

Currenta and HiveMQ: Driving Digital Transformation in the Chemical Industry

The Drive for Digital Transformation: Overcoming Operational Hurdles at Currenta

Currenta provides infrastructure management and services for CHEMPARK, one of the largest chemical parks in Europe. They ensure the safety of the site, manage waste disposal, and provide means for production such as process water, steam, and energy. Its two subsidiaries, Chemion and Tectrion, are concerned with logistics and technical maintenance, respectively. They also provide analytics and state-of-the-art emergency and fire services. Boasting 3.2 billion euros in annual sales, spanning three chemical park sites with an impressive workforce of over 3,400 skilled employees, Currenta is refining and innovating the chemical industry with the goal of fostering sustainability. The company has a huge influence in its sector and offers over 950 services for approximately 70 customers, and manages 1,800 buildings.

In an era where digital transformation and interconnectedness are increasingly critical, Currenta decided to leverage the power of the Internet of Things (IoT) and the lightweight MQTT protocol to streamline its operations. To power its business's backend and digital revolution, Currenta turned to HiveMQ, an MQTT enterprise solutions provider that offers high availability, security, and scalability.

MQTT is a lightweight messaging protocol that delivers efficiency and reliability to the communication between Currenta's services, plants, and systems for greater agility amidst the complex demands of the chemical industry.

Currenta offers a multitude of chemical management operations including green energy products, chemical recycling, and more. One of its offerings is wastewater testing services to companies located inside or outside of the CHEMPARK.

Before embarking on a digital transformation journey, the wastewater collection procedure was done using analogous devices. Sample collection was performed by the customer with Currenta taking charge of samples after they were collected by plant personnel. The processes needed to be streamlined and centralized.

At a glance

What do they do?

- Infrastructure management and services and green energy supplier for CHEMPARK
- Wastewater testing services

Challenges

- Centralize and improve efficiency for wastewater testing
- Offer CHEMPARK-wide sampling services

Solution

- HiveMQ established communication between Currenta's industrial services, plants, and systems
- HiveMQ Enterprise Security Extension for enhanced security features

Results

- New system with HiveMQ streamlined operations, reduced network overhead
- Broadened business offerings and new services using online sampling devices

CURRENTA 



As the sampling takes place in the customer's premises, Currenta needed digital samplers that allow remote configuration and online data access to monitor the sampling process. To expand its business offerings, Currenta wanted to provide the service of sample collection to take charge of the entire end-to-end process from sample collection until issuance of a certificate of analysis.

Facing these challenges, Currenta sought an innovative solution that could modernize its wastewater collection procedures, improving operational efficiency, and ensuring the reliable and secure handling of samples. Currenta understood the necessity of continuous technological innovation and evolution. Dr. Markus Weber, head of the environmental and process analytics lab Leverkusen at Currenta, said, "In a rapidly digital world, it's important for us to implement systems that not only streamline and automate our operations but also uphold our commitments to safety and sustainability." This led them to explore the possibilities of Internet of Things (IoT) technology, MQTT, and HiveMQ.

Choosing and Implementing HiveMQ for Efficient Industrial Operations

Recognizing the need to overhaul its wastewater process sampling, the team needed to deploy automated sampling devices, which required a secure, efficient wireless communication system.

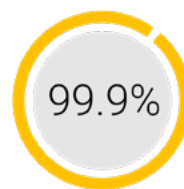
Currenta recognized **MQTT** as an ideal protocol because of the security features, small code footprint, and ease of use due to JSON on the payload.

Initially, the company conducted a Proof of Concept (PoC) using a free software MQTT broker. The team was able to prove MQTT as a viable solution but needed an enterprise-grade solution that was secure, reliable, and flexible enough to scale with their use case.

The Currenta team chose HiveMQ to take advantage of the platform's clustering feature for high availability, and the enterprise security extension to manage IoT devices.

HiveMQ's platform enabled a seamless MQTT implementation, establishing a robust communication channel between Currenta's industrial services, plants, and systems. HiveMQ's extensibility allowed Currenta to customize the platform according to its stringent security protocols and other specific requirements. Dr. Jannick Kappelmann, Technical Data Steward at Currenta, confirmed the significant impact of HiveMQ's flexibility. "We were able to engineer and extend the platform according to our unique needs," said Dr. Kappelmann.

In addition to HiveMQ, Currenta selected Apache Kafka for real-time data streaming to create high-availability clusters that can handle vast quantities of data events in real time. The goal is to provide 99.9% availability to ensure seamless and uninterrupted services for their customers.



AVAILABILITY

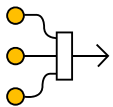
to ensure seamless and uninterrupted services for their customers.

Dr. Kappelmann, commented on their technology choices, "As we modernize our operations, we rely heavily on both HiveMQ and Kafka. HiveMQ's ability to handle MQTT's lightweight messaging coupled with Kafka's reliable high availability architecture makes a powerful combination. Our aim is to integrate these high availability clusters into our architecture, ensuring that we always stay online, and our data remains secure."

Improved Operations, New Services, and Enhanced Security Compliance

With the implementation of HiveMQ's MQTT platform, Currenta has significantly improved its operational efficiency.

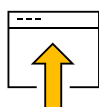
The system can now manage more than 10,000 concurrent connections and throughput exceeding 10,000 messages per second, resulting in streamlined operations, reduced network overhead, and quicker system updates. “We are planning to roll out the new sampling device to all plants in the future enabling continuous monitoring of the sampling process.” said Dr. Weber. “This efficiency has been made possible due to the scalability and flexibility of the HiveMQ platform.”



Streamlined
operations



Reduced network
overhead



Quicker system
updates

Currenta’s IoT modernization also allowed them to reduce the long-length troubleshooting process. Previously, troubleshooting required sifting through logs for up to 30 minutes, but with HiveMQ’s MQTT solution, issues are immediately available on the dashboard.

The real-time visibility and monitoring are also leveraged in Currenta’s automated water sample collection process. This automation enabled Currenta to offer a completely new service to its plant customers.

Most importantly, Currenta sought a solution that enables state-of-the-art client authentication and allows for fine-grained authorizations. “As an operator of critical infrastructure, we follow state-of-the-art IT security measures in every aspect of our IT operations,” Dr. Kappelmann noted. By leveraging the security features of HiveMQ, Currenta not only secures device access to the MQTT service but also ensures the protection of sensitive data and the continuity of critical operations.

A Bright Future Powered by HiveMQ

Currenta plans to continue using HiveMQ as a core part of its digital strategy, which includes an expansion of its MQTT implementation to support new services and emerging technologies. Dr. Kappelmann said, “HiveMQ has allowed us to



HiveMQ has allowed us to significantly improve user satisfaction and operational efficiency through a robust, always-on solution.

Dr. Markus Weber, head of the environmental and process analytics lab Leverkusen at Currenta



significantly improve user satisfaction and operational efficiency through a robust, always-on solution. We’re excited about the future possibilities with HiveMQ.”

As Currenta’s industrial operations continue to evolve, the role of HiveMQ as the foundation of its connectivity architecture allows Currenta to customize its digital infrastructure according to its ever-changing needs. Dr. Kappelmann noted, “As we move towards an increasingly connected industrial landscape, the role of a robust, reliable, and flexible MQTT platform becomes more critical. HiveMQ has proven itself to be that platform for us.”

With HiveMQ as a key component of its connectivity infrastructure, Currenta is well-positioned to realize its ambitious plans for digital innovation and sustainability.

“We are continuously exploring new ways to enhance our services and provide added value to our customers. With HiveMQ, we are confident that we can effectively implement these innovations, ensuring that Currenta remains a leader in industrial services, achieves a goal of 99% availability, and ultimately, ushers in sustainability in the chemical industry,” concluded Dr. Weber.