



April 2019 | Case study:

From a hidden leak to great customer service: CEM in action

Background

Knoxville Utilities Board (KUB) is an independent agency of the U.S. city of Knoxville, Tennessee, providing electric, natural gas, water, and wastewater services to more than 459,000 customers in Knoxville and parts of seven surrounding counties.

KUB has been using TaKaDu's Central Event Management (CEM) solution since April 2017 as part of its concerted efforts to improve customer service, increase network visibility and reduce non-revenue water (NRW). As part of a water loss reduction initiative, KUB invested in the implementation of District Metered Areas (DMAs). The DMAs partitioned the water network into 44 small areas serving no more than 3,000 customers, making it easier to find leaks. Over 200 pressure sensors and flow meters were installed at over 100 locations to monitor the network within each DMA.

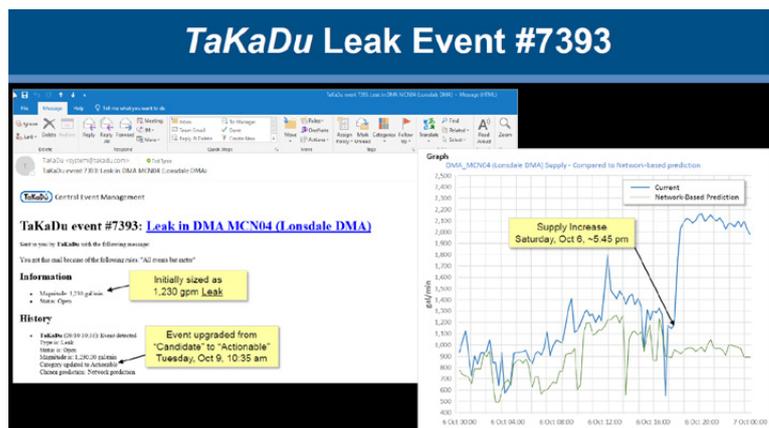
Since deployment, TaKaDu's cloud-based CEM solution has enabled KUB to detect and manage the vast volumes of raw data, providing near real-time analysis and alerts for network events and incidents of multiple types, such as leaks, bursts, faulty assets, telemetry and data issues, operational failures and other anomalies. TaKaDu's predictive data analytics and algorithms provide important information and knowledge about these events, enabling KUB to prioritize and make educated managerial decisions.

Hidden leak event “lifecycle”

On **October 6**, 2018, TaKaDu’s system detected a leak event showing the impact of the leak on the DMA_MCN04 Supply. The event was initially sized at 1,230 gallons per minute (gpm). The anomaly was detected by comparing the current supply pattern with the predicted pattern.

The event showing the demand increase was monitored and managed by the KUB team, who added a series of comments to the event. Originally the problem was thought to be a faulty sensor or component, but the stability of the pattern was “puzzling.”

KUB conducted step-testing after the event was identified and measured (magnitude, amount of water loss, etc.) by TaKaDu software to narrow the search. By closing a few valves temporarily, KUB quickly determined which sector of the DMA had the leak. They then looked at their hydraulic water model and used lift-and-shift acoustic loggers and a ground microphone to pinpoint the exact location of the leak.



The leak was found and isolated on **October 18**, in the median of a 6-lane divided interstate. Much larger than expected, the leak averaged around 1,333 gpm, for a total leak volume of 19.2 million gallon (MG), representing a massive water loss! Without TaKaDu informing KUB about this event and its magnitude, it’s very possible KUB would not have known the leak was occurring. The leak was found to be on a pipe beneath the interstate near a bridge foundation.

Leak Found – Thursday, Oct 18nd ~2:45 pm



“Without having DMAs and the TaKaDu CEM solution to know and manage the data, the leak could very likely have existed for a long period of time without us knowing! This was an excellent demonstration of the power of TaKaDu as a management system in reducing the Awareness Time component of leaks as well as providing our staff with all the necessary information to make an educated decision and prioritize the tasks.”

Ted Tyree, Water Systems Engineering at KUB

Results

Better decision making and significant water and cost savings

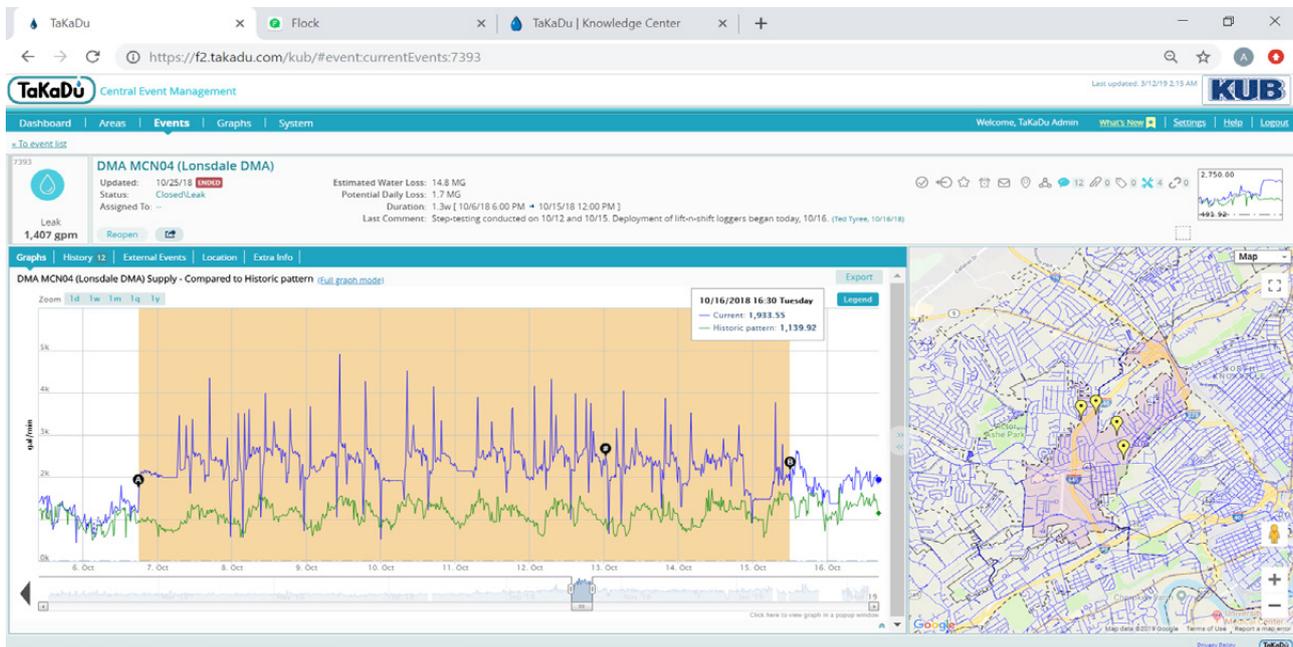
From its detection until it was found, the estimated NRW loss during the week was 19.2 MG at a cost of US\$7,718. If the leak had continued, the water and financial loss could have been much more significant, reaching almost a quarter million dollars over one year, as shown in the table on the right.

If the leak had turned into a burst, the incident could also have caused a major disruption to the highway, affecting traffic flow in the area and damaging infrastructure; resulting in a higher total repair cost.

Time period	Estimated water loss (MG)	Cost (US\$)
1 month	48	19,296
3 months	144	57,888
12 months	584	234,678

Summary

TaKaDu provided prompt notification of the event, preventing significant NRW loss and disruption to the public. Converting the water network data in the DMAs into actionable insights, TaKaDu acted as the centralized platform for managing the entire life-cycle of the event quickly and effectively.



Leak Event in TaKaDu