How Blockchain can transform Global Trade Supply Chains

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IBM

Supply chains have three core modern era challenges ...

Data Visibility

Process Optimization

Demand Management

… and despite progress in all three areas, end-to-end inefficiencies remain

- Administrative costs are twice the cost of physically shipping the container
- Fraud in global trade is $600B

- Worldwide cargo losses exceeds $55B
- Non-tariff trade barriers suppress global trade by ~15% (World Economic Forum)

Blockchain creates the TRUST necessary to address these challenges

We can connect the ever-increasing sets of data…
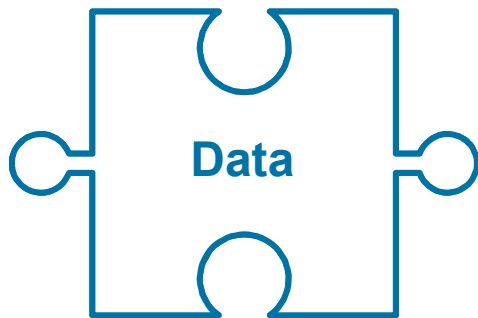
Data

- 80% of worldwide data is sitting in silos
- 90% of data in the world today has been created in the last two years
- Less than 0.5% of all data is ever analyzed

Trust
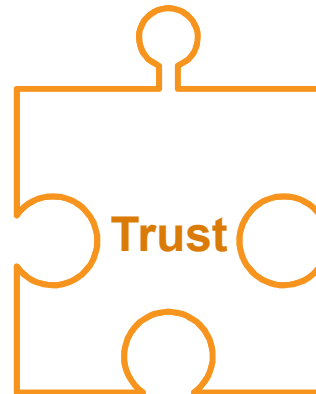
BLOCKCHAIN

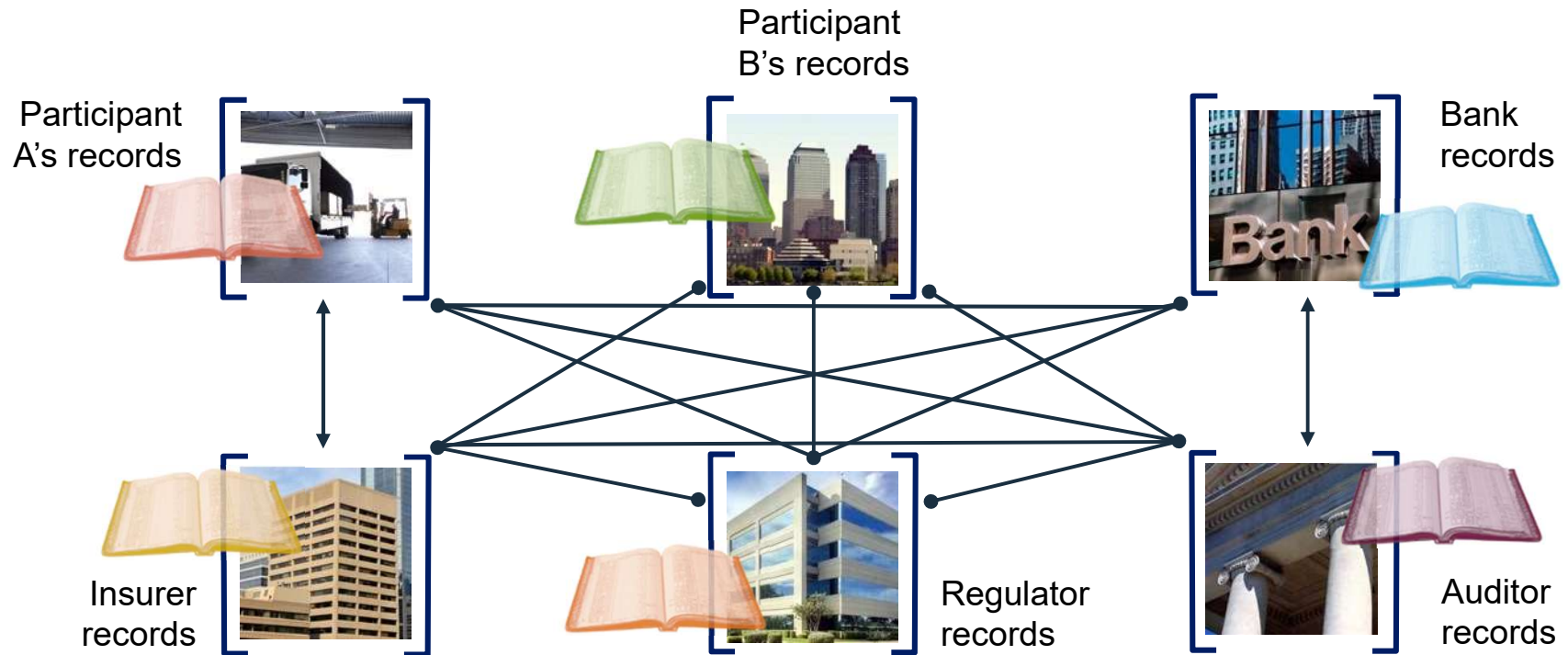**… with the ever-more-powerful analytics**

Analytics

- $130B+ is spent on big data and business analytics globally
- 73% of global CEOs report cognitive computing will play important role in the future of their organizations

Problem…

Participant A's records

Participant B's records

Bank records

Insurer records

Regulator records

Auditor records

… inefficient, expensive, vulnerable

Solution: a shared, replicated, permissioned ledger …

Participant
A's records

Participant
B's records

Bank
records

Blockchain

Insurer
records

Regulator
records

Auditor
records
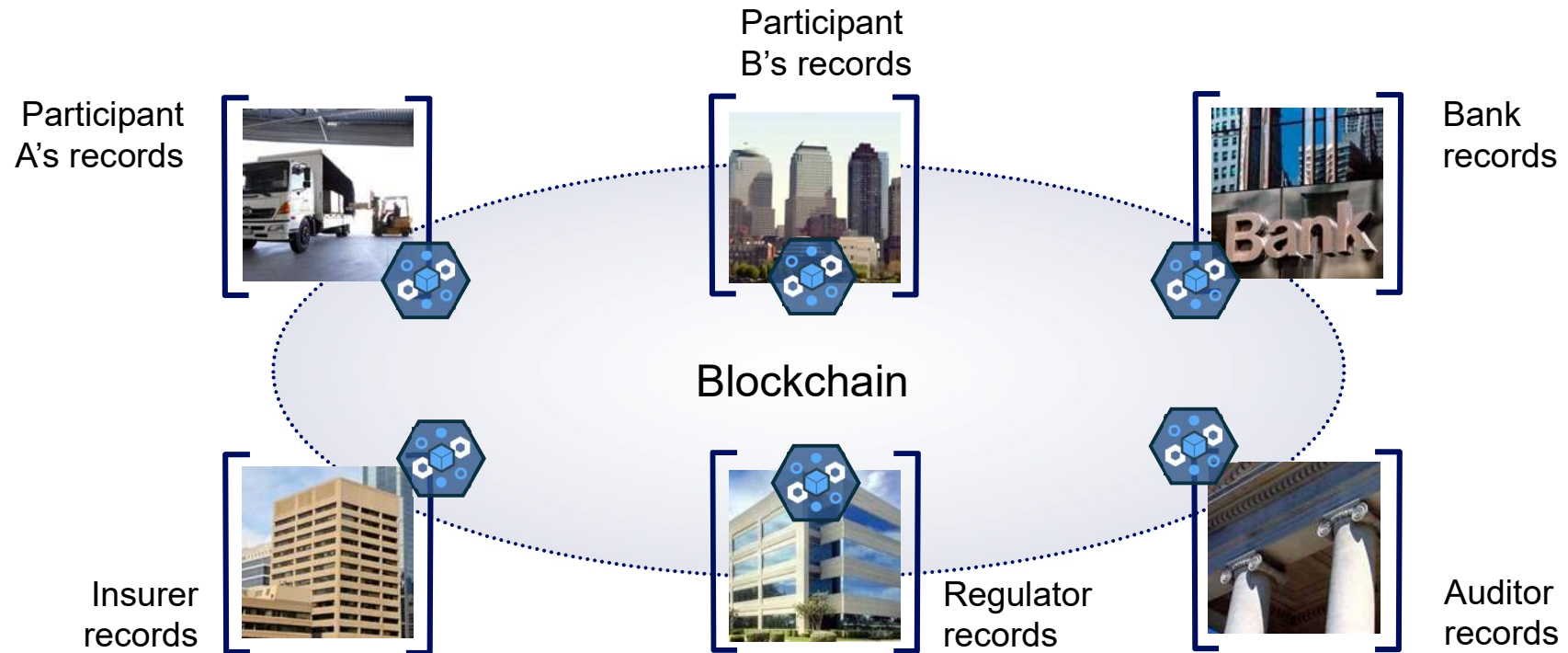
… with consensus, provenance, immutability and finality

Blockchain for Business…

Append-only distributed system of record shared across business network

Shared ledger

Smart contract
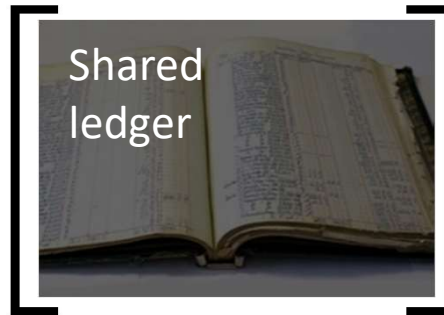
Shipping documentation is embedded in transaction database and executed with transactions

Ensuring appropriate visibility; transactions are secure, authenticated and verifiable
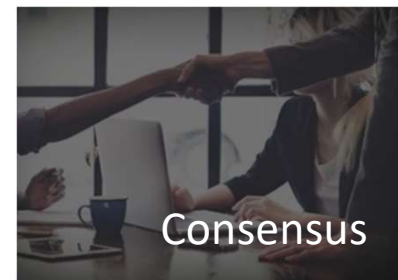
Privacy

Consensus

Transactions are endorsed by relevant participants

… Broader participation, lower cost, increased efficiency

TRUST in Trade:
Shared Ledger, Smart Contracts, Privacy and Consensus

IBM

Open, Transparent and **Trustworthy** business transactions

Traceable transaction history enabling ongoing audits

Permissioned Secure Access and cryptographic information and **Data Protection.**

Regulatory compliant execution of cross-border intermodal logistics shipments

Enhance **customer protection and experience** and **promote competitive marketplace**

Industry Supply Chain Use Cases

Supply Chain Workflow

Blockchain solution to manage and track the paper trail of tens of millions of shipping containers across the world by digitizing the supply chain process

Supply Chain Visibility

Blockchain technology provides visibility to all the participants involved in moving goods by tracking the purchase order and shipment status

Supply Chain Accountability

Blockchain holds the history of many items through entire supply chain providing traceability of raw materials

Manufacturing Provenance

Blockchain holds complete provenance details of each component part, accessible by each manufacturer in the production process

Supply Chain Financing

Blockchain solution creates a consolidated and detailed view of transactions visible to all parties resulting in a reduction in # disputes, dispute cycle time, and improvement in use of working capital

Regulatory and Insurance

Blockchain captures information about shipments, risk and liability, and helps firms comply with insurance regulations

Example: Shipment case study

Maersk and IBM analyzed the shipment of avocados from Mombasa to Rotterdam

We followed the shipment from Mombasa to Rotterdam and tracked the actors, people and information exchanges. The findings illustrated the complexity and costs inherent in today's global supply chain

Avocado Shipment — 1
Actors — 30
People — 100
Information exchanges — 200

0   50   100   150   200   250
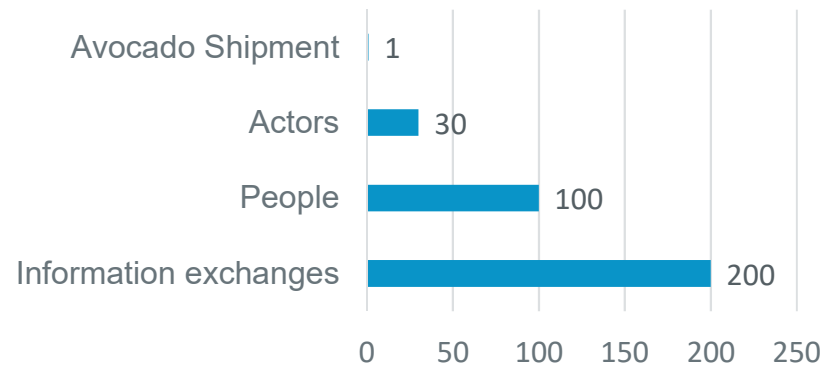
The case for Global Trade Digitization

TODAY

TOMORROW
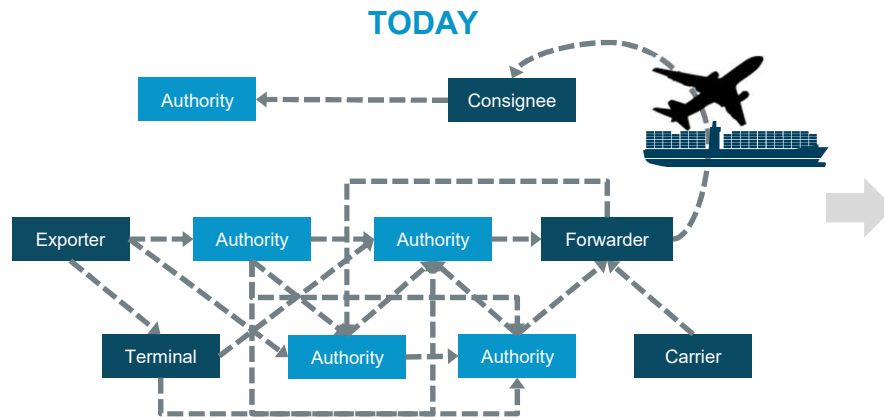
- Inconsistent information across organizational boundaries and "blind spots" throughout the supply chain hinder the efficient flow of goods

- Complex, cumbersome, and costly peer-to-peer messaging

- Manual, time-consuming, paper-based processes; high air courier expense and delays

- Risk assessments often lack sufficient information; clearance processes subject to fraud

- The administrative cost of handling a container shipment is comparable to the cost of the actual physical transport
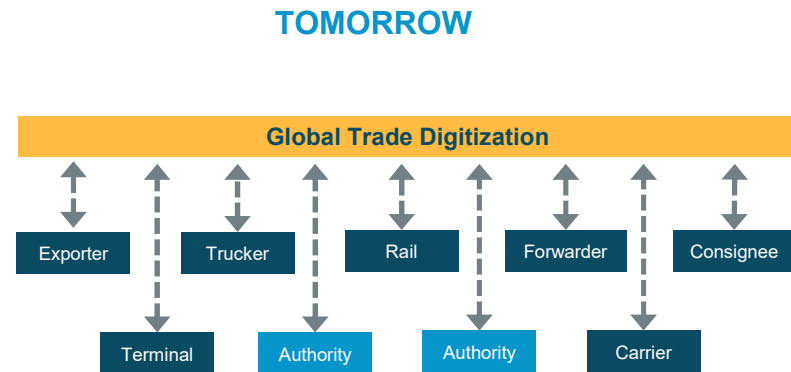
- Instant, secure access to end-to-end supply chain information; single source of the truth

- Assurance of the authenticity and immutability of digital documents; trusted cross-organizational workflows

- Better risk assessments and fewer unnecessary interventions

- Far lower administrative expenses and elimination of costs to move physical paper across international borders

- Estimated global savings from more efficient sharing of information: $27 billion

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IBM and Maersk are bringing Global Trade Digitization (GTD) to market to *reduce global trade barriers and increase efficiency international trade*

GTD is a trade platform for containerized shipping connecting the entire supply chain ecosystem

1 **Shipping Information Pipeline (SIP)**

- **Provides end-to-end supply chain visibility**
- **Enables all involved in a global shipping transaction to securely and seamlessly exchange shipment events in *real time***

2 **Paperless Trade**

- **Digitizes and automates paperwork filings**
- **Enabling end users to securely submit, stamp and approve documents across national and organizational boundaries**

Ocean Carriers · Transportation Management. · Shippers / Supply Chain Actors · Customs Systems · Supply Chain Visibility Systems · **GTD Platform** · Trade Associations · Ports and Terminals · Supply Chain / Transportation Management systems · Logistic actors internal systems · Authorities · Freight Forwarders · Port Community Systems; Terminal Operating Systems

GTD is built on an open technology stack and is underpinned by Blockchain technology

With GTD, the entire supply chain ecosystem shares a single trusted view of shipping events and documentation filings

Export

| Exporter / Consignor | 3PL Service Provider | Inland Transportation | Port / Terminal | Authorities |

Import

| Port / Terminal | Authorities | 3PL Service Providers | Inland Transportation | Importer / Consignee |

Global Trade Digitization

Shipping Information Pipeline

Not exhaustive list of Events tracked by GTD

Start container tracking · Empty container picked up from depot · ETA empty container at stuffing site · ATA Empty container at stuffing site · Container stuffing completed at inland location · VGM submitted · Container sealed · ATD Packed container from stuffing site · Estimated gate in for packed container at terminal export · Gate in full at terminal export · ETD packed container from export terminal · Packed container loaded · Export documentation cleared · Container ready to load · ATD packed container from export terminal · ETA packed container at import terminal · Temperature update · Estimated discharge time for packed container at import terminal · Import documentation cleared · Container selected for inspection · ATA packed container at import terminal · Packed container discharged at import terminal · Estimated gate out of packed container from terminal import · Gate out packed container from terminal import · ETA packed container at stripping location · ATA packed container at stripping location · Seal removed · Packed container stripped at inland location · Empty container ready for pick-up · Empty container picked up from stripping location · ATA empty container at depot · Container tracking ended

Paperless Trade Blockchain Network

Note: representative only; not all documents require Paperless Trade nor is this an exhaustive set of documents that could be processed by Paperless Trade

Packing List · Bill of Lading · Export documentation · Advance declration · Pre-paid invoice · Certificate of Origin · Shipping instructions · ISF · Geography specific certificate · Dangerous Goods Declaration · Cargo specific certificate · Customs Clearance · Commercial Invoice · Import documentation

GTD is an <u>industry</u> platform that connects and provides benefits to the supply chain ecosystem

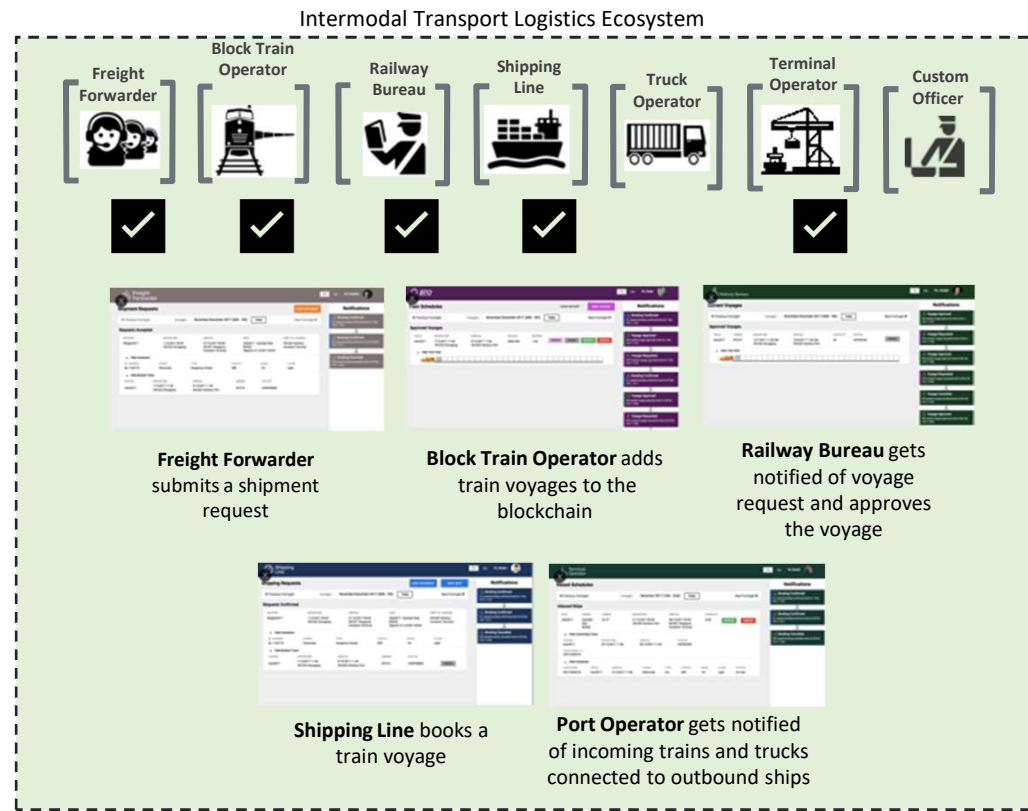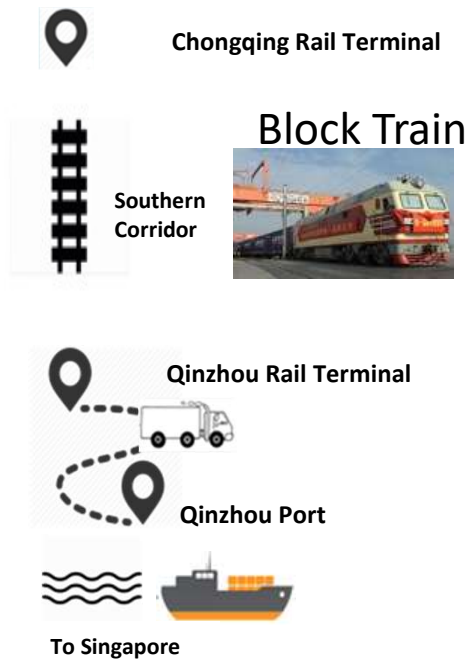## Product offering and a global network of interconnected with all supply chain participants….

Ports and Terminals

Provide information about the disposition of shipments within the boundaries of the port / terminal

Benefit from pre-built connections to shipping lines and other actors, end-to-end visibility across shipping corridors, and real-time access to more information to enrich port collaboration and improve terminal planning

Shipping Lines

Provide information about the disposition of shipments across the ocean leg

Benefit from pre-built connections to customers and ports / terminals around the world and real-time access to end-to-end supply chain events

Customs Authorities

Provide information about the export and import clearance status for shipments into and out of the country

Benefit from more informed risk assessments, better information sharing, less manual paperwork, and easier connections to national single window platforms

Freight Forwarders / 3PL

Provide the transportation plan, inland transportation events, information on intermodal handoffs, and document filings

Benefit from pre-built connections to the ecosystem, improved tools for customs clearance brokerage function, and real-time access to the end–to-end supply chain data to improve effectiveness of track-and-trace tools

Intermodal Transport

Provide information on the disposition of shipments carried on trucks, rail, barges, etc.

Benefit from improved planning and utilization of assets (e.g., less queuing) given real-time access to end-to-end supply chain events for shipments

Shippers

Engage with GTD as a customer and user of SIP and Paperless Trade

Benefit from a streamlined and improved supply chain allowing for greater predictability, early notification of issues, full transparency to validate fees and surcharges, and less safety stock inventory

Intermodal logistics example with PSA, PIL

End-to-end journey of containers from Chongqing

Rail Terminal to Singapore using Intermodal

Transportation - Truck, Rail and Ship.

Chongqing Rail Terminal

Block Train

Southern Corridor

Qinzhou Rail Terminal

Qinzhou Port

To Singapore

Intermodal Transport Logistics Ecosystem

Freight Forwarder | Block Train Operator | Railway Bureau | Shipping Line | Truck Operator | Terminal Operator | Custom Officer

Freight Forwarder submits a shipment request

Block Train Operator adds train voyages to the blockchain

Railway Bureau gets notified of voyage request and approves the voyage

Shipping Line books a train voyage

Port Operator gets notified of incoming trains and trucks connected to outbound ships

Blockchain and Trade Facilitation

Characteristics that support trade facilitation measures
- Simplified business processes and workflows across organizations
- Immutable audit trails
- Resilient by nature, Secure by design
- Enhanced compliance due to visibility

However barriers remain that will take time
- Regulatory and legal acceptance
- Interoperability and scalability of early stage technology