



“There is a long list of promises about the use of blockchain in logistics, yet hardly any productive applications to be found. The Kühne + Nagel IT Teams are able to gain practical experience using the delivered VGM (Verified Gross Mass) portal solution, which applies blockchain technology in a real production environment.”

Bernd Dahmen,

Senior Vice President Global IT
Air and Sea, Kühne + Nagel

* VGM = Verified Gross Mass



Increasing trust in data with blockchain technology

Proving the capabilities of blockchain technology in an existing productive system

Kühne + Nagel checks the weight of sea freight containers using blockchain technology

The global logistics company Kühne + Nagel recognized early on how digitalization could set it apart from its competitors. The use of new technologies such as blockchain is part of the organization’s strategy to continuously improve processes as well as its business model.

“Kühne + Nagel is involved in a series of blockchain projects which focus on unsolved industry challenges in various areas,” explains Martin Kolbe, Chief Information Officer at Kühne + Nagel International AG. “This involves working closely with customers, suppliers, and authorities, because we can only exploit the full potential of blockchain when working in collaboration with our business partners. Running the Verified Gross Mass (VGM) portal on blockchain in a high-volume environment delivers us valuable findings and the basis for the development of further shared blockchain applications.”

Overview

Client: Kühne + Nagel

Industry: Logistics

Country: Germany

Client Challenge/Business Need:

Kühne + Nagel wanted to gain experience with blockchain technology by implementing it in a suitable production environment, discovering strengths and weaknesses in the process

Solution:

Kühne + Nagel used an existing system – the VGM Portal – for transferring security-related information as part of SOLA (Safety of Life at Sea), which represented the ideal testing environment for the technology and was extended with Hyperledger Fabric

Results:

Together, Capgemini and Kühne + Nagel achieved the objective within two months. Hyperledger Fabric allows for swift data replication as opposed to a high level of manual configuration and was a steep learning curve.



Testing new, disruptive technologies in a suitable application scenario

Blockchain technologies, which became well-known through crypto currencies such as Bitcoin, are taking on an increasingly significant role outside of the financial world. There is particular hope for the possible impact of blockchain in logistics and supply chain management.

A closer look at many ongoing use cases reveals that they are often little more than marketing events, lacking any additional specialist value. However, that does not change the original premise that blockchain technology has the potential to play a crucial role in future IT landscapes. It is therefore important to implement the technology at an early stage and gain experience before using the technology in large projects or considering widespread strategic implementation. The best way to do this is to move beyond pure proof of concepts into systems used in daily operations. When selecting a system, it is important to consider that blockchain technologies make the most sense for processes where many people are working on the same data basis in an heterogenous environment. The ideal candidates for initial productive applications are therefore systems with limited technical complexity which are in use by many different communication partners. Based on this criteria, Kühne + Nagel was able to find a fitting use case.

A microservice based on hyperledger fabric

The Verified Gross Mass (VGM) portal was chosen as the use case for blockchain technology. Dispatchers share the container weight (verified gross mass) in the system and this information can also be transferred to connected shipping companies for further usage and distribution. The number of parties involved can be just as large and variable, making blockchain technology particularly suitable in this instance as opposed to a shared, centrally operated solution.

All information shared via the portal is saved "on chain," meaning native blockchain interfaces can be used to exchange data with third parties connected with the

The collaborative approach

As a strategic partner, Capgemini was involved in the conception phase right from the beginning and the ideas of the Kühne + Nagel Hyperledger Fabric project, especially regarding the evaluation of the technical implementation.

A timeframe of just three months was planned for implementing the MVP (Minimal Viable Product). It was therefore important for Kühne + Nagel to have a partner like Capgemini who already had extensive knowledge in the implementation of blockchain applications and specialist knowledge in the field. The selected technology stack of Oracle Database, Spring Boot Backend, React Frontend, and Hyperledger Fabric as Blockchain Framework had already been used by Capgemini in several previous PoCs.





approved distributed ledger network. This renders additional communication channels outside the chain unnecessary. Kühne + Nagel designed the solution in strict compliance with industry requirements for confidentiality and data privacy, which complement the classic blockchain features of immutability and traceability.

The VGM portal is a reliably functioning, productive system, making it an unusual testing environment for new technology. Kühne + Nagel deliberately chose to do it this way as the real challenges of new technology can only be experienced and solved in a production environment.

At the same time, the use of new technology shouldn't have any profoundly negative effects on the live system. In order to minimize risk it was decided to first synchronize blockchain with the existing database. It was also decided to keep the system running even if any downtime or errors in the hyperledger fabric technology should occur.

Useful findings uncovered early in project

The trial resulted in both positive and negative experiences, both of which indicate success from a project perspective as the main objective was to gain a better understanding of the technology. Based on this initial trial, Kühne + Nagel has learned that:

- The hyperledger fabric technology meets the basic requirements
- The system can continue operating in the event of downtime or an error in one of the blockchain components thanks to microservice architecture and a synchronization mechanism developed in-house
- The replication performance and speed (100+ transactions per minute without optimization) surpasses expectations
- It is possible to connect to existing applications with little effort
- It is possible to connect to spring boot applications thanks to the available Java SDK
- The hyperledger fabric technology and any changes in the system require a significant amount of configuration.

What the future holds

As a result of the trial run, the used technology can now be implemented in a productive environment with limited complexity. The developments in the hyperledger fabric project also indicate that the technology will soon reach the required level of maturity for implementation in more complex scenarios.

The VGM portal project provided Kühne + Nagel with an excellent analysis of blockchain technology, allowing them to make an informed discussion with key business partners regarding the advantages of the new technology.

About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of over 200,000 team members in more than 40 countries. The Group reported 2018 global revenues of EUR 13.2 billion.

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About Kühne + Nagel

With 79,000 employees working at approximately 1,300 locations in more than 100 countries, Kühne + Nagel is one of the world's leading logistics service providers. The company is an expert in sea freight, air freight, overland transport, and contract logistics, with a clear focus on optimizing value added chains and integrated logistics.

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