



**SAP
Innovation
Awards 2019**

SAP Innovation Awards 2019 Entry Pitch Deck

How water leakage reporting and detecting at De Watergroep has become child's play thanks to SAP

De Watergroep

VIDEO: what do kids say about water leakage?



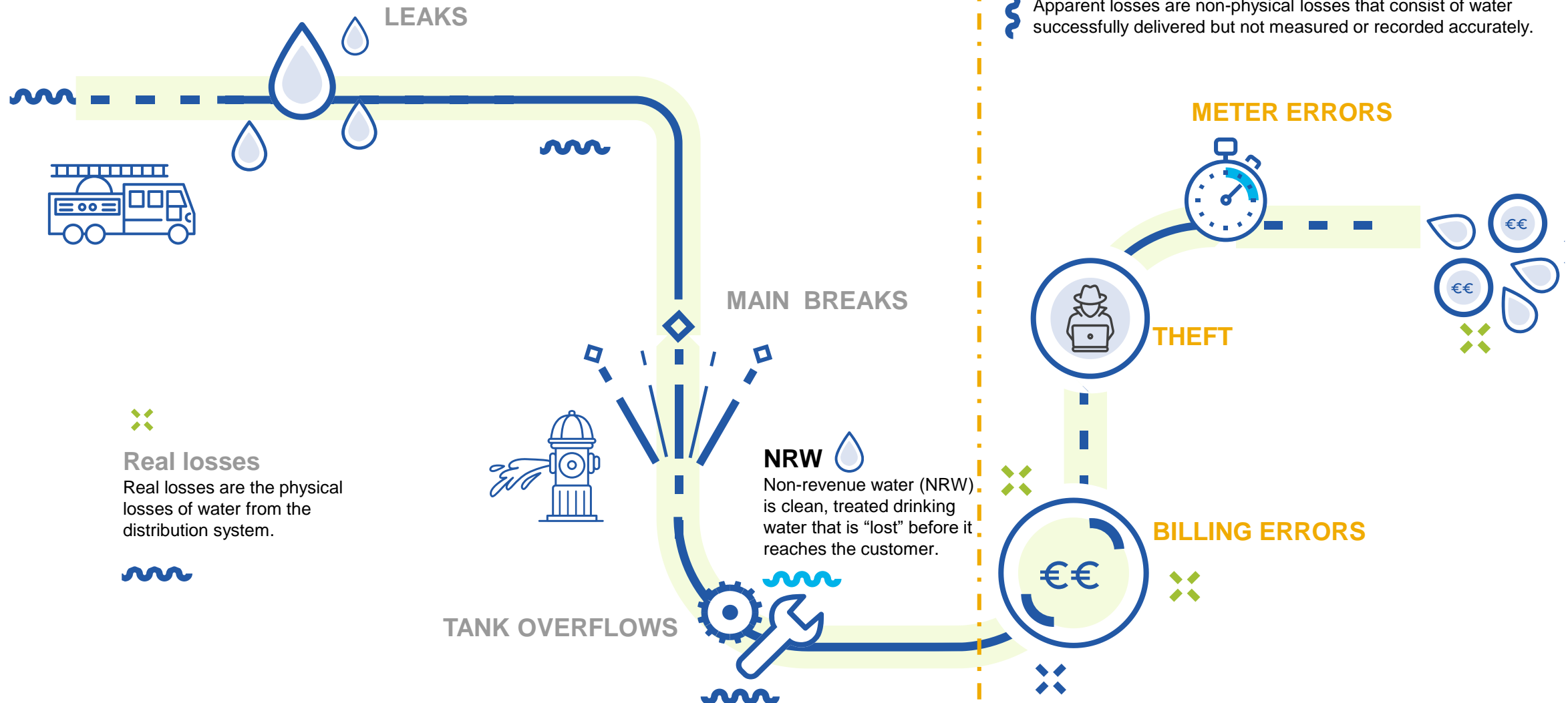
Link: <https://www.youtube.com/watch?v=CnPnlj3MKLE&feature=youtu.be>



Note:

*Please use this video only for the purpose of the SAP Innovation Awards 2019.
Explicit consent from De Watergroep is needed if the video is to be distributed or shown more outside of the Awards procedure.*

PROBLEM: the high cost of non-revenue water



How water leakage reporting and detecting at De Watergroep has become child's play thanks to SAP

De Watergroep



"Quote"

"De Watergroep adapted its organization to even better and more flexibly meet its customers' needs. That's why digitalization is high on our list of strategic and business ambitions."

"The best way to tackle NRW is to combine good asset management and replacement strategy with an innovative approach... and that was the core mission for this project."

"Our teams need to have access to the right data at the right time, especially when it comes to NRW. Reliable data helps our people to make better informed decisions."

"And that's exactly how they can make the difference for our customers too"

Cristina Orodel

Team manager
asset information

>> [Watch the video here](#) <<

Challenge

De Watergroep is a Belgian public utility company responsible for producing, distributing and handling the drinking water, waste water and industrial water of more than 3 million people. In Belgium, 20% of the water distributed by De Watergroep will never be invoiced (European average is 23%), which is a substantial loss. With public and political pressure on NRW rising, De Watergroep sought a more practical, far-reaching solution. That's how the reduction of NRW became a prime focus and part of its strategic goals. It developed an algorithm with a deep data mining approach as the basis, entirely integrated in the existing user experience. De Watergroep also decided to adapt processes, break data siloes and to enable its leak reporting team to tackle the problem with intelligent, reliable data that is brought to them proactively.

Solution

With 34,000 kilometres of tubes, most of which are about 100 years old, it was time for a new approach. Instead of using tools and shovels, it was better to ask digital tools to come to the aid of the leak detection team. In their toolbox, they now rely on the newest SAP technologies, ranging from SAP HANA Express edition and the integration of R for the use of SAP Leonardo. Reporting has changed dramatically as well. Instead of going through endless rows in Excel, reporting is now shown in a digital board reporting mode, using SAP Analytics Cloud and the Digital Boardroom extension. This helps the team to bring insights instead of data, and management to make better informed decisions.

Outcome

The leak reporting team now works differently: instead of working based on their job description, they put processes at the heart of everything they do. They also work centrally instead of regionally and can rely on reliable sets of data, allowing them to bring insights instead of data. Reporting on NRW has become less complex and does not require specific skills. The workload has been reduced, as well as the risk of making manual errors. In short, data have been turned into insights.

Before only **30%**
of data was analysed,
NOW 100%

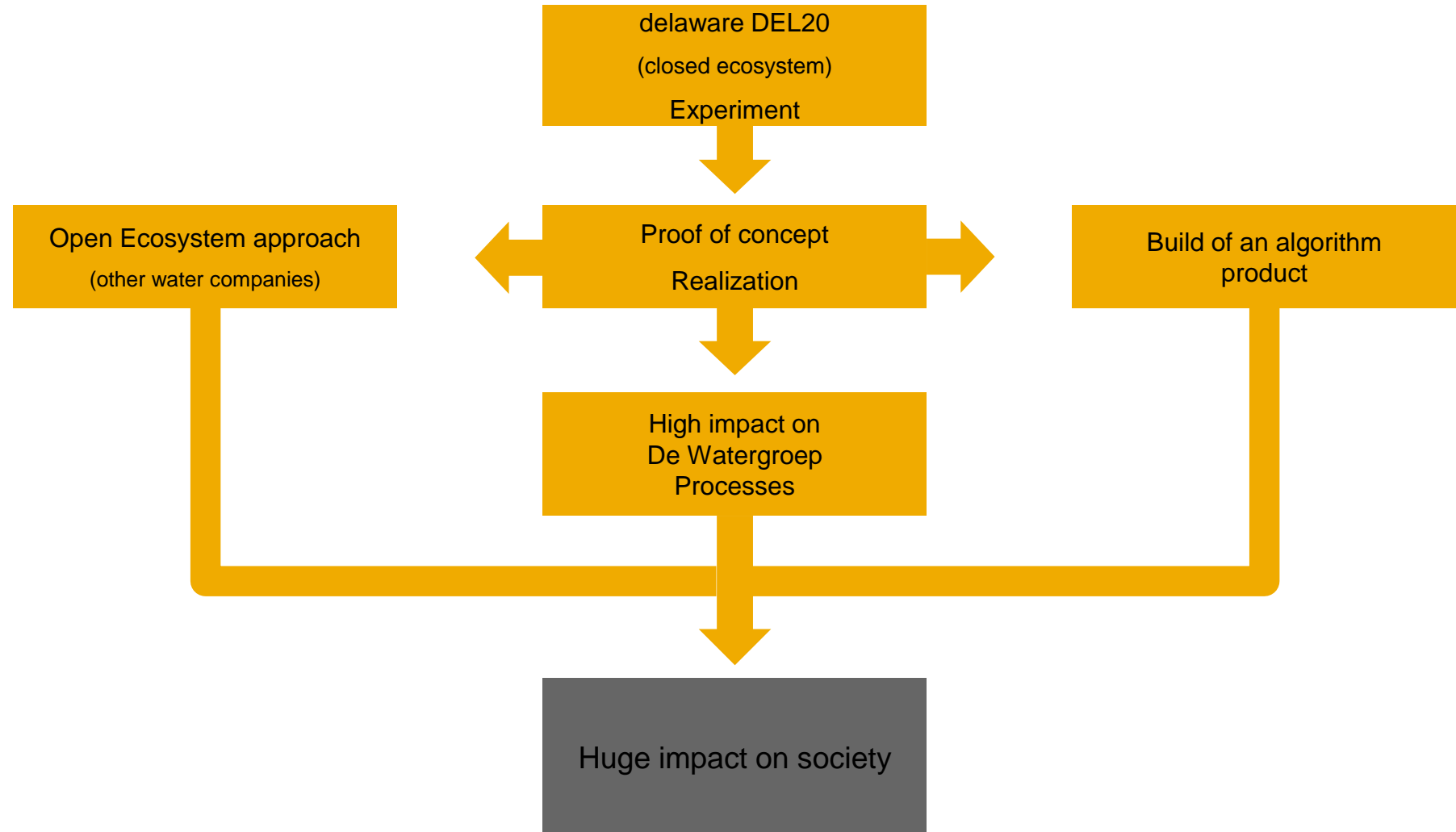
Analysing **100%**
of the data only takes
20% OF THE TIME

20 employees are responsible
for detecting leaks
in more than
34,000 kilometres of tubes



Project / Use Case Details

From a closed ecosystem experiment to a market solution in an open ecosystem





Partner Information

delaware

Implementor and strategic sparring partner from the very beginning

De Watergroep had the business knowledge and people to make a success of this project, where delaware brought in the right technical people that helped to close the gap with the necessary skills and expertise. delaware was also an important partner for De Watergroep's BI strategy. And that's how they organically started working in an ecosystem to derive the best results.

Now that it becomes even more clear that the results of this project are worth sharing with other drinking water companies, delaware and De Watergroep will explore the next steps in optimization, scalability and what is the best way to bring this to market together. They will also continue to fine tune the algorithm, based on the input they get from peers in De Watergroep's larger ecosystem.



"At delaware, we have the people, the ambition and the technical knowledge to do innovation, but not the cases. Our clients do have these cases, but they lack time and skills, and often resources, capabilities and guts to solve them with new technologies. By combining our needs and those of our customers, we can work around a concrete problem or issue, based on real data, and actually put innovation and co-creation into practice, increase trust in new technologies and share what we have learnt with the ecosystem. This is the main mission of the Del 20 project, where our teams and teams of our most innovative customers work together on a concrete and innovative case, without any sales intentions on our end. In the ecosystem, we have the intention of learning from each other without seeing each other as competition.

The NRW-project with De Watergroep came to life in this DEL20-project and is a perfect example of co-creation and co-innovation between delaware and one of its customers. Together, we made the business case around NRW, and found in our common drive and passion for innovation an important success factor for this project. The philosophy of DEL20 is simple: "no pain, no cure". This means that for this particular project, we promised De Watergroep to build a POC together with them, but if it turned out not to be working properly, they did not lose anything. It is important for us that if we co-create, we carry the larger share of the responsibility. We invest in this project together. That's why we also gave 25 man-days to this project and cut down on the paperwork. We don't want to create any hurdles.

I'm happy to see that the NRW project turns out to be a perfect example of what programs like DEL20 can achieve and we couldn't be more proud that we are now submitting together to be nominated for a SAP Innovation award."

Thierry Bruyneel and Steven Lenaerts, partners at delaware



DEL20

ECOSYSTEM key facts & figures

- Started in **2017**
- More than **45** member firms
- **6** experiments delivered so far

Read more on DEL 20?
SAP dedicated a **blog**
to our project.

>> [Read it here](#) <<



delaware

About De Watergroep



De Watergroep's mission:

*"We supply a range of customized water solutions. Today, **for tomorrow's generation.**"*

www.dewatergroep.be

De Watergroep's vision:

"Our technological edge is a strong asset that we constantly develop and exploit."

Innovation is part of De Watergroep's **DNA**

€ 613 million in turnover

1,500 employees

De Watergroep's strategic goal:

"Reduce NRW"

180 Belgian municipalities and **more than 3 million** Belgian citizens are **customers**

34,000 kilometres in tubes



Business Challenge & Objectives

In De Watergroep's vision, it says that its technological edge is a strong asset that they constantly develop and exploit. Furthermore, De Watergroep wants to treat its people, assets and resources in a sustainable matter. That is why, instead of doing heavy investments in changing kilometres of tubes, the project team took a creative and innovative approach to tackle the NRW problem. The project needed to find an answer to these challenges:

- **People & processes - digitization:** Allow IT and business to work more closely together by working process-based, and work centrally instead of regionally. It is important for De Watergroep to make sure that their employees can grow personally and extend their professional knowledge. With more than 30% of employees about to retire, it is also crucial to safeguard their knowledge and have it reflected in digital processes and tools. The project needed to instill a digital mindset: from thinking in silos to thinking in processes and increasing operational excellence by running reports on these processes as well.
- **Public & government:** With the dry spells that we have experienced worldwide, the public and politicians alike are keeping a close eye on all water usage. Since it was not an option to start replacing the network of tubes without investing heavily and creating a long trail of administrative procedures, De Watergroep set about to tackle the impact of NRW on society, economy and environment smartly and in the short term.
- **Innovation and scalability:** De Watergroep wants to innovate like a private sector company and prepare their company for the future. Even though De Watergroep is a public company, which implies that it cannot move resources around freely and needs to go through lengthy administrative procedures for big projects, it is a private company at heart and wants to think out of the box. Innovation is in its DNA. Since De Watergroep wants to be a pioneer, it was important that the results could be shared within De Watergroep's ecosystem so that they can benefit from this too, especially when taking into account the social, economic and environmental impact.

The project had multiple objectives, such as:

- **Detect leaks sooner.** Detecting leaks could take weeks or even months, with undeniable economic, social and environmental consequences. The leakage reporting team was running through large reports in excel with different ways of measuring throughout the regions, which made it impossible to intervene sooner in case of water loss. This needed to be digitized so that the team could really bring information and act proactively, as well as reduce the number of manual errors.
- **Unite different teams** and start to work **centrally:** by bringing together business and IT, and by bringing in the expertise from the different regions. This also implied changing their way of thinking, measuring, reporting and instilling a digital mindset. To make the change go more easily, De Watergroep wanted the project to be embedded in its existing BI/BO program and use the same branding. However, the bigger cause and effect of the project allowed to get all eyes pointing in the same direction quite easily.
- **Use industry best practices:** investing smartly also means leveraging existing frameworks to be able to move quickly. The project team was asked to use the APQC model to determine the governance model and KPIs for the NRW project. Furthermore, the project needed to be linked to three important BI governance principles at De Watergroep. Every layer in De Watergroep organization is expected to adhere to these principles (processes) and truly live them. The same expectations framework applies to its external suppliers. The PCC (process control center) framework for processes plays an important role in these governance principles. It comes with best practices and puts the data in hand in a 360-degree perspective, showing it in a bigger context and illustrating the dependencies. This was the perfect basis to start from in this project as well. Next to that, De Watergroep has data lineage principles in place, which account for the auditability and traceability of all data from source to target. The project team needed to respect these, too.
- From a **more technological point** of view, the team needed to come up with a solution that closed the loop between De Watergroep's necessity to avoid leakage and the data and systems that are available to detect those leakages.





Project / Use Case Details

De Watergroep is a drinking water company with a prime focus on the reduction of NRW. The NRW project needed to tackle water leakage detection smartly and efficiently. The key success factors in this project were people, data and technology, and innovation and digitization.

People:

- **Collaboration:** Take innovative approach for the public sector:
 - create one project team, working process-based instead of job description-based
 - increase the collaboration between IT and business = **use technology to break barriers between teams and make processes smoother**
- **Effectiveness:**
 - Customer-centricity: Create a user story starting from the user persona to get into the end-user's shoes
 - Use (existing) mascot & branding (BIBO) to make the transition to the new system smoother
- **Strategy:** Use the company's values and strategic goals as common ground
- **Sustainability:** Helping to adopt a "cloud" and "digital" mindset – from doing manual efforts, the team made the switch to reporting based on the right numbers and could focus on interpreting the reports and stopping water leakage sooner than ever. This means that they truly feel they bring added value and have an impact – not only within De Watergroep, but also on the environment. It made them savvier digitally as well. Everyone can make reports and access the numbers. This project was a breakthrough for De Watergroep's transformation to working more digitally and streamlining processes.

Data and Technology:

- **Reliability:**
 - Use a common data layer to capture all IOT data coming from SCADA systems (single point of truth) => SAP HANA Express edition
 - Developing and optimizing the algorithm and reporting to give a real-time view into what is happening. => SAP Leonardo (SAP Analytics Cloud + R integration)
 - De Watergroep is the first drinking water company that collected and combined data from various sources and aligned them. A black box approach helped to turn the data around and look at it with a fresh perspective. Combined with data science and machine learning, data has become much more reliable.
- **Efficiency:**
 - Single point of access: one system where all data is measured the same way, refreshed regularly and offers a single source of truth. One access point for all, offering reliable, up-to-date and uniform insights into NRW => SAP Analytics Cloud + Digital Boardroom extension
 - Anyplace, anywhere, anytime: the reports can be accessed everywhere, and are no longer regionally organized.
- **Agility:** By means of the self-service possibilities within SAP Analytics Cloud, end users cannot only see predefined stories, but can also make their own analysis.

Innovation & digitization

- Classify leaks automatically into the right categories based on probability
- Innovative fail or scale approach that allowed to abort the project after every ten days.
- Cloud and on-premise data sources
- Generic sensor data
- Data mining via R integration
- Data driven asset management of utilities network
- Using a POC to come up with the best results. The first POC covered 100 of about 350 water zones, which gave the best insights for the next phase of the project. Every zone has specific needs.





Benefits and Outcomes

Business / Social

Business:

- The idea from the beginning was that the solution needed to be able to **extend the results** of the project to other drinking water companies and members of De Watergroep's ecosystem, and that is exactly what De Watergroep is exploring at this very moment.
- In a next phase, the solution can allow De Watergroep to **extend its offering**. Where its services now end outside of the house or company, De Watergroep could help and when identifying a leak, also a network of trusted plumbers that can help to fix leaks in private houses.
- This project perfectly illustrates De Watergroep's new **business model**, which wants to empower their employees and invest smartly in new technology
- The automation in reporting has been increased, while the number of errors went down. At the same time, there is less time spent on reporting.

Social

It is too soon to tell if De Watergroep's aim to reduce NRW with 1% by 2020 will be met. It can however be said that leak detection is now only a matter of a week, where it used to be a month. And if leaks can be detected sooner, it goes without saying that they can also be fixed sooner. In times where water is scarce, this is a significant improvement.

IT

This project drives down the software-to-services ratio and reduces total project costs:

- **No internal knowledge build up required** – because the right people were involved internally, and because the right technical skills were added and thanks to a smooth handover, the support costs were reduced, as well as reporting development costs, since creating reports does not require any additional skills. Working with a **POC** with one regional head helped to come up with a good product before rolling it out to the other regions.
- **Flexible architecture and data model** has already proven its value in adding new models from concept to production in less than 2 weeks. Still newer models are planned to be further investigated.
- Working together with a **supplier who had helped to set up De Watergroep's BI strategy**, and that carried part of the development costs, also helped to keep the project costs down
- Connecting existing systems and tapping into SAP's best practices helped **to reduce the development time**
- By **bringing together people from the business and IT** in the same project and having regular touchpoints to give regular thumbs ups/thumbs down on the project, the project was **run efficiently**, and **unnecessary development costs were avoided**. delaware, De Watergroep's partner, also invested 25 man-days into this project, which also helped to keep the costs down.
- Automatization, categorization and probability percentage give clear view into NRW.

Human Empowerment

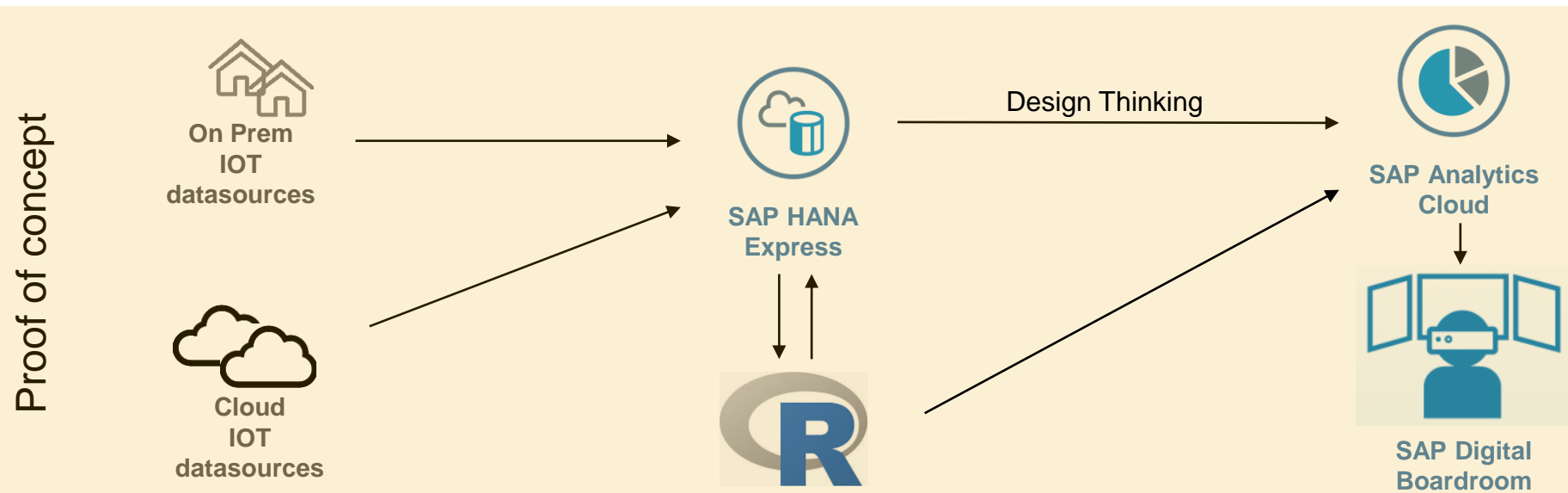
- The key to success in this project included involving the business and stakeholders from the very beginning, by **working closely together as one team and combining business and expertise about production processes with the data and analytical expertise of the subject matter experts**, who felt that they were bringing added value because of their expertise and could help shape the solution. **Sponsorship and ambassadorship** within and outside of the project team proved crucial in this project's success.
- For this particular project, it helped that the impact went further than De Watergroep's own business. **It also had an economic, social and environmental impact**. This made the project team members **proud** that they could contribute to such an innovative project because it was in line with their own values as well as those of De Watergroep. They saw the opportunities and results of providing leak detection differently, not only at De Watergroep, but also throughout Belgium and perhaps even abroad.
- This helped to focus and maintain the group's enthusiasm and commitment. Furthermore, working together with the right external experts allowed them **to learn and develop their own knowledge**. This is important because they will need to be able to stand their ground when the external experts are gone. It was also important to really have one team, one that celebrates successes too.
- By listening to the team members regularly, giving them **feedback** and offering them the opportunity to learn and extend their knowledge, they felt they were making a difference.
- **Reporting has become less complex** for the team and it does not require a specific skillset. It allows the team to understand the data easily and bring insights instead of data. This is a true upgrade to their role.



The right SAP
building blocks
for our
solution...



Architecture



Let us explain

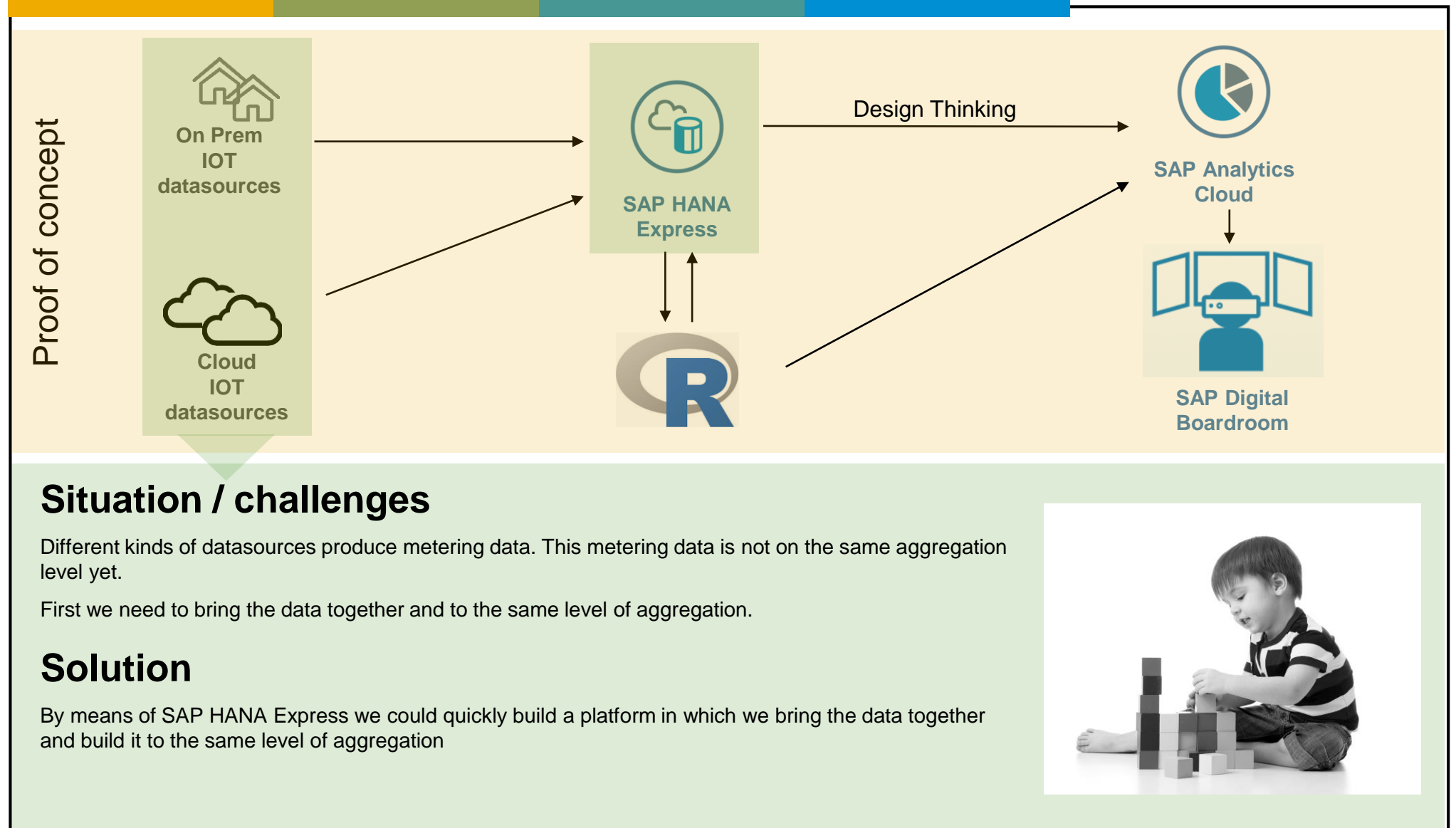




The right SAP
building blocks
for our
solution...



Architecture

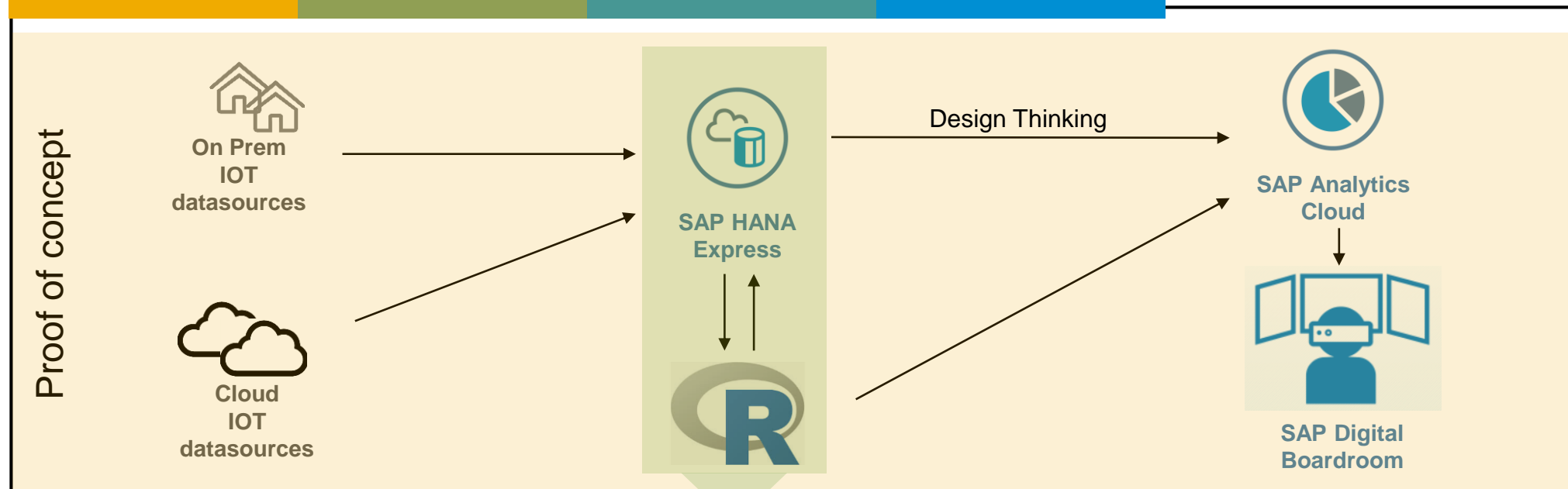




The right SAP
building blocks
for our
solution...



Architecture



Situation / challenges

The old way of working consisted of manual labor, to analyze graphs of every registration zone for every day and make a decision based on gut feeling of whether it was worth the investment to start the expensive procedure of checking a zone for leaks.

Solution

By means of SAP HANA Express we could analyse the data more quickly and more thoroughly.

R enables De Watergroep to assist their employees in making complex decisions. In the case of the leak detection algorithm R computes the highest potential loss of volume for every registration zone. Now the most urgent registration zones are automatically delivered by mail and immediately indicate the urgency of these zones, as well as the potential loss.

In general, R will enable De Watergroep to analyze different business problems with proven statistical methods to automate and strengthen decision making in complex business scenarios, so the possibilities are endless.

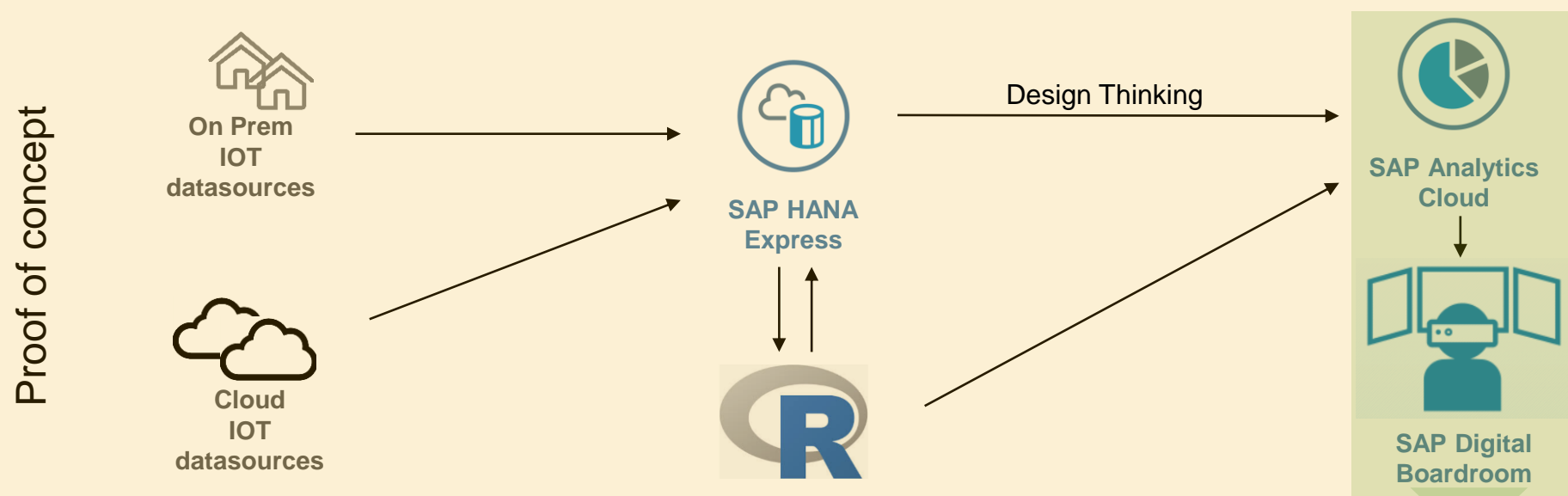




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Architecture



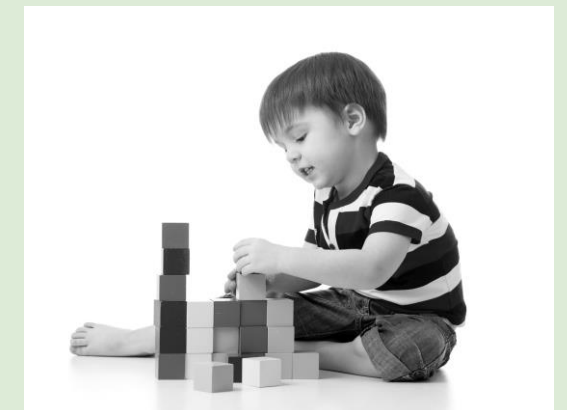
Situation / challenges

Very static reports were available due to basic analytics. No drill down possibilities were offered. Next, the business user was not able to modify things to the report based on the actual needs.

Solution

By means of SAP Analytics Cloud and the Digital Boardroom extension, the business users are now able to do deep dive analyses based on different angles to investigate. Also, the self service possibilities offer the business user possibilities to tweak the reports to her/his needs.

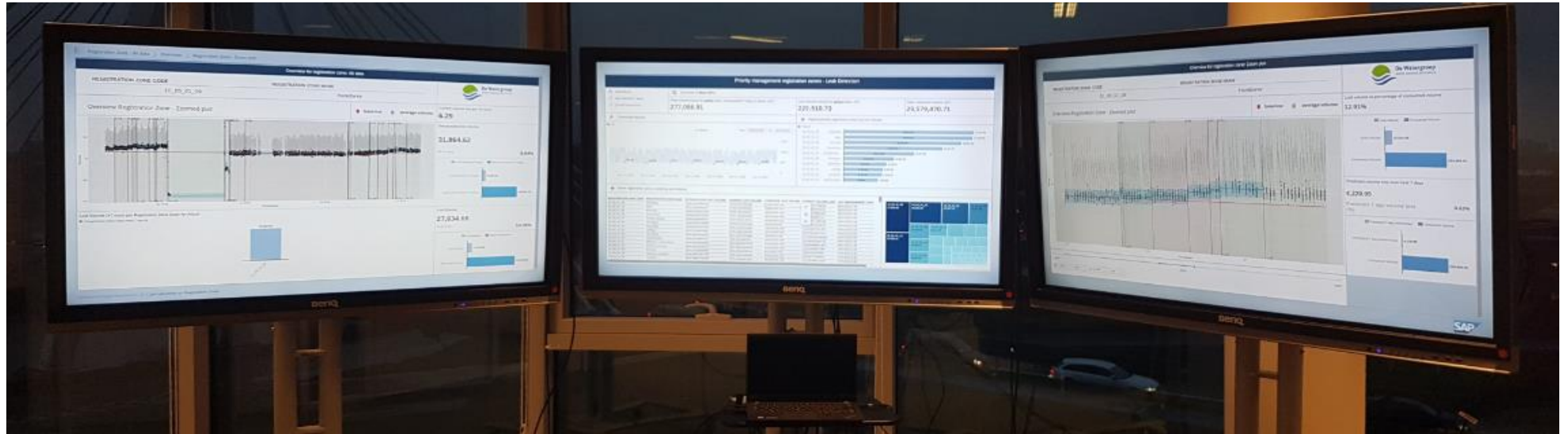
Via Design Thinking we came to a solution on how we could use the reports and boardroom to the best extent.





Project / Use Case Details

The outcome of leak detection on the SAP Digital Boardroom. To see how this works in practice, we refer to “[Additional Information](#)”.



“We have built this solution because we want to make sure that all water that we produce really gets to its customers. We want to discover all leaks as quickly as possible because we know how precious water is”

Francis Volckaert
Coördinator Lekdetectie



Project / Use Case Details

The outcome of leak detection on the field



"Before this initiative, we needed to rely on feedback we got from our customers. Customers needed to tell us where a leak was visible or when it was not visible, it was just wasted without anybody knowing. Now we can use data to discover these leaks which makes it much more easy for us"

Philip Servayge
Fonteinier Netbeheer



Deployment

Date of Deployment or POC: August 2018

Number of live users: 20

SAP Technologies Used:

SAP HANA Express Edition	POC
SAP Analytics Cloud	POC
SAP Digital Boardroom	POC
SAP Leonardo	POC
SAP Predictive Analytics (R)	POC

Server Processor: Unknown (cloud-based)

Linux Distribution: Unknown (cloud-based)



Emerging Technologies and Use Cases

The following Emerging Technologies and use-cases are part of the project and describe the contribution

	Technology or Use Case	Yes/No	Contribution to Project
1.	Machine Learning / Artificial Intelligence	NO	
2.	IoT	YES	IOT data coming from different SCADA systems
3.	3D printing	NO	
4.	Blockchain	NO	
5.	API Economy / Integrate the Intelligent Enterprise	YES	Integration of different data sources
6.	Cloud Native / Event Based Architectures	NO	
7.	Extending the digital core with SAP CP / ABAP in SAP CP	YES	Via SAP HANA Express Edition
8.	SAP Leonardo Application (extending SAP application, using Industry Innovation Kits or result of Design Thinking workshop)	YES	Design Thinking SAP Analytics Cloud Digital Boardroom R – integration in SAP HANA Express edition R – integration in SAP Analytics Cloud / boardroom



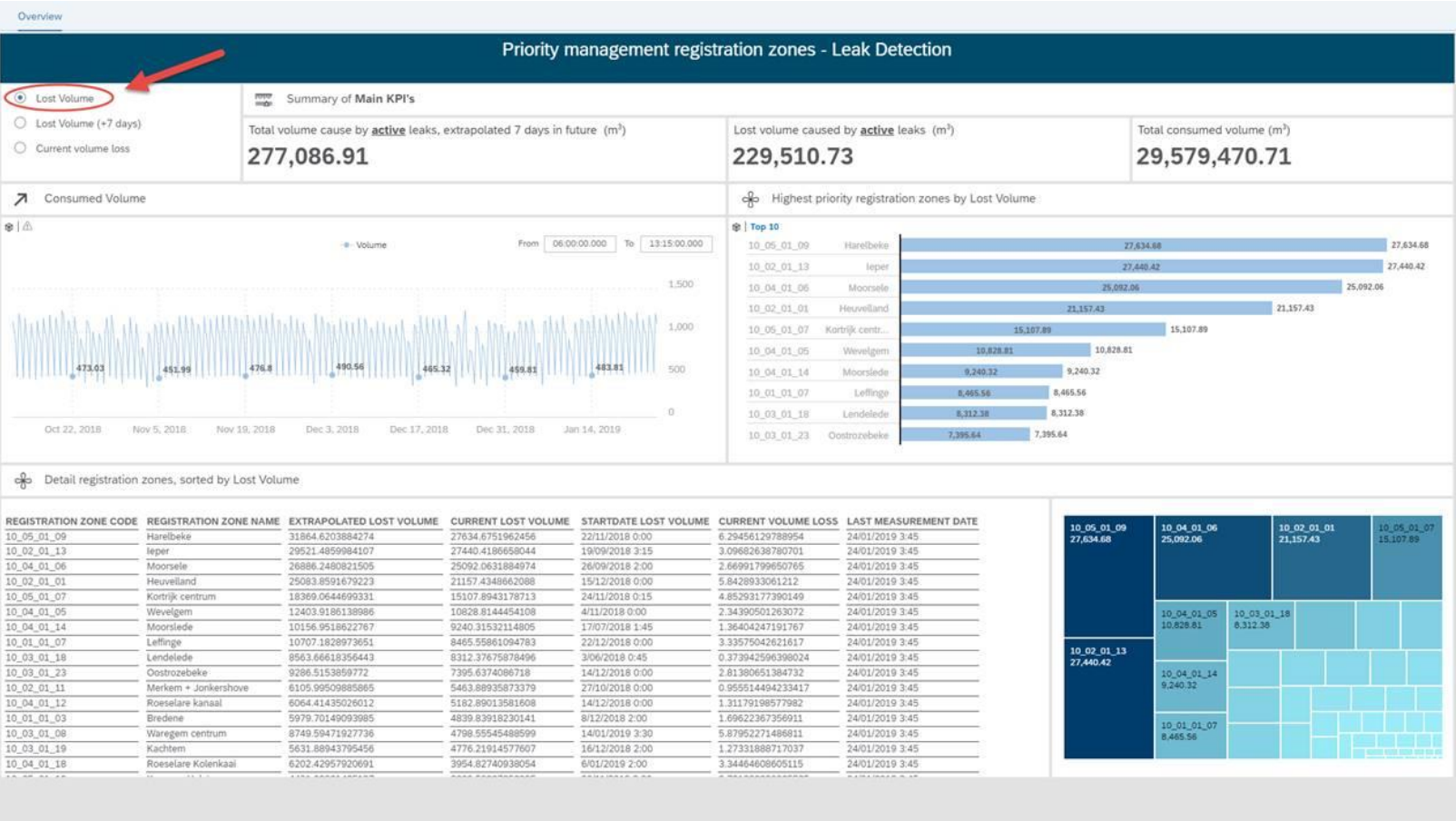
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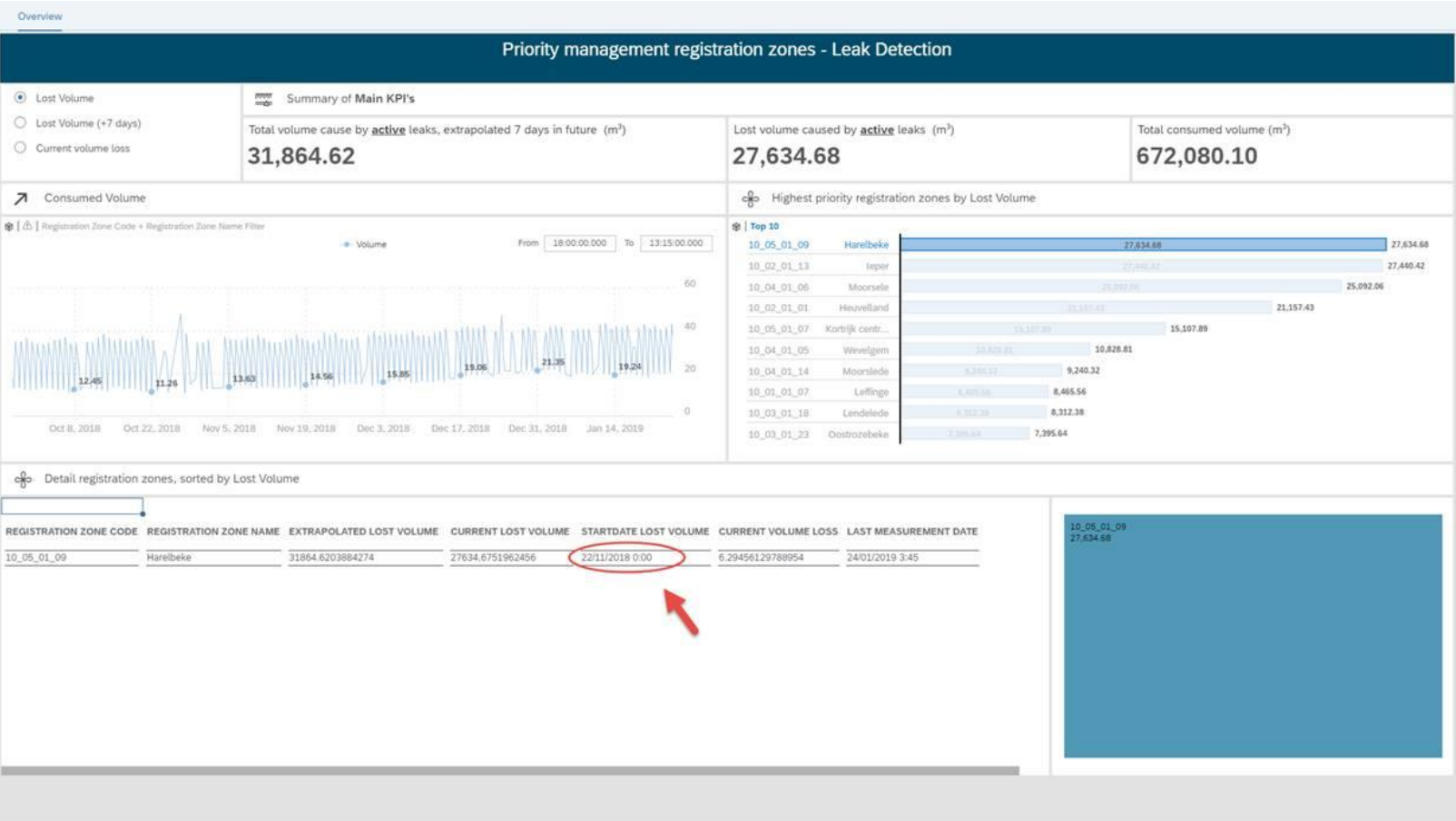
Additional information

End user scenario – Priority management registration zones



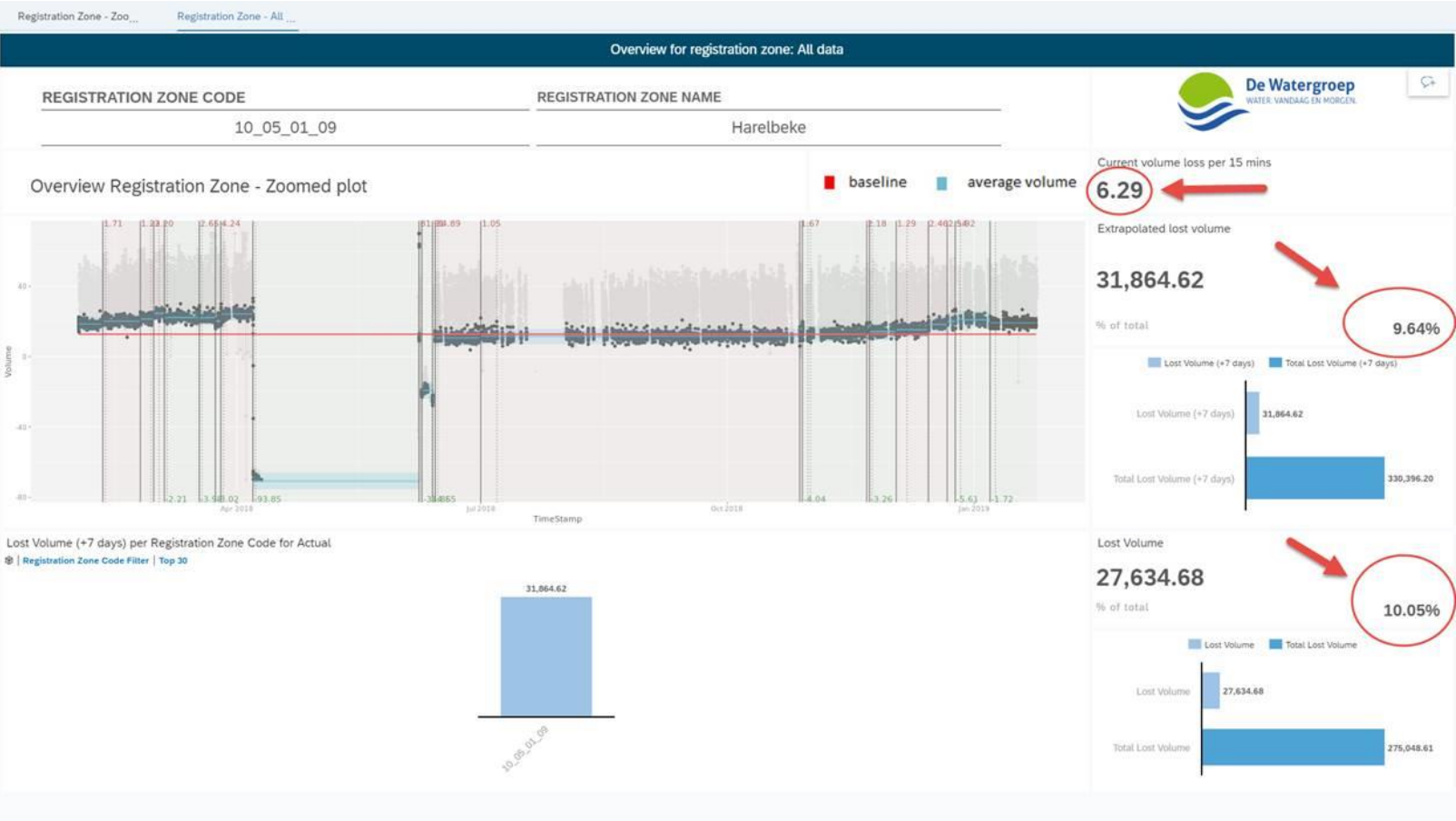
User opens the dashboard with overview of all the registration zones (s)he is responsible for.

End user scenario – Priority management registration zones



(S)he sorts the different zones based on the 'Lost Volume'. Doing so (s)he now has prioritized the different zones based on the volume of water that has been lost in these zones. (S)he takes a look and quickly sees that Registration Zone '10_05_01_09 – Harelbeke' has lost the most volume, and this started the 22nd of November

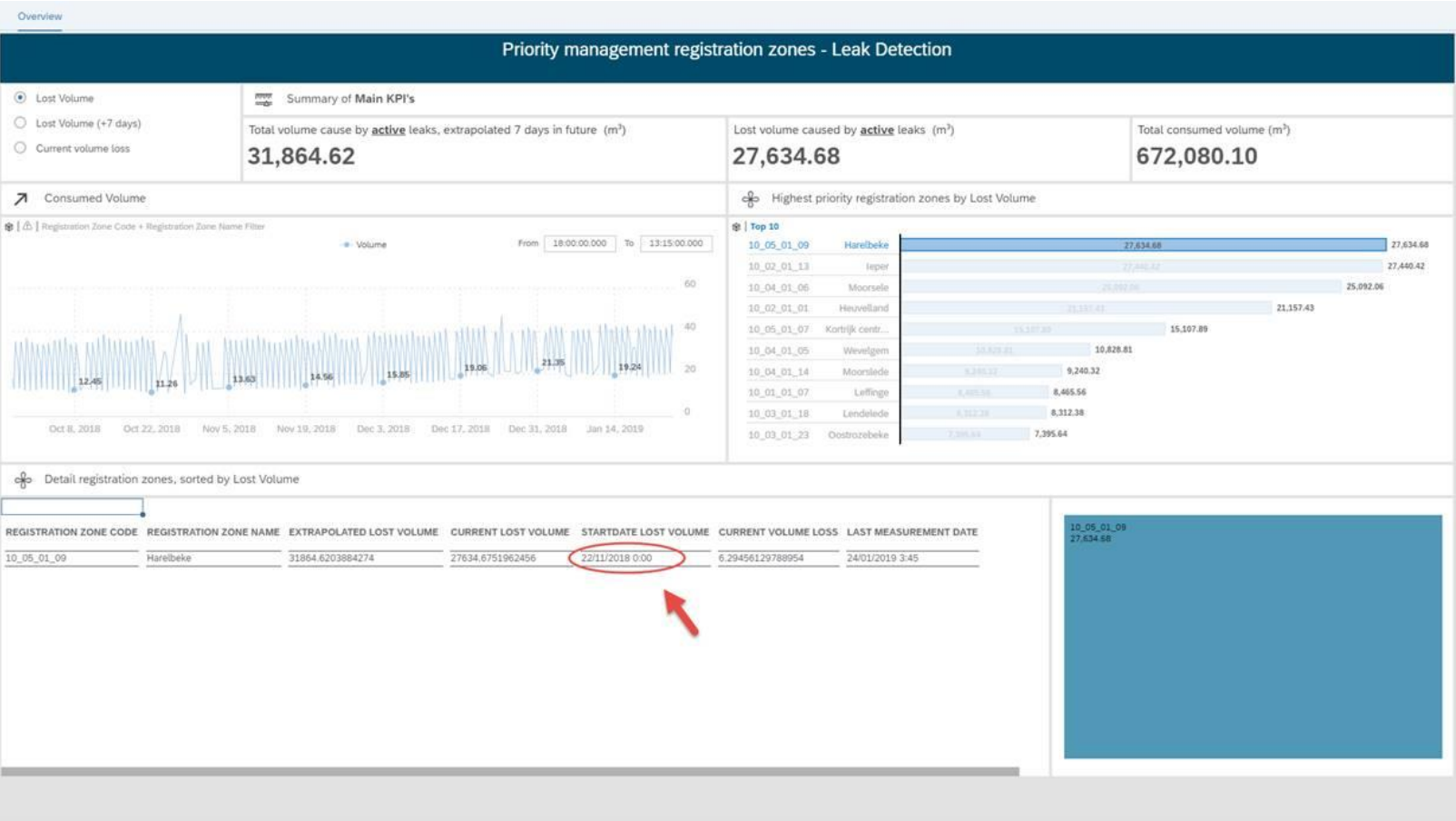
End user scenario – Overview for registration zone – all data



(S)he takes a look at the second screen: 'Overview for registration zone – all data'

(S)he sees that the baseline (red line) is set correctly and sees that this registration zone amounts to up to 10% of the total volume lost. Next to that (s)he also sees that the extrapolated volume (in 7 days) also amounts to 10% of the total extrapolated volume and notices it's currently losing 6.29 m³ of water every 15 minutes.

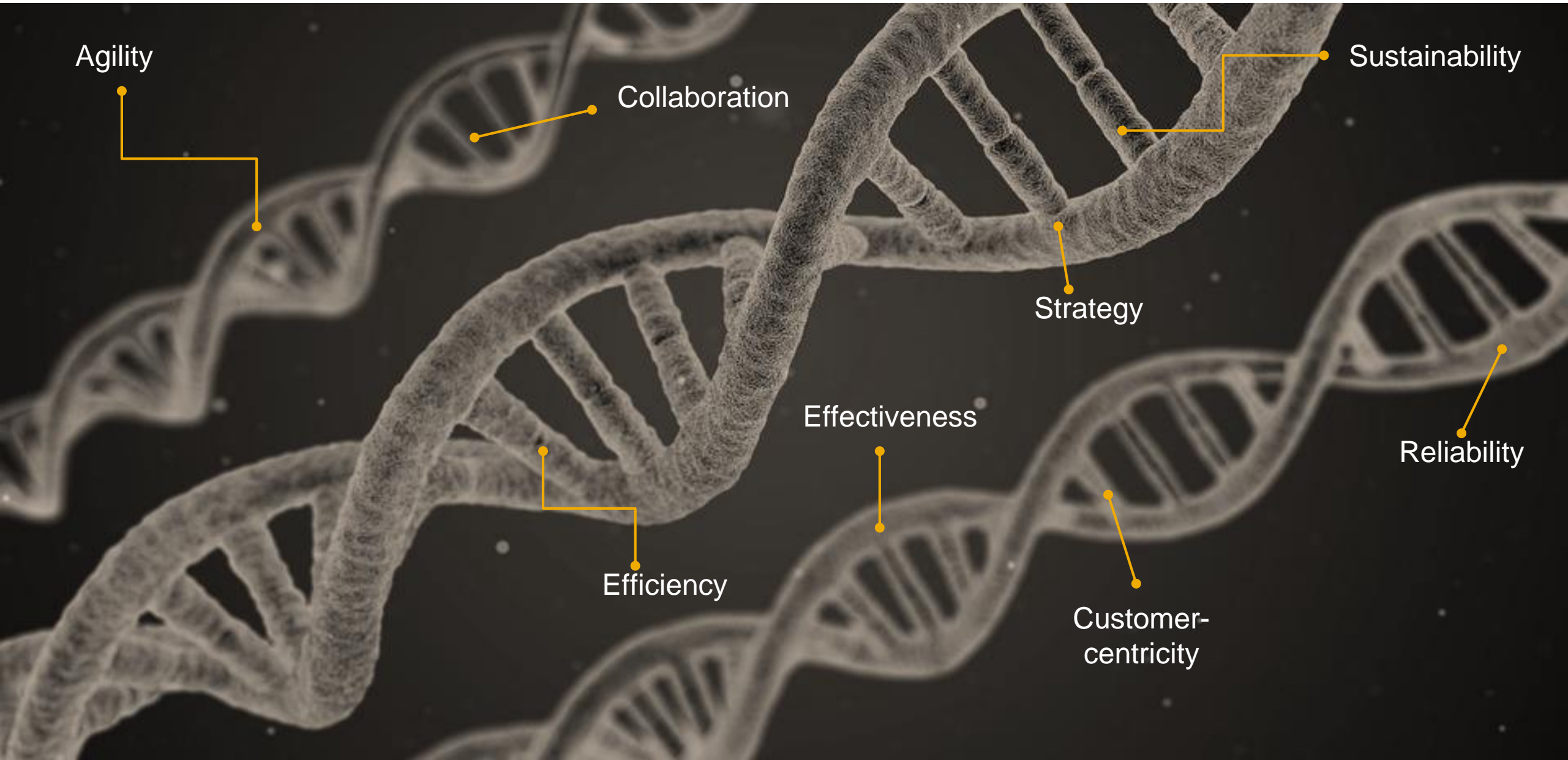
End user scenario – Overview for registration zone – all data



(S)he then takes a glance at the 'Registration Zone – Zoomed plot' to find out what's going on.

(S)he immediately sees that starting in November, 12.91% of the total volume was lost due to leaks. (S)he sees in the graph that the average volume level has gone down because of the repair (s)he had done a few weeks ago, but quickly sees that the Registration Zone has not yet gone back to the baseline-level. (S)he then orders his/her team to go and inspect the Registration Zone as the potential loss of water is huge here.

Innovation is part of De Watergroep's DNA



Agility

Collaboration

Sustainability

Strategy

Effectiveness

Reliability

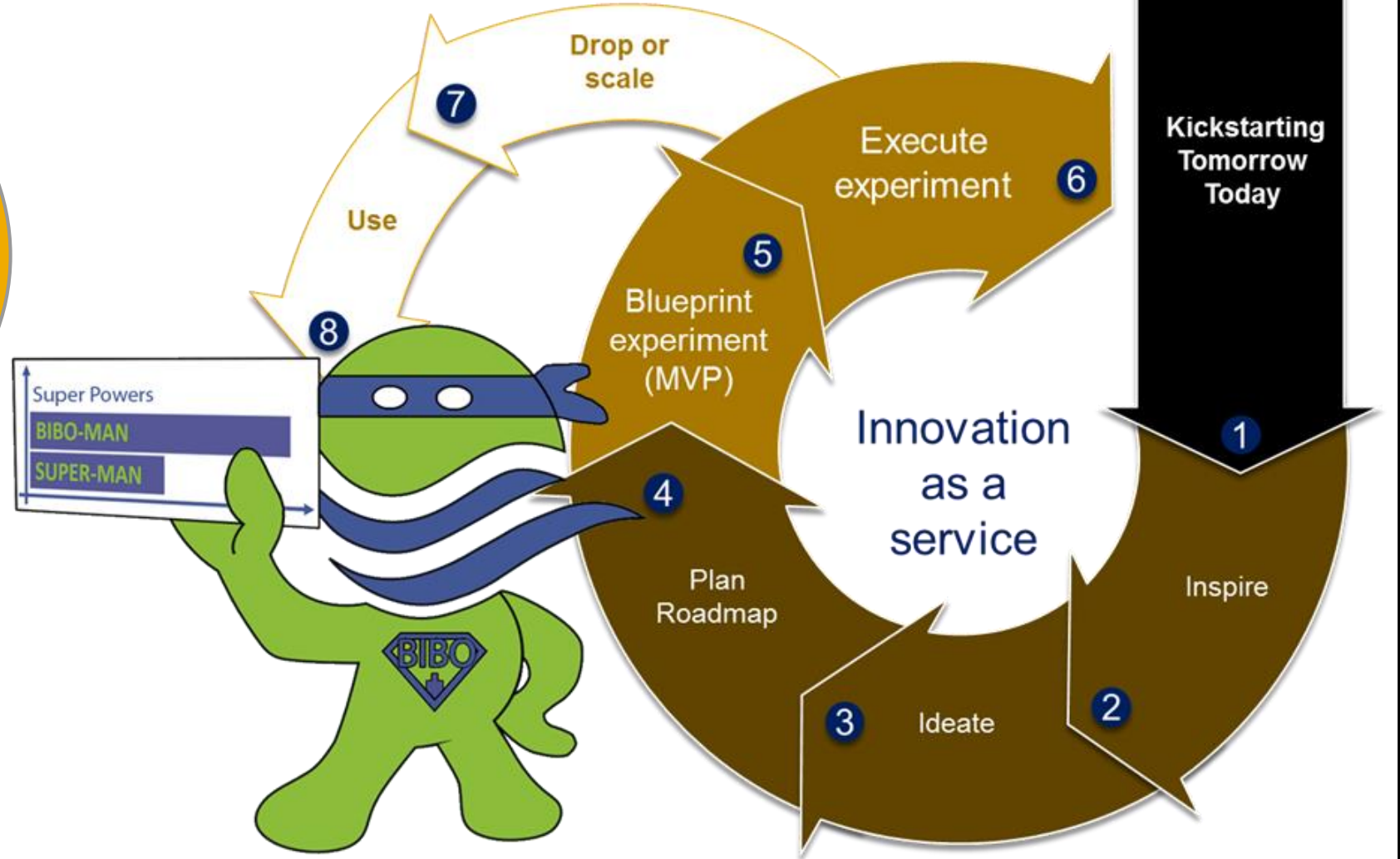
Efficiency

Customer-
centricity



Project / Use Case Details

An **agile** approach that allowed for making drop or scale decisions very quickly, and that was based on best practices, industry standards and the existing branding, helped to drive innovation more quickly, just like it would have in a private company.

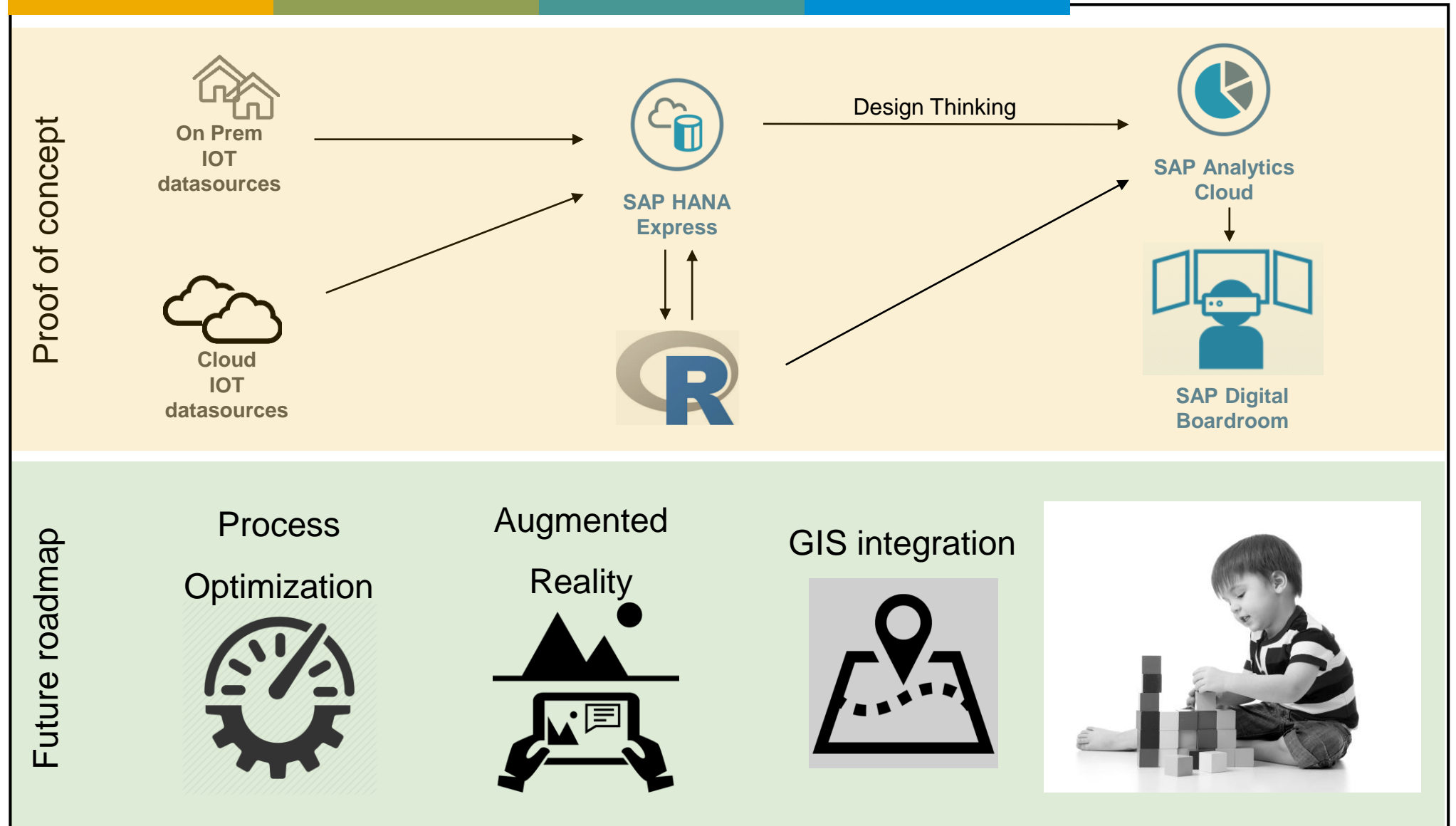




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Thank you