Use Case:

Driving Operational Efficiency and Reducing Water Loss

February 2018

Covering a challenging area with a steep topographical terrain and serving about 500,000 people, Haifa's water utility company Mei Carmel has one of the most complicated water grids in Israel. The network includes 600 km of water mains and over 100 different pressure zones. In April 2016, Mei Carmel initiated a pilot with TaKaDu's Integrated Event Management solution to provide greater visibility of its water network and reduce water loss. Since deployment, TaKaDu has helped the Haifa utility to make huge improvements in its operations and efficiency levels and deliver significant NRW (non-revenue water) savings.

Business Need

Founded in 2010, Mei Carmel spent the first three years dealing with malfunctioning infrastructure; the utility replaced over 120,000 water meters and established a control system.

A couple of years later, Mei Carmel started a Water Loss Reduction Process, led by Stav Avraham, Mei Carmel's COO. Stav implemented a multi-disciplinary program combining engineering, design, re-organization and technological steps focused on long-term water loss reduction.

Mei Carmel proceeded to take active measures to cut down on water loss. A dedicated team was established with a specific budget, defined assignments and scheduled weekly meetings. Mei Carmel set up main zone DMA (district metered areas) installations, meter transmissions, 'back to back' AMR (automatic meter reading) with supply connections and acoustic sensors for real data, including night flows and basic balance.

With access to real data, the team found the main causes for water loss to be the faulty measurements of water sources, unmetered landscape irrigation connections, water theft, unobserved pipeline bursts and incorrect consumer meter readings. Leaks were still mostly discovered through regular checks.

In early 2016, Mei Carmel took a decision to take further measures to improve its water efficiency. Although proud of its low water loss levels, it understood the value of harnessing data to gain further insights into network events. Mei Carmel turned to TaKaDu's Event Management Solution to enable them to monitor the water network automatically and provide early detection of 'incidents' without being dependent on manual feedback from the field.

Following a successful pilot, the utility signed a three-year contract with TaKaDu in June 2017. Today Mei Carmel has over 80 DMAs and control zones with the entire network covered by TaKaDu's integrated event management solution.

Solution

TaKaDu – the 'umbrella' management layer, managing the flood of data

Realizing that the huge amount of data, generated by several sources, could no longer be handled separately, Mei Carmel started using TaKaDu as its daily network management platform. TaKaDu oversees an implementation process involving different technologies, such as acoustic leakage sensors, meters, water balance and pressure monitoring, and a range of engineering decisions. Acting as the 'umbrella' layer for all events, TaKaDu provides in-depth insights into the network's events and incidents, including leaks, bursts, changes in water pressure and faulty assets.

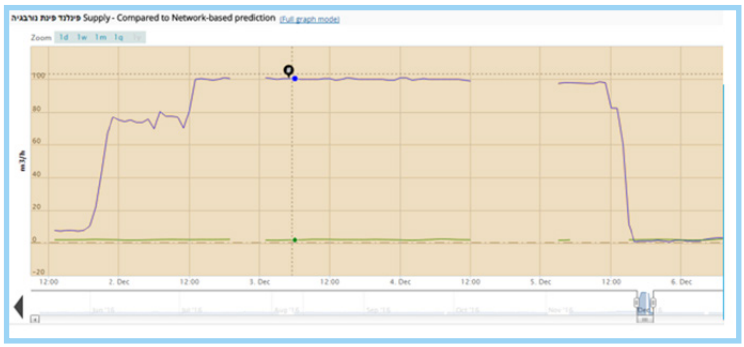
Integrated at the highest level, TaKaDu enables every event and anomaly to be detected, analyzed, managed and resolved as quickly as possible. For example, TaKaDu has enabled Mei Carmel to detect hidden leaks (see the example below), extract nightline trends for identifying leaks before they turn into bursts and carry out individual water loss analysis by examining deviations from fixed patterns.

TaKaDu's software is also integrated with Mei Carmel's Customer Call Center and other departments, ensuring cross-organizational coordination on an ongoing basis. The TaKaDu system provides managerial dashboards, actionable insights and detailed reports to management teams, enabling smarter decision-making.

TaKaDu Event Examples

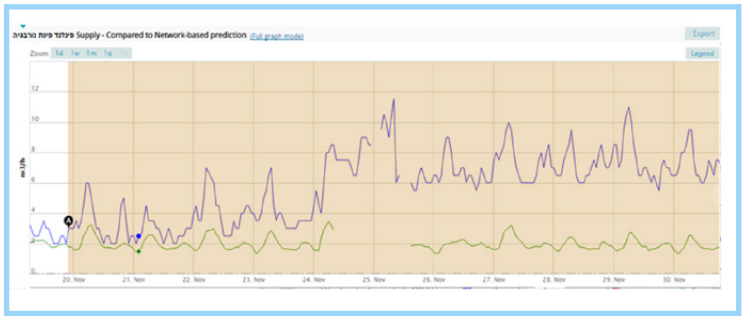
1. Hidden Leak Event

TaKaDu's software showed a major leak in the city of Haifa through a significant flow increase in one of the areas. A field team was dispatched to the area and they proceeded to find and repair two small leaks. Although it was assumed that the problem was solved, TaKaDu continued to report a flow increase. The field team was sent again to investigate more deeply. This time, they found a huge leak in a hidden creek outside the residential area – a place where no one usually goes – saving Mei Carmel approximately US$90,000.



Graph showing the start of the event in TaKaDu.

Eventually, the main leak was found in a natural creek outside the residential area. Without TaKaDu, the leak would probably not have been discovered for another 6-10 months.



The event continued to show a flow increase even though repair teams were sent to the area, discovered two different leaks, and fixed them.

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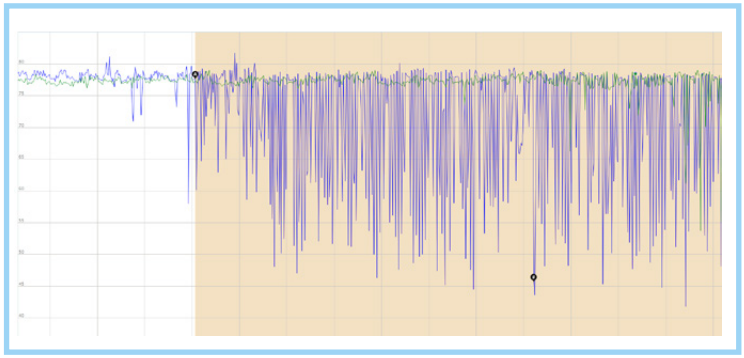
2. Pressure Decrease Event

TaKaDu detected a reduction in pressure in a PRV (pressure relief valve) located between two reservoirs. The valve needed to be opened to clean one of the reservoirs, but the maintenance team had forgotten to close back the valve and TaKaDu alerted to an anomaly in the behavior of the data. Mei Carmel thought that something was wrong with the meter, however, after checking the meter, they saw that it wasn't the problem. TaKaDu continued to send an anomaly alert. Mei Carmel then got another alert regarding an increase in the level of the reservoir, and, together with the TaKaDu alert, understood what happened. They sent a member of the team to open back the valves and the event was resolved.



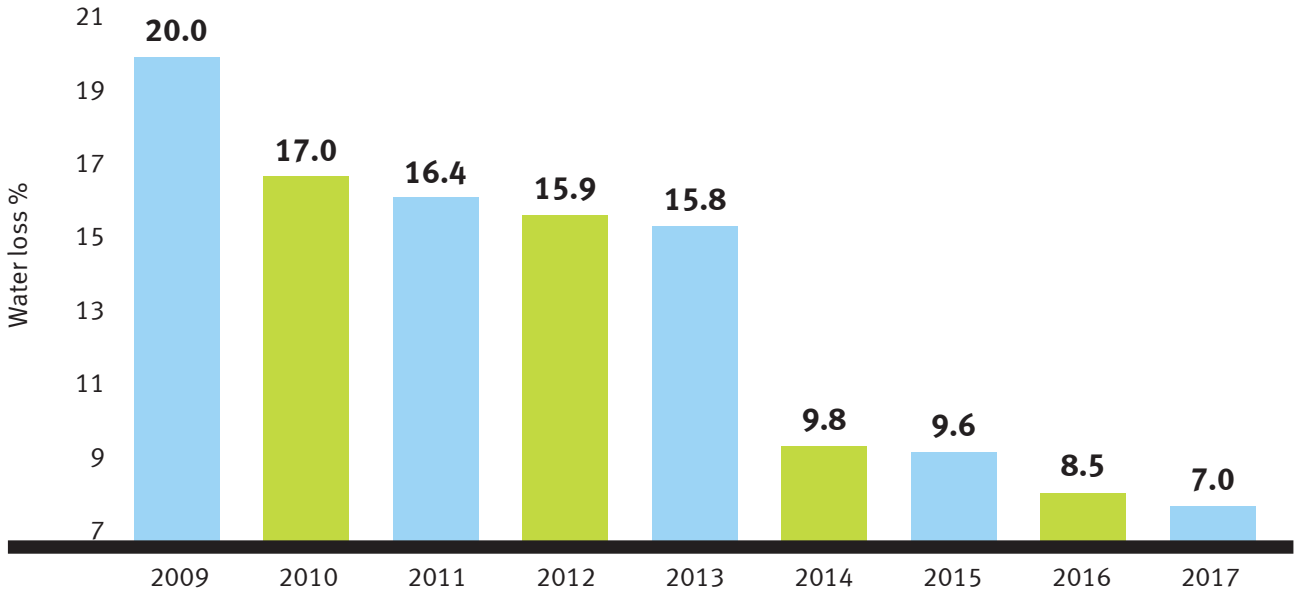
Graph showing the start of the event in TaKaDu.

Results

By taking a holistic approach to water efficiency, Mei Carmel has implemented an effective PPT (People, Processes and Technology) strategy using TaKaDu. Mei Carmel has made huge improvements in its operational efficiency levels and reduced its NRW loss.

TaKaDu's tangible and intangible benefits include:

- Repairs validation – ensuring that a leak has been successfully repaired by monitoring the event lifecycle from start to finish. Events are closed in the system only after TaKaDu has verified that it has been fixed and the usage pattern has returned to normal.
- Leakage awareness time – detecting small leaks within hours and trend leaks which wouldn't have been identified otherwise
- Reduction in analyst time – providing automatic alerts, an intuitive user interface and a variety of graphs and reports. Previously, Mei Carmel's analyst would have spent a full working day preparing a report with specific information per DMA.
- Avoiding collateral damage – detecting growing leaks before they become failures and bursts and reducing outages of critical facilities
- Improved network operations – identifying breaches between DMAs, saving pumping energy and detecting network operation failures via the detection of abnormal flows or pressures
- Visibility of network availability – increasing system up-time through the ongoing monitoring of sensors and telemetry
- Maintenance cost savings and shorter repair cycles – via the early detection of network inefficiencies and a centralized view
- Improved customer service and customer satisfaction – leading to reduced service interruptions and faster response times
- Regulatory compliance – enabling objective visibility into KPIs, network metrics and operational activities through dashboards
- Cross-departmental coordination – information is shared with representatives from different departments
- Enhanced prioritization – enabled by the granular view of network issues and capabilities, events can be sorted based on priority and specific need



Graph showing the reduction in water loss at Mei Carmel (2009 – 2017)

”The implementation of TaKaDu at Mei Carmel proved to be perfect timing. Firstly, this was due to the quantity and quality of data gathered from the water network, which required extensive and complex analysis, and was difficult to manage manually and prioritize. TaKaDu's analytical tools were able to take in the vast amount of information and gain real operational value. Secondly, Takadu is an open platform for any new data sources being added, such as pressure control, acoustics sensors and more, enabling cross-referencing of information and focused decision-making. Thirdly, TaKaDu allowed us to follow night line targets and cross-check them with historical nightline behavior.

This proved to be a very efficient way to monitor network performance, such as identifying network leaks and other anomalies, and to solve the problem rapidly, reducing water loss.”

***Stav Avraham**, Mei Carmel’s COO*