Case Study:

Managing the Metal and Mining Industry's Supply Chain with Hyperledger Fabric

The MineHub-KrypC partnership creates a platform to transform the global mining and minerals trade-finance and supply chain

Goals

- Offer superior automated workflows across a wide network of global players

- Offer tangible business value to the global mining and minerals ecosystem

- Connect thousands of companies of diverse sizes without prior relationships

- Create secure and private access to data

- Speed, speed, speed!

Approach

- See the vision

- Identify the technology

- Form a partnership

- Deliver the MVP

- Meet industry needs

Results

- Easy, instant collaboration between companies

- Secure and private data storage in PDCs

- Working MVP delivered in a short timeframe

The global mining market reached 1.64 trillion USD in 2020. It's expected to grow to 1.84 trillion USD in 2021 after recovering from COVID-19's impact. Through this supply chain, raw materials transform into the tools and equipment we use every day.

But as the world recently learned, a worldwide pandemic can have a profound impact on global supply chains. So can stricter environmental regulations and political or social unrest.

We can't predict global diseases or politics, but even in the normal course of business we struggle to control our global supply chains. Poor and opaque supply chain processes disrupt supply chains on a daily basis, resulting in billions of lost income and higher costs. And the challenge gets bigger as supply chains get more complicated every day. Despite these challenges a robust and transparent supply chain management is feasible, provided we find new ways of automating our processes to create "one version of the truth" amongst players that everybody can rely on.

MineHub envisioned a solution that would transform the supply chain workflows and processes for the mining and metals industry. Its solution wouldn't just improve the practical day-to-day operations – Once in place, this robust, agile platform would help users mitigate damage from unpredictable global disruptions, reduce costs and make more profit due to higher efficiencies and end-to-end visibility of their data.

MineHub understood the power of Private Data Collections (PDCs) that became available with Hyperledger Fabric 2. PDCs deliver critical functionality for bringing together a large group of diverse companies with differing needs and commercial interests and allowing them to exchange business critical data in a secure, private, and scalable manner.

KrypC saw the potential for enterprise level services with Hyperledger Fabric 2.2, and was working towards addressing the very challenges MineHub was looking to solve through its Hyperledger Fabric layer 2 platform, KrypCore.

Could a partnership between the two meet MineHub's big needs in a short time frame?

Seeing the vision

Nearly 1.8 trillion USD of metals and minerals move across the world every year from mines, through ports, along transport lines, to processing plants and, ultimately, to the end users. This chain includes hundreds of companies making millions of transactions. Many of these still use manual processes—actual or digital—that require staff resources to process.

"I've been working in the intersection of technology and commodities for a while," says Hugh Halford-Thompson, Vice President of Partnerships & Integrations at MineHub Technologies. "Large companies spend billions of dollars on their IT systems. And then they export data from their system, put it in an email, and then someone at the other end puts that all into their own company's billion-dollar IT system. That's wrong."

It's not just wrong, it's costly. One case study puts the lost time processing documents at 5-10%. Globally, this equates to 180 billion USD lost.

MineHub wanted to create a decentralized collaboration platform to solve this problem. The company envisioned sharing unstructured data, like documents or chats, along with standardization to pull in forms and other structured data. These could be shared and managed with cross company workflows.

In the commodities industry, parties don't always know everyone who will be involved in a transaction up front. For any transaction there are different parties, such as banks and insurance companies, who get involved. MineHub wanted to allow users to be able to choose who to pull into a transaction and when — sort of like a shared drive, but decentralized, private, and flexible.

There were two big challenges in creating this platform. The first was, could it truly scale? "I was less concerned about transactions per second than the number of users and the impromptu relationships between them," Halford-Thompson says. For a platform to serve commodities well, it needed the flexibility to make unplanned, on-the-fly transactions between users.

His second concern was privacy, which was critical. "You can see how a sudden boost in visible communications between parties could tip off others that something's up," Halford-Thompson explains.

For the platform to do what MineHub envisioned, there needed to be a way to ensure privacy in a scalable manner. Unfortunately, that capability didn't exist yet. But MineHub knew it was coming in the form of Private Data Collections.

Waiting for the right platform: Hyperledger Fabric 2.2

"When MineHub and Hyperledger started talking about PDCs, it was still a bit theoretical," says Halford-Thompson. "Once it got enough momentum, I became convinced that this was a viable solution to the sort of network we were looking to set up."

So MineHub started its platform with an earlier version, Hyperledger Fabric 1.4. It started trials with clients, but the platform would never scale properly due to the limitations of Hyperledger Channels.

What MineHub needed was to upgrade to Hyperledger Fabric version 2.2.

Forming a partnership

KrypC understands that enterprises that want to work together across interconnected workflows need a single version of truth and that blockchain technology can provide this. From the beginning, KrypC has been focused on leveraging Hyperledger Fabric to build technologies that help enterprises adopt and develop blockchain solutions. KrypC's platform is designed to be cloud agnostic. It can be deployed on any cloud provider, across any domain, or on premise. It's KrypCore platform is designed as a low/no-code environment, which turns blockchain deployment from a huge development challenge into an easy and efficient configuration process. This makes blockchain deployment across a wide variety of users fast, flexible, and cost effective.

The release of Hyperledger Fabric 2.2 showed the power of KrypC's Hyperledger Fabric layer 2 platform: It was able to offer an upgrade from Hyperledger Fabric 1.x to Hyperledger Fabric 2.x in a fast and fully automated process that ensures continuity in service of running applications. And that's when the two companies met.

After a few discussions, it became clear a partnership between them made sense.

MineHub needed to connect hundreds of companies — from large, international corporations to small, local businesses. Each of these organizations would have unique needs and requirements. "MineHub needed a strong blockchain layer with the flexibility to add new organizations and manage them dynamically," says Ravi Jagannathan, Founder and CEO of KrypC Technologies. "Minehub needed to build a scalable network handling thousands of participants. We built our Hyperledger Fabric layer 2 platform for this exact need."

KrypC's configurable KrypCore platform offers the agility to quickly create and add new functionalities to a decentralized system and to deploy them seamlessly in smart contracts. KrypCore offers a unique and unrivalled approach to performing asynchronous system updates and upgrades amongst a wide variety of users operating on entirely different IT infrastructures. This has been a challenge for many decentralized networks, and the solution is what makes KrypCore unique.

Typically, networks must go offline for updates, which isn't possible in an enterprise environment where users rely on a platform for business-critical services. With so many participants connected to a platform, there will always be a need to update

their applications in different ways and at different times. This can easily result in incompatibilities and security risks.

"One of the biggest problems many decentralized networks face is how to update a live network with many competing interests and priorities," explains Halford-Thompson. "KrypC uses a smart contract you can call to update itself, which I thought was genius."

With their toolsets, KrypC is able to offer users of decentralized applications a seamless solution to manage security updates and enable rapid addition of new features. By solving for this challenge, MineHub was able to redirect their focus on the user functionality and business value they wanted to unlock for its customers.

"A partnership like this is like getting married on the first date...you never quite know until afterwards if it's a good fit."

— Hugh Halford-Thompson, VP Partnerships & Integrations, *MineHub Technologies*

Meeting mining needs

For KrypC, robust cryptography is a key concept for its Hyperledger Fabric layer 2 platform. "MineHub's platform sits on top of Hyperledger Fabric and its security standards. Underneath that is the cloud security," explains Jagannathan. "Everyone in KrypC has a cryptography background so we use all the relevant PKI ("public / private key") techniques to keep communications and data secure."

Because of the sensitive nature of information in the mining industry, every client has their own private data collection data (PDC) store. Each client decides what to share with whom and only that data is shared into the other PDCs.

Large companies may want their own dedicated environments — and maybe even private clouds. But that can be cost prohibitive for smaller organizations.

Therefore, smaller participants of the Minehub solution get their own secure PDCs in a shared environment. This approach ensures the same security levels that larger firms enjoy, but at a reduced cost.

One challenge around privacy involves the sharing of data. If Company A shares data with Company B and Company B shares with Company C, each person only knows the next

person. If someone on the chain updates information, how do you tell everyone without breaking privacy? MineHub was able to design a unique solution to this problem together with the KrypC engineers. In addition, KrypCore offers a full API layer, which eases integration at the level of Minehub's customers and helps with platform scalability.

"Typically, companies provide blockchain layer 2 offerings that are closely connected to the infrastructure," explains Jagannathan. "Our approach is to use a data lake to manage the PDCs, which makes platforms like Minehub more flexible and efficient."

Minehub defines the business rules it needs, and KrypC configures the APIs that make the required functionality happen.

A few technical challenges aside, the platform partnership moved along smoothly and now Minehub has a platform that offers secure, collaborative, real-time sharing of data and workflow functionality across a wide range of enterprises.

System graphic
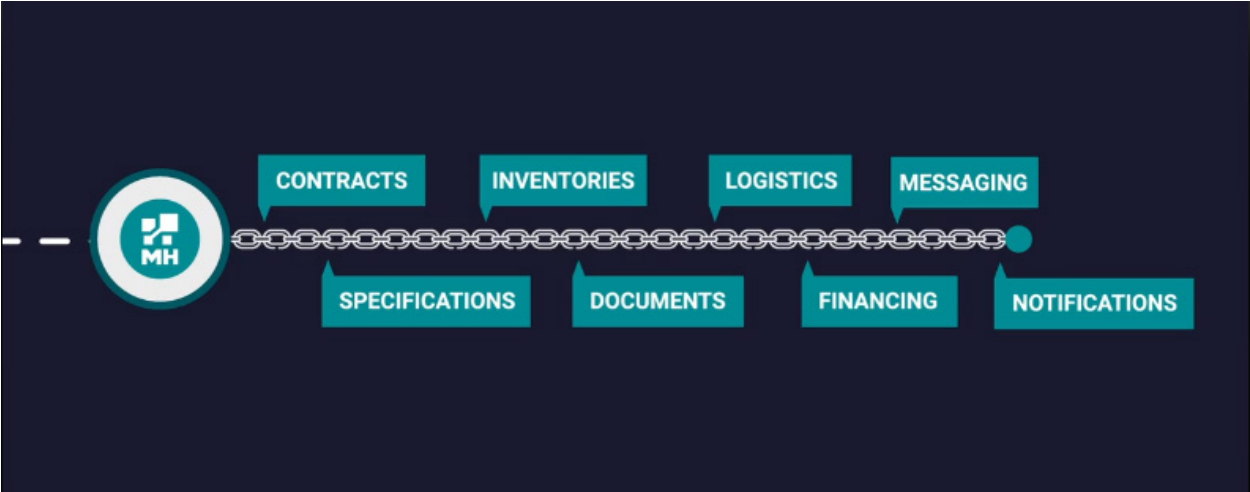
What's next?

MineHub is already testing its platform across China. While there are similar Hyperledger Fabric initiatives in China, MineHub is one of the first to enable its customers to share workflows and data across infrastructures in and outside China.

Since Environmental, Social, and Corporate Governance (ESG) compliance is critical for the mining industry and the wider world, MineHub plans to focus on providing tools for ESG compliance. Without clear visibility into their supply chains, the industry can't track and report on ESG. MineHub has made it one of its priorities to help companies with decarbonization and to make significant strides in ESG beyond the regulatory requirements.

KrypC will continue to be a strategic partner with Minehub for future developments and is continuously focused on developing its KrypCore layer 2 platform as a universal no-code, configurable integration layer that enables any enterprise, decentralized workflows and keeps its users up to date as a fully managed service.

About MineHub

MineHub is an open, enterprise-grade platform for digital trade, bringing efficiency, security and responsibility to mining and metals supply chains. MineHub connects the many parties involved in a physical commodity transaction in a digitally integrated workflow, operating on the basis of shared information.

Users of MineHub are in full control of their supply chains, enabling them to optimize their use of resources, respond better and faster to customer needs and have confidence in the resilience, security, and compliance of their operations. To learn more, visit https://MineHub.com/

About KrypC

KrypC is a Hyperledger Certified Solution Provider and a lead SI partner of Hedera Hashgraph. Founded by an innovation and passion-driven team of tech and business professionals, KrypC builds software solutions using blockchain for solving previously unsolvable business problems. KrypCore, KrypC's flagship product is a Hyperledger layer 2 platform that makes Hyperledger platforms affordable for enterprises. With their domain-agnostic and cloud-agnostic KrypCore Platform they have been aiding many enterprises and start-up innovators to build, develop, manage, and scale innovative solutions at minimal effort, cost, and risk.

Their vision is to make all digital information trustworthy through responsible technologies for the betterment of society and humankind. To learn more, visit https://krypc.com/

About Hyperledger Foundation

Hyperledger Foundation was founded in 2015 to bring transparency and efficiency to the enterprise market by fostering a thriving ecosystem around open source blockchain software technologies. As a project of the Linux Foundation, Hyperledger Foundation coordinates a community of member and non member organizations, individual contributors and software developers building enterprise-grade platforms, libraries, tools and solutions for multi-party systems using blockchain, distributed ledger, and related technologies. Members include industry-leading organizations in finance, banking, healthcare, supply chains, manufacturing, technology and beyond. All Hyperledger code is built publicly and available under the Apache license. To learn more, visit: https://www.hyperledger.org/