

MARCH 2018

Blockchain and the Maritime Industry

An introduction

We will look at...



- A review of the current transactional ecosystem
- The blockchain concept
- Smart contracts
- Q&A

Current Shipping Transactional Ecosystem

Current Shipping Transactional Ecosystem Supply Chain



- Significant paper documents are required
- Physical inspection of documents is time-consuming and expensive
- Long chain of parties including intermediaries also inflate the costs of shipping transactions



Current Shipping Transactional Ecosystem Supply Chain (cont.)



- No single party can access all aspects of the supply chain
- No accountability for inefficiency of parties
- No accountability for fraud
 - Qingdao warehouse fraud
 - Multiple warehouse receipts used to defraud lenders/buyers
- No accountability for external events such as cargo theft
- The reliance on multiple brokers to facilitate processes also inflates the cost of transactions

Current Shipping Transactional Ecosystem Finance



- Small to midsize owners find it difficult to obtain reasonable financing/refinancing terms
 - Reasons: balance sheet of the Borrower; name lending considerations more important; varying valuations of the underlying assets; credit worthiness of the underlying charter party contracts and sustainability; regulatory concerns; other vague reasons etc.
 - General lack of trust in the system to enable a level playing field is persistent and potentially disastrous for the maritime finance industry
-
- **A solution could be blockchain enabled smart contracts!**

The Blockchain Concept

The Blockchain Concept

What is a “blockchain”?



A blockchain is a:

- Distributed
- Trustless
- Public
- Ledger

Distributed

What do we mean by “distributed”?



Means:

- There is no central server(s) running the operation
- Many computers combine to do the work involved
- E.g.: Bittorrent (filesharing)
- Eg: Calculations being shared out amongst many computers on a network

Trustless

What does it mean to be “trustless”?



- Uses public/private key cryptography - #hash function (or algorithm)
 - I.e. asymmetric cryptography
 - Public key associated with user freely distributed
 - Private key must remain private
 - The public key authenticates that a message was sent by the (person controlling the) private key – but the private key cannot be "reverse engineered" from the public key
 - No secure channel needed

Ledger

What is a “ledger”?



- It is any record of a quanta of things of value (could include asset valuations, class certificates, charter rates, profit & loss analysis, etc., in a ship finance context)
- Against IDs
- (It may be lots of other things too, but we are keeping to a single example)
- Although the ID may just be a public key

Public Ledger

What do we mean by “public”?



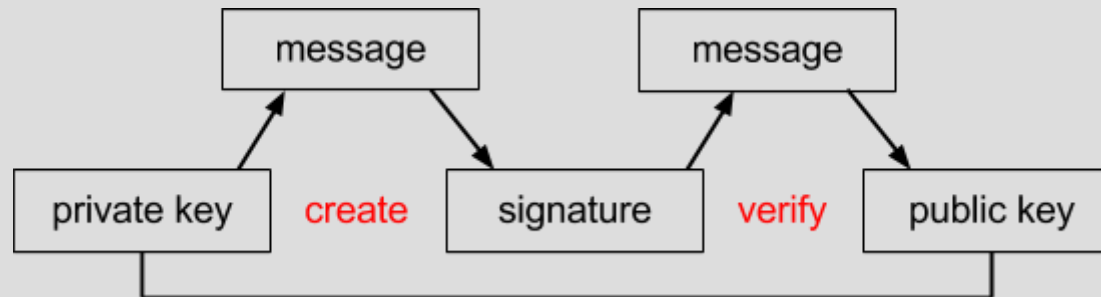
- It means that the ledger can be examined by anyone
- The entries and IDs associated with a quanta of value...
- ...is open to everyone
- No one person/authority controls it – no central authority is required for it to function and participants can join and leave at will

How Does a Blockchain Work?

Part 1



- Blockchain works by utilising two different (but connected) keys: a "private key" to create a signature and a "public key" that others can use to check it



- The private key cannot mathematically be derived from the public key

How Does a Blockchain Work?

Part 2



- There is only one way to verify a chain of transactions without central authority...and that is to be aware of every transaction
- This is done by
 - Transactions being broadcast
 - Computers competing to do the cryptographic "work" which validates a "block" of transactions

How Does a Blockchain Work?

Part 3



- Which is added to the previous blocks to form a single chain of blocks
- Other computers signal their acceptance of the block by competing to add the next block in the chain
- The longest chain is the valid chain
- Computers doing the work of forming the blocks receive payment in newly created coins ("mining") and small transaction fees (incentive to participate)

Smart Contracts

Smart Contracts

Introduction



- This was posited in the early 1990s itself
- It envisioned self-executing contracts
 - E.g. payments made upon external conditions being satisfied
- Follows the blockchain theory (with the exception of public ledgers)
- Currently not fully implemented in any industry outside of cryptocurrencies (Bitcoin, Ethereum, Ripple, etc.)

Smart Contracts

Application in Shipping Industry



- The contracts in the transaction will take the form of a computer program that is accessible to all parties.
- In a typical shipping transaction:
 - Exporters
 - Export authorities
 - Port officials
 - Import custom officials
 - Importers
 - Financiers
 - Surveyors
 - Valuers, etc.



Smart Contracts

Application in Shipping Industry



- Various documents are uploaded to the system which form the transaction (standard documents such as MOA, BOL, CP, etc. are a standard part of the software program and will not change);
- Thus the relevant contract is published by the asset owner and the counterparty will negotiate the price/freight directly via the blockchain network
- As each party approves and signs the relevant document on the system, the program approves and moves the transaction on to the next stage
- Contract is executed by a computer network using consensus protocols
- Auto-Execution and simultaneous uploading of information for all parties to see

Smart Contracts

Advantages



- **Efficiency**
 - As predefined stipulations are met by the parties, the contract will self-execute which increases the efficiency of shipping escrow by limiting the intermediaries involved
 - Tasks that are normally completed manually can also be automated
- **Transparency**
 - The information is available to all with the required access key, which limits the risks in transactions as counter-parties can evaluate information along the chain
 - As the execution of contracts and other tasks are automated, there is less risk of human errors

Smart Contracts

Advantages



- **Security**
 - All information is encrypted and cannot be tampered with by the parties as a protection from fraud
 - The greater accuracy combined with greater security will limit disputes regarding the validity of the transaction
 - Encrypted software and increase in visibility to all parties will decrease the level of theft and hacking in the industry
 - Will also make it easier to apportion accountability for such events
- **Cost saving**
 - Large costs relating to documentation, procedural delays and errors will be limited
 - Costs related to various intermediaries will be removed or limited

Smart Contracts

Advantages



- **Market**
 - Everyone can access blockchain technology.
 - Lower barriers to entry will increase market competition
 - Parties can develop direct communication without intermediaries
 - Decentralised brokerage system built on blockchain technology
 - Open market place for financiers, owners, shippers and carriers
 - Open information on capacity, cost and estimated delivery times –easier for parties to assess potential transactions
 - World Economic Forum: Global trade will increase by 15% and global GDP will increase by 5%

Smart Contracts

Disadvantages



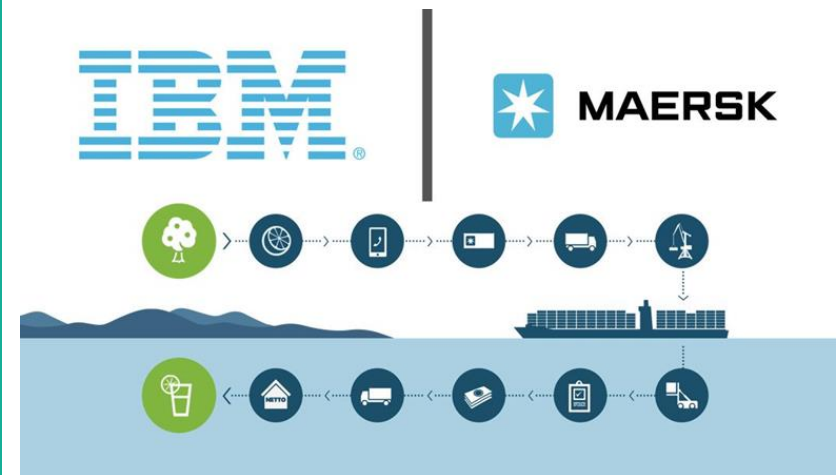
- **Special contractual terms**
 - Maritime related contracts can be very unique and specific
 - The blockchain network will need to recognise specific maritime norms and features
- **Flexibility**
 - Certain issues during the transaction are normally resolved commercially
 - This could potentially be difficult in a sealed system approach
 - Parties will also have different contractual terms that will need to be agreed and adopted by the blockchain network
- **Global adoption**
 - No current government or jurisdiction has implemented this
 - Will require some time before being fully implemented

Examples

IBM & Maersk



- Planned joint venture to adopt block chain application for freight
- Trial in 2016 traced a container of flowers from Mombassa, Kenya to Rotterdam, Netherlands
- Platform designed to:
 - exchange real-time event data for the global supply chain
 - deal with document workflow through paperless trade
- Currently waiting regulatory approval
- Expected to be launched by mid-2018



Examples

Shipowner.io



- Claimed to be world's first distributed ledger platform for participation in capital financing of assets and services in the shipping industry
- Aim is to "democratise the way ships are owned, bought, sold and operated"
- Based on the Ethereum blockchain platform
- The platform will log various contractual transactions
- Users to create their own virtual tokens to represent assets



Thank you for Listening
Questions?



Nijoe Joseph

Partner

+971 44073921

+971 521203186

Nijoe.Joseph@shlegal.com