BLOCKCHAINS

ARCHITECTURE, DESIGN AND USE CASES

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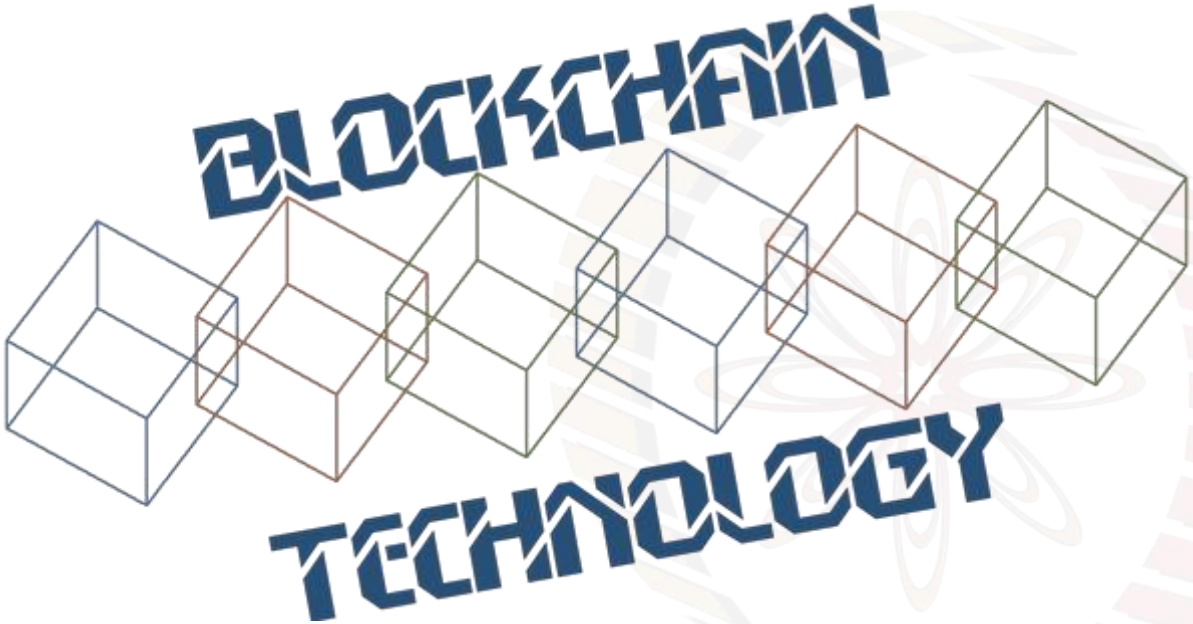
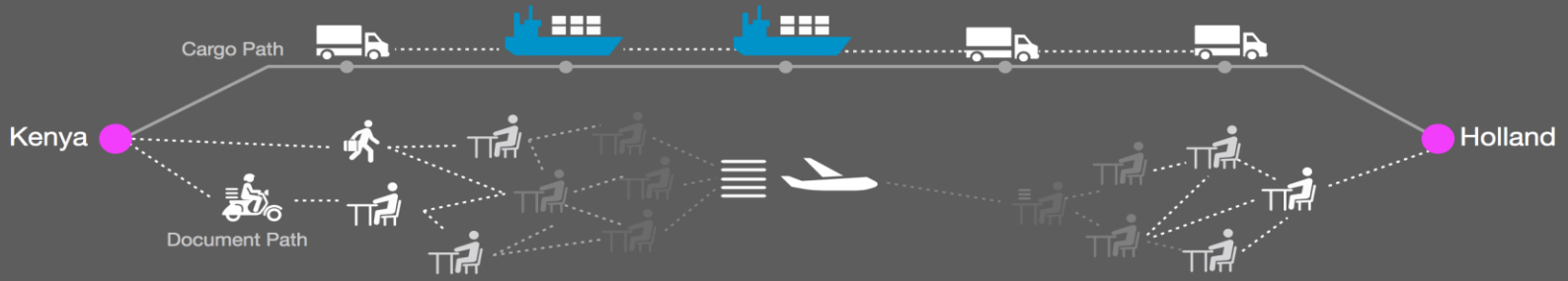


Image courtesy: http://beetfusion.com/

REVOLUTIONIZING GLOBAL TRADE

IBM Blockchain for Trade Logistics



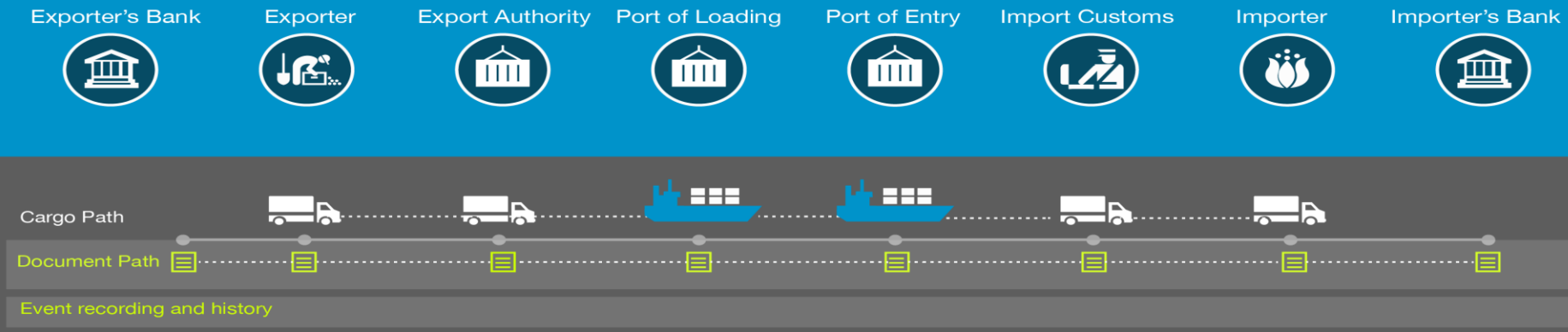
up to
15%
Import/export cost is spent on air courier for customs paperwork
A Major International Shipping Company

27 Billion
potential savings using electronic documents
Based on World Shipping Council Data

If all countries improve border administration and transport and communication infrastructure to even half of global best practice,
it could mean a $1 trillion increase in global exports.

World Economic Forum, 2013 Report

IBM Blockchain for Trade Logistics



BLOCKCHAIN NODE

Secure Data Exchanges

BLOCKCHAIN NODE

Tamper-Proof Documents & e-Signatures

BLOCKCHAIN NODE

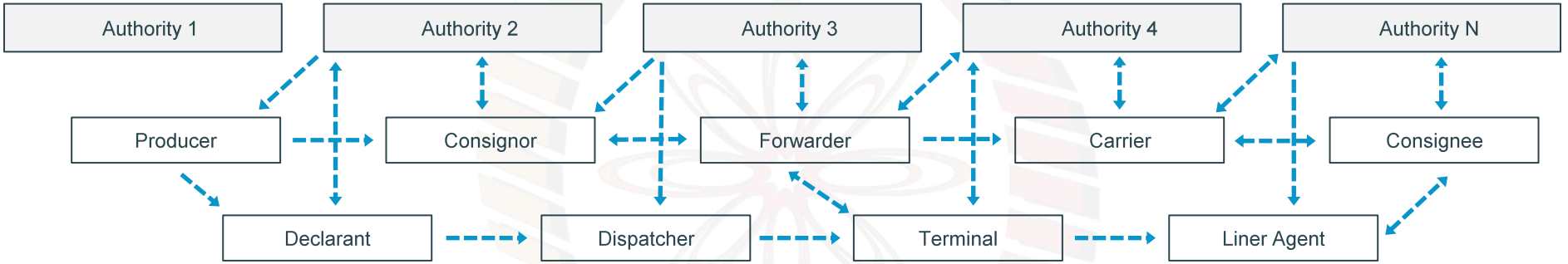
Digital & Automated Workflows

BLOCKCHAIN NODE

Real-Time Visibility & Analytics

Logistics Data Challenges

A complex system where actors are communicating back and forth and data is stored locally at each actor's site



DATA CHALLENGES

- Error-prone information
- Incomplete/ inconsistent information
- Border delays
- Lack of shipment visibility

ROOT CAUSES

1. Multiple data formats
2. Too many peer-to-peer interactions
3. Absence of messaging standard

Key Industry Challenges

Banks	Importers and Exporters	Carriers	Forwarders	Ports	Authorities
Manual, paper-based processes. Lack of Real-Time information.	Excess Inventory. Manual, paper-based processes. Duplication of Administrative Process.	No single version of ”the Truth”. Manual, paper-based processes.	Manual Data Collection. Manual, paper-based processes.	Collection and Delivery Black Holes. Sub-optimal stack placement. Manual Data Collection.	False Positives. Lack of visibility pre-manifest. Lack of visibility into land movement before/after ocean transport.

Global Trade Digitization (GTD)

What?

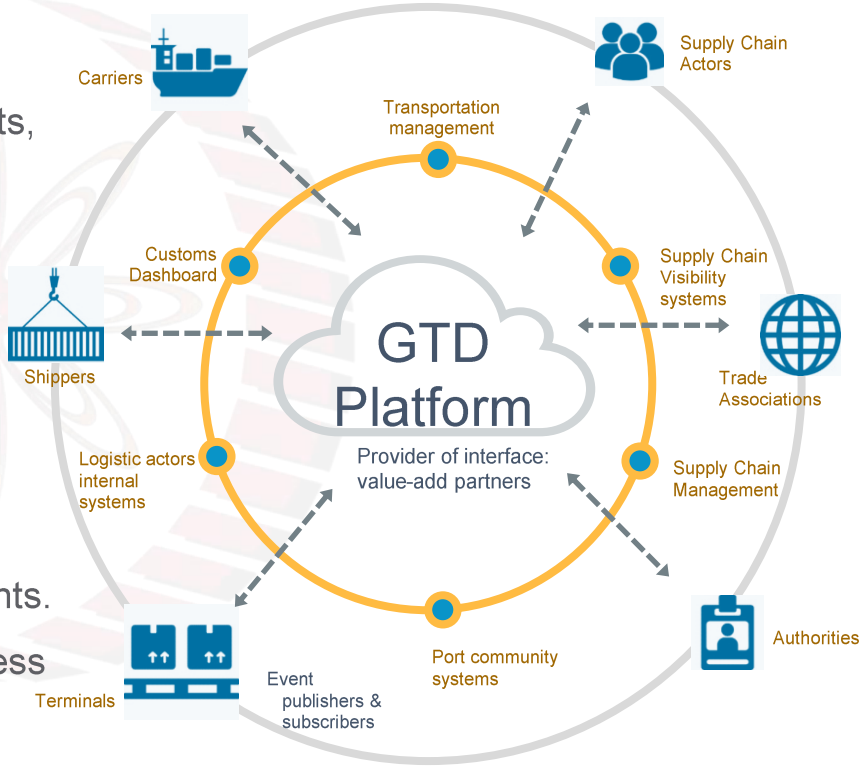
- An open, extensible platform for sharing shipping events, messages, and documents across all the actors and systems in the supply chain ecosystem.

How?

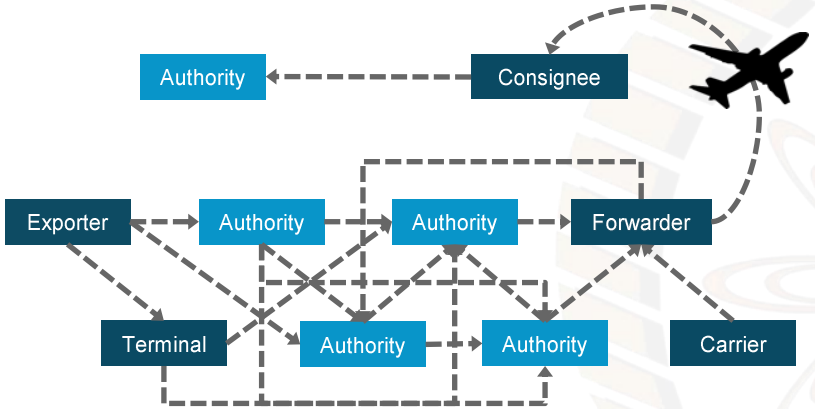
- Providing Shared Visibility and Shared State for Container Shipments

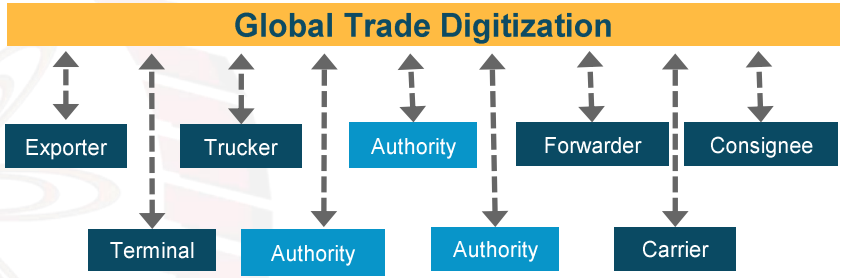
Benefits

- Increase speed and transparency for cross border transactions through real time access to container events.
- Reduced cost and increased efficiency through paperless trade



Paperless Trade





TODAY

- Manual, paper-based processes
- Humans must carry documents to authorities for stamps
- Air Courier expense and delays

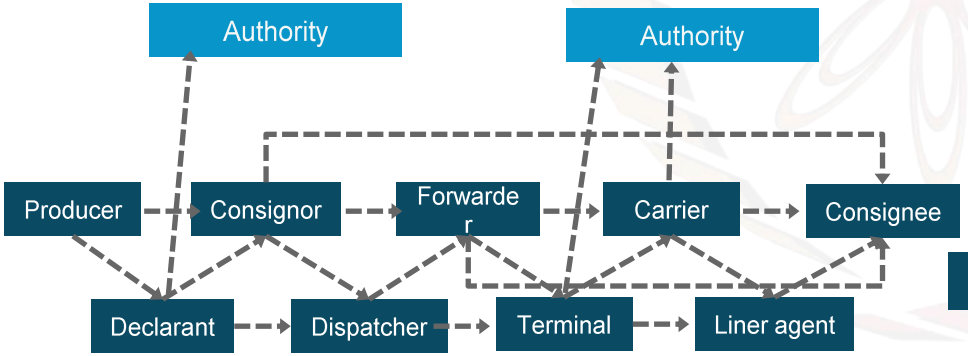
TOMORROW

- Digital Documents
- Trusted Data Exchanges
- Trusted Workflows
- Instant Secure Access

Shared Visibility

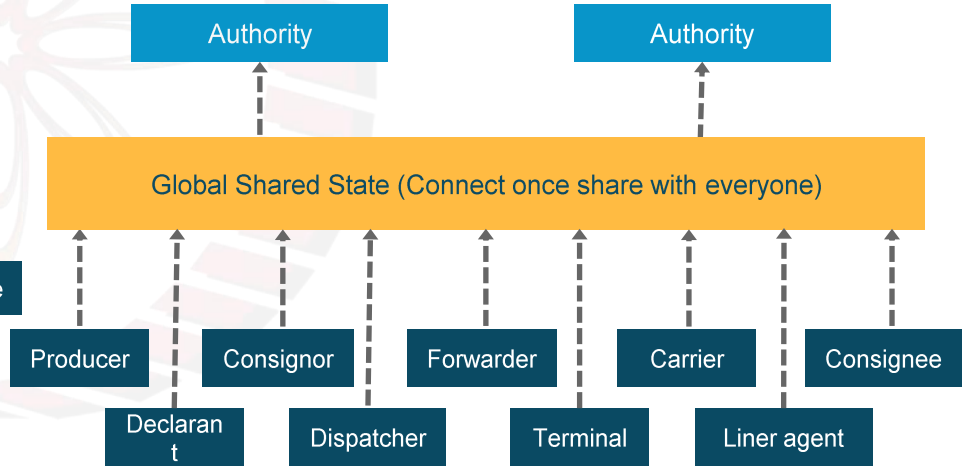
TODAY

- Each actor must configure peer-to-peer messaging with their partners
- Each actor has their own view of state



TOMORROW

- Shared state
- Shared communication infrastructure



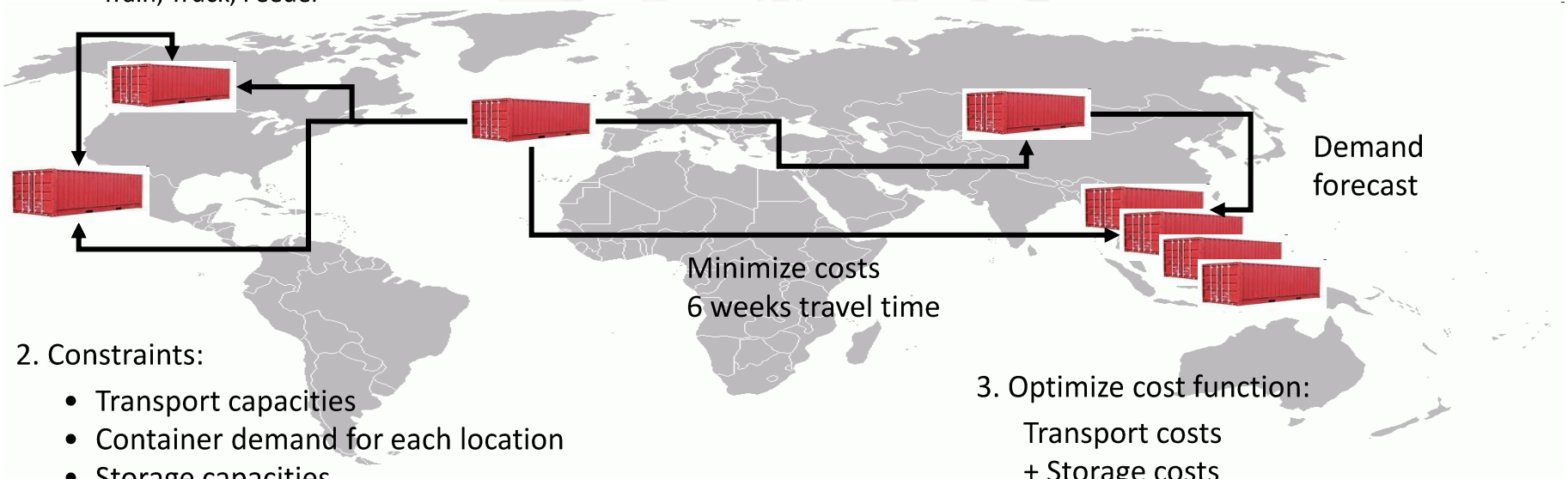
GTD Documents and Events

Other Issues: Empty Container Repositioning

1. Decision variables:

Transport modes and time
- Company vessel
- Train, Truck, Feeder

1/3rd of all container movements are empty
82 million port to port moves of empty TEUs
Maersk spends nearly $1B relocating empty containers



2. Constraints:
- Transport capacities
- Container demand for each location
- Storage capacities
- Business rules (e.g. Jones Act)

3. Optimize cost function:

Transport costs
+ Storage costs
+ On / Off hire

Blockchain for Container Management (?)

Parties

Container Owners / Utilities	Shipping lines/Freight Forwarders	Container Yard Owner / Port Authority
Own the containers, can rent out containers on favorable terms	Needs containers to transport goods	Own the storage facilities for empty containers, a) rent out space b) do due diligence for collection before collecting containers from yard*

Benefits

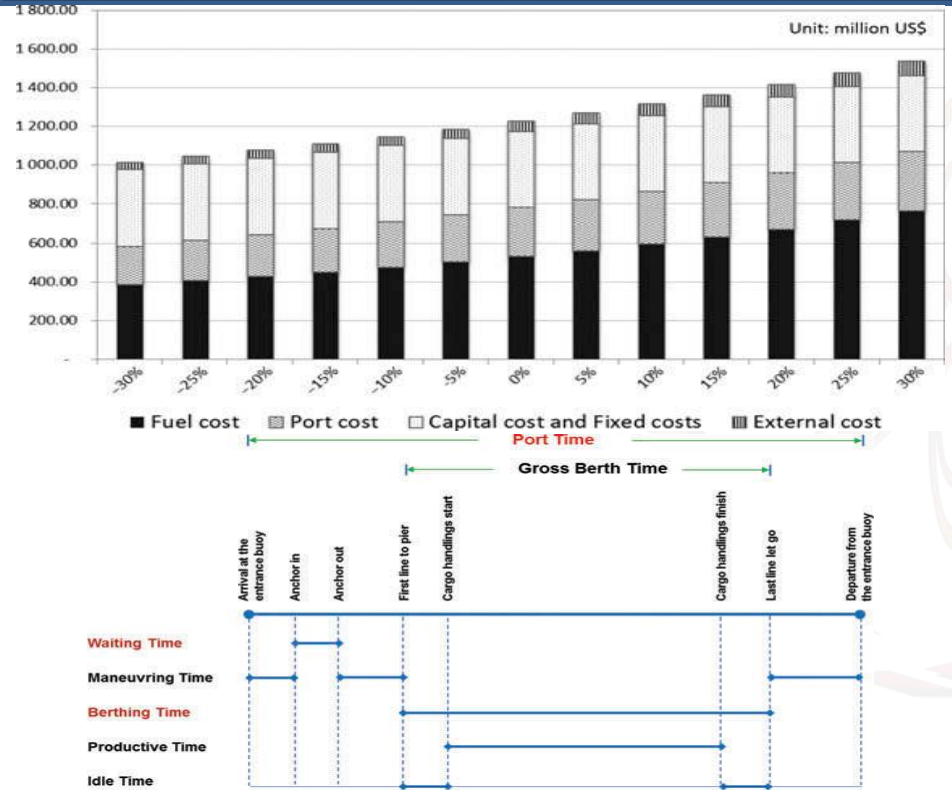
Container Owners / Utilities	Shipping lines/Freight Forwarders	Container Yard Owner / Port Authority
• Reduce number of empty containers shipped, better container utilization • Differential pricing through marketplace to rent out containers	• Reduce number of empty containers shipped • Improve ship utilization • Differential pricing through marketplace to rent out containers	• Improve yard utilization and preparedness

Blockchain for Container Management (?)

- Publish information about where containers are needed and where empty containers are available (current info and for a certain look-ahead into the future)
  - IoT devices could play a key role here
- Allows global optimization of container relocation within a shipping line initially
- Expand to support a marketplace for empty containers and reefers across shipping lines, ports, logistics service providers and container utilities
- Allow booking empty container at a discount – could open up shipping to trade goods that couldn't afford it previously

- The marketplace, once established and automated, could help eliminate container utilities and bring down the per-container cost of shipping
- The fine-grained visibility and automation can help support differentiated and real-time pricing / cost assessment of shipping a container

Other Issues: Port Operations



The Problem

- Shipping lines are continuously trying to improve operational efficiency to reduce fuel and operating costs as well as green house emissions
  - 95% of liners have already adopted slow steaming setting the voyage speed to 15-18 knots
  - International Maritime council set a goal of reducing CO_2 emissions by 75% by 2050

Port Operations

- Time spent by a ship in a port emerges as an important factor affecting operating cost as well as CO_2 emissions
  - Lesser time in a port, more the time the ship gets at sea
  - Enables maintaining service schedule while operating at low speed; avoid speeding to prevent penalties arising from delays

Blockchain for Port Operations (?)

- (Port authority) Publish information about berth availability including maximum ship size allowed, storage availability and possible delays due to equipment malfunction, custom backlogs, labour unrest, natural calamities etc.
- Allows shipping lines to optimize voyage speed to arrive at port just in time
- For intermodal shipment, freight forwarder/ground transport and liner exchange information about current location, time of arrival, assigned berth and storage area, shipment details (e.g. 5 Tonnes of fresh produce) along with transportation requirements (e.g. temperature controlled truck)
- (Shipping Line) Publish information about different containers to optimize loading and unloading onto ship (heavy containers go at the bottom)
- (Shipping Line) Publish information about container availability (Full/Partial) to optimize stuffing and unstuffing

Fun Reading

- IBM and Maersk, Cross-Border Supply Chain demo (4 mins): https://www.youtube.com/watch?v=tdhpYQCWnCw
- Noteworthy startup, Wave: http://wavebl.com/


thank you!