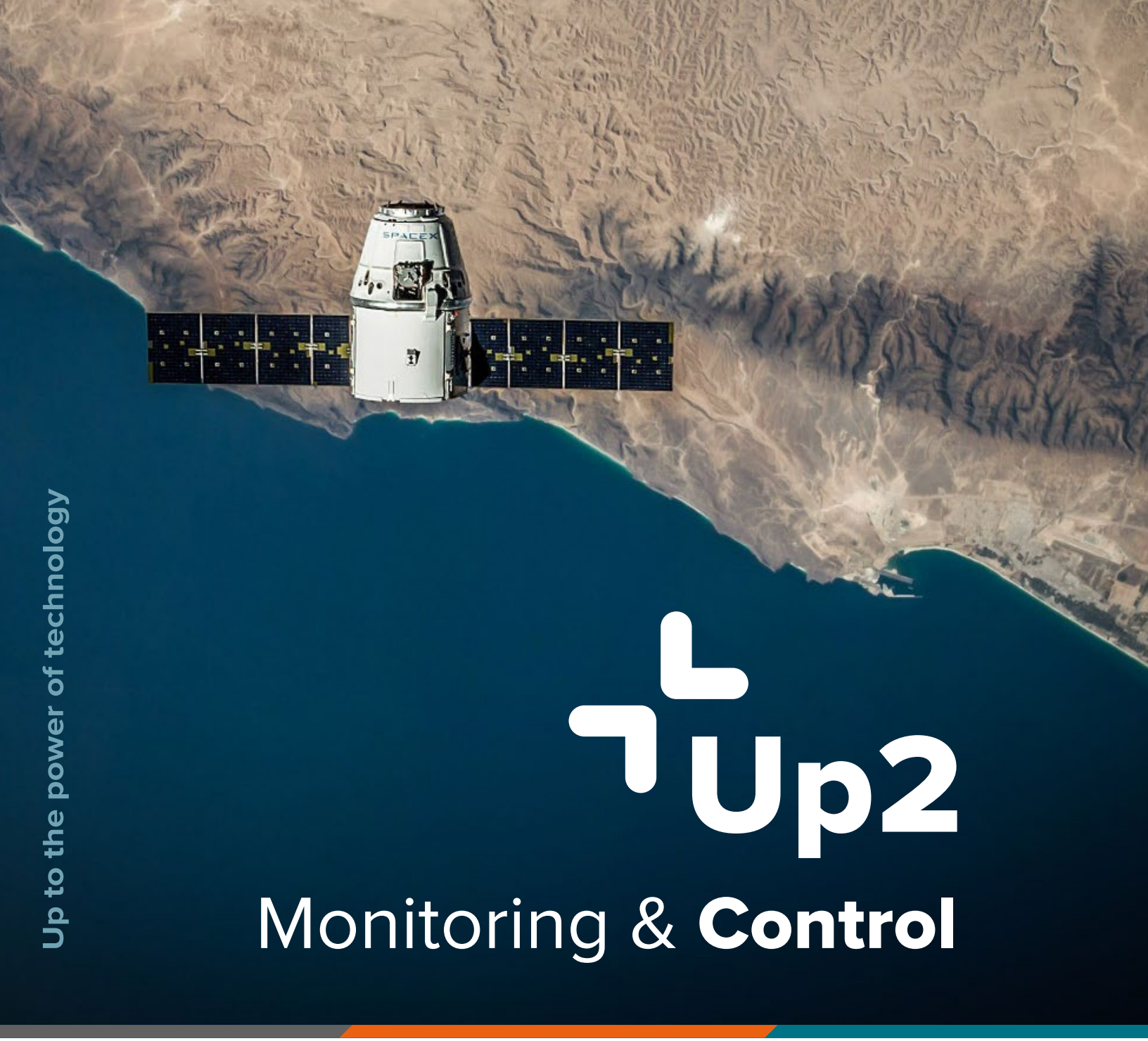


Up to the power of technology

Up2

Monitoring & **Control**

Software solutions for
monitoring and control of railroad infrastructure, bridges, vehicles, and many others

We create solutions that monitor key business infrastructure, ensure real-time visibility, provide control on abnormalities and emergency events, and automate the process for identifying patterns and revealing insights.

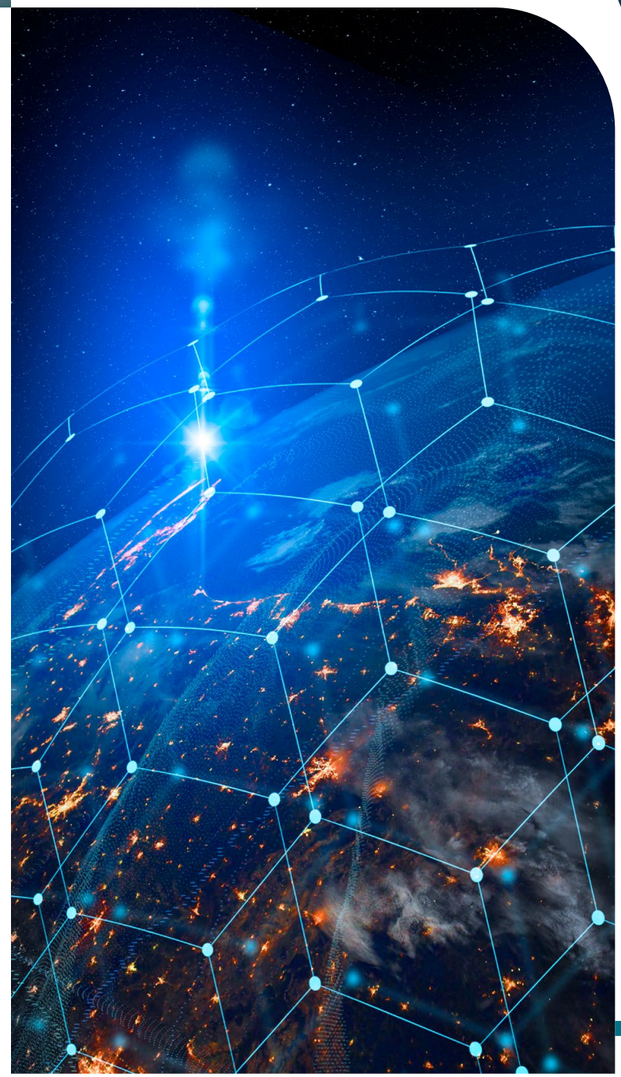
Every business relies on infrastructure to deliver products and services. It is crucial to detect and fix issues and errors on time and to prevent anomalies to avoid potential losses.

including critical railroad infrastructure, bridges, vehicles, and construction machinery.

We have built own monitoring and control framework which helps us deliver customizable, scalable, and highly performant applications. Often a client needs to start with a proof-of-concept to explore the options for monitoring the infrastructure. We connect the infrastructure to Internet, implement notifications for critical events and visualize the transformed data on a real-time dashboard.

It is not the strongest of the species that survives, nor the most intelligent, but the one most responsive to changes.

– Charles Darwin, 1809



The world is changing faster than ever, and there are no signs of this pace slowing down.

Following the recent pandemic events, reveals that businesses are forced to work in an unprecedented environment.

To survive, they shall evolve and adapt.

Evolve, but how?
Change, but what?

Following nature's example, we might evolve by randomly changing parts of our process. This approach involves a lot of failures, including ones that could lead to our business dying out.

We humans, on the other hand, do not rely only on luck.

Today we progress by building on top of our existing knowledge and discoveries and by conducting experiments and tracking their effects.

Measurements and prompt actions paved our way from randomness into manageability and predictability. This is the best one could do to keep their business sharp.

To help companies embrace change, **we implement intelligent monitoring and control solutions.**

Maplese – monitoring and control framework

Along the way, we have developed Maplese - lightweight, cross-platform, highly performant framework that helps us deliver customizable, scalable, and future-proof monitoring and control applications.

Often a client needs to start with a proof-of-concept to explore the options for monitoring and control. We connect their infrastructure, notify for critical events, and visualize the transformed data on a real-time dashboard.

What experiments to conduct and how to utilize the captured observations is up to the needs and requirements of the client.

Saving every byte in a data lake and hiring experienced data scientists to analyze it or using Machine Learning to predict more complex events - the opportunities are unlimited when it is your data and you control

What is Maplese?

Maplese connects, collects, processes, and transforms, notifies for critical events and anomalies, and distributes data to various channels for further use and processing.

By channels we mean other systems such as a cloud or cloud tool, a big data storage, an application or dashboard that is using the data.

Maplese also comes with a real-time dashboarding infrastructure for monitoring devices, receiving notifications, and sending commands. This has proven to be essential, since dashboarding tools are often limited to handle real-time data.

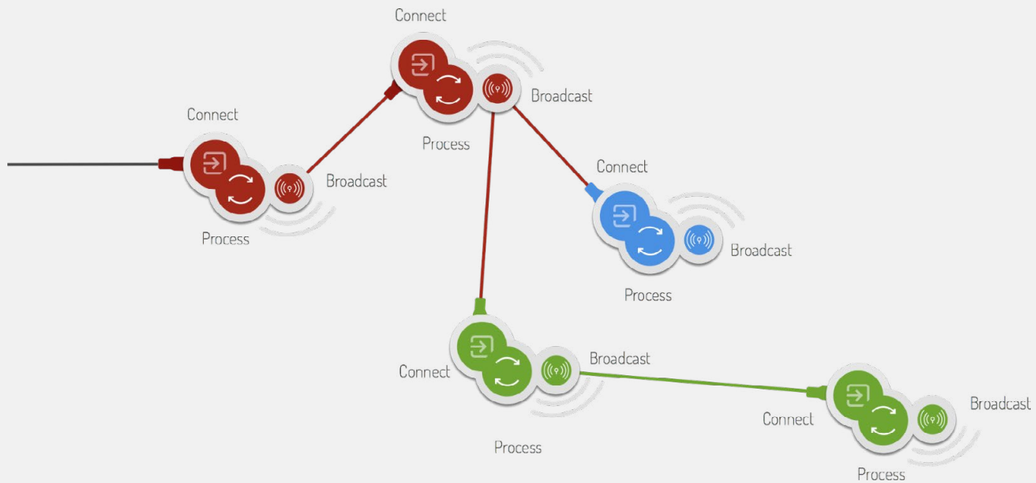
The system can be hosted on premises or out on the field and can run without Internet connection. Maplese on-device approach helps reduce latency for critical applications, lower dependency on the cloud, and better manage the massive deluge of data generated by sensors and devices.

On the edge

We have developed Maplese in such way that it can be used in the cloud as well on the edge, close and even on the device to manage locally vast amounts of data and forward to the cloud only the data that matters.

On the device Maplese can do preprocessing - sort, filter and compute the data and make decisions without going to the cloud. Thus, Maplese provides:

- Low connectivity – for devices deployed in environments with intermittent Internet connection, Maplese can accumulate state reports on the device and when connected – send data to the cloud.
- Lower dependence on the cloud as Maplese is cloud-agnostic, high performance, and reduced latency
- Less bandwidth consumption and working even when the connectivity to the cloud is affected
- Improved security and privacy – the sensitive data is kept at the source rather than sending identifiable information to the cloud



How does it work?

Maplese Composite Architecture

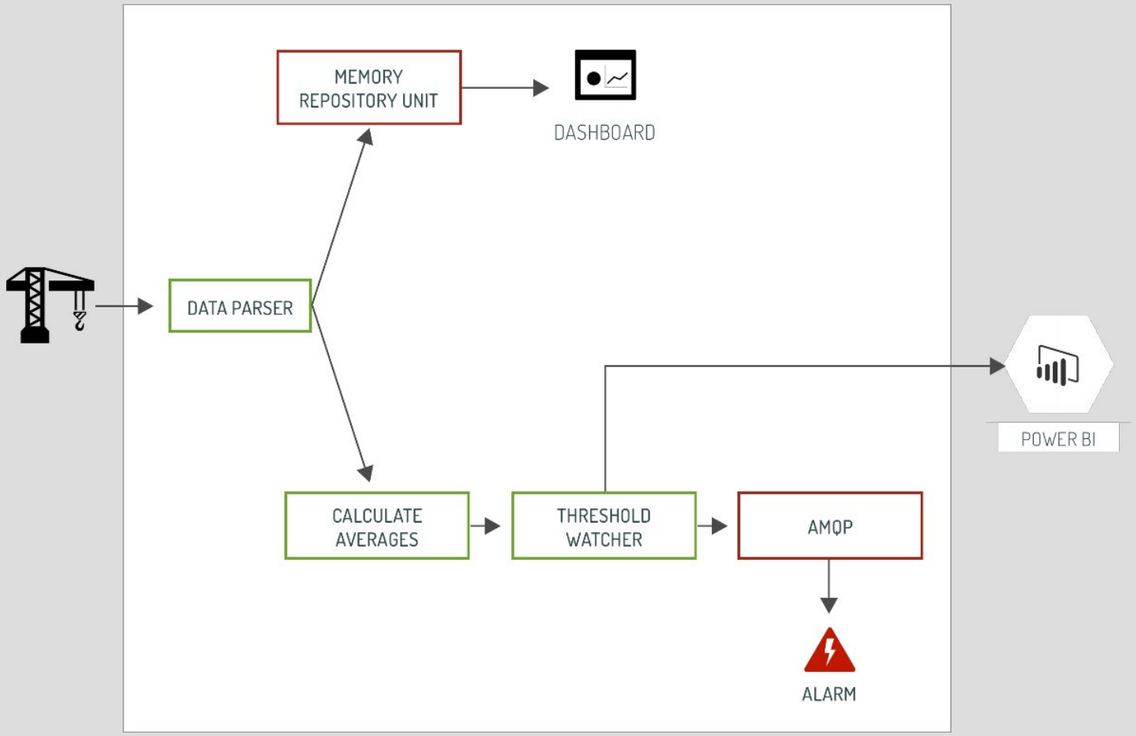
Maplese is built on what we call a composite architecture.

One can define code and data structures and upload them to Maplese. These are formed in units which can be linked to form a flow of activities at runtime.

Each flow represents the path that the device data goes through. Each unit in the flow takes care of a certain operation, such as parsing JSON, unpacking network or device data, sending a notification, exporting, and so on.

A Maplese instance comes with several pre-defined units. These units take care of the common tasks like parsing XML or JSON, unpacking the payload, sending data to a common third party (like SMS, Email or Azure Event Bus), triggering an alert, In-Memory storage, File storage. Custom units can be defined (there is Visual Code Editor provided) when needed.

Transformed data is pushed to subscribers (including UI).



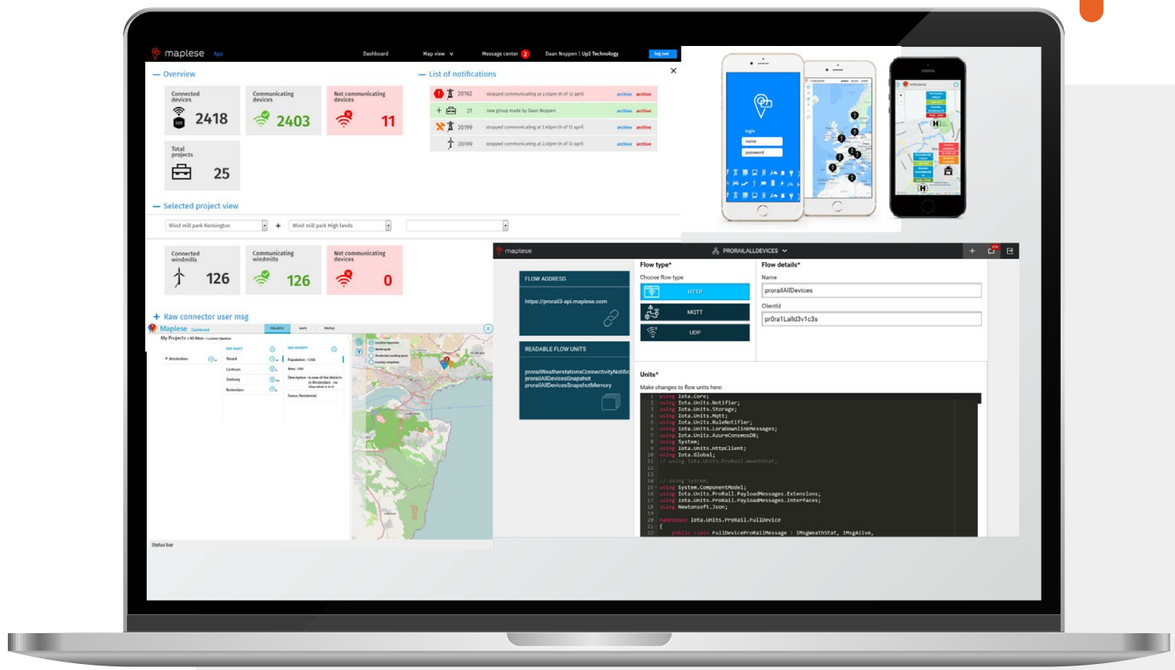
Maplese UI

Maplese comes with a visual dashboard which provides rich set of out-of-the box widgets for real-time data monitoring and notifications. It uses Maplese REST API to gather initial data along with the historical data from the Maplese runtime, and MQTT over web sockets for real-time data updates.

The Dashboard gives our clients the opportunity to see the data coming from the sensor in no time without extra development needed. The configurable dashboard offers a unique view to every user with the exact data needed.

Maplese provides Web IDE for configuring and reusing units, defining dataflows, and making fast changes in the code.

A mobile app is available for getting push notifications about critical events and anomalies.



Unit composition – Dataflow

- Data is parsed
- Peeks are filtered
- Non-relevant data is excluded
- Data thresholds are monitored

- The results are displayed real-time
- Alarms are sent
- Data is stored in a local file storage

Why Maplese?

Frictionless Experience

With Maplese the clients can get the data from the sensors and see it on a mobile app or in a browser without much effort. Enterprises can start small just now, have the time to make the big decision and scale up.

- No burden of instantiating a large IoT system infrastructure
- No efforts for creating multiple virtual machines, learning API's, new IDE's, etc.

Fast prototyping

Maplese provides an environment where developers can get things connected.

- No days of head-banging until you send a single number read from a sensor
- Transform your data from payload into readable structured format on the fly and displays data streams in a nice-looking UI

The enterprise in control

In the many Control and Monitoring projects we see device specific software solutions are used. Within time, more devices are connected, and the data is everywhere.

With Maplese we can help to build one data processing infrastructure, which:

- the enterprise owns
- is device independent
- is cloud independent

ProRail – railroad infrastructure monitoring

ProRail is a Dutch government organization that is responsible for the maintenance and extensions of the national railway network infrastructure, allocating rail capacity, and traffic control.

Using Maplese, we have been working on different projects to improve train schedule predictability.

- Railroad switch monitoring to secure their operational state in the winter
- Weather stations to measure local in comparison to predicted weather
- Railroad crossing, measuring closing times and the impact along tracks of new train schedules

With this project, ProRail gained insights they were unable to before. How much time did they block the public road network? Are there barriers that close so quickly they could hit a passer-by? Are there barriers that close so slowly that they could block a vehicle on the railroad?

Damen shipyards –
onshore real-time monitoring

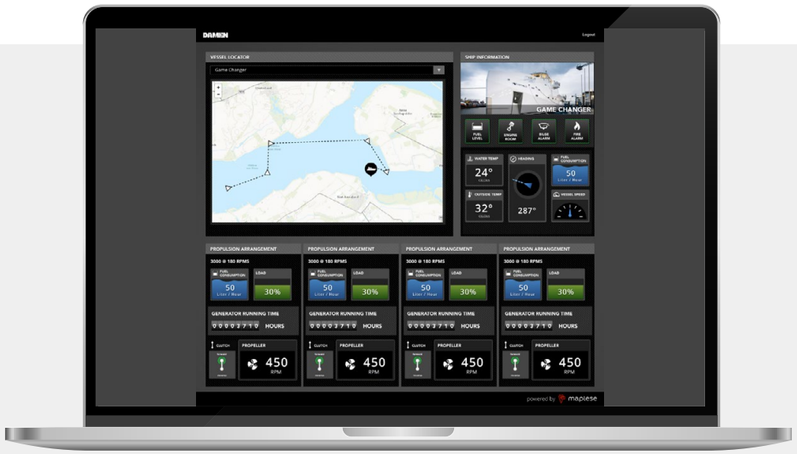
Damen is an international shipyard group focused on creating niche vessels. To improve their service proposition for ship/fleet owners Damen needed real-time information from the ship onshore.

Maplese was used to implement a remote monitoring solution for their yacht support vessel - the “Game Changer”

The solution tracked the ship location, together with information from its vital systems - Praxis Alarm Monitoring System, Engine Room, Navigation, and Fuel tanks.

Handling hundreds of updates per second is a challenge but enabling engineers on the shore to give advice and suggestions to the ship crew without the need of it coming back to the harbor is worth it.

The amount of data (from navigation system and from the Praxis system on board) is very large and the frequency of data sensing is 1 sec, for some messages even less.



KPN - LORA roll-out
& Network testing

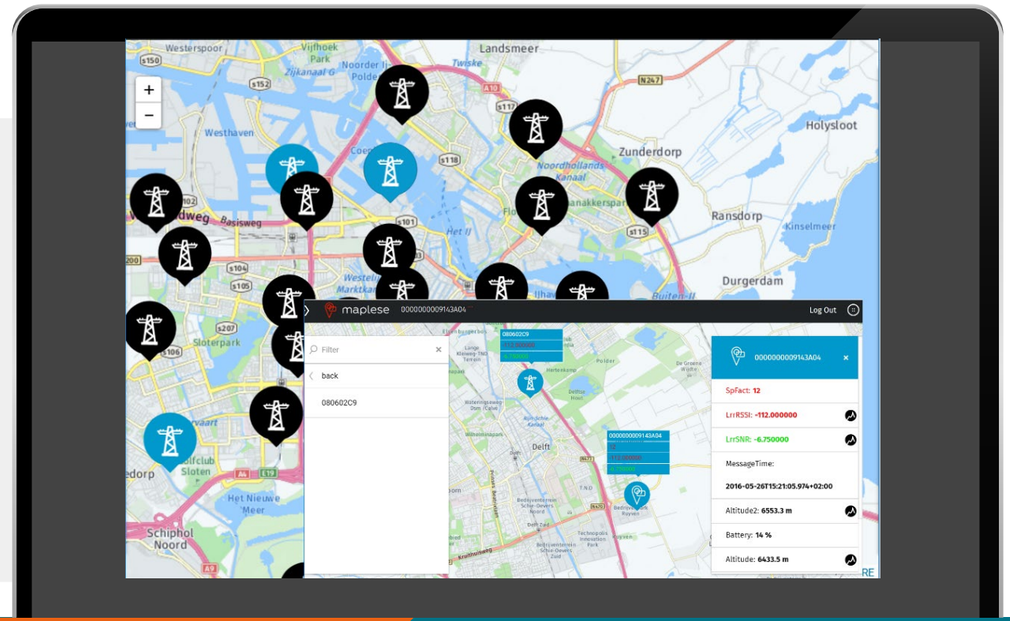
KPN has launched its LORA IoT network. One of the issues encountered was the cumbersome testing of the installed LORA gateways.

The various KPN contractors had a testing device to send test messages. To view the network results, they had to sign in using a laptop with RSA keys to KPN network systems.

Maplese was used to simplify network testing during roll-out of gateways by combining and presenting relevant data from network test devices and the Lora network gateways.

We securely combined the real-time data from the LORA gateways, the testing devices and the network systems. After sending a test message to gateways, the test results where displayed on a single interface.

We also provided a heat map, so KPN could follow in real-time the progress of the roll-out.



Monitoring moveable bridges – pilot for Rijkswaterstaat

Rijkswaterstaat is the Dutch Ministry of Infrastructure and Water Management. As a country of which third is below sea-level, this happens to be one of the most important ministries.

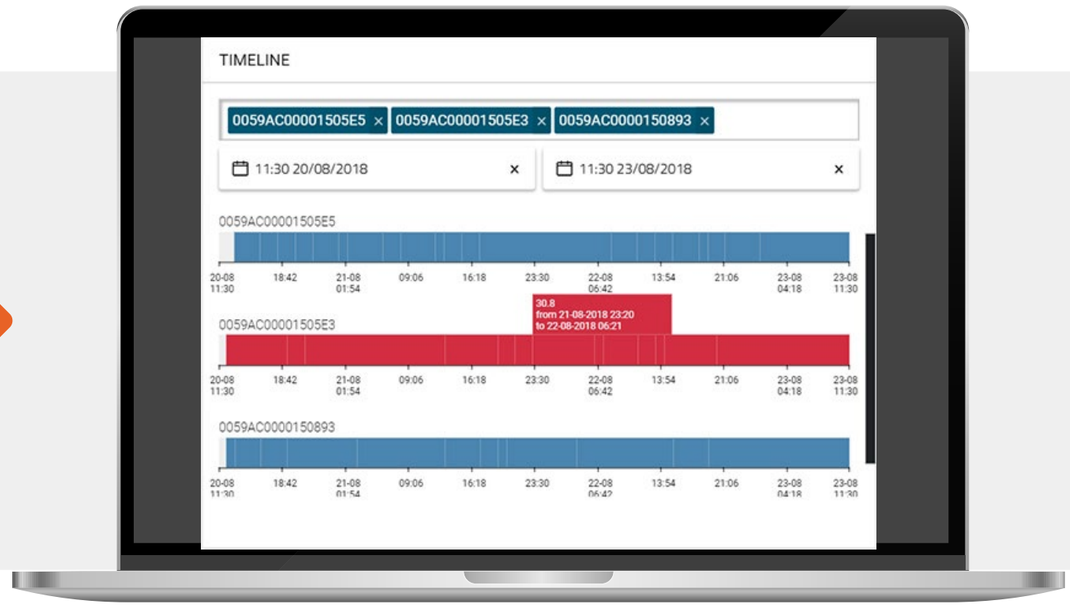
As there is a lot of water in the Netherlands, there are a lot of bridges too.

Partnering with Sogeti, we run a pilot monitoring 20 movable bridges in Amsterdam for RWS.

Maplese was used for parsing the data from the sensors and visualizing the state of the bridge – open or close on a map. In addition, device temperature was visualized on the dashboard and the battery voltage which are important for monitoring the state of the devices.

A historical timeline graph widget displays what time and how long a bridge was open or closed.

The time a certain bridge is open on average is also displayed on the dashboard on a graph, so all the monitoring of the bridges is on a single UI.



ANWB Medical Air Assistance – real-time incidents notification application

With more than 8,000 flights per year, the ANWB Medical Air Assistance (MAA) is the operator of medical helicopters in the Netherlands. They fly to four trauma centers for (semi) governments and for event organizations; seven days a week, 24 hours a day.

The control room and helicopter pilots do not have a combined view of information needed to dispatch the medical choppers to the requested incident locations.

Maplese was used for providing a Dashboard with integrated view of all the needed information on a map:

- Incident location
- Helicopter location
- Obstacles / no fly zones
- Safe landing spot locations and requirements
- Nearest hospital locations

NS OV-Fiets – monitoring bike parking equipment and bike rental availability

We are a partner of NS to develop the back-office for the OV-Fiets bike rental and parking concept. This back-office is the heart of the complete operation and interfaces with parking stations and systems.

The NS requested us to develop a real-time solution to monitor infrastructural incidents and bike availability.

Using our framework Maplese we successfully disclosed the required information in a few days.

All the NS locations for bike parking and rentals are displayed on a map with real-time information about the number of available bikes and other statuses – repair, reliability indications, etc.

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