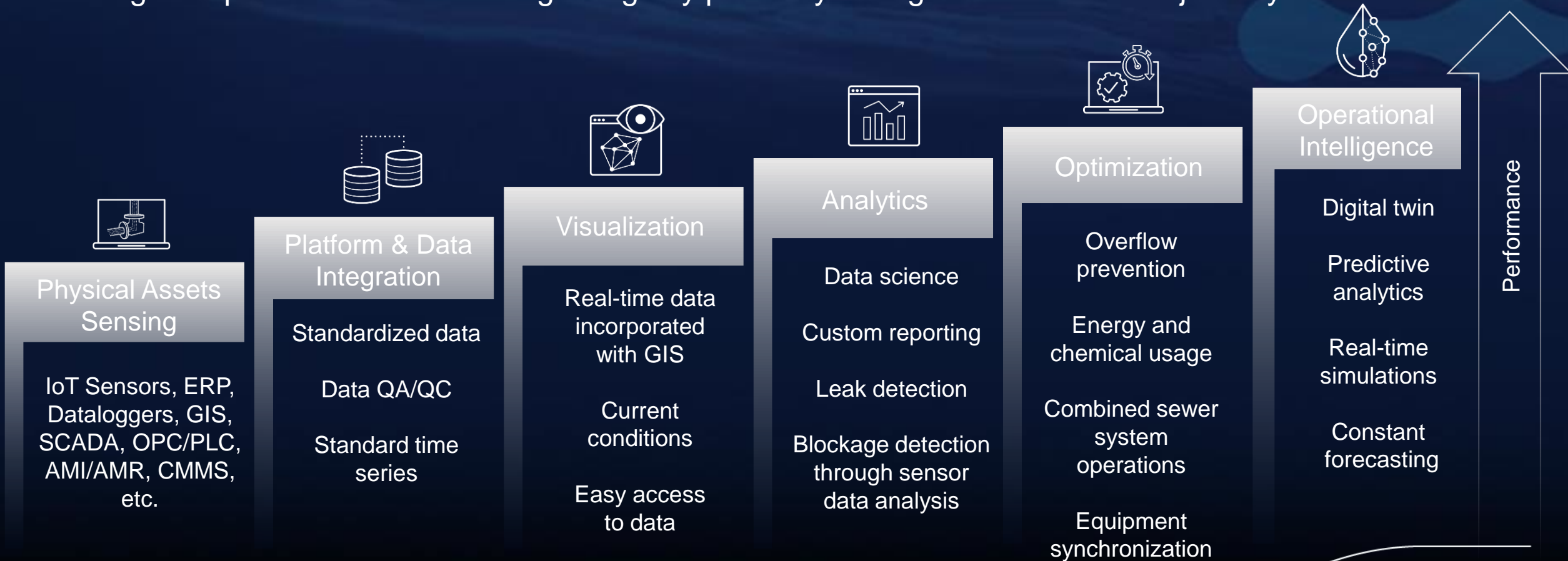
# Digitalization Best Practices

Adrian Grama – Project Manager Xylem Romania



# The Path to Improved Performance Starts from Wherever You Are

Harness data from any source and transform it into useful information for the operation, generating knowledge to optimize decision making along any point in your digital transformation journey.

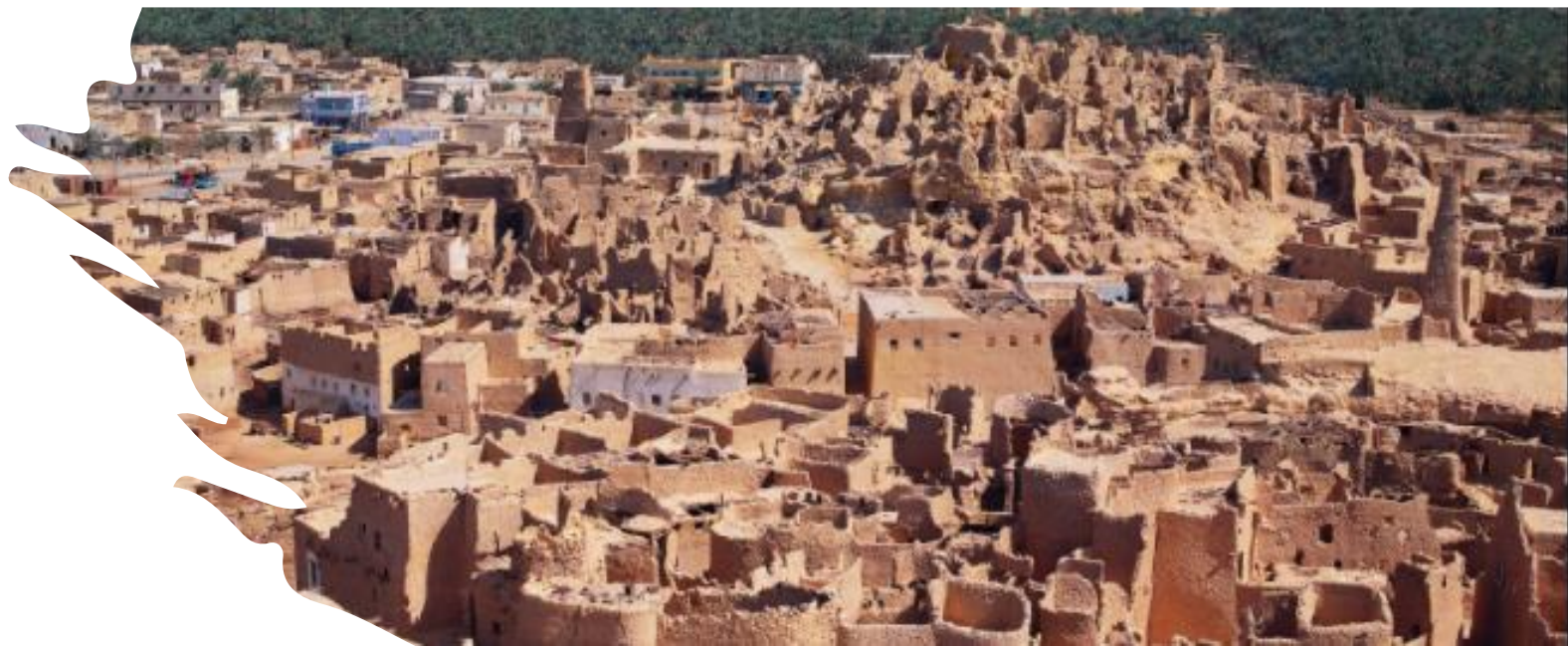


# Water Metering

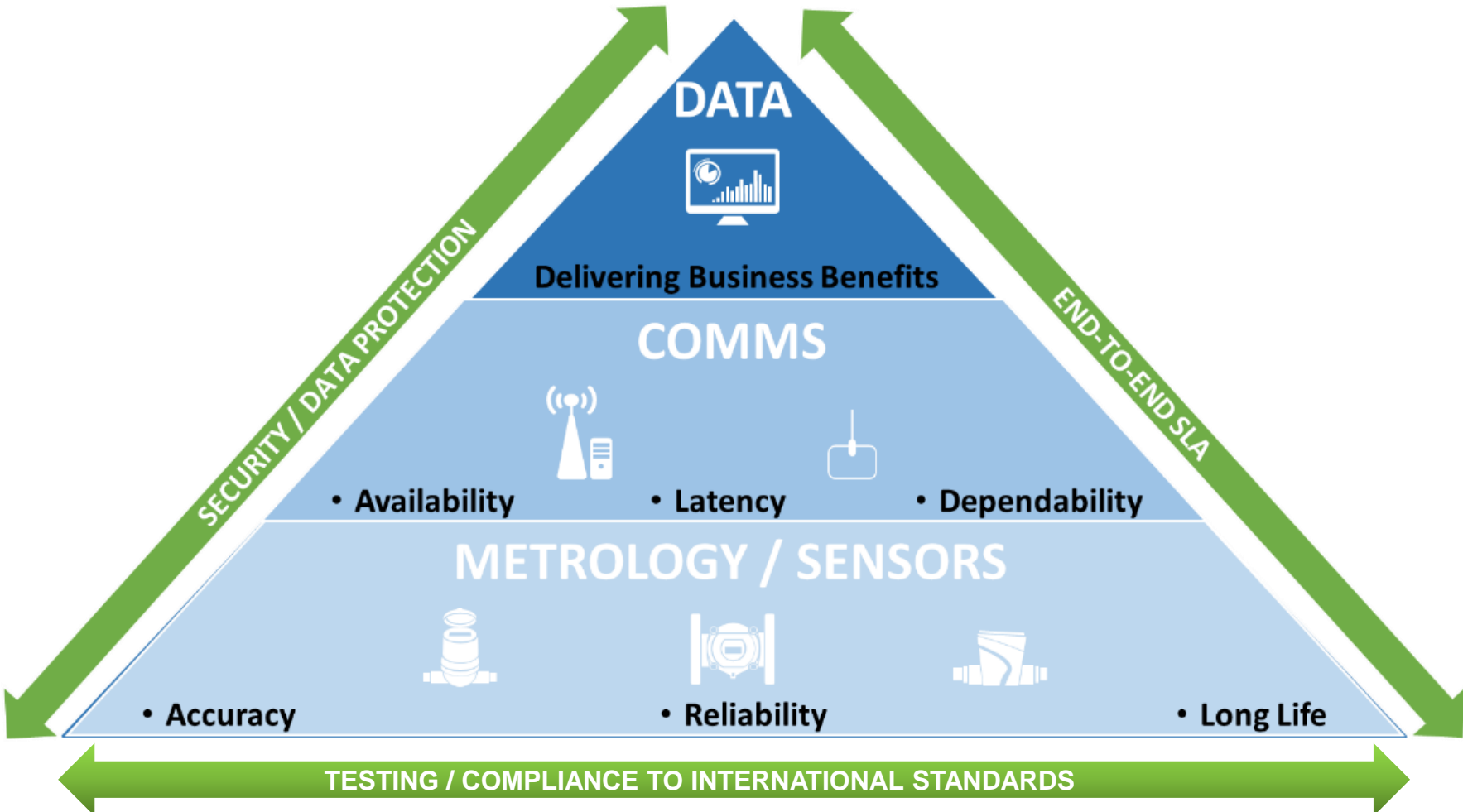
## Distributing & Allocating

## Water is Not a New Idea

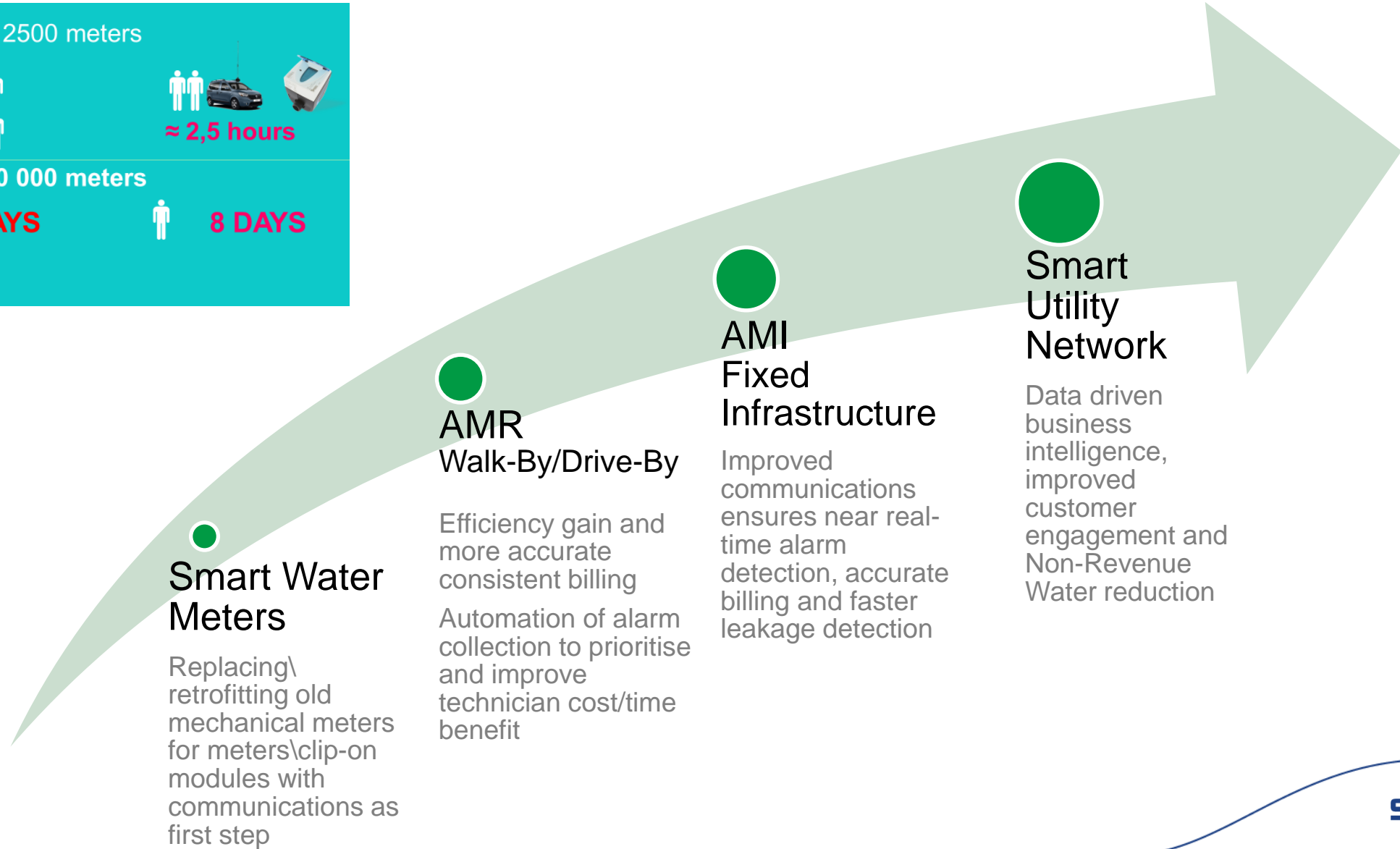
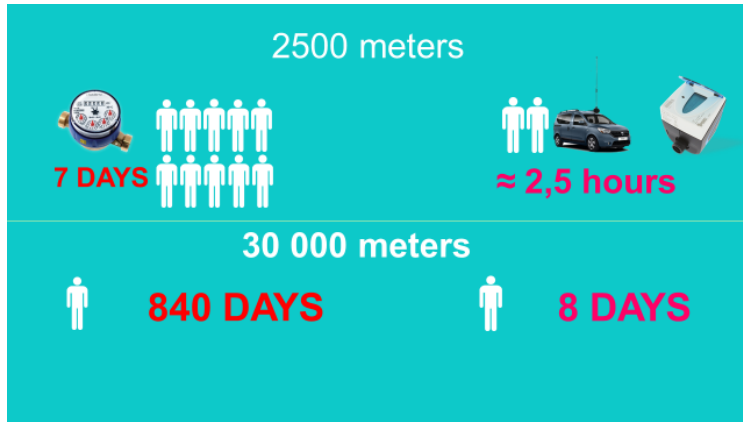
- Oases Ghadames, Libya
  - UNESCO World Heritage site
- 3000 years of water measurement and distribution
- Water pulled from ground with pot with a hole in it
- Each land owner gets water until the number of full pots permitted by the “water commission” is reached



# Fundamentals of an Effective smart water system



# Transitioning to Smart Water Networks



## Smart Water Meters

Replacing/ retrofitting old mechanical meters for meters\clip-on modules with communications as first step

## AMR Walk-By/Drive-By

Efficiency gain and more accurate consistent billing  
Automation of alarm collection to prioritise and improve technician cost/time benefit

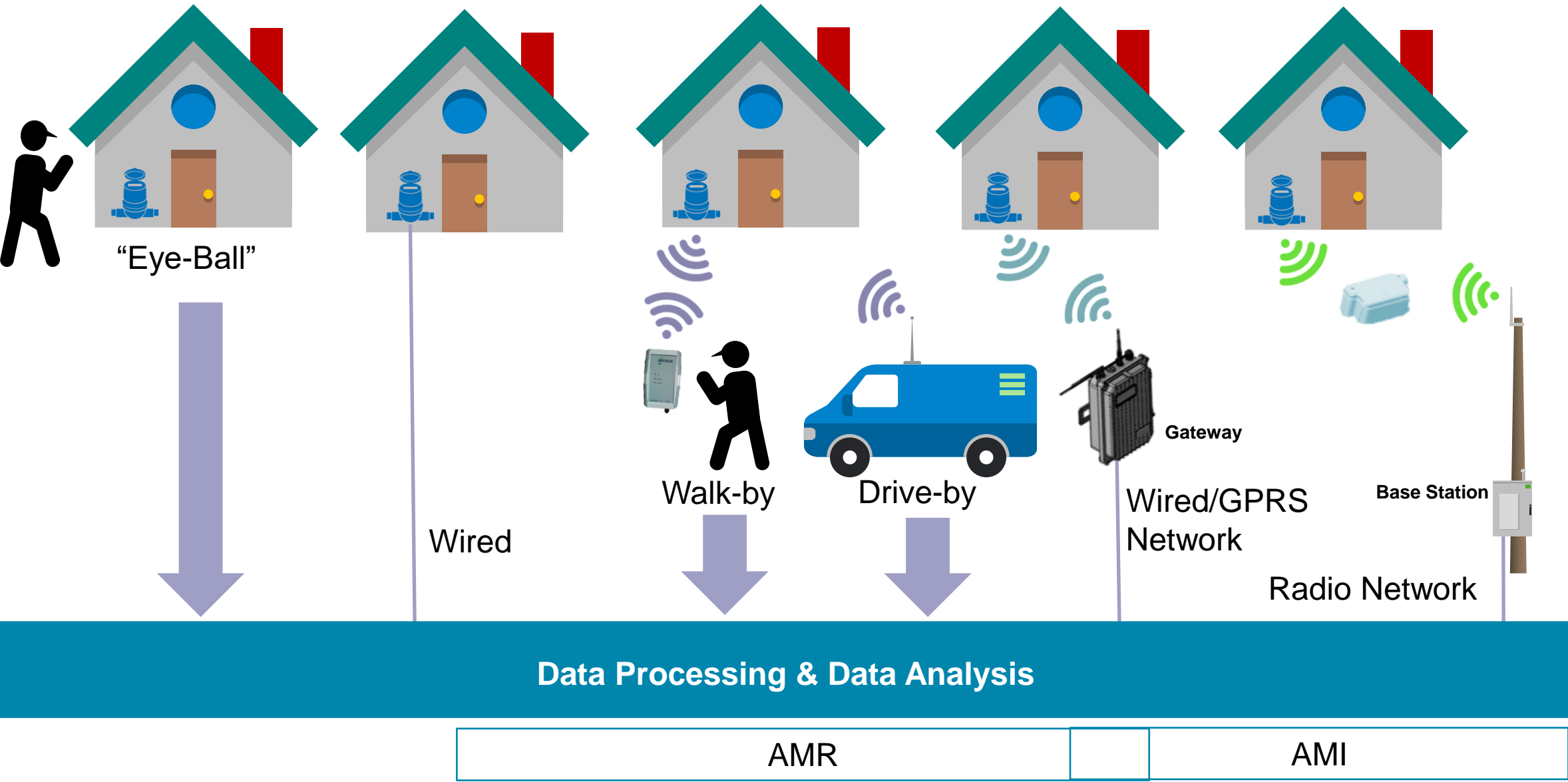
## AMI Fixed Infrastructure

Improved communications ensures near real-time alarm detection, accurate billing and faster leakage detection

## Smart Utility Network

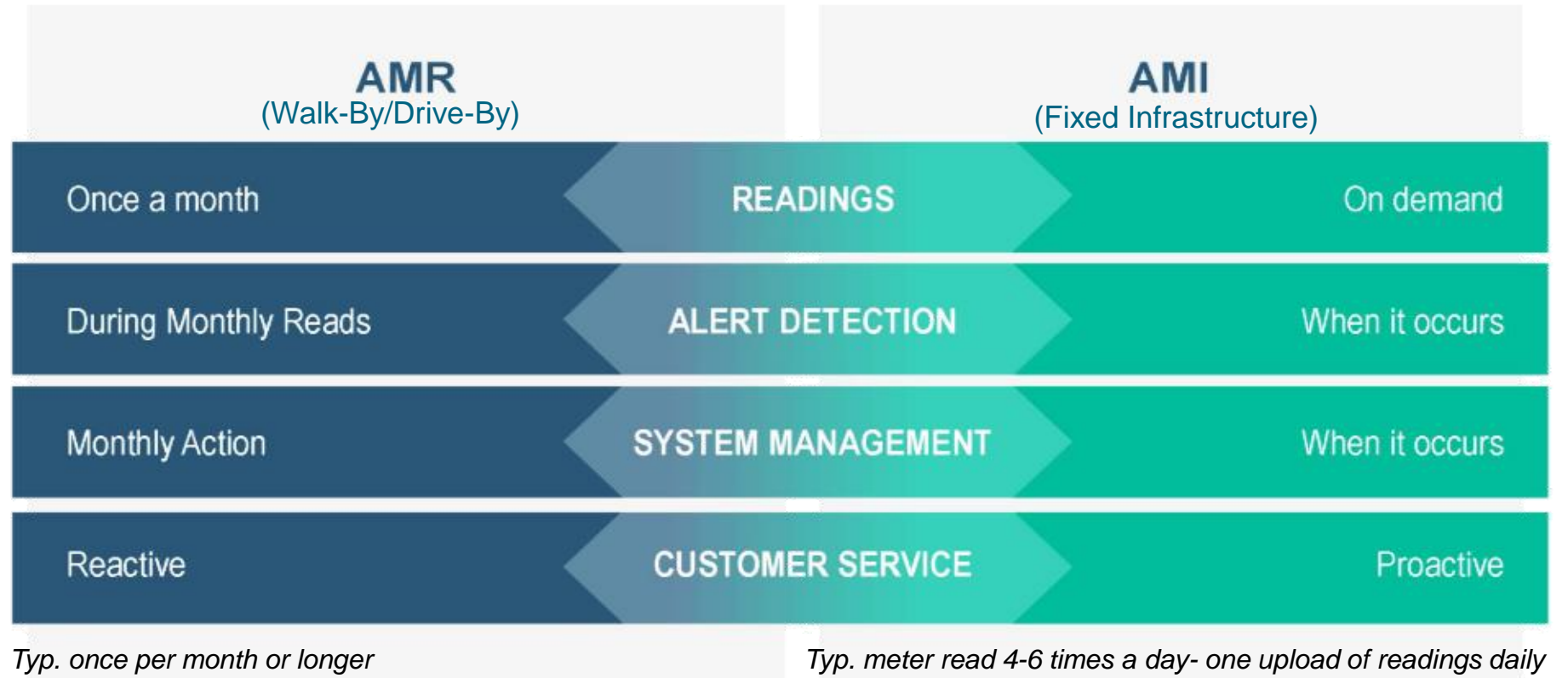
Data driven business intelligence, improved customer engagement and Non-Revenue Water reduction

# Communication – Data Collection Methods



# Comparing Characteristics of AMR and AMI

Country	Typ. AMR water meter read freq. for billing
UK	Monthly
Finland	Quarterly
Denmark	½ Year
Germany	Yearly
France	Yearly
Netherlands	2 years



Key differentiators are “**Reading Frequency**” and “**Responsiveness**”

# Wireless Technologies Used/Targeting AMI

## Licensed Spectrum

**SENSUS**  
**FlexNet™**



Note:  
Only two practical options utilising licensed spectrum for water meters

## Unlicensed Spectrum

**SENSUS RF**

**M-Bus**  
wireless

**OMS**®  
Open Metering System

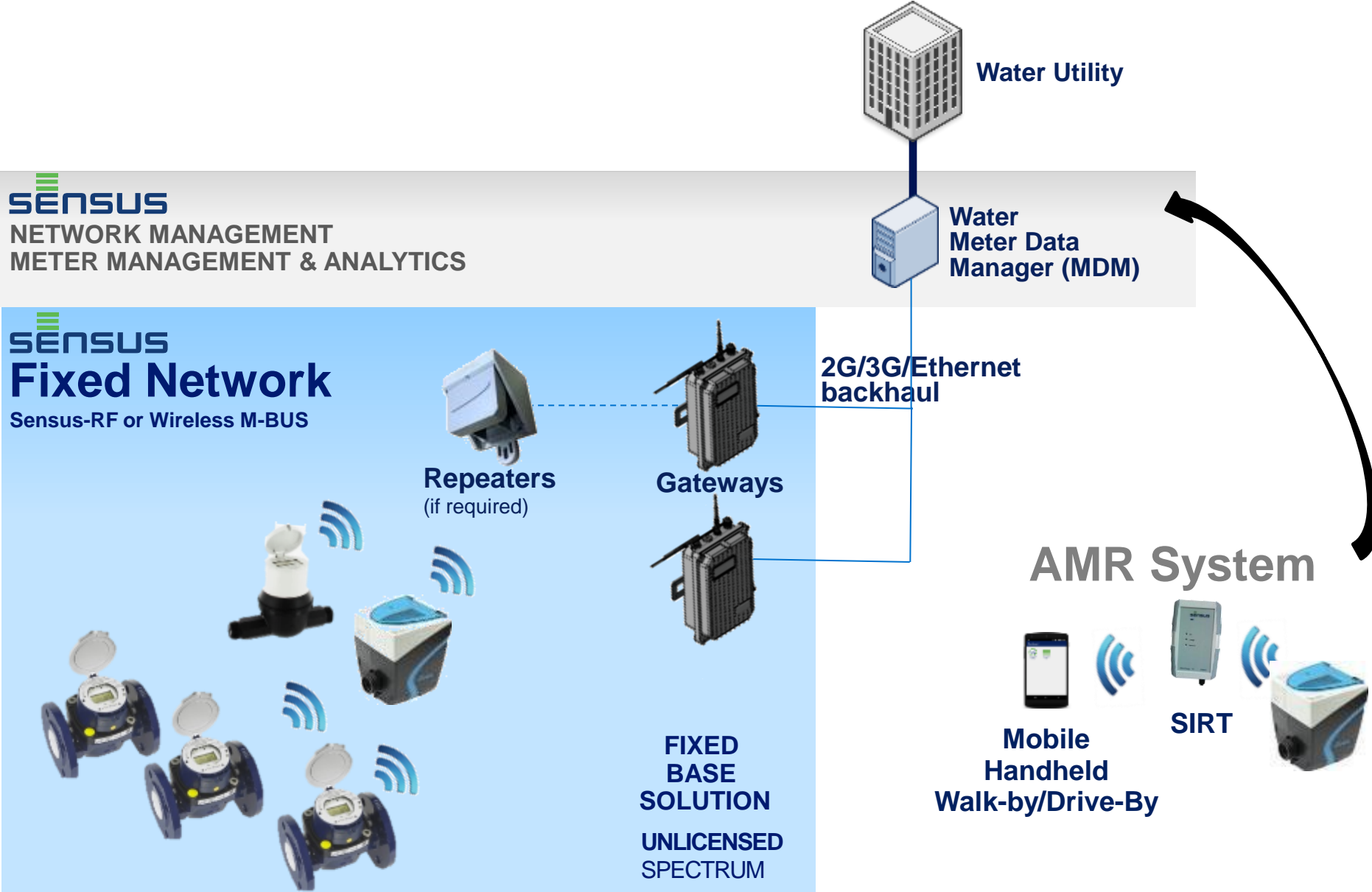
**LoRa™ / LoRaWAN™**

**sigfox**

**WizeAlliance**  
a.k.a 169MHz

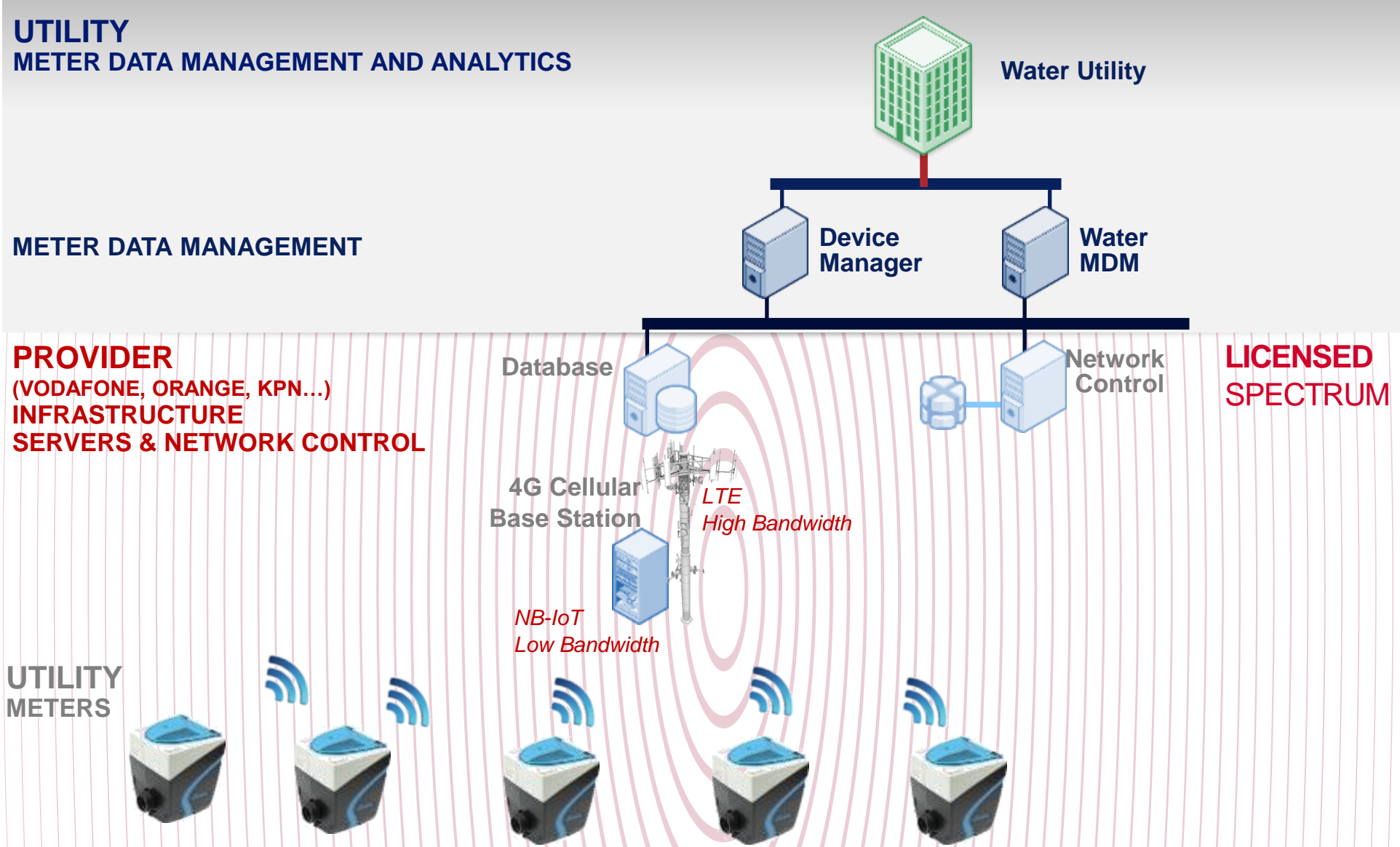
Note:  
There are many others not specifically targeting water meter comms

# SensusRF or Wireless M-Bus – Mobile and/or Fixed Base Solution



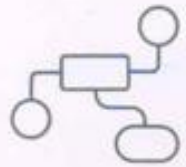
- Natural progression for AMR systems
- A good fit for utilities and those which are cautious progressing along their digital journey

# NB-IoT Radio – using LTE Infrastructure



# Digitalization Platform/Solution

## Recommended Features



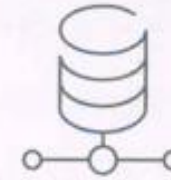
### Interconnected

Two-way communication with other platforms and solutions.



### Vendor Agnostic

All data sources are processed, regardless of suppliers or technologies.



### Data centric

Single data model relating all utility's assets with their attributes.



### Scalable

Easy integration of new elements. Stable performance when newly processed and stored data is added.



### Modular

GoAigua solutions can be activated or deactivated according to the use cases required.



### Safe

Encryption of sensitive data. Robust cybersecurity protocols for critical infrastructures.

# Platform/Solution Architecture

Real-time monitoring and actions on key indicators

SERVICE OPERATIONS CENTER

BI CONNECTORS

DASHBOARDS & REPORTING

Operational Intelligence

Analytics, Optimization and Real-Time Decision Support

UNIFIED NETWORK  
MANAGEMENT

LEAK DETECTION  
& LOCALIZATION

NETWORK REAL-TIME  
DECISION SUPPORT

FLOOD (SSO) /  
CSO PREDICTION &  
PREVENTION

METER DATA ANALYTICS

BIOLOGICAL  
MONITORING

PLANT REAL-TIME  
DECISION SUPPORT

UNIFIED PLANT  
MANAGEMENT

REAL-TIME WHAT-IF  
SCENARIOS

CLOG MONITORING

Modular Data Applications



DOMAIN MASTER DATA

IoT CORE

DATA SCIENCE  
FRAMEWORK

GIS FRAMEWORK

Data Warehouse



AMI/AMR

SENSORS

SCADA, PLCs & IoT Sensors

Distributed DBs

GIS, CMMS

Vendor agnostic,  
integrates with  
any technology

# Complete overview

# From intake to effluent

**WATER TREATMENT PLANTS**  
Make better decisions in real-time and reduce risks of unplanned incidents

**WATER DISTRIBUTION SYSTEMS**  
Manage real losses and gain real-time operational awareness

**METERING AND REVENUE**  
Ensure financial resiliency to keep revenue flowing

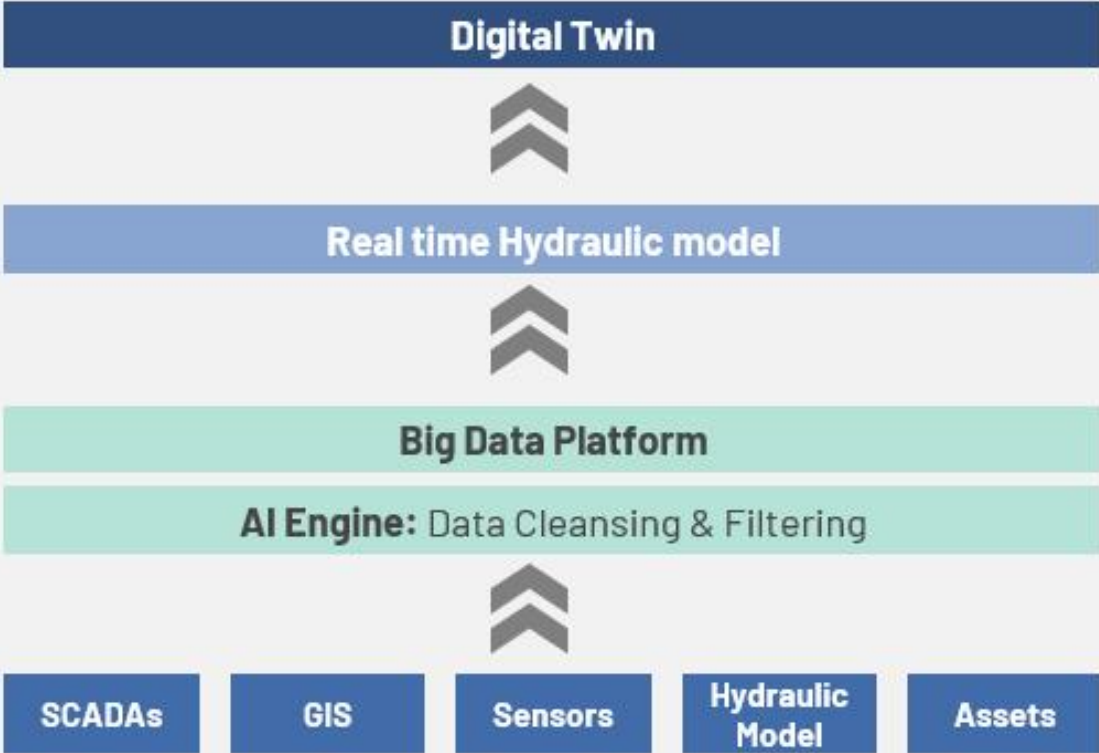
**COLLECTION SYSTEMS**  
Detect blocks and forecast flows, prioritize capital improvement plan to ensure reliability and best value for investments

**WASTEWATER TREATMENT PLANTS**  
Reduce costs by optimizing energy and chemical consumption while increasing margins of compliance

**WASTEWATER ASSETS**  
Coordinated control of pump stations, lift stations, tanks, tunnels, high-rate treatment; manage water capacity in real-time leading to optimized capex spend



# Simulator – Digital Twin



*Resilience, Risk value, Demand forecast, Network adaptability, Efficiency, etc.*

# Asset Management

## What is the objective?

To take informed decisions to maximise the impact of maintenance and renovation.

## What are the challenges?

Lack of instruments to technically justify investments

Defining a common criteria for decision making

Data availability and accuracy

Trust on digital solutions



# PipePlanner : a data-driven approach to prioritise budget allocations

Technical and scientific literature associates pipe criticality with several parameters, including Pipe age, Material, Traffic load, Nominal pressure, Pressure cycles, Diameter, Depth, Transients, ...

$$Index = I_D W_D + I_R W_R + I_P W_P + I_L W_L + I_C W_C + I_A W_A (I_{AP} W_{AP} + I_T I_{LP} W_{TLP})$$

Diameter  
Repairs  
Nominal Pressure  
Leakage  
Connections  
Age  
Pressure variations  
Traffic  
Surface type



**Main benefits:** multi-parameter risk assessment (CoF, LoF), proactive rehab planning : **replace a pipe prior to its rupture** (water loss, continuity of supply, ...)

**Additional benefits:** justifiable and repeatable decisions, less reliance on personnel experience, continuous revision/update as more data becomes available (**PLATFORM**), ...

Thank you!