GLOBALLY CONNECTED PORTS
PORT OF ROTTERDAM'S STEPWISE APPROACH AND BLOCKCHAIN'S ROLE

Aljosja Beije, Logistics and Technology Lead at BlockLab Rotterdam, The Netherlands
Oscar van Veen, Digital Business Solutions, Port of Rotterdam, The Netherlands

CLICK HERE FOR POR NEWS'

SUMMARY

Geo-political changes, sustainability concerns and technologies such as Artificial Intelligence (AI) and blockchain are having a profound impact on the way global supply chains operate. Ports can play an important role in dealing with these challenges by providing a globally interconnected, safe and neutral digital infrastructure. How this needs to be done is often a much more difficult question to answer than the "why?" and "what?" questions. In this article, Port of Rotterdam offers an insight into their Connected Ports Strategy and how this is practically implemented.

PLAYING CATCH-UP WITH CONTAINERS

In 1955, trucking company owner Malcolm McLean and engineer Keith Tantlinger developed the modern intermodal container. Brilliant in its simplicity, it made the world a smaller place as it could be quickly loaded and off-loaded onto ships, reducing transit times while securely holding the cargo. However, data and financial flows within global trade have remained largely analogue and rely on paper documents, such as the Bill-of-Lading and Letter-of-Credit that have not fundamentally changed since the Middle Ages. To catch-up with the container, the financial and information flows need to come out of these 'Dark Ages'.

THE ELEPHANT IN THE ROOM

Ports play a pivotal role as a safe and neutral point-of-entry or exit for cargo. This also makes them a potential bottleneck if these flows are not properly managed. One way to avoid this is to add capacity; this is exactly what the Port of Rotterdam (PoR) did when building the 2nd Maasvlakte. However, adding capacity is a long-term effort requiring billions of euros in investments. As international trade is expected to become more volatile as a result of geo-political uncertainty and the impact of technologies such as AI and blockchain, there's a need to deal with capacity challenges almost overnight. The solution to this problem, as any supply chain scholar and practitioner will tell you, is as simple as the idea of the container; data sharing. However, it has proven to be a significant challenge for the industry.

The PoR has taken a step-by-step approach as it looks to digitize its operations. As a port, you start with yourself and your port community and then include the hinterland in the digitisation process. Then it is a matter of building a network
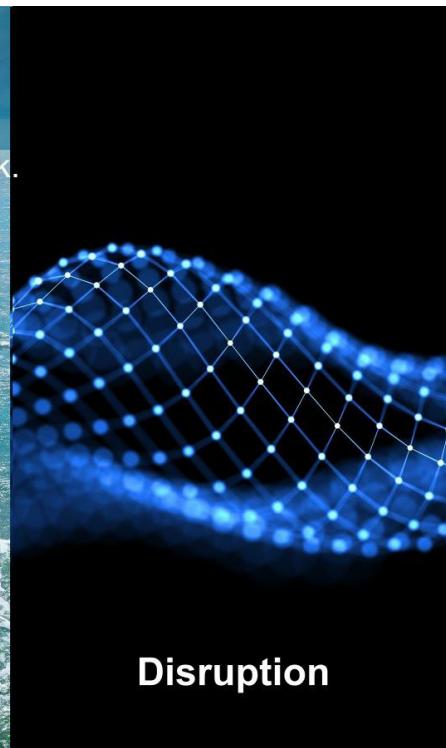
Our world in transition
Faster than we think. With greater impact than we think.

Digitalisation

Disintermediation

Disruption

of interconnected ports. Also here, PoR started simple, for instance, by exchanging ETDs, or master data about the depths of berths. In mid-2018, PoR has started work, together with Samsung SDS and ABN-AMRO, on a blockchain solution to support their connected ports strategy.
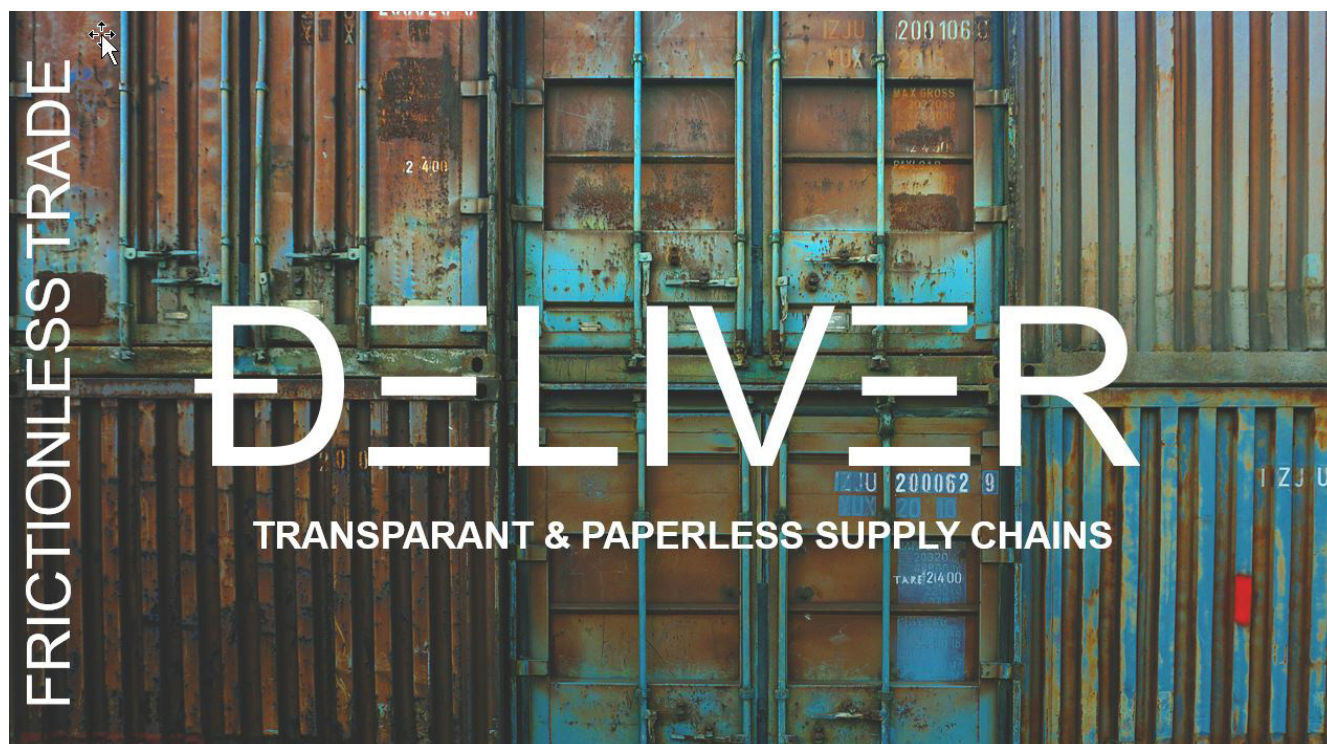
DELIVER: CONNECTING TRADE LANES

'ĐΞLIVΞR' is an open, independent platform that connects blockchains and other technological networks in order to make global logistics more transparent and efficient through validated data. It has been developed in collaboration with the Dutch ABN AMRO bank, Samsung SDS, Samsung's logistics and IT arm, and the PoR. This doesn't make it a big corporate affair; on the contrary, also small and medium sized companies in the chain stand to benefit. For example, having access to reliable and up-to-date ETA data, allows for better decision making about the follow-on modality (train, barge, or truck)

after the container arrives at the port; with shipments only being selected for road if this is absolutely needed. The upside? Lower costs and reduced CO_2 emissions. Another advantage is that parties have a common understanding of a transaction, hence no more lengthy reconciliation processes that force members to work sequentially.

'ĐΞLIVΞR' acts as a notary. The role of the notary is to ensure the secure transfer of the asset from its 'home chain' and

FRICTIONLESS TRADE

ĐΞLIVΞR
TRANSPARANT & PAPERLESS SUPPLY CHAINS

Step by step towards a digital port

	Port Authority	Port Community	Hinterland	Global
0	**1**	**2**	**3**	**SMART PORT**
NO AUTOMATION	INDIVIDUAL AUTOMATION	INTEGRATED SYSTEM IN THE PORT	INTEGRATED SYSTEM FROM PORT TO HINTERLAND	CONNECTED PORTS AND LOGISTICS CHAINS
	Eliminate waste for Port Authority	Eliminate waste for Port Community	Eliminate waste for the direct logistic chain	Eliminate waste for the whole logistic chain

the registration of that asset on the other chain. An asset can be any document used within international trade. In the case of the pilot, it involved the transfer of the Bill-of-Lading from the South-Korean Blockchain Platform for Global Trade, based on the Hyperledger protocol, onto an Ethereum-based blockchain platform. This notary scheme also registers the asset and allows authorized parties to authenticate the asset they have fetched, by comparing the hash of the fetched asset with the one on the notary. Another role of the notary is to ensure that there's an uncontestable audit trail of the various versions of the digital asset. This audit trial can be used to resolve conflicts between supply chain members. The end result? Validated data that will allow supply chain members to truly automate their processes, make better management decisions and improve coordination between members in the supply chain.

The pilot project initially concerns multimodal transport of a container between Asia and the hinterland of Rotterdam. Other trade lanes are already being looked into. In addition, the PoR, Samsung SDS and ABN AMRO,are actively talking to other parties to join the platform; as consumers of the services the platform provides, or service producers themselves. Also, they frequently engage with international standard organizations and government bodies on topics such as standardization and compliance.

TOWARDS GLOBALLY CONNECTED PORTS
'ÐƩLIVƩR' provides the super connector that can seamlessly integrate the physical, financial and information flows between ports and their respective hinterlands. For example, it is already integrated with the Pronto tool for Port Call Optimisation developed by the PoR's Digital Business Solutions (DBS) and Transfollow's eCMR solution. Another DBS tool, Boxinsider, which connects with various inland terminals is on the roadmap for integration. Having already successfully integrated IoT enabled condition monitoring of a container in the first 'ÐƩLIVƩR' pilot, integration of other IoT sensors within the port and hinterland will be a logical next step. The PoR uses them to optimise cooperation within the port community and with hinterland parties and also aims to use them for data exchange with ports and logistics players in the rest of the world. These tools contribute to the creation of a single point of truth. Vital in the advance towards globally connected ports is the creation of standards for data and asset exchange in logistics chains. The PoR has taken an active role in this, not only in digital transformation of supply chains but also in energy transition.

Globally connected ports cannot be accomplished in a vacuum; the PoR believes that the key to success lies in cooperation and invites ports and other supply chain members to embark on this journey together, and bring unprecedented levels of efficiency to global trade.

REVIEW POR IN THE AIS PORTAL

ABOUT THE AUTHOR
....

Aljosja Beije is co-founder of Blocklab, Port of Rotterdam's dedicated blockchain team. With over 20 years of supply chain and technology experience, Aljosja "breaths, eats and sleeps" blockchain and supply chain management. He's co-author of the book "Blockchain and the Supply Chain", together with Nick Vyas and Bhaskar Krishnamachari, both professors at the University of Southern California.

In 2018 Oscar Van Veen joined the Port of Rotterdam Authority (PoR) Digital Business Solutions team as a 'port rookie', after selling his digital agency Mangrove. com with offices in Rotterdam, Porto and NY. He's now putting his entrepreneurial skills, management drive and passion for digital innovation to use in support of the bigger PoR goal: be world's smartest, most sustainable port.

ABOUT THE ORGANIZATION
....

Port of Rotterdam is Europe's biggest port with a throughput of approximately 470 million tonnes of freight per year. A landlord port, managing 12,500 ha of port area, PoR was ranked by the World Economic Forum in 2018 as Europe's best port infrastructure. PoR direct and indirect added value is estimated to be $51.2 billion (€45.6 billion), or 6.2% of the Dutch GDP. Blocklab develops blockchain solutions for logistics and energy in co-creation with its partners, ranging from multinational corporates and government agencies to SME's.

ENQUIRIES
....

Aljosja Beije
Mail: aljosja@blocklab.nl
Phone: +31 6 21 586 483
Oscar van Veen
Email: DC.Veen@portofrotterdam.com
Phone: +31 6 55 786 362