The SmartLog is a blockchain-enabled pilot project aiming to reduce overall cargo unit transport times in accordance with the EU’s targets for road, rail, air and water transport networks in the Baltic/North Sea region. These improvements are being made under its Trans-European Transport Networks (TEN-T) programme.

SmartLog’s testing for the proof of concept began in June, 2017 in Muuga Harbour at the Port of Tallinn, the largest container harbour in Estonia.

The project will connect some of the individual operators’ port management systems together with the blockchain solution. This is predicted to bring local operators greater awareness on how their performance ties in with the larger context of port operations, and give them solid insight into how to improve their interactions so that Tallinn Port benefits from the increases in speed and cost savings.

The data will be analyzed once the project has collected a sufficient amount of it, and the project will give the operators some rudimentary tools to analyze the data themselves, in addition to the near-real-time data streams, of course.

The project consortium is made up from six regional development, technology, and academic organizations. Kouvala Innovation from Finland is leading the project, and it also includes Tallinn University of Technology, Valga County development agency and Sensei OÜ from Estonia, Örebro Region from Sweden and finally Transport and Telecommunications Institute from Latvia.

The project is funded through the EU’s Interreg Central Baltic program, and it has a runtime of three years, starting from September, 2016 and ending in the summer of 2019. The idea for the solution was originally conceived in late 2014, when blockchain was just about to gain traction as a mainstream phenomenon, and the general IoT discussion was starting to pick up on the concept of blockchain as well as the possibilities it could offer with industrial scale implementation.

The idea and the concept which followed was greatly improved through extensive talks and sparring discussions with John Cohn, IBM Fellow and Chief Scientist at IBM’s Watson IoT headquarters in Munich, Germany. The project is divided into five distinct and parallel activities: development, research, field work, administration, and communications. The development work package (WP) is responsible for the blockchain software development and eventual implementation in the pilot company context. The research WP is responsible for gathering data from the companies and from the SmartLog blockchain itself, and formulating the conclusions on how exactly this technology, implemented in this way, will affect the operative and business processes of the pilot companies. The field WP is responsible for identifying, contacting and working with the logistics industry companies.

A blockchain is a distributed database that is used to maintain a continuously growing list of records, called blocks. Each block contains a timestamp and a link to a previous block. A blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for validating new blocks. By design, blockchains are inherently resistant to modification of data. Once recorded, the
data in any given block cannot be altered retroactively without the alteration of all subsequent blocks and a collusion of the network majority. Functionally, a blockchain can serve as an open, distributed ledger that can record transactions between parties efficiently and in a verifiable and permanent way. The ledger itself can also be programmed to trigger transactions automatically.

Blockchains are secure by design and are an example of a distributed computing system with high fault tolerance. Decentralized consensus has therefore been achieved with a blockchain. This makes blockchains very suitable for the recording of events, medical records, and other record management activities, such as identity management, transaction processing, and documenting provenance. Originally used to power the cryptocurrency Bitcoin, the blockchain has been subject to powerful hype and interest in the past couple of years in virtually every industry. It holds a very large potential for global disruptions, much in the way of the introduction of email did for private communication channels in the late 1980s. Recently the number of blockchains in use has exploded, largely due to the maturity of the development frameworks and general business application interest.

INDUSTRY-WIDE PROBLEM

The industry problem we framed in the early concept stage is, simply put, the lack of communication and information sharing between the logistics companies, especially in the supply chain part of the industry. This may seem counter-intuitive, given that the industry is all about moving things from one place to the other and knowing where the things are is the cornerstone of any business viable operation. In order to recognize this problem, we had to take several steps backward and look at the supply chains from the top-level network perspective. From that vantage point, the sub-optimization of the network level activity became apparent, even though some aspects of it were well optimized. Cargo units are already moving as efficiently as possible using existing machinery and infrastructure. There is little that can be done to make them physically move faster, apart from investing considerable amounts of money into new roads, railroad tracks or port infrastructures. However, the information pertaining to the moving of the units, as we discovered, is moving very much less efficiently, and the possibilities to affect that are very much less costly and time consuming.

There are several different communication channels and standards in use, all the time and all around the logistics and supply chain industry. Phone calls, text messages, structured and unstructured emails, fax, and the various information management systems which are in use – not only per company, but very often numerous ones inside an individual organization. Added to them, the uncountable EDI messaging dialects and conventions, and competing standards multiplied with all the companies using them create far too many potential combinations. It is impossible to have viable integrations between companies’ systems and processes, which leads to a situation where all the vital information is already out there, but hidden away in small boxes hosted by individual companies with no incentive to share.

CONNECTING THE DOTS

The industry’s problem comes back to the root cause of not sharing transaction-based information efficiently enough, and the thing at which blockchain technology excels is precisely that – facilitating and securing multi-party, trustworthy connections which are used for transaction sharing. The project concept is about creating a blockchain that is able to store logistics and supply chain related transactions, more specifically transactions which describe the movements and status of individual intermodal containers. This information is then processed and secured in a way which makes it possible to share it to the parties to whom it is relevant – and hide it from the parties to whose business it is irrelevant.

Each party participating in the SmartLog blockchain will have their own copy of the transaction log, and interfaces and tools required to access it. They can see every container in existence which will have relevance to their operations in the future, from the moment an empty container request order has been placed, triggered by an order made by a client to the supply chain owner in question. After the container has passed the supply chain operative company’s scope of operations, they no longer need to see the information related to it. The length of the supply chain measured in participating organizations along the way correlates directly to the efficiency boost the SmartLog blockchain approach brings about.
network level, a total visibility scenario will be realized in all participating supply chains, providing of course that a sufficient critical mass of companies start sharing their container transaction data.

Once the network level visibility has been achieved, it is possible to start leveling up the automation of the work processes involved. Sharing, updating and reacting to information-based activities can be almost instantly automated to a high degree, and the more evolved processes will not lag behind for long. The key here is that once you can trust the integrity of the information, you can start acting on it without too much amount of human intervention or supervision.

**Blockchain Automation**

Presently, it seems that the blockchain can provide a greatly enhanced visibility and potential for process automation to the logistics and supply chains industry. The solution we have been creating and are in the process of testing appears to be 100% scalable, in the sense that when the mass of transaction data starts to grow exponentially, the main load of processing can be divided amongst the participants in a fair ratio, so no one would have to expend any data processing resources without incurring added value. In the near future, if we manage to create a blockchain with enough participants and traction in the live business environment, there will be plenty of room for follow-up projects. Firstly, the level of automation which can be brought to bear on top of data that is trusted is significant. This type of automation is called, in blockchain terms, smart contracts and it means simply that when certain conditions in the data are met, predetermined actions can be triggered. The quantity and quality of eligible data here makes all the difference.

Secondly, the sheer mass of data which will be accumulated in a quite short period of time from the companies will mean that teasing any sort of business intelligence out of it using human analytics is impossible. Artificial intelligence techniques and technologies are the only viable approaches when dealing with such huge amounts of largely uniform structured data. We have already submitted funding applications which will cover both of the aspects mentioned above, and others.

The future of the logistics industry seems, by all indicators, to be very much ripe for a large scale digital disruption. The only question each one of the actors in the field must ask and answer is, do we want to be a part of it or do we let it happen to us?

**About the Author**

Mika Lammi, Head of IoT Business Development, has been working on digital and creative industries business development and education for the past 18 years. Among other things, he has been involved in the development of Finnish gaming industry higher education, as well as the pioneering work on blockchain solutions in the logistics industry.

**About the Organization**

Kouvola Innovation Oy is a dynamic development company owned by the City of Kouvola. Our mission is to increase the vitality of the Kouvola Region by providing key services for companies big and small, new and old. We coach and engage entrepreneurs and are active in social networks which boost the local economy onward and upward.

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