

think

“TradeLens - Blockchain in der Logistik”

Jährliche Konferenz der
Deutschen Gesellschaft für Transportrecht
(DGTR)

07.11.2019
Berlin

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IBM DACH*



Warum Blockchain ??

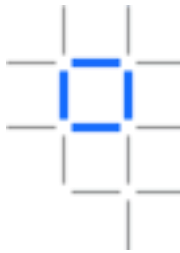
think



Transparenz.
Sicherheit.
Vertrauen.
Beschleunigung.



IBM



Hyperledger Fabric - Mitglieder der Linux Foundation

Premier



General



Associate

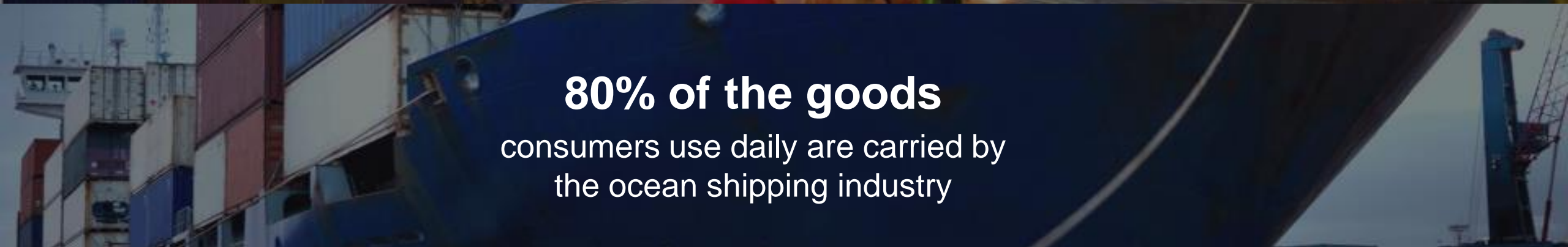


Blockchain Lösungen für Unternehmen und Organisationen in allen Branchen

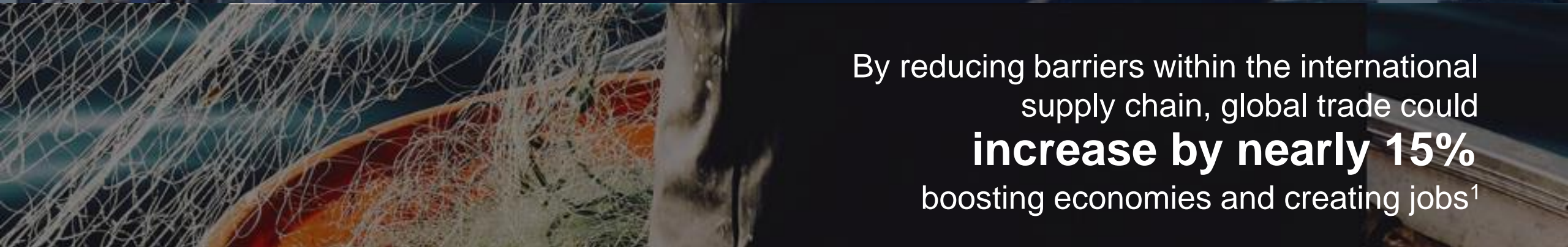




More than
\$16 trillion in goods
are shipped across international
borders each year



80% of the goods
consumers use daily are carried by
the ocean shipping industry



By reducing barriers within the international
supply chain, global trade could
increase by nearly 15%
boosting economies and creating jobs¹

GLOBAL TRADE IS HIGHLY INEFFICIENT AND BURDENED BY PAPER-BASED PROCESSES

One shipment of avocados from Mombasa to Rotterdam



30 actors

100 people

200 Information exchanges

- Valuable data is trapped in organizational **silos**
- **Diverse perspectives** on transaction state
- **Manual and time-consuming** business processes
- Clearance processes subject to **fraud**

There is significant potential to improve information exchange within the supply chain

TradeLens.

Disrupting the supply chain - a common project of IBM & Maersk

The New York Times

Blockchain: A Better Way to Track Pork Chops, Bonds, Bad Peanut Butter?



Cargo containers are loaded on a Maersk ship at the Port of Mombasa in Kenya.

PIL, PSA, IBM Conclude Blockchain Trial from Chongqing to Singapore



Shipping company Pacific International Lines (PIL), port group PSA International (PSA) and technology company IBM Singapore (IBM) have completed a blockchain-based supply chain platform trial.

As informed, the companies worked on a proof of concept (POC) exercise, built on IBM Blockchain Platform, applying and then testing the platform to track and trace cargo movement from

Chongqing to Singapore via the Southern Transport Corridor.

SupplyChain

Dnata hails successful blockchain pilot with aviation partners

coindesk

Dnata Taps IBM for Air Cargo Blockchain Pilot

Bloomberg

Business

Maersk, IBM Launch Blockchain-Based Shipping Platform TradeLens

By Christian Weierberg
August 9, 2019, 4:00 AM PDT

A.P. Moller-Maersk A/S, the world's largest container line, and International Business Machines Corp. have launched a blockchain-based platform for sharing manifest information in real time, responding to partners.

Forbes

2,882 views | 4/1/19, 10:01am

IBM-Maersk Blockchain Platform Adds 92 Clients As Part Of Global Launch

Michael del Castillo
IBM Staff
A former member of the IBM Blockchain and engineering.



GLOBAL TRADE IS HIGHLY INEFFICIENT AND BURDENED BY PAPER-BASED PROCESSES

+ Data trapped in organizational silos

Information is held in paper and various digital formats across dozens of service providers along the supply chain, requiring complex, cumbersome, and costly peer-to-peer messaging. The result is inconsistent information across organizational boundaries, latency in obtaining shipment visibility, and blind spots that hinder the efficient flow of goods.

+ Manual, time-consuming, paper-based processes

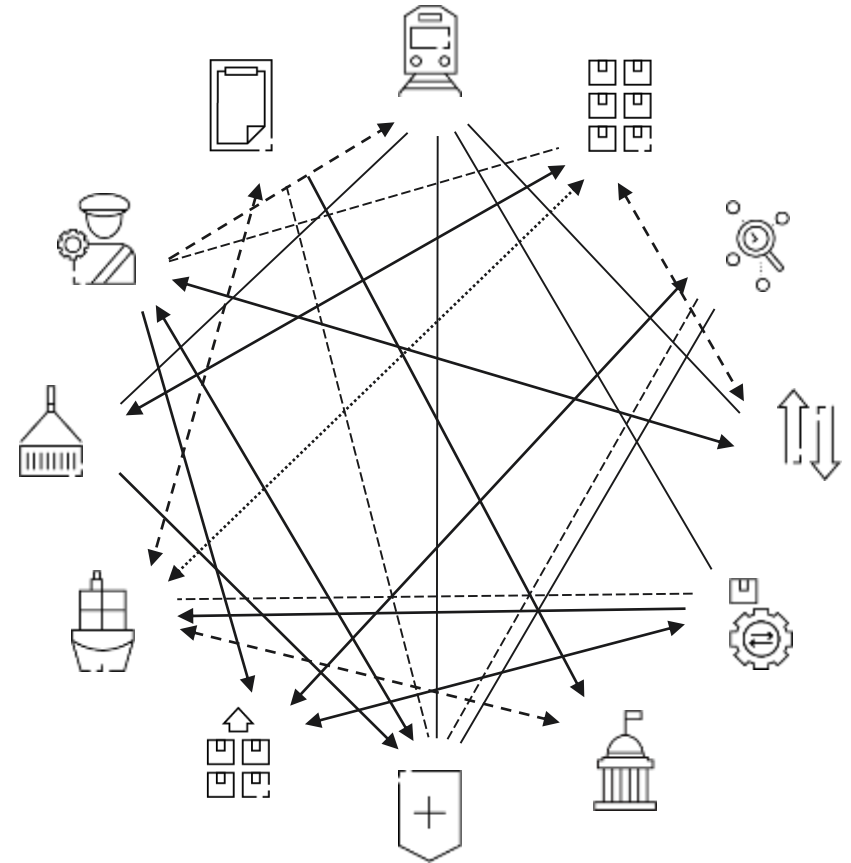
The collection and processing of up-to-date data, as well as inefficient trade document exchange, requires manual checks and frequent follow-ups and results in errors, delays and high compliance costs. Late filings are common due to missing information.

+ Clearance takes too long and is often subject to fraud

Risk assessments by customs authorities lack sufficient and trusted information resulting in high inspection rates, added prevention measures against fraud and forgery, and delayed customs clearance.

+ High costs and poor customer service

These challenges have significant downstream repercussions. The inability to forecast and plan effectively, address supply chain disruptions in near real-time, and share trusted information across the supply chain leads to excessive safety stock inventory, high administrative costs, operational challenges, and ultimately poor customer service.



OUR MISSION

DIGITIZE THE GLOBAL SUPPLY CHAIN

+ Connect the ecosystem

Bring together all parties in the supply chain - including shippers, freight forwarders, intermodal operators, ports and terminals, ocean carriers, customs and other government authorities, and others - onto a blockchain-based platform with a secure permission and identity framework.

+ Drive true information sharing

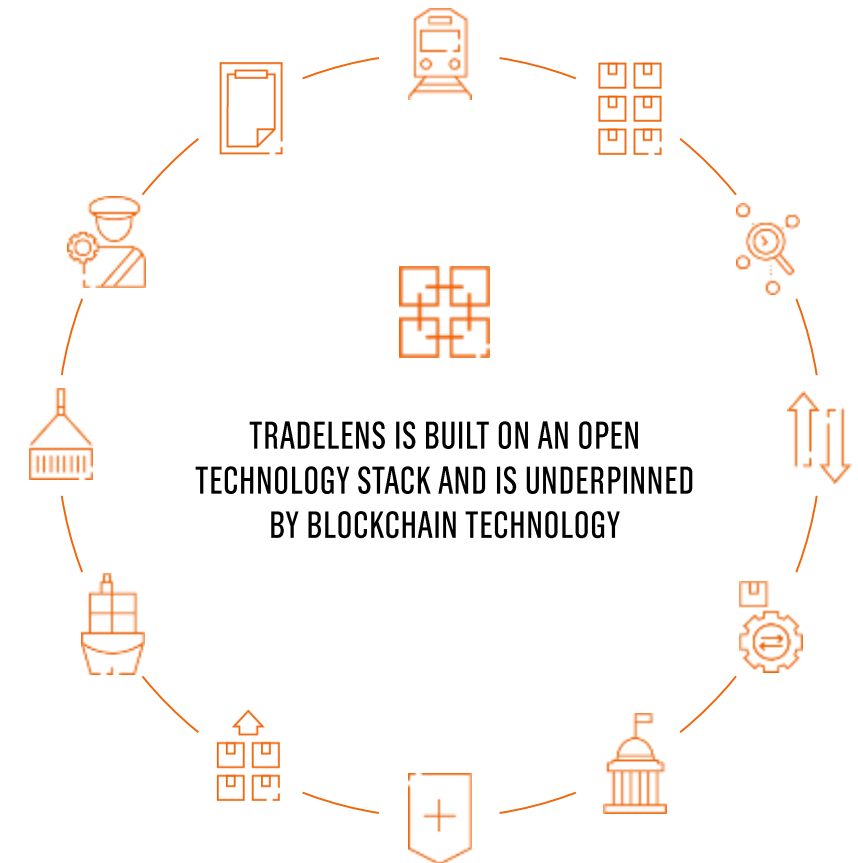
Provide for the seamless, secure sharing of near real-time, actionable supply chain information across all parties to a trade - encompassing shipping milestones, cargo details, trade documents, the structured data embedded in trade documents, customs filings, sensor readings, and more.

+ Foster collaboration and trust

Enable the digitization and automation of the cross-organization business processes integral to global trade, including import and export clearance, with blockchain ensuring secure, auditable, and non-repudiable transactions.

+ Spur innovation

Lay the foundation for ongoing improvement and innovation through an open, publicly -available API, the use of standards and promotion of interoperability, and the launch of an Application Marketplace that parties can use to build and deploy TradeLens-powered applications for themselves, their partners, and their customers



TRADELENS

AN OPEN AND NEUTRAL BLOCKCHAIN-POWERED PLATFORM THAT IS DIGITIZING THE GLOBAL SUPPLY CHAIN AND TRANSFORMING TRADE

- + TradeLens is ushering in a new era in global supply chains—one where all parties can collaborate, share data, and realize the benefits of digitization.
- + Data is published directly from the source so the right people can securely manage their supply chain in near real-time.
- + TradeLens breaks down longstanding data and processing silos that exist among trading partners and simplifies the flow of documentation that accompanies every shipment.
- + Currently, the platform handles 13 million events and more than 100,000 documents every week and growing.
- + The platform is being driven by a broad collaboration of industry players under the leadership of IBM and Maersk

GLOBAL TRADE IN NUMBERS



\$16+ TRILLION IN GOODS

ARE SHIPPED ACROSS INTERNATIONAL BORDERS EACH YEAR



80% OF THE GOODS

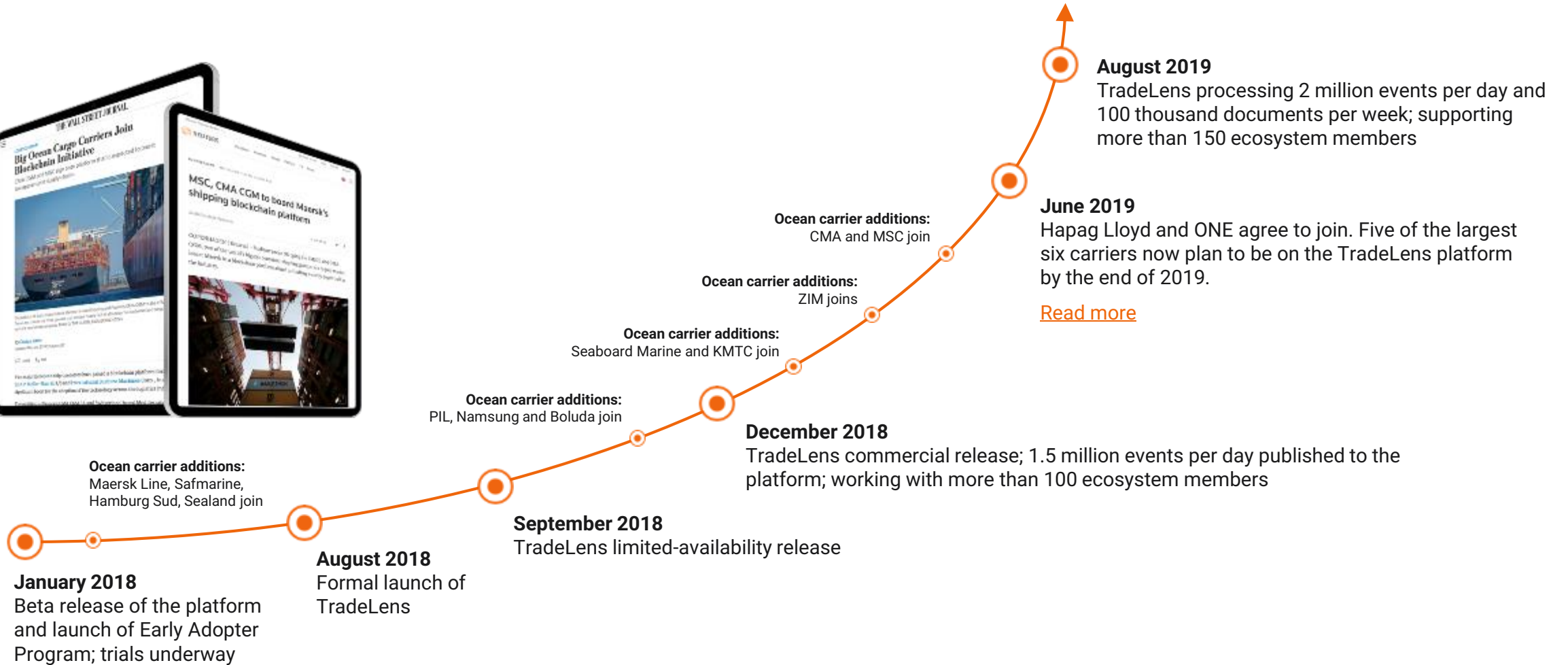
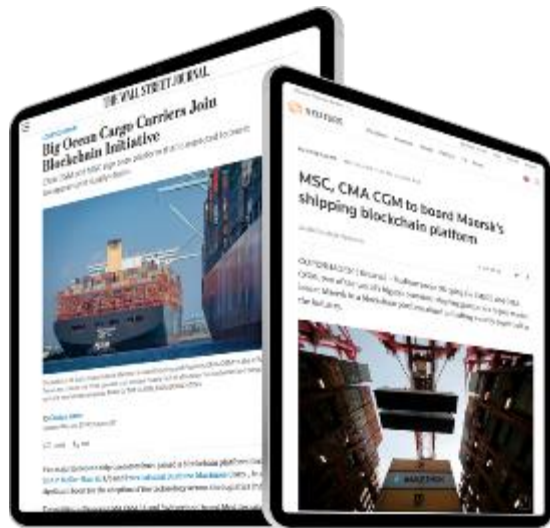
CONSUMERS USE DAILY ARE CARRIED BY THE OCEAN SHIPPING INDUSTRY

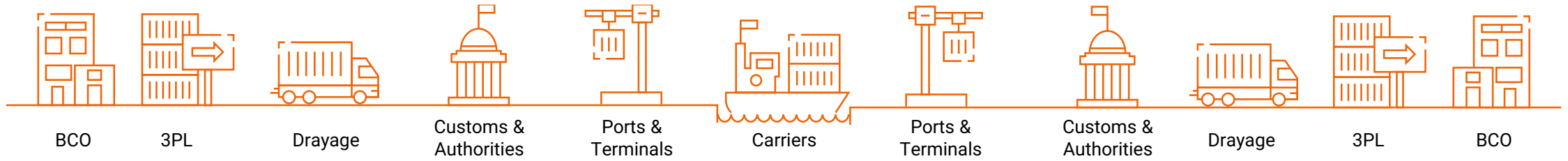


BY REDUCING BARRIERS WITHIN THE INTERNATIONAL SUPPLY CHAIN,

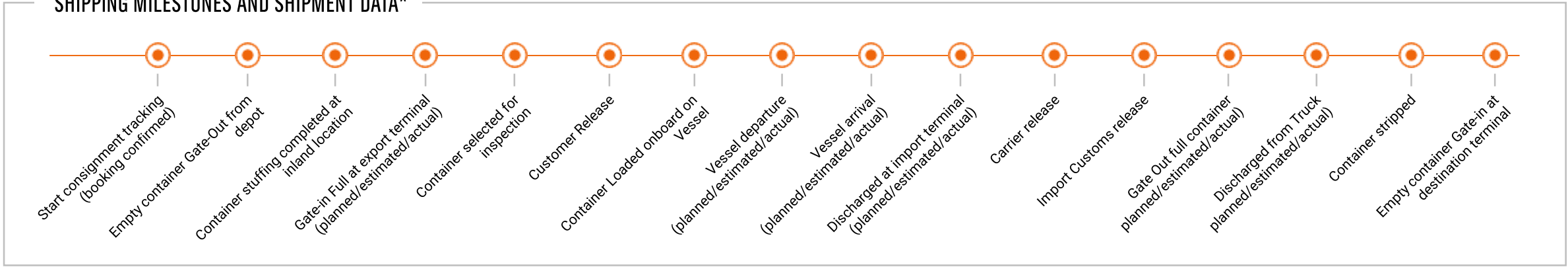
GLOBAL TRADE COULD INCREASE BY NEARLY 15%

OUR JOURNEY

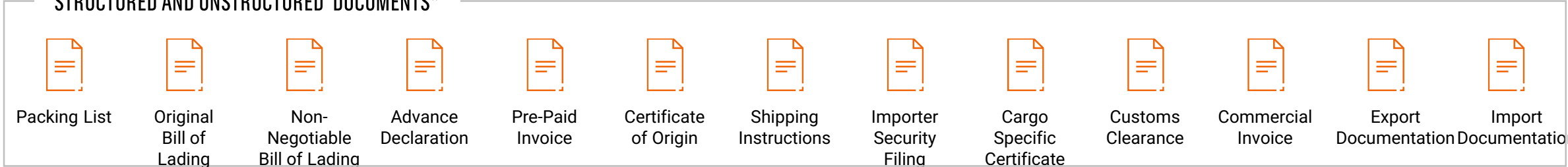




SHIPPING MILESTONES AND SHIPMENT DATA*



STRUCTURED AND UNSTRUCTURED DOCUMENTS*



TRADELENS BLOCKCHAIN BUSINESS NETWORK



* Note: representative sample only of the data on the platform

ECOSYSTEM PARTICIPANTS

NETWORK MEMBERS



Ocean Carriers

Provide the transportation plan, information about the status of shipments across the ocean leg, and critical documents such as the BoL; access end-to-end supply chain data in near real-time including events directly from shipper, intermodal, customs and 3PLs



Ports / Terminal Operators

Provide information about the disposition of cargo within the boundaries of the port/terminal; access near real-time information to enrich port collaboration and improve terminal planning



Intermodal Operators

Provide transportation plans and information on the disposition of shipments carried on trucks, rail, barges, etc.; improve planning and utilization of assets given near real-time access to end-to-end supply chain events for shipments



Government Authorities

Provide information about the export and import clearance status for shipments into and out of the country; access end-to-end supply chain information for improved customs clearance and risk assessments

TRADELENS CLIENTS



Shippers/BCOs

Engage with the platform as a consumer of shipping information to improve supply chain management, as a means to collaborate with supply chain partners, and as a way to streamline clearance



Freight Forwarders / 3PLs

Engage with the platform as a consumer of shipping information, a means to collaborate with customers and supply chain partners, and a way to improve customs brokerage capabilities



Financial Services

Engage with the platform as a consumer of supply chain information for a variety of trade finance, insurance, and other purposes to reduce the risk of fraud and increase speed and flexibility to customers

OCEAN CARRIERS

The ocean leg is at the heart of a container shipment journey, and as such carriers are the linchpin of the end-to-end information model by providing the booking that links all parts of the journey.

Given the central role that carriers play today in safeguarding and distributing key information and documents across parties to a shipment, they are in a unique position to govern the blockchain network that will transform the industry's information-sharing model.

TradeLens is currently in partnership with 17 global ocean carriers*.



* CMA CGM, MSC, Hapag-Lloyd and ONE have agreed to join TradeLens; final on-boarding pending. Speak with your TradeLens representative for a report on current onboarding status.

3PL AND INTERMODAL

Third-party logistics providers (3PLs) and Freight Forwarders are central to the global movement of goods. As a solution designed for the entire supply chain industry, TradeLens is focused on maximizing the value of these participants by:

- + Improving collaboration with their customers by leveraging global standards and nuanced data control
- + Tangibly bringing together the commercial, documentary and operational elements of supply chain management

Intermodal operators handling their customers' cargo want more visibility up and down the supply chain so they can act fast and lower the cost of every shipment.

TradeLens provides trustworthy data that helps them to predict and optimize equipment utilization, speed up pick-ups and drop-offs and reduce queueing times.



* This list of 3PLs and intermodal operators is not exhaustive. Speak with your TradeLens representative for a complete list, along with current onboarding status.

GOVERNMENT AUTHORITIES

Authorities and agents in charge of the import and export of goods want powerful new tools to help them simply and clearly identify risks and efficiently process huge volumes of trade that cross their borders.

TradeLens is working with authorities from 11 countries to deliver better information sharing, less manual paperwork, and easier connections to national single window platforms.



Abu Dhabi
Customs



Azerbaijan
Customs



Australia Home
Affairs



Bahrain
Customs



Canada
Customs



Dutch
Customs



Ghana/GCNET



Peru
Customs



Russia
Customs



Saudi Arabia
Customs



Singapore
Customs

* This list of authorities is not exhaustive. Speak with your TradeLens representative for a complete list, along with current onboarding status.

PORTS AND TERMINALS

Port communities and terminal operators are seeking ways to reduce the cost of connecting partners in the supply chain in order to increase stack placement efficiency and optimize truck and vessel service times.

TradeLens is focused on maximizing the value of these participants by:

- + Reducing the cost of connecting to shipping lines and the broader port community by leveraging an industry standard platform participants are already connected to
- + Simplifying conversational electronic communications of ETAs for all port community participants improves utilization of port assets
- + Enabling advanced communication on aggregated booking volumes and next mode of transport provides better data for stack placement decisions, leading to better truck and vessel service times



* This list of ports and terminal operators is not exhaustive. Speak with your TradeLens representative for a complete list, along with current onboarding status.

THE TRADELENS PORT AND TERMINAL NETWORK

- + Coverage across 6 continents
- + 72 ports and terminals directly integrated with TradeLens
- + Data from up to 600 ports and terminals captured by existing TradeLens members

- Ports and terminals directly integrated with TradeLens
- Ports and terminals contributing data via carriers to TradeLens

Interactive map of TradeLens port and terminal network:

<https://www.tradelens.com/ecosystem/>

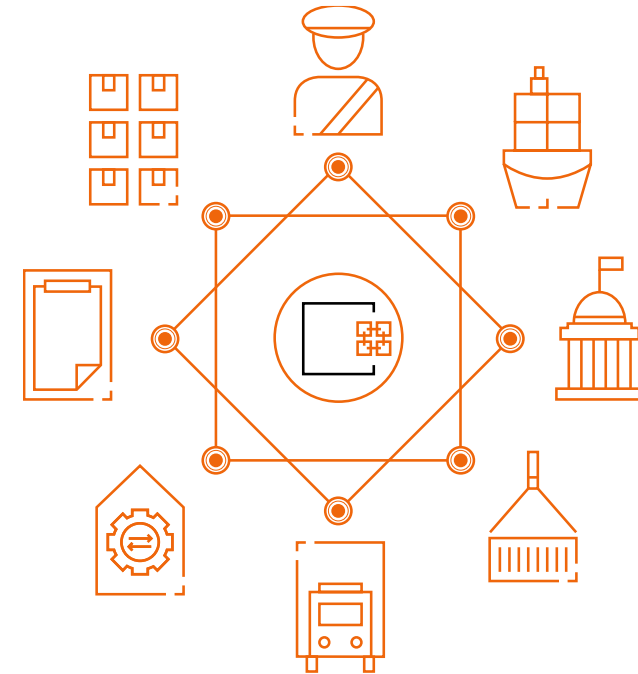


BLOCKCHAIN

The TradeLens blockchain is a shared, immutable ledger that records transactions and tracks tangible and intangible assets. Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.

While the power of TradeLens comes from its members, blockchain enables secure distribution and storage of vital information at the heart of the platform.

TradeLens uses the IBM Blockchain Platform which is based on Hyperledger Fabric, an open-source permissioned blockchain where the peer members ("Trust Anchors") are known to the network based on cryptographic identities.



How the TradeLens blockchain connects the ecosystem:

- + **Tamper-proof recording and non-repudiation** for all data submitted to the solution.
- + **Verifiability** of data against the recorded proof of submission on the blockchain.
- + **Recoverability** of the solution from the data recorded on the blockchain.
- + **Provenance and Auditability.** All transactions are signed and dated on the ledger.
- + **Privacy** of data to ensure that it is only shared with relevant organizations.

STANDARDS AND INTEROPERABILITY

TradeLens is a neutral platform that is available to participants of any party to a shipment, anywhere in the world. The platform provides a way for all major logistics and permissioned participants to immediately contribute to and extract value from the TradeLens network.

TradeLens is committed to the promotion and adoption of standards and interoperability of platforms.

+ Information standardization

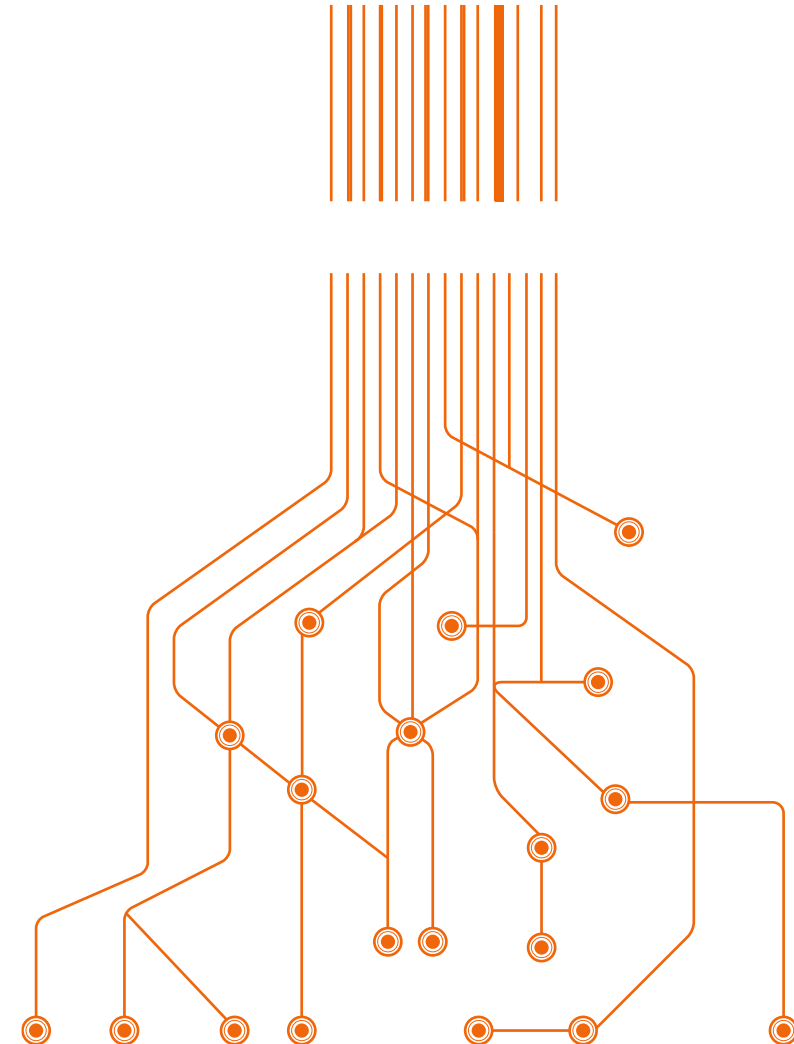
TradeLens will work closely with the advisory board, ecosystem members and standards bodies to help the industry develop and adopt standard codes and data models. The TradeLens data model and access control scheme aligns with UN/CEFACT.

+ Interface standards

TradeLens is committed to openness, with all functionality surfaced via non-proprietary, publicly available APIs that are designed specifically for ease of integration.

+ Blockchain interoperability

The TradeLens platform has full intentions to follow blockchain-based standards evolving in the industry, inclusive of cross-ledger namespace and transfers or information between ledgers.



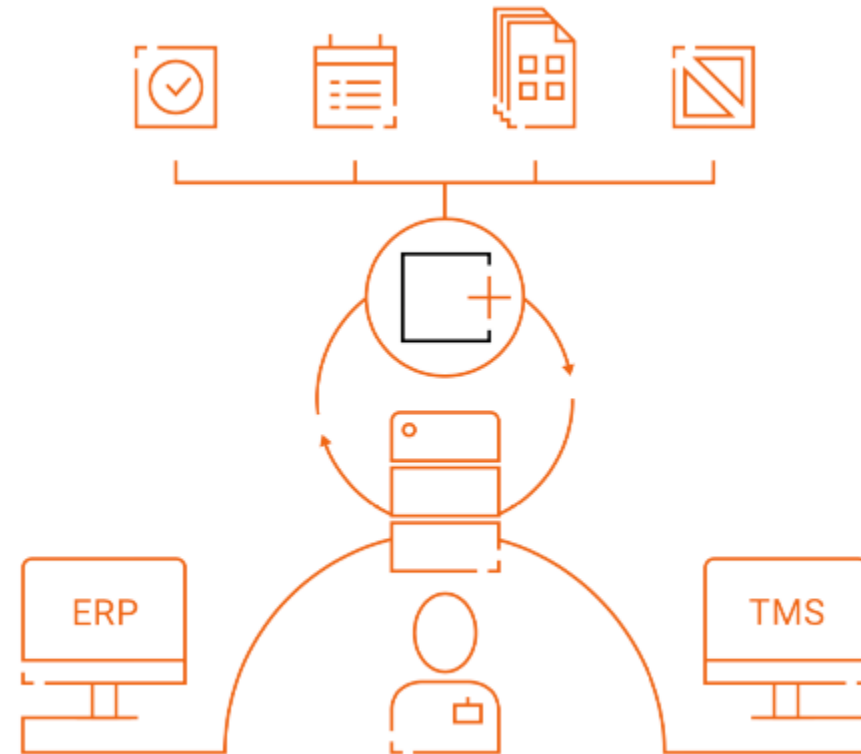
API ACCESS

TradeLens integrates with users' in-house systems via non-proprietary, publicly available APIs that are designed specifically for ease of set-up and use.

TradeLens uses Swagger for its APIs, which is a common framework for documenting REST APIs. The platform Event Publish API accepts shipping event data from publishers, which can be distributed through the platform Subscription API. This allows subscribers to receive notification of updated events that occur across the shipping lifecycle.

API benefits

- + Open APIs enable real-time data transfer between supply chain participants via publish, subscribe, query and doc share functions.
- + Reduce EDI maintenance costs with a family of open-standard APIs for real-time data transfer between supply chain partners.
- + Proactively manage exceptions with estimated, planned and actual milestone notifications that immediately publish associated data via API.
- + Spur innovation at all levels of your IT division by unlocking creative energies formerly locked up in EDI set-up and operation.



SECURITY

TradeLens leverages the comprehensive security capabilities embedded in numerous mission-critical platforms that IBM manages for many of its Fortune 500 clients

Secure Development, Deployment and Operations

- + **Secure development** processes followed; includes source code review for security flaws, industry standard encryption algorithms, vulnerability management, and penetration testing.
- + **Invite only** system with authentication and authorization of all users and access.
- + **Granular permissions** to documents according to participant Role on consignment

Compliance to IT Security Standards

- + TradeLens has been accredited with the **ISO27001 IT security certification** as of August 2019.

Built on Enterprise IBM Blockchain Platform and IBM Cloud

- + Provides **protection against ransomware** since there is no capability to access system root, and back ups are not accessible via TradeLens interface.
- + **Permissioned ledger** with immutability, access control and data segregation by channel
- + **Encryption** in firmware, keys protected by hardware
- + PII and other **sensitive data is not stored** on chain (only hashes)
- + Leverages fully managed **IBM Kubernetes** Service for run-time components.

DATA MODEL

The TradeLens platform manages the sharing of data associated with three interrelated “objects” as defined by the UN-CEFACT Supply Chain Reference Data Model standard: Shipments, Consignments, and Transport Equipment.

+ Shipment

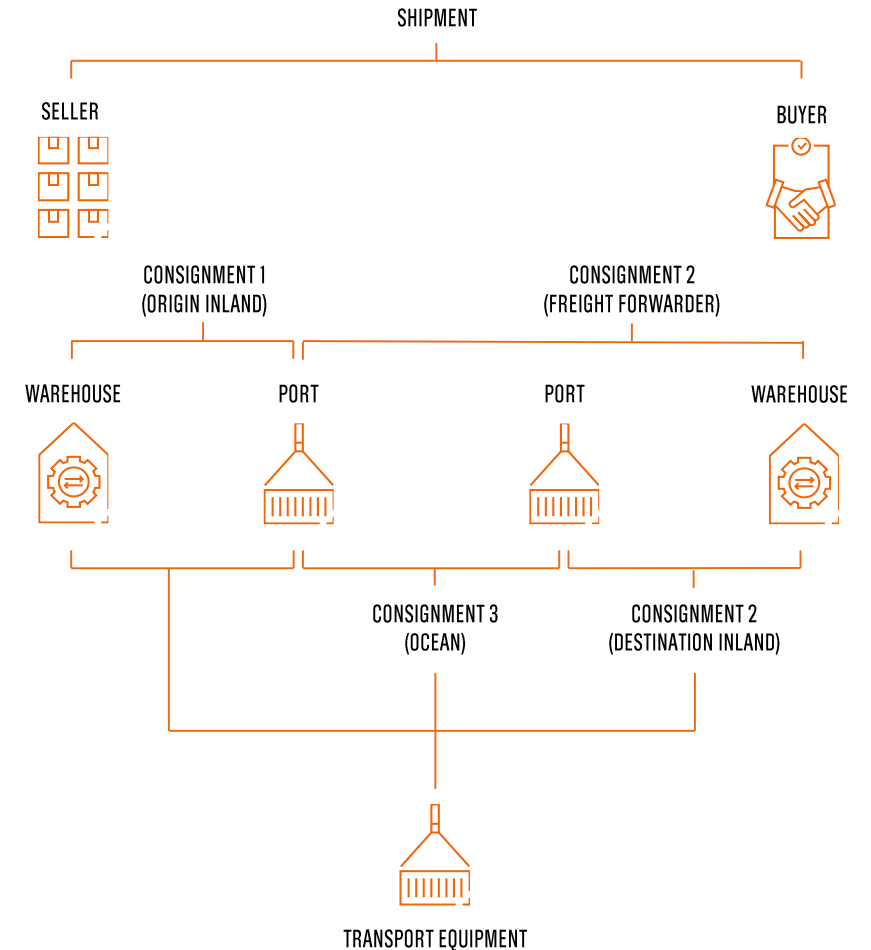
A separately identifiable collection of goods (available to be) transported together from a seller to a buyer, including the shipping arrangements and movement of products including despatch and delivery, regardless of the modes of transport or the contracting/subcontracting relationships.

+ Consignment

Separately identifiable collection of goods transported together from one consignor to one consignee via one or more modes of transport as specified in one single transport contract.

+ Transport Equipment

The physical equipment used to hold, protect, or secure cargo for logistics purposes. Currently, containers are supported as Transport Equipment in TradeLens. Since some types of transport equipment are re-used, Transport Equipment in TradeLens is further constrained to an instance of the usage of a piece of equipment within the context of a shipment or a set of consignments relating to the end-to-end transportation of a shipment.



MILESTONES

Data that are precise and accessible to all parties help shipments move faster. TradeLens provides a near real-time publish and subscribe mechanism for exchanging milestone data between the entities that are involved in the shipment.

Importers and exporters who use TradeLens can easily determine the status of their shipments through access to more than 120 shipment event types, communicated directly from the source, including document updates and planned, estimated and actual transport milestones.

Planned

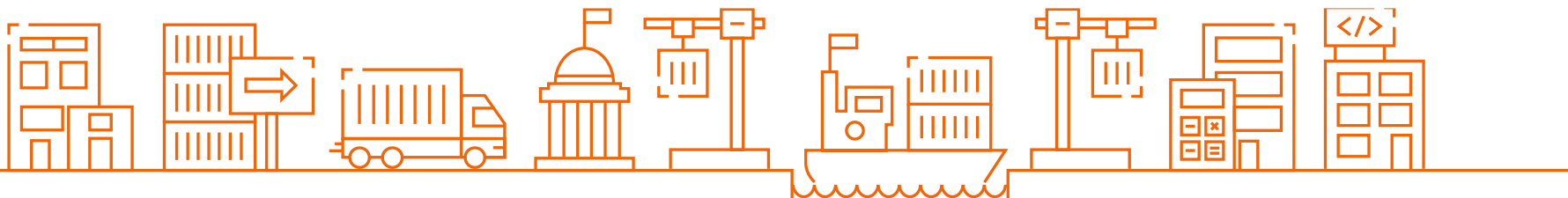
- + Planned stuffing start
- + Planned stuffing completed
- + Planned loaded on truck
- + Planned gate out
- + Planned gate in
- + Planned discharge from truck
- + More...

Estimated

- + Estimated rail arrival
- + Estimated discharge from rail
- + Estimated loaded on barge
- + Estimated barge departure
- + Estimated barge arrival
- + Estimated discharge from barge
- + More...

Actual

- + Actual loaded on vessel
- + Actual vessel departure
- + Actual vessel arrival
- + Actual discharge from vessel
- + Actual stripping start
- + Actual container stripped
- + More...



DOCUMENT SHARING

TradeLens provides a framework for sharing documents among trade parties, with security, version control, and privacy. Authorized users with the required permissions can upload, download, view and edit documents. The TradeLens document store allows documents to be securely stored and viewed by various parties to a shipment.

Digitized document benefits

- + Trade documents are associated with containers, and consignments in a distributed and shared repository, eliminating endless file, folder and email searching for information.
- + TradeLens supports the use of structured documents. The information they contain can be easily analyzed and interpreted, allowing for greater automation and accuracy.
- + Each time a document is edited or uploaded to the TradeLens platform, a new version of the document is created and added to the document store, eliminating multiple copies and the inconsistency of identifying the latest versions.
- + TradeLens uses the Hyperledger Fabric permissioned blockchain to guarantee the immutability and traceability of trade documents.
- + Participants assigned to the consignment have default access rights based on a unified permissions model
- + Network participants assigned to a consignment can immediately access shared documents and data, never having to wait for a document to be sent.

DOCUMENTS SUPPORTED ON THE PLATFORM

- + Sea Waybill*
- + Commercial Invoice *
- + Packing List *
- + Booking Request
- + Booking Confirmation
- + Shipping Instructions
- + Export Declaration
- + Bill of Lading
- + Pro-Forma Invoice
- + Arrival Notice
- + Import Declaration
- + Health Certificate
- + Phytosanitary Certificate
- + Veterinary Certificate
- + Fumigation Certificate
- + Inspection Certificate
- + Certificate of Analysis
- + Certificate of Origin
- + Dangerous Goods Declaration

* Structured support

DATA SHARING

TradeLens permissions are determined through a combination of the organization’s role and the data type. The TradeLens platform then permits access to data according to the permission matrix.

The full Data Sharing Specification is available [here](#)

	Transport Service Buyer	Consignor	Consignee	Origin 3PL Agent	Destination 3PL Agent	Export Customs Broker	Import Customs Broker	Request Party	Notify Party	Transport Service Provider	Origin Marine Terminal	• • •
Events												
Planned stuffing start	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
Planned stuffing completed	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
Actual loaded on truck	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Estimated gate out	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
Actual gate in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	
• • •												
Documents												
Booking Confirmation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Shipping Instructions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
Bill of Lading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
Sea Waybill	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
House Bill of Lading	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	
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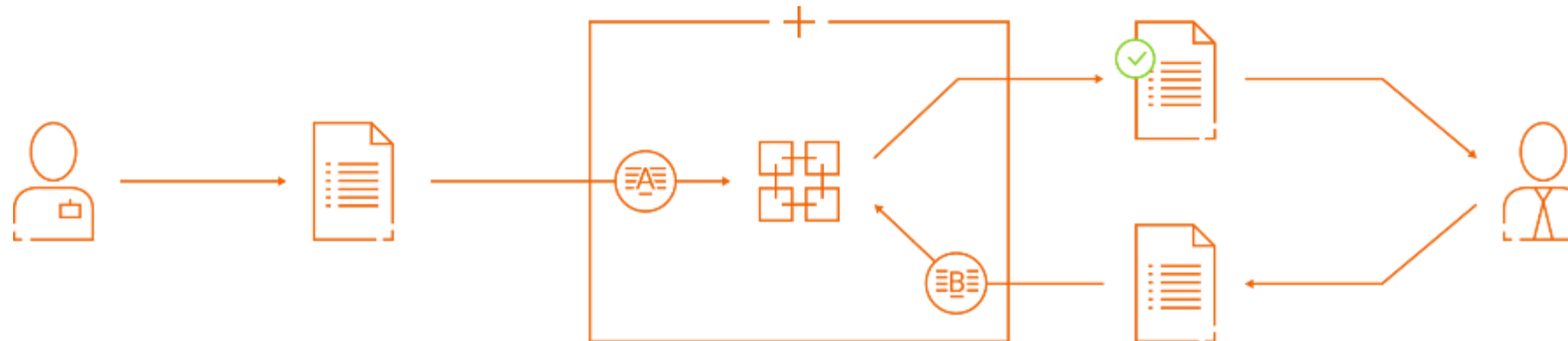
Participant has an obligation to provide (publish) the data, where relevant/applicable
 Participant has read access (can subscribe) to the data
 Participant has no access to the data

TradeLens Core

DOCUMENT VERSIONING

TradeLens document handling provides seamless role-based access to structured and unstructured consignment information for all supply chain partners. Parties to the consignment can be notified when relevant documents or document amendments are published.

How blockchain enables version control



Publish a document

TradeLens utilizes a blockchain-based document store on IBM Cloud. Documents can be published to the platform through the TradeLens web UI or via a secure API protocol.

Storage and encryption

A readable version is saved to the TradeLens Document Store and an encrypted 'hash', or token (A), is saved to the blockchain ledger. Documents are searchable for 120 days from booking confirmation.

Retrieve and verify

Authorized users have direct access to documents. TradeLens compares a new document token (B) with a stored document token (A) to verify the authenticity and immutability of each retrieved document.

FUTURE OF THE MARKETPLACE

1 – 2 YEAR OUTLOOK (SUBJECT TO CHANGE)

- + **TradeLens Core (released December 2018)**
Releasing smart notification built with business logic to bolster agile supply chains.
- + **Shipping Instruction Automation**
Simplify the complexity and iteration between shipper and provider in the sending of instructions and creation of a complying bill of lading.
- + **Negotiable Electronic Bill of Lading**
A digital asset providing secure paperless transfer of ownership and cargo release.
- + **Freight Booking**
Seamlessly book freight with TradeLens member carriers.
- + **Trade Finance**
Digital alternatives to traditional letters of credit, leveraging TradeLens milestone, document, and e-Bill capabilities.
- + **Cargo Insurance**
Purchase highly competitive cargo insurance from leading firms, enabled by TradeLens data.



- + **Cross-mode Dangerous Goods**
Simplified, consistent, and auditable means to share dangerous goods documentation across all modes of transport
- + **Additional Developments**
Advance Ship Notification (ASN) automation, AI logistics insights, interoperability with leading blockchain solutions, and more.

- + **The TradeLens Marketplace**
Supporting a partner program on TradeLens.com in Q4 2019.

MORE INFORMATION

JOINING TRADELENS

- + TradeLens is available today for both TradeLens Clients and Network Members
- + **TradeLens Clients** can get up and running quickly and gain access to share trade documents and near real-time, high-fidelity shipping milestones across parties via the TradeLens web app or by consuming and publishing data via API
- + **Network Members** provide data, and can get access to data, according to the published TradeLens Data Sharing Specification

Interested participants should contact their local IBM or Maersk sales representatives

TRADELENS ONLINE

- + Visit us at www.tradelens.com for more information
- + If you would like to get in contact, please provide your details [here](#)





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