BLOCKCHAIN PRACTICES

#BLING #MaritimeLogistics

Blockchain for Maritime Ports

Aalborg University

How can document handling be improved?

Aalborg University's Department of the Built Environment is leading research on intelligent transport, tracking data analysis, big data analysis, and freight transport studies - from transport, business and logistics perspectives. The University's research group focuses on analyzing business models behind new technological solutions in transportation, and studying the potential impact of new technologies in transport and logistics.

Their role in BLING is to explore how blockchain technologies can be used to increase the quality of services provided from 'Government to Businesses' (G2B) for freight transport in ports and cities. This is an important complement to the other BLING pilots which focus on 'Government to Citizen' (G2C) services.

Aalborg will contribute to the identification and development of the new ways of using blockchain to optimize freight transport through better service provision from public authorities, which will help create better government services for maritime ports in the freight industry.

Logistics, ports and document handling

Maritime ports and logistic hubs have constantly been an efficiency driver for the global economy. With today's market of new and innovative technologies, the maritime industry is overdue for communicational upgrades.

The primary issue the sector faces is in inefficient cargo document handling throughout the supply chain. Shipping cargo via ships involves dozens of parties - terminal operators, customs, shipping agents, port authorities, freight forwarders etc. - having rounds of interactions and confirmations as goods are moved/consigned/consolidated and so on. Most of the parties involved in these interactions are not aware of upcoming transportation activities, and often do not know the place of origin, goods type, corresponding

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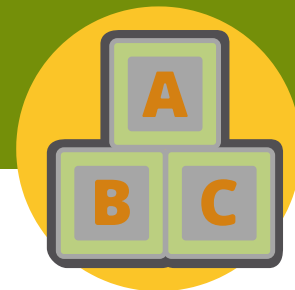
documentation and other relevant information for customs and receivers. This lack of information especially complicates work for customs and their container checks, which brings additional time delays before goods can be collected for onward shipping. For the BLING project, Aalborg University is creating a model showing how blockchain can be used for document coordination in a sea port, working with the Port of Alborg to capture real-life experiences and situations to build a robust real-world foundation for a blockchain-enabled business model.

Why a blockchain solution?

Blockchain could potentially transform the maritime industry's existing document handling schemes. If blockchain tools are integrated into existing accounting, database and ERP systems, it will be possible to potentially standardize documentation and move document flows online, replacing physical processes with digital approval processes. When saved to a blockchain, these approvals would also serve as timestamps, enabling tracking and real-time monitoring of goods as they move through administrative processes.

A key aspect of implementing blockchain is the transparency and auditability of all transactions – which is a key for such a widespread distributed network as shipping. Establishing connectivity between all parties in a supply chain is the next step for time-efficient, secured deliveries. Blockchain upends established rules of data ownership, centralization and access. Instead of conventional workflows, blockchain-enabled systems can bring new approaches to collaboration, and link multiple parties with equality of ownership.

To support this vision, Aalborg University is developing a knowledge base that identifies the actors in the logistics/port network for mid-sized maritime ports in Denmark. The pilot identifies what the document handling challenges are that these actors face, and how various blockchain use-scenarios and technologies can help tackle these challenges. To reality-check their results, Aalborg is working within the port network for the Port of Aalborg, who are a project partner in this work.

This work will inform industry specialists, maritime agents and agencies, municipalities and blockchain enthusiasts about the potential of the technology for a middle-size maritime port. Aalborg University's research will identify conceptual intersections and links between existing projects, mapping current approaches and potentially increasing knowledge in this area.

## From Port Community Systems to Blockchain-enabled systems

Aalborg initially identified and analysed all existing blockchain projects and applications in the maritime industry that had been covered in the media and in academia. We classified all of the maritime blockchain projects we found into three scenarios: blockchain for document communication, blockchain for financial transactions, and blockchain for product
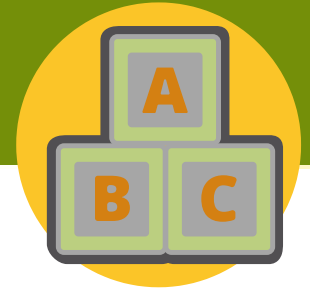
trackability. Aalborg focused on the first scenario – document communication.

In general, the document workflow in maritime logistics has not been changed for decades, and this pushed Aalborg to search for other initiatives that had been proposed before the development of blockchain. This allowed Aalborg to compare blockchain concepts and earlier maritime innovation proposals. We found close interrelations between blockchain concepts and 'Port Community Systems' (PCS) from 90s and 00s as. PCS was an attempt to address many of the challenges that current blockchain-enabled solutions are looking at. PCSs had similar goals to digitize port document handling and speed up port communication - however, many PCS initiatives failed because of data ownership concerns and partners' unwillingness to change business routines and organizational structures. A combination of the two approaches could be key for industry adoption.

To better understand where the industry - particularly medium-sized ports - is heading, Aalborg conducted interviews with six major maritime ports in Denmark. The goal was to understand the feasibility of different blockchain use scenarios from both practical and business viewpoints. The results showed uncertainties in communication between port actors: the port authority, terminal operators, customs. Addressing that is crucial for building a decentralized communication like blockchain. It appears that medium-sized ports are generally not focused on IT innovation, prioritizing physical expansion and equipment optimization. Aalborg found big communication gaps between port authorities and terminal operators, mainly in optimization and data handling.

Connectivity across a port's network is important if we are to help the industry shift into the digital space. Aalborg is currently looking at the influence of SMEs that are based at the port site, and port authorities and customs agents, and exploring whether these actors can be brought together as part of a digital network.