IoT & Blockchain

Mercredi 9/10/2019 - ASPROM

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Making Blockchain Real for Business

Quick Reminder

IBM

Requirements of blockchain for business

ASSETS

Participants decide which assets to share

IDENTITY

Participants know who they are dealing with; information shared is need-to-know

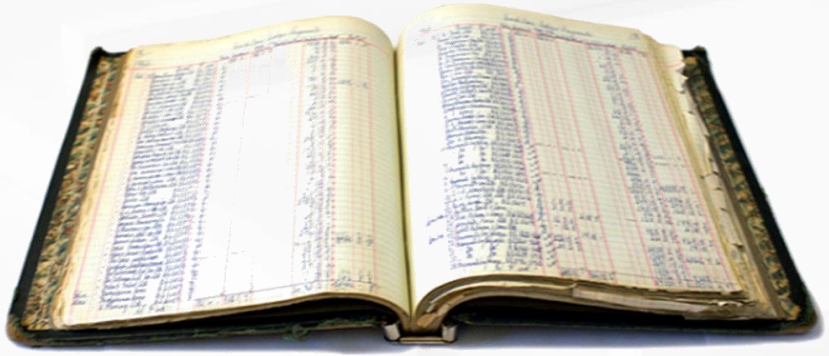
ENDORSEMENT

Participants give provable endorsement

Assets

The business network decides what to share on the ledger

- Assets are anything of value
  - On the blockchain, these are represented digitally using a pre-agreed format
- Transactions change the state of an asset and are provably recorded on the blockchain
  - e.g. transfer ownership, change color
- Transactions are underpinned by smart contracts
  - Verifiable business rules that cause the asset to change state



Identity

Knowing who you're dealing with

- Various regulations applied to businesses require them to know who they are dealing with
  - e.g. KYC, AML, CFT
- Identity is used to ensure business networks are kept private and individual transactions confidential
  - With transparency for the regulator
- There are established methods for obtaining and asserting identity
  - Cryptography is central to these
  - Identity allows transactions to be signed and encrypted

Transaction Endorsement

Provable verification by relevant participants

- Endorsement is the process in which a transaction is verified as “good”
  - Ensures that participants are happy to accept the transaction and prevents (e.g.) double spending
- Endorsement can be expensive in public blockchains
  - Without identity, transactions are thrown to the whole network for endorsement
  - Proof of work is particularly CPU intensive
- In the real world, transactions are endorsed by a smaller number of participants
  - e.g. sender bank, receiver bank, payments provider
  - Must be completed in an appropriate timeframe

Blockchain not good for all use cases…

IBM

Why

Blockchain benefits…

Saves
time

Transaction time from days to near instantaneous

Removes
cost

Overheads and cost intermediaries

Reduces
risk

Tampering, fraud & cyber crime

Increases
trust

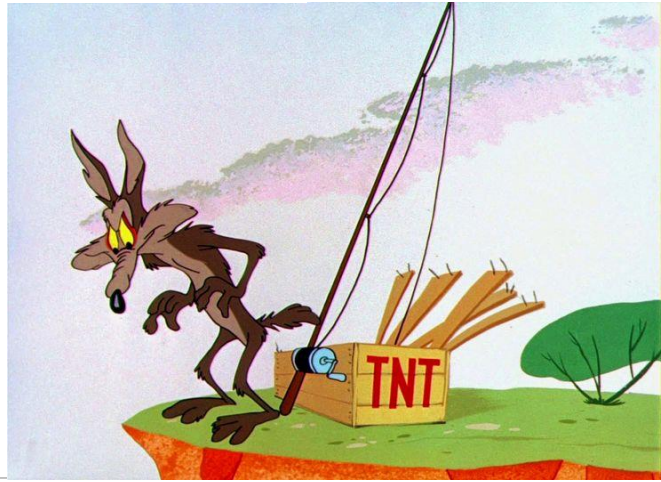
Through shared processes and recordkeeping

…doesn't justify all use cases

Why

Blockchain is NOT

- ✗ Suited to high performance (millisecond) transactions
- ✗ For just one participant (no business network)
- ✗ A replicated database replacement
- ✗ A messaging solution
- ✗ A transaction processing replacement
- ✗ Suited for low value, high volume transactions



Blockchain use cases

IBM

Use case examples by (selected) industry

Financial

- Trade Finance
- Cross currency payments
- Mortgages

Public Sector

- Asset Registration
- Citizen Identity
- Medical records
- Medicine supply chain

Retail

- Supply chain
- Loyalty programs
- Information sharing (supplier – retailer)

Insurance

- Claims processing
- Risk provenance
- Asset usage history
- Claims file

Manufacturing

- Supply chain
- Product parts
- Maintenance tracking

Selected References

Why

FX Netting

CLS Fundamental to FX

Settlements through digital currency

MIZUHO

Identity management

Crédit Mutuel ARKEA

Food Safety

Walmart

Trade Finance

Bank of America Merrill Lynch

HSBC

Channel Financing

IBM Global Financing

Low liquidity securities trading and settlement

JPX TOKYO STOCK EXCHANGE

Reward points management

UnionPay 银联

Contract Management

MUFG

Why

Key players for Blockchain adoption

Regulator

- An organization who enforces the rules of play
- Regulators are keen to support Blockchain based innovations
- Concern is systemic risk – new technology, distributed data, security

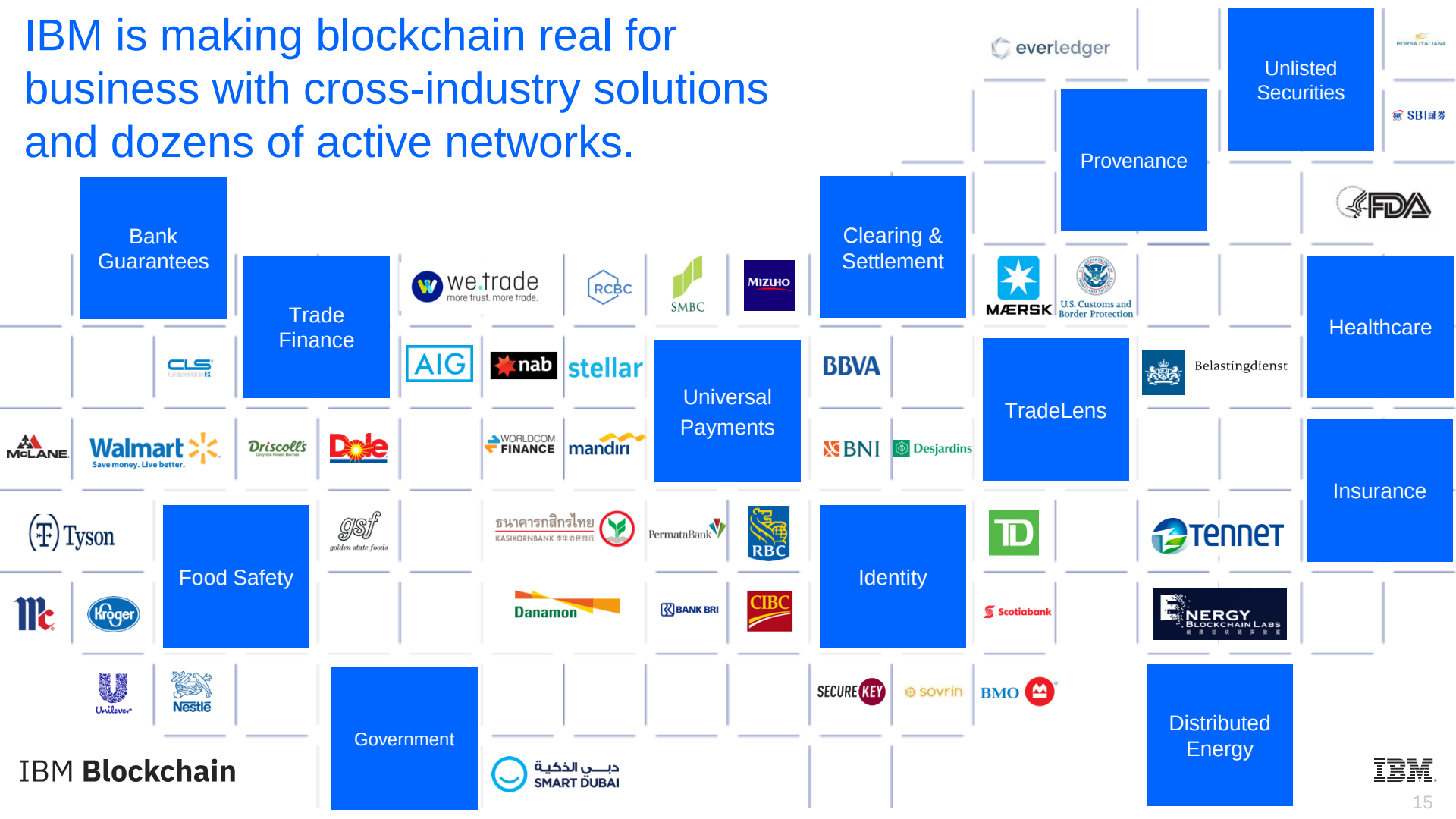
Industry Group

- Often funded by members of a business network
- Provide technical advice on industry trends
- Encourages best practice by making recommendations to members

Market Maker

- In financial markets, takes buy-side and sell-side to provide liquidity
- More generally, the organization who innovates
  - Creates a new good or service, and business process (likely)
  - Creates a new business process for an existing good or service

IBM is making blockchain real for business with cross-industry solutions and dozens of active networks.



IBM **Blockchain**

Blockchain Network & Consortium

IBM

Example: Food Trust

What?

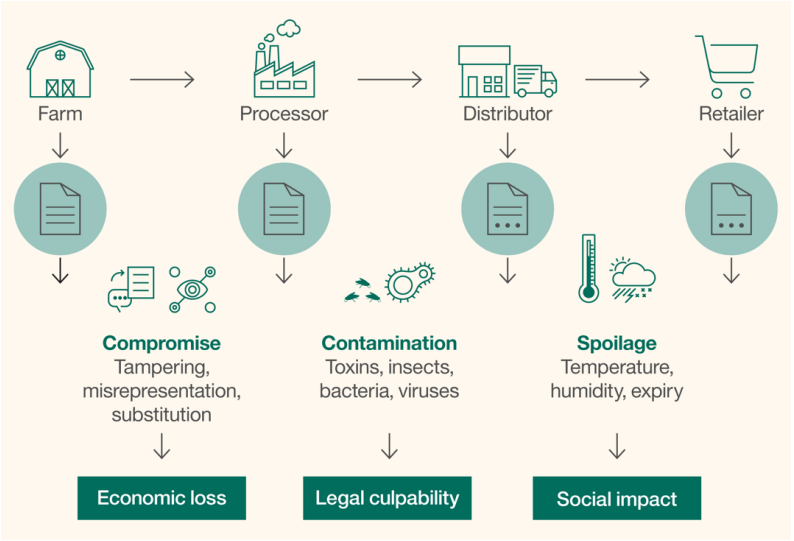
- IBM Food Trust is a set of modules providing traceability to improve food transparency and efficiency

How?

- Blockchain is used to create a trusted connection with shared value for all ecosystem participants, including end consumers.

Benefits

- Reduce impact of food recalls through instant access to end-to-end traceability data to verify history in the food network and supply chain.
- Help to address the 1 in 10 people sickened and 400,000 fatalities WW which occur every year from food-born illnesses.



Example: TradeLens

What?

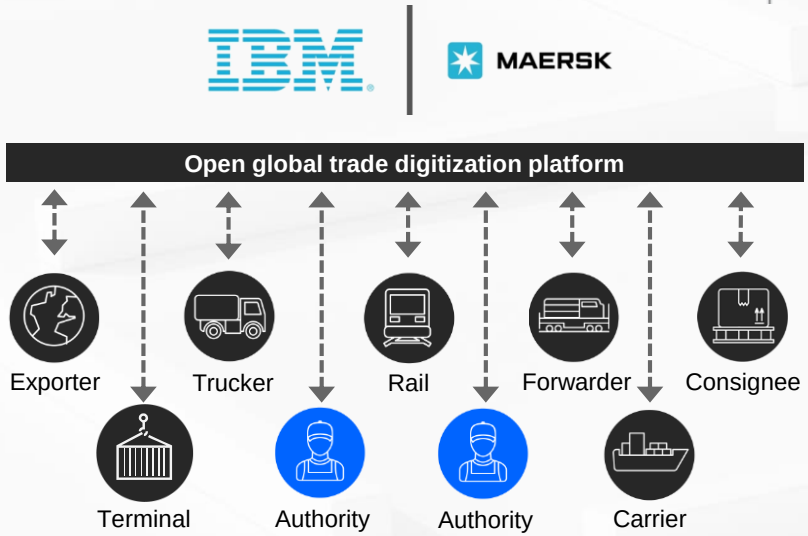
- An open, extensible platform for sharing shipping events, messages, and documents across all the actors and systems in the supply chain ecosystem.

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



Example: Trusted Identity

What?

- Sovrin pushes identity to the edge of the network
- Cryptographic, point to point exchange of identity
- Based on Hyperledger Indy technology

Benefits

- A decentralized approach that establishes trust and puts the end user in control
- Every person, organization, and thing has a digital wallet to control the flow of their identity
- No PII is stored on the public ledger!

sovrin
identity for all

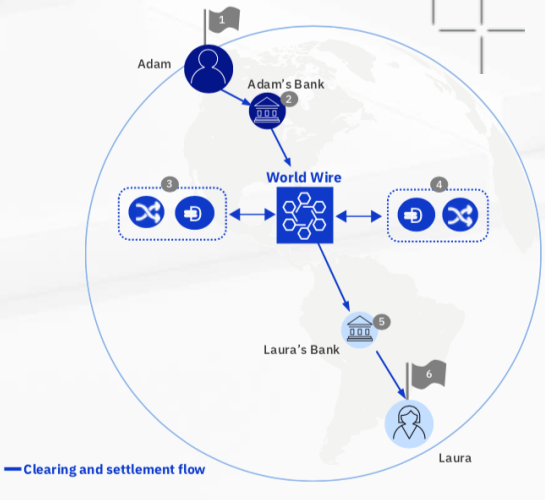
Example: World Wire

What?

- IBM Blockchain World Wire is an integrated network for real-time clearing and settlement.
- Allows banks and financial institutions to send and settle payments around the globe with finality in a matter of seconds
- Eliminates enduring challenges that have long hampered the cross-border payments industry.

Current international payment system today

With IBM Blockchain World Wire tomorrow



Benefits

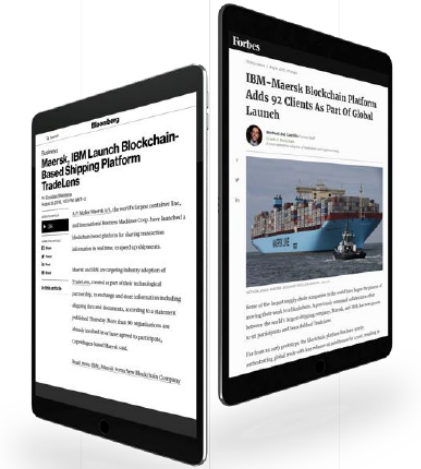
- Payment support regardless of size, origination, destination or asset type
- Higher visibility for streamlined transactions with reduced disputes and reconciliation needs
- Enhanced regulatory compliance through improved transparency
- Secure network with interaction and eligibility criteria as well as robust access controls

TradeLens Blockchain Network

TRADELENS

An open and neutral blockchain-based platform that is digitizing the global supply chain and transforming trade

- The platform empowers faster and more efficient, transparent and secure global trade
- TradeLens is built for the industry and offers benefits to trade participants from across the supply chain ecosystem
- IBM and Maersk are developing the platform under a joint collaboration, with significant input from and participation by the industry
- An Advisory Board is being formed to help shape the platform and drive standards
- TradeLens is live in production today, processing millions of transactions per day



OUR JOURNEY

September 2016
Maersk and IBM agree to invest in a blockchain prototype to assess feasibility and value

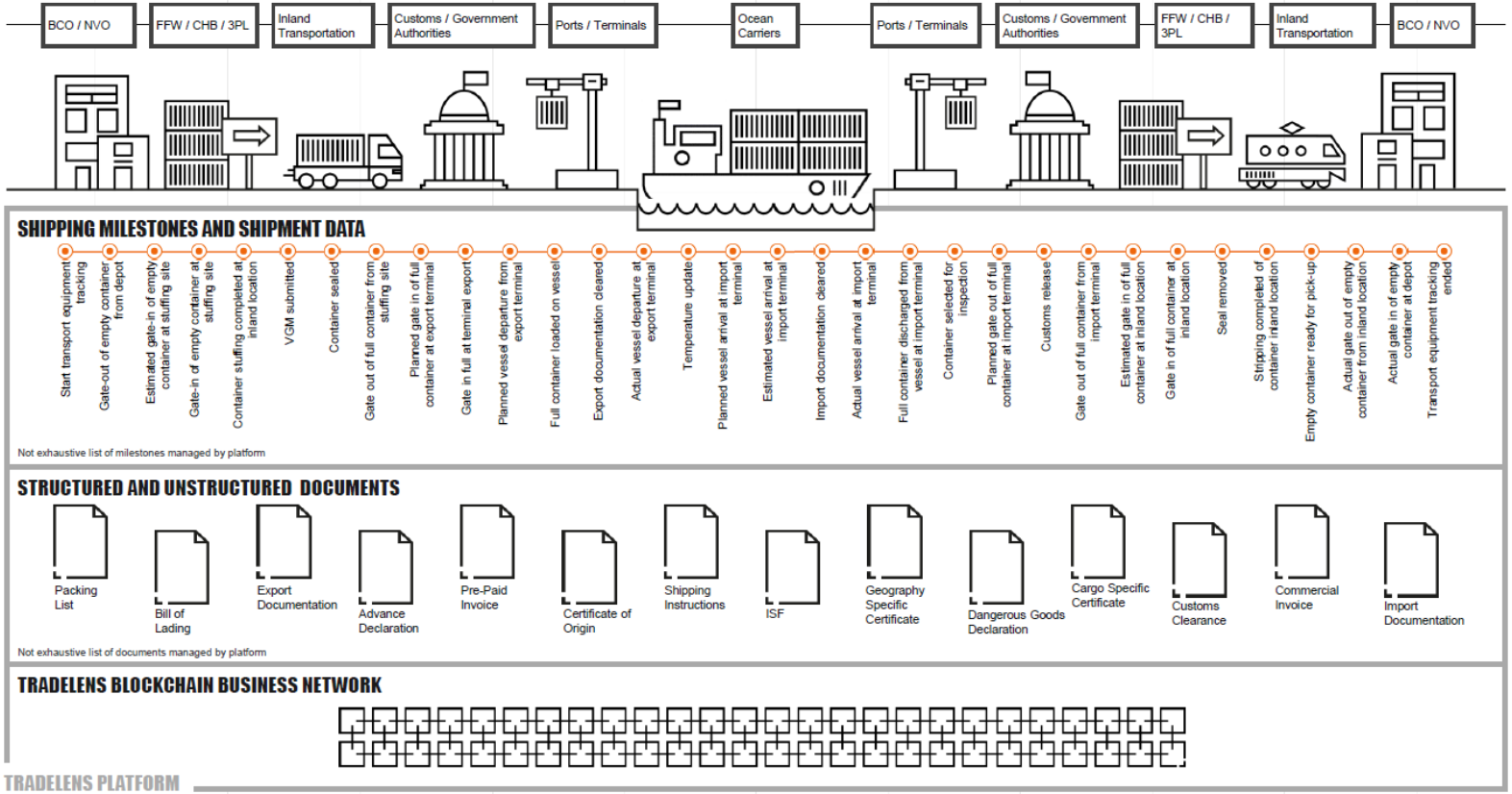
March 2017
Initial pilot assessing impact on shipments of avocados from Mombasa to Rotterdam confirmed viability and value of blockchain platform; Maersk and IBM agree to pursue

January 2018
Beta release of the platform and launch of Early Adopter program; trials underway

August 2018
Formal launch of the TradeLens platform
92 participants signed on

September 2018
TradeLens Limited Availability Release

December 2018
TradeLens General Availability Release
1.5 million events per day published to the platform


BCO / NVO
FFW / CHB / 3PL
Inland Transportation
Customs / Government Authorities
Ports / Terminals
Ocean Carriers
Ports / Terminals
Customs / Government Authorities
FFW / CHB / 3PL
Inland Transportation
BCO / NVO
SHIPPING MILESTONES AND SHIPMENT DATA
Start transport equipment tracking
Gate-out of empty container from depot
Estimated gate-in of empty container at stuffing site
Gate-in of empty container at stuffing site
Container stuffing completed at inland location
VGM submitted
Container sealed
Gate out of full container from stuffing site
Planned gate in of full container at export terminal
Gate in full at terminal export
Planned vessel departure from export terminal
Full container loaded on vessel
Export documentation cleared
Actual vessel departure at export terminal
Temperature update
Planned vessel arrival at import terminal
Estimated vessel arrival at import terminal
Import documentation cleared
Actual vessel arrival at import terminal
Full container discharged from vessel at import terminal
Container selected for inspection
Planned gate out of full container at import terminal
Customs release
Gate out of full container from import terminal
Estimated gate in of full container at inland location
Gate in of full container at inland location
Seal removed
Stripping completed of container inland location
Empty container ready for pick-up
Actual gate out of empty container from inland location
Actual gate in of empty container at depot
Transport equipment tracking ended
Not exhaustive list of milestones managed by platform
STRUCTURED AND UNSTRUCTURED DOCUMENTS
Packing List
Bill of Lading
Export Documentation
Advance Declaration
Pre-Paid Invoice
Certificate of Origin
Shipping Instructions
ISF
Geography Specific Certificate
Dangerous Goods Declaration
Cargo Specific Certificate
Customs Clearance
Commercial Invoice
Import Documentation
Not exhaustive list of documents managed by platform
TRADELENS BLOCKCHAIN BUSINESS NETWORK
TRADELENS PLATFORM

TRADELENS AND BLOCKCHAIN

Blockchain addresses the underlying challenges inherent in collaborating across a distributed, fragmented supply chain ecosystem

SHARED LEDGER

Append-only distributed system of record shared across business network

A network of industry participants maintains a distributed, permissioned ledger with copies of document filings, relevant supply chain events, authority approval status, and full audit history; every change results in a new, immutable block

SMART CONTRACT

Shared business logic governing what transactions may be written to the ledger

Cross-organizational business processes, such as import and export clearance, are pre-programmed and built into Blockchain and distributed to and executed on the network, preventing any member from changing the business logic

PRIVACY

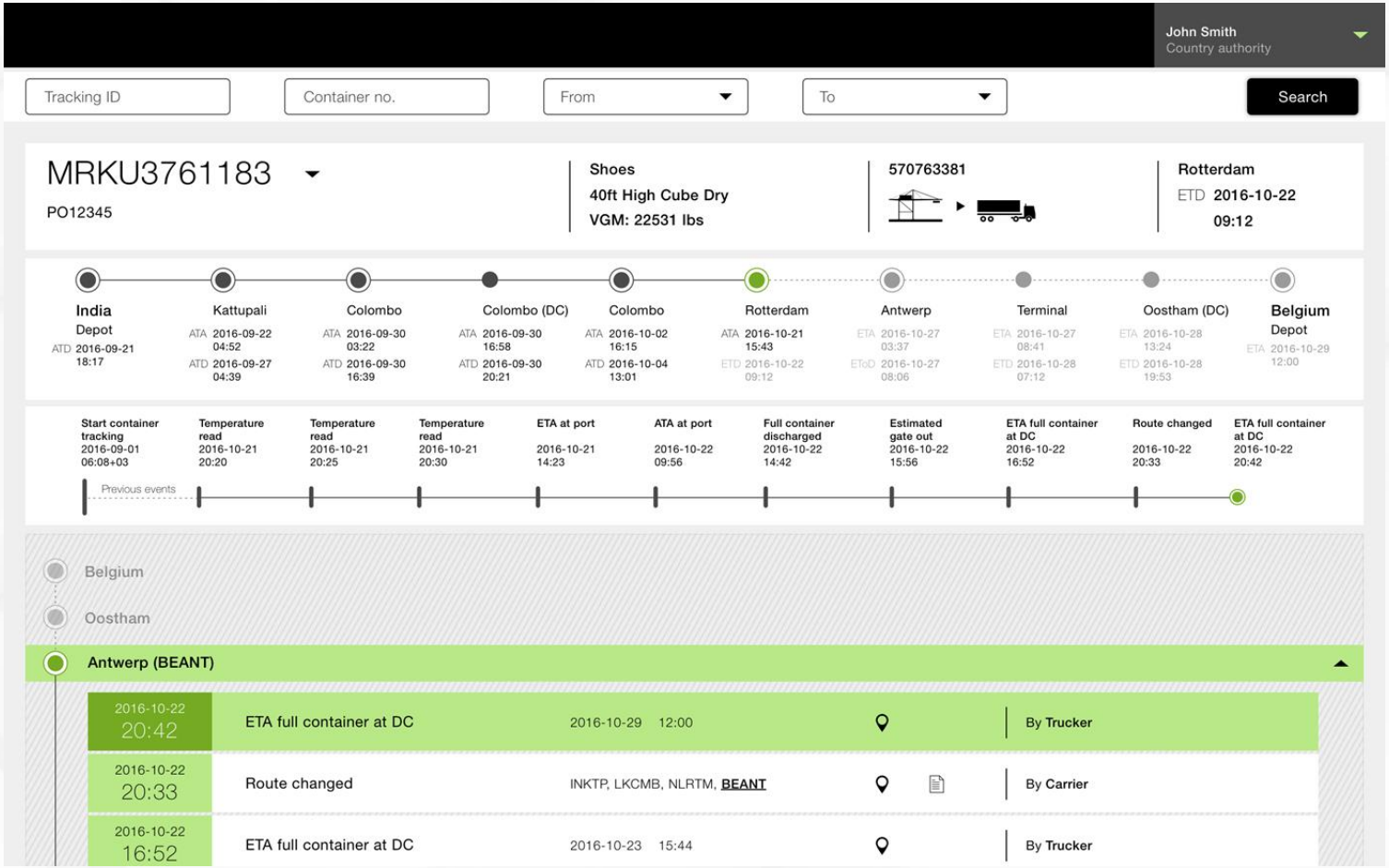
Ensuring appropriate visibility; transactions are secure, authenticated and verifiable

Cryptography enables permissioned access so only the parties participating in a specific shipment can submit, edit or approve related data

TRUST

Transactions are endorsed by relevant participants

Information such as documentation filings and authority approvals can only be changed if endorsed by the parties taking part in the shipment; full audit history maintained on the Blockchain


John Smith
Country authority
Tracking ID
Container no.
From
To
Search
MRKU3761183
PO12345
Shoes
40ft High Cube Dry
VGM: 22531 lbs
570763381
Rotterdam
ETD 2016-10-22
09:12
India
Depot
ATD 2016-09-21
18:17
Kattupali
ATA 2016-09-22
04:52
ATD 2016-09-27
04:39
Colombo
ATA 2016-09-30
03:22
ATD 2016-09-30
16:39
Colombo (DC)
ATA 2016-09-30
16:58
ATD 2016-09-30
20:21
Colombo
ATA 2016-10-02
16:15
ATD 2016-10-04
13:01
Rotterdam
ATA 2016-10-21
15:43
ETD 2016-10-22
09:12
Antwerp
ETA 2016-10-27
03:37
ETOD 2016-10-27
08:06
Terminal
ETA 2016-10-27
08:41
ETD 2016-10-28
07:12
Oostham (DC)
ETA 2016-10-28
13:24
ETD 2016-10-28
19:53
Belgium
Depot
ETA 2016-10-29
12:00
Start container tracking
2016-09-01
06:08+03
Temperature read
2016-10-21
20:20
Temperature read
2016-10-21
20:25
Temperature read
2016-10-21
20:30
ETA at port
2016-10-21
14:23
ATA at port
2016-10-22
09:56
Full container discharged
2016-10-22
14:42
Estimated gate out
2016-10-22
15:56
ETA full container at DC
2016-10-22
16:52
Route changed
2016-10-22
20:33
ETA full container at DC
2016-10-22
20:42
Previous events
Belgium
Oostham
Antwerp (BEANT)
2016-10-22
20:42
ETA full container at DC
2016-10-29 12:00
By Trucker
2016-10-22
20:33
Route changed
INKTP, LKCMB, NLRTM, BEANT
By Carrier
2016-10-22
16:52
ETA full container at DC
2016-10-23 15:44
By Trucker

TRADELENS NETWORK OVERVIEW

Enrichment Data

Supplements foundational data, in real-time and direct from the source

- Rapidly growing network
- Extensive port / terminal coverage

60+

Connected Logistics Members

Terminals | Inland transportation | Government Authorities

Foundational Data

The core data needed to track and manage shipments end-to-end

- **20%** of global container shipping volume
- Vast number of trade lanes covered

20M

Containers per year

Ocean Carriers (network members) | Ocean Carriers* (participants) | Forwarders/ NVOs | Clients/ BCOs

TradeLens Platform

500M Events
per year

CRRENT NETWORK STATUS – AS OF APRIL 2019

Shipping Events

+ 500M per year + 10M per week

◉ **Live**: The Network Member is connected to the Platform and providing data

◎ **In Process**: The Network Member engaged and/or integration is in process

Some members engaged under Early Adopter Program and/or trial agreements

Ports and Terminals

Terminal Location	Operator	Status
Algeciras, Spain	Port of Algeciras	◎
Algeciras, Spain	APM Terminals	◉
Apapa, Nigeria	APM Terminals	◉
Auckland, New Zealand	PortConnect	◉
Avonmouth, UK	MCP	◉
Bahrain	APM Terminals	◉
Barcelona, Spain	Port of Barcelona	◎
Bilbao, Spain	Port of Bilbao	◉
Brisbane, Australia	Patrick Terminals	◉
Buenos Aires, Argentina	APM Terminals	◉
Busan, South Korea	Port of Busan	◎
Callao, Peru	APM Terminals	◉
Cotonou, Benin	APM Terminals	◉
Elizabeth, NJ, USA	APM Terminals	◎
Felixstowe, UK	MCP	◉
Fremantle, Australia	Patrick Terminals	◉
Gothenburg, Sweden	APM Terminals	◉
Grangemouth, UK	MCP	◉
Gunsan, South Korea	KL-NET	◉
Halifax, Canada	Halterm Canada	◉

Terminal Location	Operator	Status
Hong Kong	Modern Terminals	◉
Houston, TX USA	Port of Houston	◉
Hull, UK	MCP	◉
Immingham, UK	MCP	◉
Itajai, Brazil	APM Terminals	◉
Incheon, South Korea	KL-NET	◉
Izmir, Turkey	APM Terminals	◉
Kwangyang, South Korea	KL-NET	◉
Lazaro, Mexico	APM Terminals	◉
Liverpool, UK	MCP	◉
Los Angeles, CA, USA	APM Terminals	◉
Maasvlakte II, Netherlands	APM Terminals	◉
Manila, Philippines	ICTSI	◎
Melbourne, Australia	Patrick Terminals	◉
Montreal, Canada	MGTP	◉
Mobile, AL USA	APM Terminals	◉
Mumbai, Brazil	APM Terminals	◎
Napier, NZ	Napier Port Authority	◉
Newcastle, UK	MCP	◉

Terminal Location	Operator	Status
Onne, Nigeria	APM Terminals	◉
Philadelphia, PA USA	Packer Terminals	◉
Pipavav, India	APM Terminals	◉
Pecem, Brazil	APM Terminals	◉
Pyeongtaek, South Korea	KL-NET	◉
Poti, Georgia	APM Terminals	◉
Pohang, South Korea	KL-NET	◉
Pusan, South Korea	KL-NET	◉
Santos, Brazil	APM Terminals	◎
Sydney, Australia	Patrick Terminals	◉
Singapore, Singapore	PSA	◉
Tangier, Morocco	APM Terminals	◉
Tauranga, NZ	PortConnect	◉
Teesport, UK	MCP	◉
Ulsan, South Korea	KL-NET	◉
Valparaiso, Chile	TSP	◉
Valencia, Spain	Port of Valencia	◉
Visakhapatnam, India	JM Baxi	◎
Xiamen, China	Port of Xiamen	◎

Ocean Carriers

Ocean Carrier / Short Sea	Status
Maersk Line	◉
Safmarine	◉
Sealand	◉
Hamburg-Sud	◎
Pacific International Lines	◎
KMTC	◎
Seaboard	◎
Namsung	◎
Boluda Lines	◎

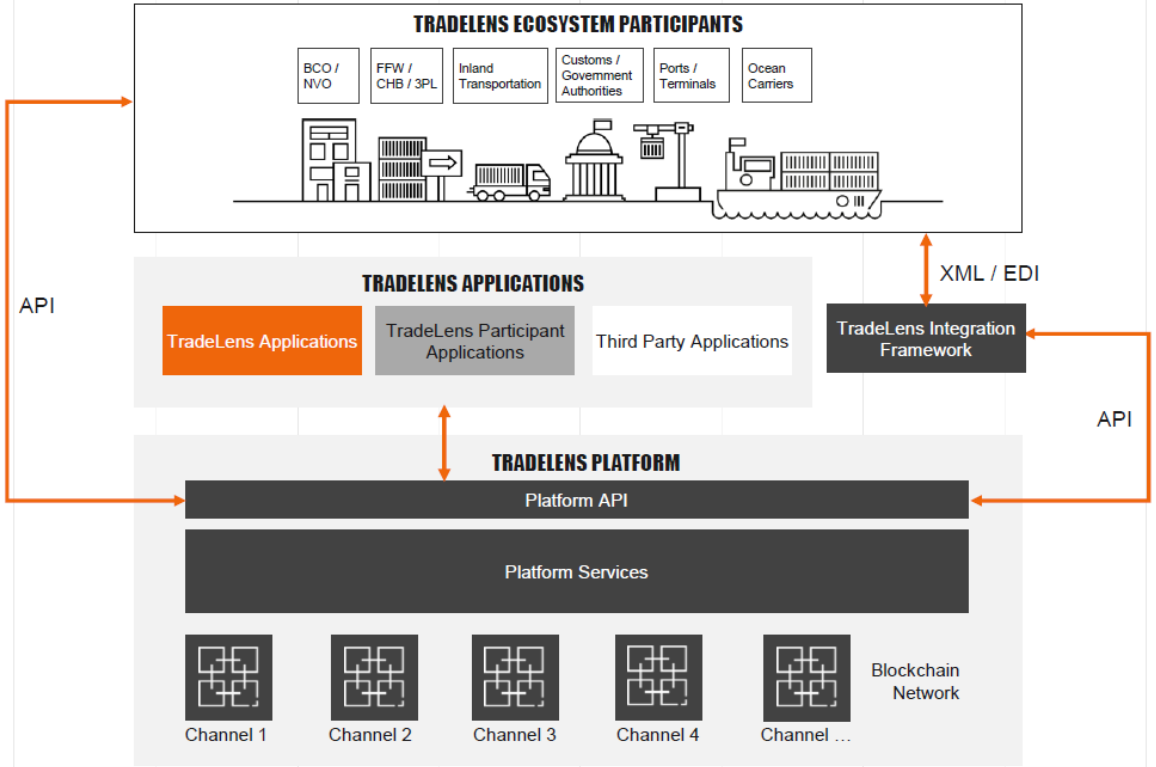
Government Authorities

Authority	Status
Australia Home Affairs	◎
Bahrain Customs	◎
Canada Customs	◎
Dutch Customs	◎
Ghana / GCNET	◎
Saudi Arabia Customs	◎
Peru Customs	◎
Singapore Customs	◎
Turkey Customs	◎

Inland Transportation

Transportation Provider	Status
Ancotrans	◉
CN Rail	◎
IMCC	◉

SOLUTION ARCHITECTURE



TRADELENS GENERAL AVAILABILITY

Share trade data across a common, secure business network, providing real-time, secure access to end-to-end supply chain information to permissioned parties

Key Features

- **Consume and publish high-fidelity trade milestone events in real-time**
  - 121 industry milestone events; support for Planned, Estimated, and Actual milestones
  - Support for Export Cutoffs events for VGM, Cargo and Documentation cutoffs
  - TradeLens Events Subscriptions via API Webhook for multiple participant types
  - Adoption of UN-CEFACT data model
- **TradeLens Shipment Manager User Interface**
  - The main UI for TradeLens enabling customers to visualize their consignments and associated documents
- **Integration Framework**
  - Service that enables non-API integration in legacy EDI and other formats
- **Document Sharing**
  - Document lifecycle seamlessly integrated with cargo movements: document events describing key documentation and compliance milestones (e.g., VGM Submitted, Customs Release)
  - Structured data handling supported – data fields will be available to other participants, not just a PDF or scan
- **Unified Permission Model based on international standards**
  - Ability to grant other organizations visibility at the consignment level
- **Secure, Blockchain-based data storage with separate channels for major ocean carriers**

TRADELENS INFORMATION FLOW

SHIPMENT PLANNING

Event	Source
Start Consignment Tracking	Carrier, 3PL
Consignment Reference Added	Shipper, 3PL
Party Added to Consignment	Carrier, 3PL
Start Transport Equipment Tracking	Carrier
New Transport Equipment Added to Consignment	Carrier
Transport Equipment Number Updated	Carrier
Shipper Updated	Shipper, 3PL
Consignee Updated	Shipper, 3PL
Cargo Type Updated	Shipper, 3PL
Shipping Instructions Submitted	Shipper, 3PL

ORIGIN INTERMODAL

Event	Source
Packing List Available	Shipper, 3PL
Planned Gate Out	Carrier
Actual Gate Out	Terminal, Trucker
Estimated Loaded on Truck	Carrier, Shipper, 3PL
Actual Load on Truck	Carrier, Trucker, 3PL
Planned Gate In	Carrier
Estimated Gate In	3PL, Trucker, Terminal
Actual Gate In	3PL, Trucker, Terminal
Estimated Discharge from Truck	3PL, Trucker, Terminal
Actual Discharge from Truck	3PL, Trucker, Terminal
Estimated Stuffing Start	3PL, Shipper
Actual Stuffing Started	3PL, Shipper
Estimated Container Stuffed	3PL, Shipper
Actual Container Stuffed	3PL, Shipper
Full Transport Equipment Sealed	Shipper
Estimated Loading on Rail / Barge	3PL, Rail
Actual Load on Rail / Barge	Rail, Barge
Planned Rail / Barge Departure	3PL, Rail, Barge
Actual Rail / Barge Departure	Rail, Barge
Estimated Discharge from Rail / Barge	Rail, Barge
Actual Discharge from Rail / Barge	Rail, Barge

EXPORT COMPLIANCE

Event	Source
Export Documentation Submitted	Customs broker
Export Documentation Approved	Customs
Customs Release	Customs
Dangerous Goods Declaration Submitted	Shipper
Dangerous Goods Request Approved	Carrier
VGM Submitted	Shipper, 3PL
Geography Specific Certificate Submitted	3PL
Geography Specific Certificate Approved	Customs

ORIGIN PORT

Event	Source
Planned Gate In	Carrier
Estimated Gate In	Terminal, 3PL, Trucker
Actual Gate In	3PL, Trucker, Terminal
Estimated Discharge from Truck	3PL, Trucker, Terminal
Actual Discharge from Truck	3PL, Trucker, Terminal
Estimated Rail / Barge Arrival	3PL, Rail, Barge
Actual Rail / Barge Arrival	Rail, Barge, Terminal
Estimated Discharge from Rail / Barge	Rail, Barge, Terminal
Actual Discharge from Rail / Barge	Rail, Barge, Terminal
Estimated Loading on Vessel	Terminal
Do Not Load	Carrier, Terminal, Customs
Actual Load on Vessel	Terminal, Carrier

OCEAN TRANSPORT

Event	Source
Planned Vessel Departure	Carrier
Estimated Vessel Departure	3PL, Carrier
Actual Vessel Departure	Terminal, Carrier
Planned Vessel Arrival	Carrier
Estimated Vessel Arrival	Carrier, 3PL
Actual Vessel Arrival	Carrier, Terminal
Estimated Loading on Vessel	Terminal, Carrier
Actual Load on Vessel	Terminal, Carrier
Bill of Lading Available	Carrier
Estimated Discharge from Vessel	Terminal, Carrier
Actual Discharged from Vessel	Terminal, Carrier
Shift-Cell	Terminal
Shift-Pier	Terminal

IMPORT COMPLIANCE

Event	Source
Advance Declaration Submitted	Carrier
Advance Declaration Approved	Customs
Import Documentation Submitted	3PL
Import Documentation Approved	Customs
Customs Release	Customs
Carrier Release	Carrier
Certificate of Origin Available	3PL
Cargo Specific Certificate Submitted	3PL
Cargo Specific Certificate Approved	Customs

DESTINATION PORT

Event	Source
Estimated Discharge from Vessel	Terminal
Actual Discharge from Vessel	Terminal
Full Container Not Selected for Inspection	Customs
Full Container Passed Inspection	Customs
Full Container Selected for Scan	Customs
Estimated Loading on Truck	Terminal
Actual Load on Truck	Terminal, Trucker, 3PL
Estimated Gate Out	Terminal, Trucker, 3PL
Actual Gate Out	Terminal, Trucker, 3PL
Estimated Loading on Rail / Barge	Terminal, Rail, Barge, 3PL
Actual Load on Rail / Barge	Terminal, Rail, Barge
Estimated Rail / Barge Departure	Terminal, Rail, Barge, 3PL
Actual Rail / Barge Departure	Terminal, Rail, Barge
Terminal Release	Terminal
Carrier Release	Carrier

DESTINATION INTERMODAL

Event	Source
Estimated Loading on Truck	Terminal, 3PL, Trucker
Actual Load on Truck	Terminal, 3PL, Trucker
Planned Gate Out	Carrier
Estimated Gate Out	Terminal, Trucker, 3PL
Actual Gate Out	Terminal, Trucker, 3PL
Estimated Gate In	Terminal, 3PL, Trucker
Actual Gate In	Terminal, 3PL, Trucker
Estimated Discharge from Truck	3PL, Trucker, Terminal
Actual Discharge from Truck	3PL, Trucker, Terminal
Actual Load on Rail / Barge	Rail, Barge
Estimated Rail / Barge Departure	3PL, Rail, Barge
Actual Rail / Barge Departure	Rail, Barge
Estimated Rail / Barge Arrival	3PL, Rail, Barge
Actual Rail / Barge Arrival	3PL, Rail, Barge
Estimated Discharge from Rail / Barge	Rail, Barge
Actual Discharge from Rail / Barge	Rail, Barge
Seal(s) Removed	Shipper, 3PL
Container Stripped	Shipper, 3PL
End Shipment Tracking	Shipper, 3PL

Full API Event documentation:
https://platform-sandbox.tradelens.com/documentation/swagger/

Not all events are represented a

REFERENCE

- *Partners : Procter&Gamble, Damco, Maersk and IBM*
- *Challenges :*
  - *Increase containers visibility*
  - *Increase Data quality*
  - *Reduce timing to access information*
  - *Reduce number of invoice disputes*
- *3 use cases :*
  - *Container traceability in ports*
  - *Multiple transport invoices aggregation and amount check*
  - *Document sharing*
- *6000 to 24 000 containers first year*

Procter&Gamble

Benefits

- Secure and real time Supply chain
- Inventory reduction
- Fair price for transport
- Dispute cost reduction

IoT & Blockchain

IBM

https://www.ibm.com/blogs/ibm-france/2018/09/20/blockchain-comprendre-les-notions-de-base-et-decouvrir-lavantage-de-le-coupler-a-linternet-des-objets-iot/

IoT et Blockchain par secteur d'activité

Les cas d'utilisation IoT utilisant le Blockchain se sont depuis multipliés dans tous les secteurs industriels :

Secteur	Cas d'utilisation	Données partagées	Partenaires
Transport	Suivi d'envoi logistique Partage des documents de transports	Localisation Conditions de transports (température, humidité ...) Documents (douanes, bon de chargement)	Expéditeur, transporteur destinataire, douanes, banque
Maintenance	Traçabilité des pièces détachées durant leur cycle de vie	Identification des pièces Information sur l'usage Information sur la maintenance	Constructeur de pièces détachées, constructeur de produits à base d'assemblages, organisme de réparation, propriétaire, agence de régulation
Logistique	Partage de l'offre et de la demande Visibilité sur les localisations et l'état de réalisation des pièces détachées	Gestion de la demande Volumes produits Provenance des pièces (ID, date d'expiration, etc. ...)	Fournisseur, constructeur, ...
Organisme de Régulation	Partage de document avec un organisme public	Document de conformité Information d'utilisation et de maintenance	Organisme public, opérateurs et constructeurs
Gestion de bâtiments	Enregistrement des accès et utilisations d'un bâtiment	Enregistrement du fonctionnement des équipements (Clim, Chauffage, Air, Lumières, Alarmes ...) Enregistrement des accès individus	Propriétaire de bâtiments, gestionnaire d'immeubles ...
Energie	Traçabilité de l'impact Carbone	Crédit Carbone Production Carbone	Gestionnaire Carbone, citoyens...
Télécommunication	Smart Building	Evénements réseaux au sein d'un bâtiment	Fournisseur de passerelles et routeurs réseaux
Automobile	Acheminement vers distributeurs	Etat des véhicules Localisations des véhicules durant la distribution	Constructeurs, distributeur, assurance, acquéreur ...
Aéronautique	Cycle de vie des pièces	Utilisation des pièces Maintenance des pièces	Constructeurs, Partenaire maintenance, compagnies aériennes
Banque	Vente aux détails	Monitoring des ventes aux détails Intégration des crédits	Banques, commerçants

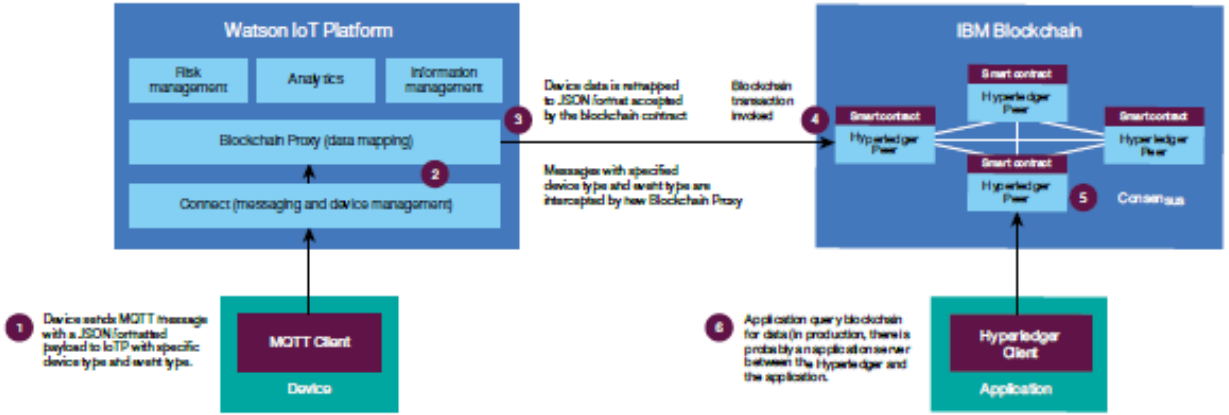
De manière très pragmatique et détaillée sur le schéma ci-dessous, une transaction IoT peut être déclenchée par un Device, via un envoi de message suivant le protocole MQTT, de manière sécurisée vers la plateforme Cloud Watson IoT.

Grâce à l'intégration Blockchain au sein de la plateforme IoT (Proxy), cet événement déclenche à son tour son enregistrement dans le réseau des partenaires du Blockchain concerné.

Un Smart Contract peut être appliqué de manière automatique si certains critères sont réunis (atteinte d'un niveau donné de transaction par exemple, arrivée sur une zone, dépassement d'une durée ...).

Cet automatisme permettra ensuite de renseigner d'autres informations qui seront alors utilisées en temps-réel par la ou les applications finales.

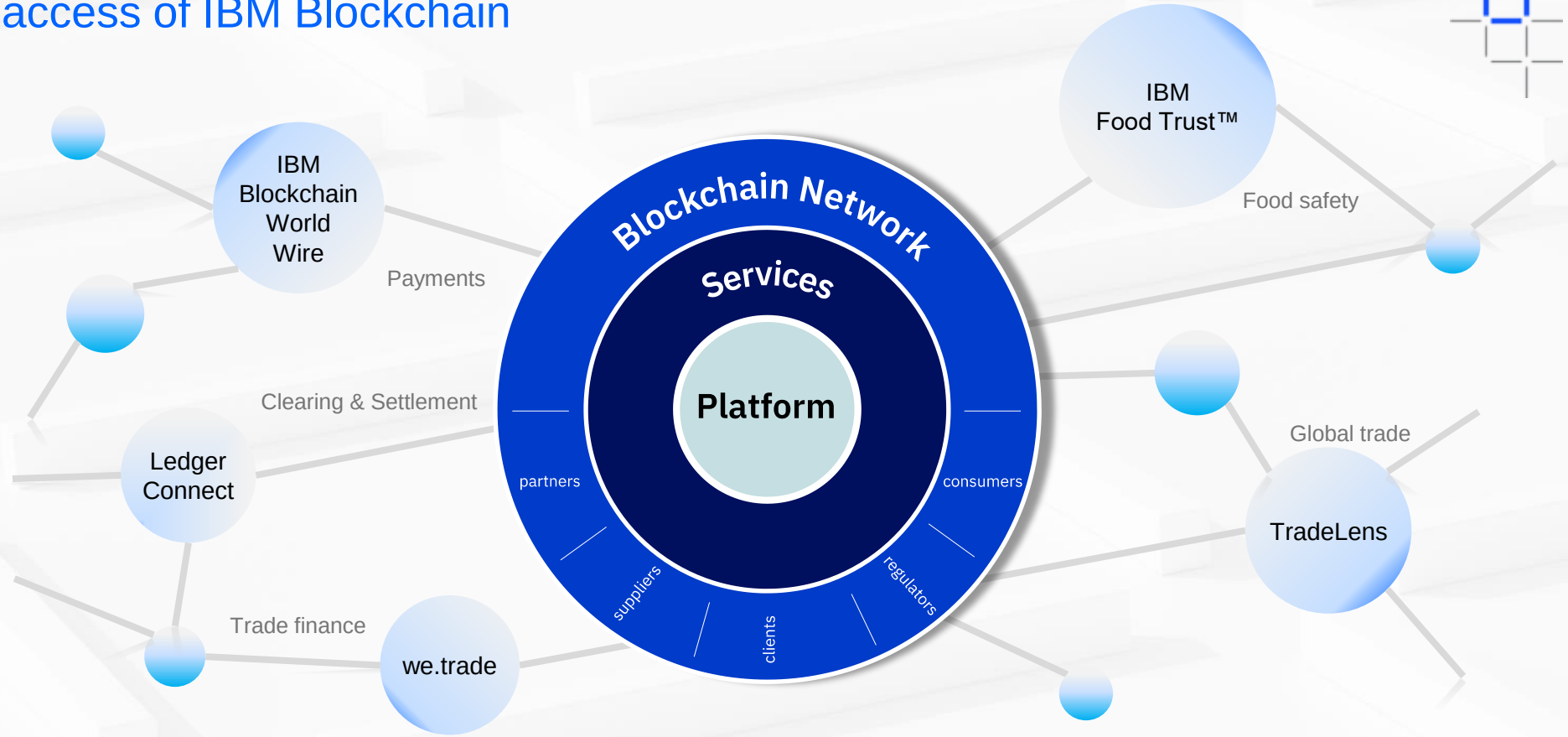
Bluemix (Hosted)



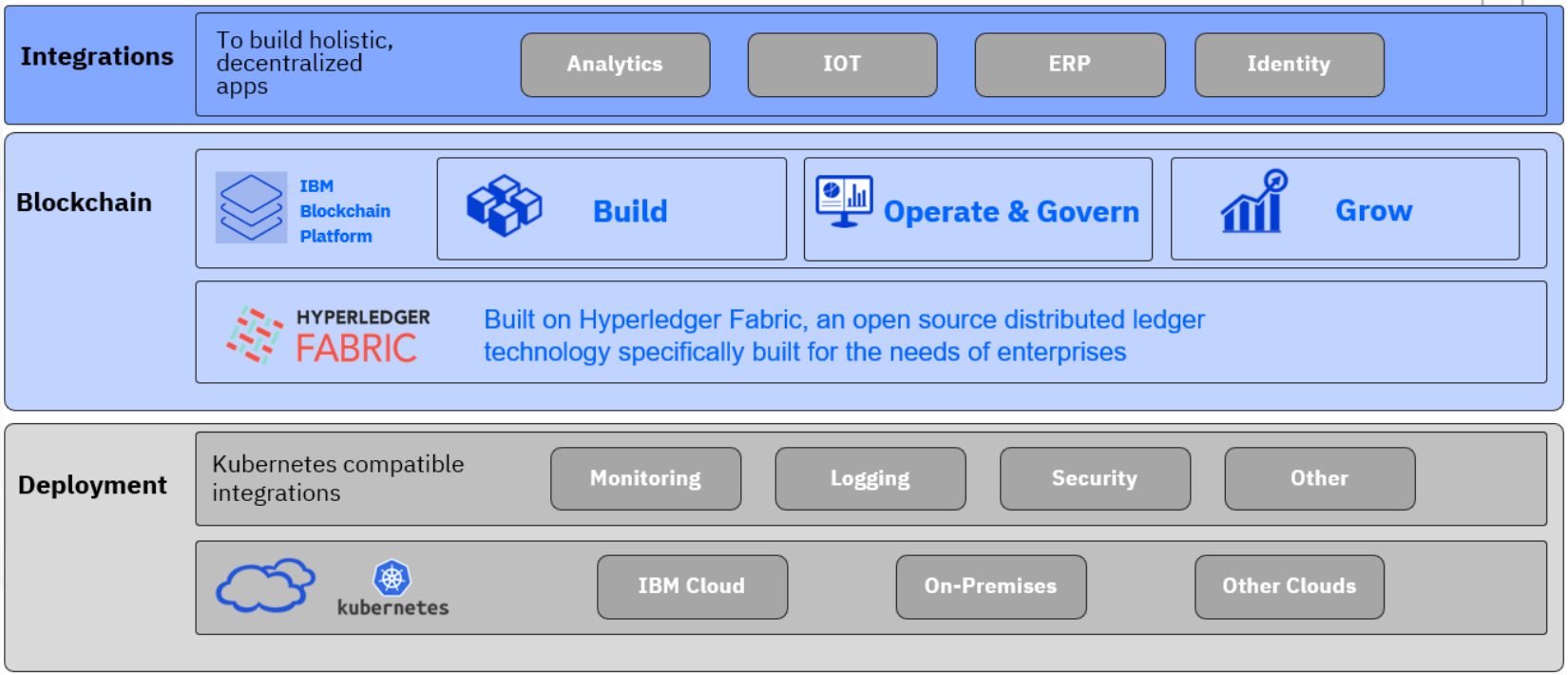
IBM Blockchain Solution

IBM

Leverage the unrivaled technology, expertise and access of IBM Blockchain



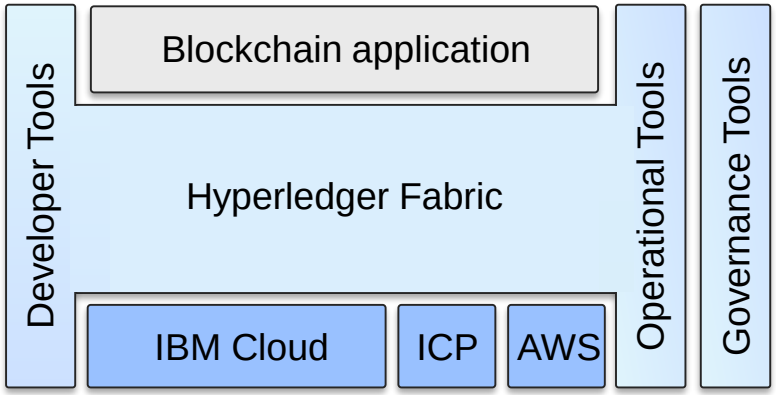
IBM **Blockchain Platform** – Conceptual Diagram



Introducing the IBM Blockchain Platform

IBM Blockchain Platform is a fully integrated enterprise-ready blockchain platform designed to accelerate the development, governance, and operation of a multi-institution business network

- **Developer tools** that will make use of Hyperledger Fabric SDK, to quickly build your blockchain application
- Hyperledger Fabric also provides the ledger, which is managed through a set of intuitive **operational tools**
- **Governance tools** for democratic management of the business network
- **Flexible deployment options** including IBM Cloud Private (ICP), AWS and a highly secure and performant IBM Cloud environment



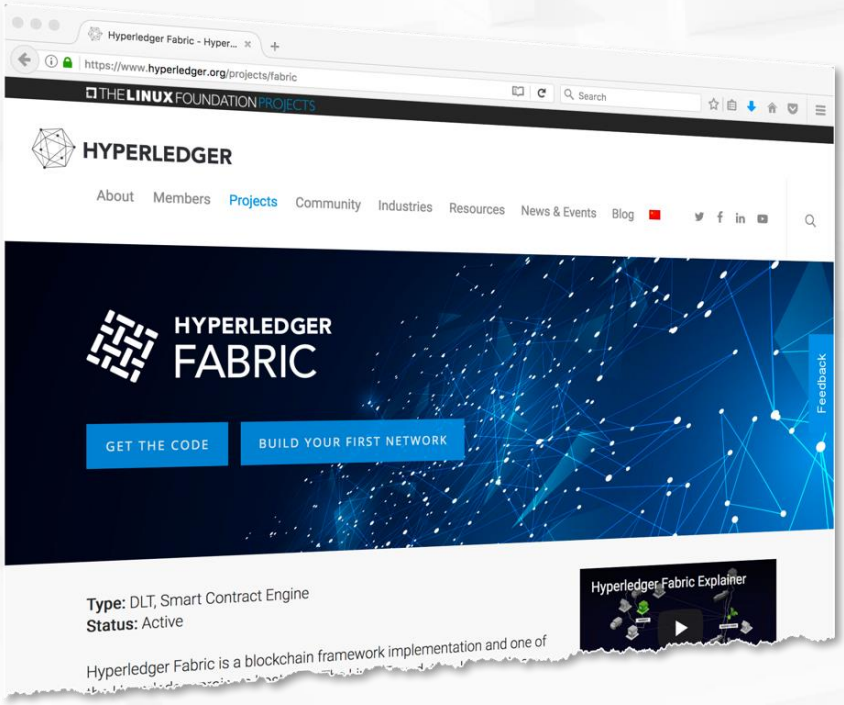
IBM Blockchain Platform Explained

Hyperledger: A Linux Foundation project

- IBM Blockchain Platform is underpinned by technology from the Hyperledger project
- Hyperledger is a collaborative effort created to advance cross-industry blockchain technologies for business
- Founded February 2016; now more than **260 member organizations**
- Open source
  Open standards
  Open governance model

Source: https://www.hyperledger.org/members
Updated: 8 January 2019

Distributed ledger



- An implementation of blockchain technology that is a foundation for developing blockchain applications
- Emphasis on ledger, smart contracts, consensus, confidentiality, resiliency and scalability.
- V1.4 released January 2019
  - Long Term Service release with emphasis on production operational and serviceability enhancements
  - New programming model abstractions for ease of development
- IBM is one of the many contributing organizations

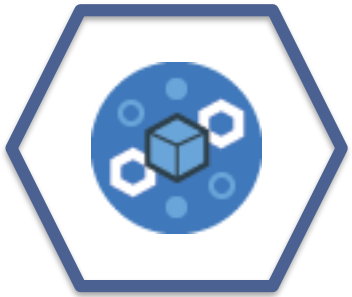
Fabric Explored

Engagement Model

IBM Offerings Supporting Hyperledger

LINUX FOUNDATION HYPERLEDGER PROJECT | IBM Blockchain ON IBM CLOUD | IBM Blockchain SOLUTIONS

BLUEMIX SERVICE



Blockchain

Managed Service on IBM Cloud

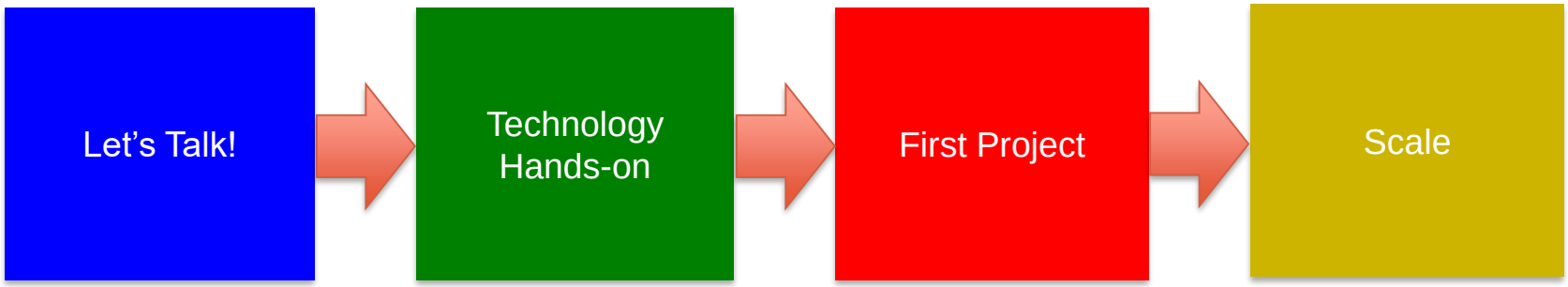
Your private Blockchain network in 1-click

Learn with sample applications

Develop your own Smart Contracts

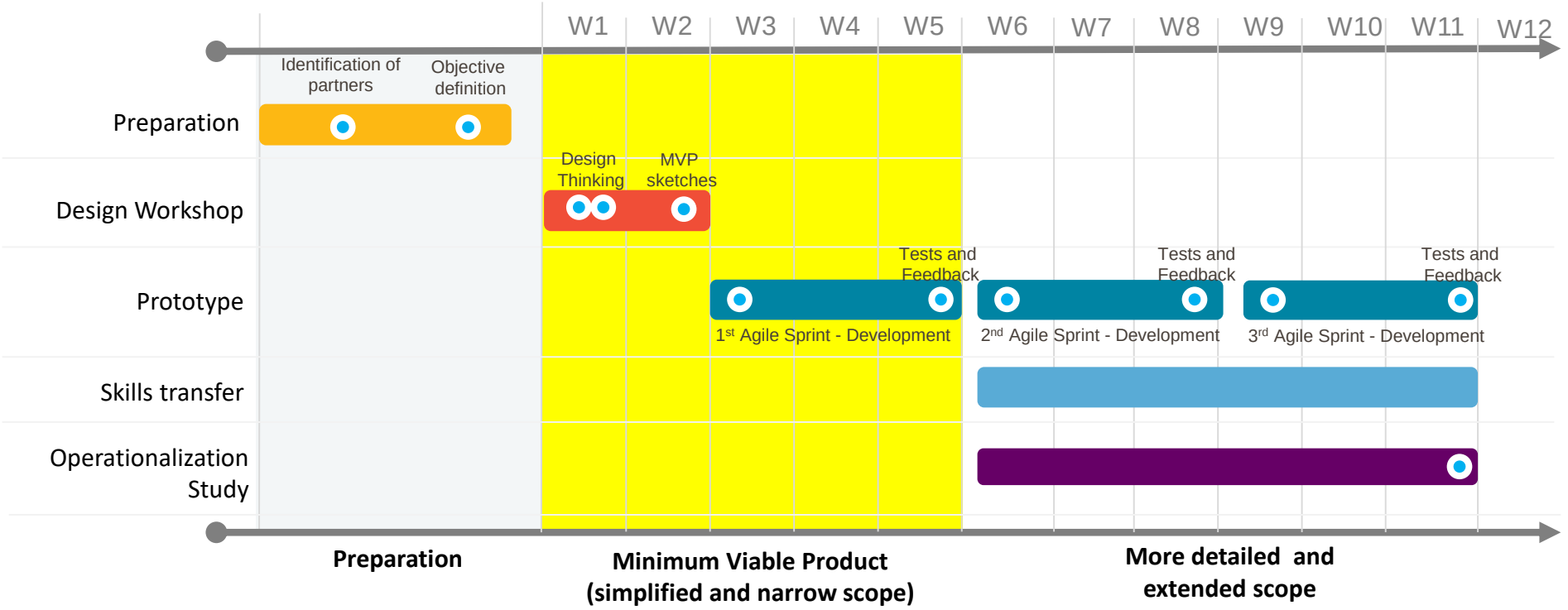
http://www.ibm.com/blockchain/

Engagement model



1. Discuss Blockchain technology 2. Explore customer business model 3. Show Blockchain Application demo	1. Understand Blockchain concepts & elements 2. Hands on with Blockchain technology 3. Standard demo customization	1. Design Thinking workshop to define business challenge 2. Agile iterations incrementally build project functionality 3. Enterprise integration	1. Scale up pilot or Scale out to new projects 2. Business Process Re-engineering 3. Systems Integration
Remote or face to face	*Remote or face to face*	*Face to face*	*Face to face*
Free of charge	*Free of charge*	*For fee*	*For fee*

Unconstrained project plan



Thanks!

Questions?