

IBM Digital Agriculture

Agribusiness Transformation & Blockchain

by Pierre Kauffmann & Chris Liguori

for the World Trade Organization

The word is:

agribusiness noun

ag·ri·busi·ness | \ˈa-grə-ˌbiz-nəs, -nəz\

Definition of *agribusiness*

: an industry engaged in the producing operations of a farm, the manufacture and distribution of farm equipment and supplies, and the processing, storage, and distribution of farm commodities



AGRICULTURE + **BUSINESS**

- Farming
- Animal Welfare
- Livestock Mgt.

- Machinery
- Logistics
- Financing
- Insurance
- Trading
- Industrialization
- Traceability
- Quality
- Compliance
- Transparency
- Distribution
- Retail
- Consumer

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The Global Farm-to-Fork Platform Powered by IBM



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Today: The majority of business communication today is still “Analog” and document based





Party A’s records

EDI ELECTRONIC DATA INTERCHANGE

Party D’s records







Bank records









Party C’s records





Party B’s records



Office 365

SharePoint

Auditor records

box



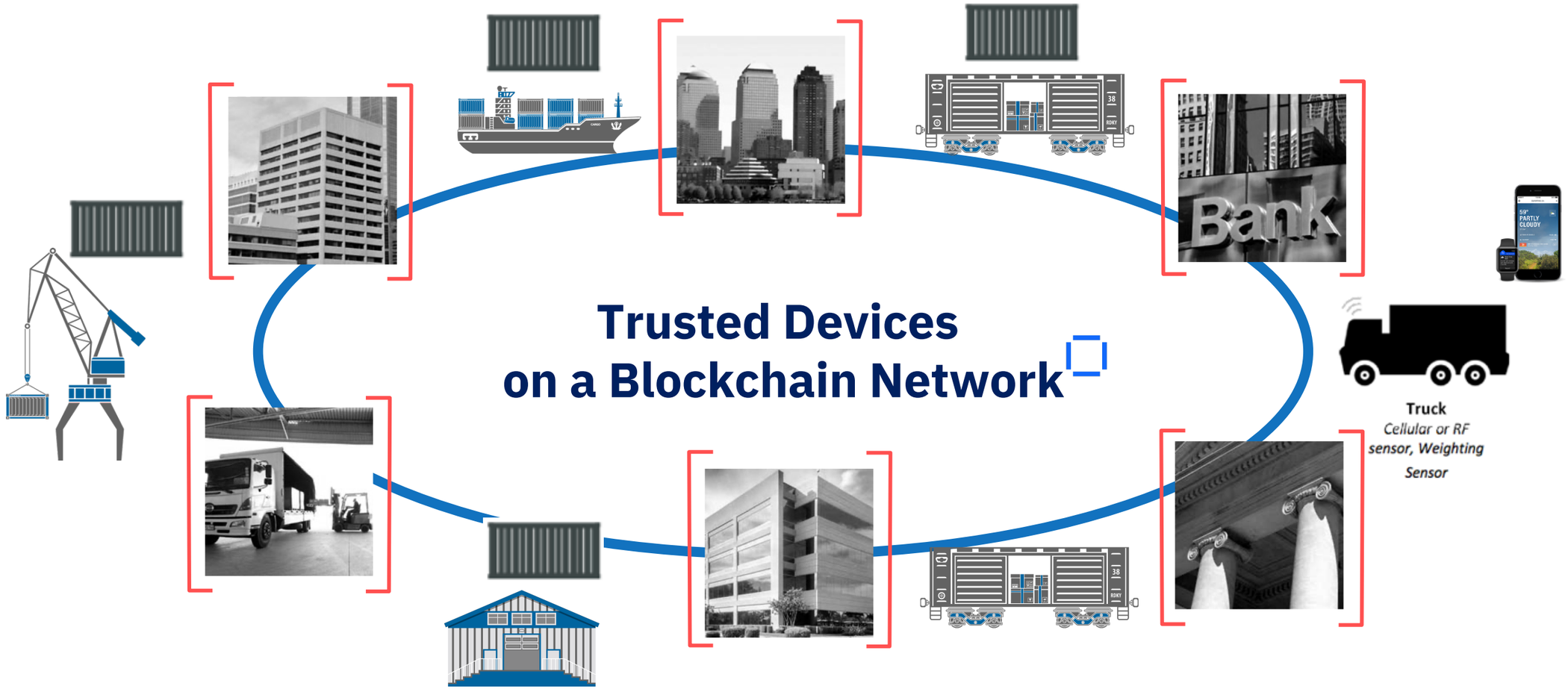


Google Drive

Dropbox

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Today with Blockchain: A shared & distributed ledger enabling trusted business transactions

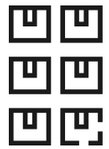
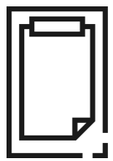


...Shared, Replicated, Permissioned Provenance: "One Version of the truth" for all stakeholders

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With the IBM Blockchain Platform you'll always know & trust your counterparties

IBM Blockchain Platform

	Raw Material Suppliers	Traders	Shippers / Cargo Owners	Surveyors	Ground Logistics	Ports & Terminals	Customs Brokers	Ocean Carriers	Freight Forwarders	Port / Customs / Tax Authorities	Regulators	Financial Services	Insurance Services	Industrial MFG	Retailers
Trusted Enterprises & Legal Entities															
Trusted Personnel (Personas)	Sourcing 	Purchasing 	Quality 	Compliance 	MFG 	Accounts Receivable 	Accounts Payable 	Finance 	Operations 	Planning 	Logistics 	Sales 	Marketing 	Customer Service 	Counter Parties 
Trusted Devices & Assets										
Trusted IT Systems															

All **Companies, Personnel, Systems and Devices** are **authenticated** when joining an IBM Industry Platform

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“BLOCKCHAIN TO SAVE THE FOOD INDUSTRY **$31 BILLION** BY 2024, DRIVEN BY IOT PARTNERSHIPS”

“Blockchain & the Internet-of-Things - A Powerful Duo”

“Compliance costs will be reduced by 30% by 2024”

JUNIPER RESEARCH

Source: Juniper Research - 25th November 2019

https://www.juniperresearch.com/press/press-releases/blockchain-to-save-the-food-industry-%2431-billion-b

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But not all Blockchains are created the same way…

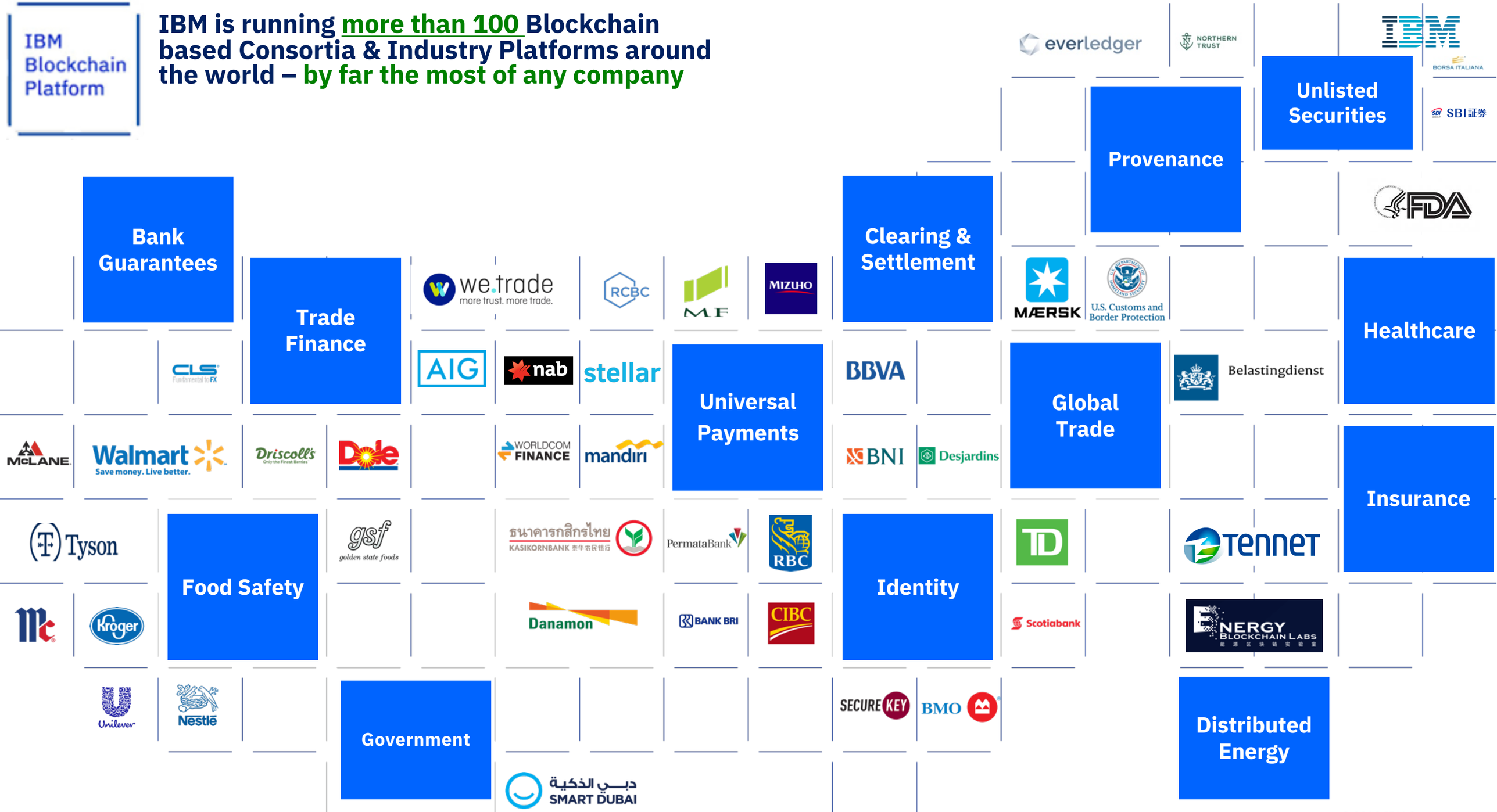
…there are public blockchains…

…and there are private & permissioned blockchains

…they are very different!

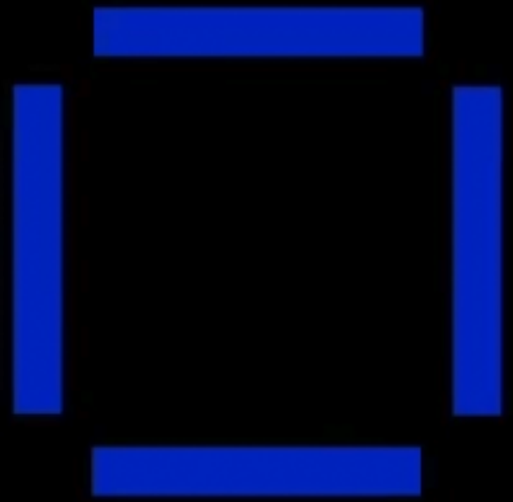
IBM Blockchain Platform

IBM is running more than 100 Blockchain based Consortia & Industry Platforms around the world – by far the most of any company



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Let’s Blockchain

*"Organizations throughout the transportation ecosystem are starting to **understand the benefits of blockchain** initiatives"*

-- Nadia Hewett, World Economic Forum

*"Whether filled with our products or the materials used in production, **understanding the status** of our containers helps us manage an **efficient supply chain**. We have been testing TradeLens and see potential as the solution scales. We look forward to industry-wide adoption to **benefit all members**"*

-- Michelle Eggers, Director Global Logistics Purchases, P&G

*"We adopt technologies that **facilitate access to information** and **increase tracking and traceability** throughout the cargo path. This is why we joined TradeLens, a global solution that uses blockchain to **facilitate the trade control** process."*

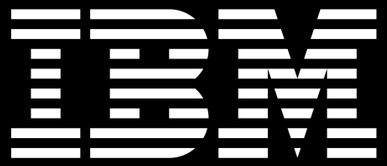
-- Rafael Garcia, National Superintendent of Customs, Sunat, Peru Customs

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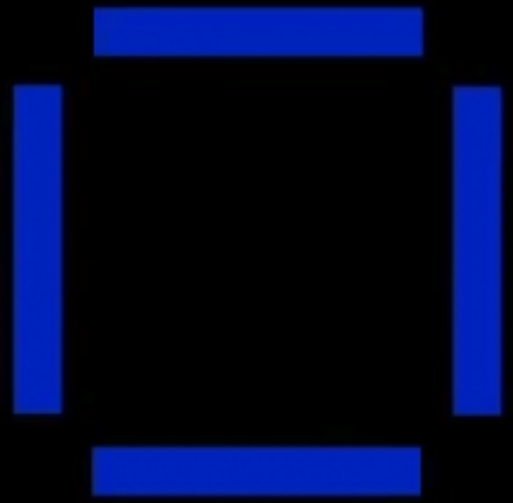
“No one is immune to a good idea”

-- Pierre Kauffmann, IBM

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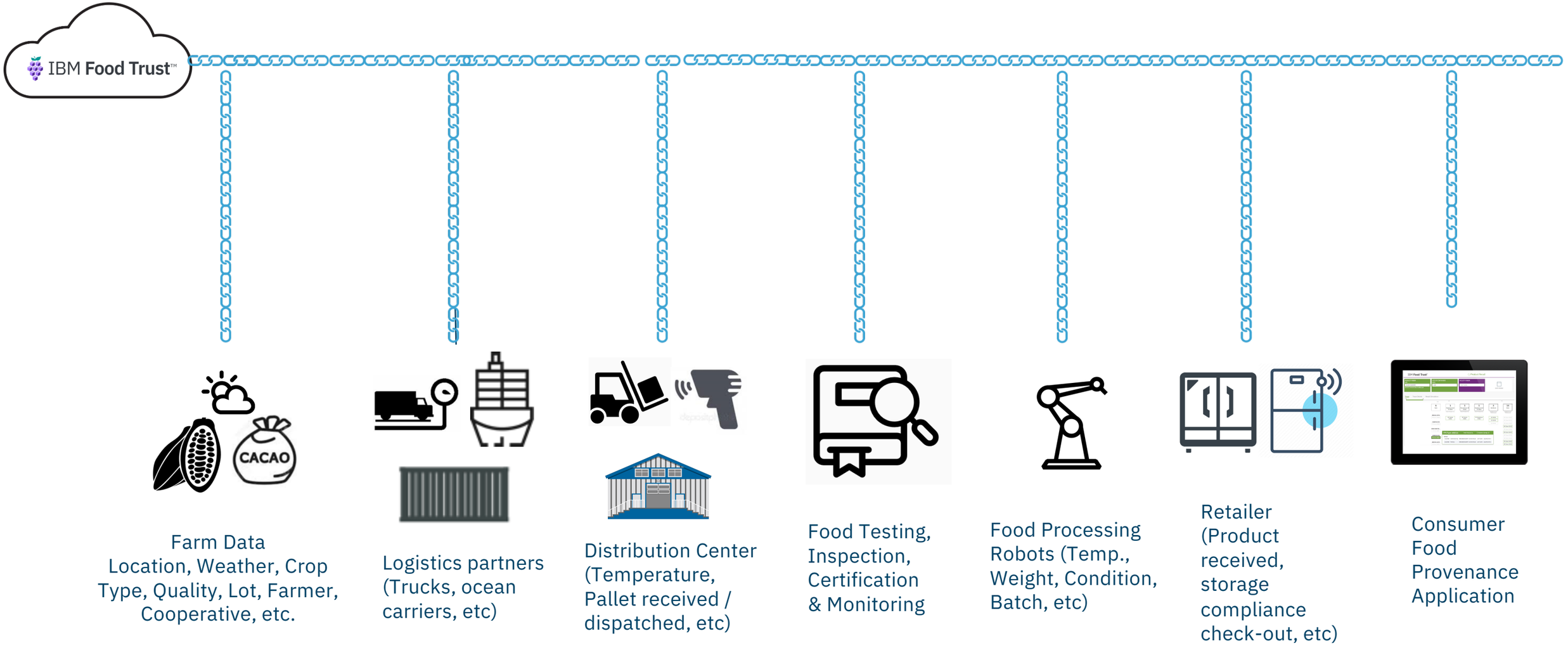


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About Blockchains for Business

Using trusted and authenticated Internet-of-Things (IoT) devices across your value chain



Farm Data
Location, Weather, Crop Type, Quality, Lot, Farmer, Cooperative, etc.

Logistics partners (Trucks, ocean carriers, etc)

Distribution Center (Temperature, Pallet received / dispatched, etc)

Food Testing, Inspection, Certification & Monitoring

Food Processing Robots (Temp., Weight, Condition, Batch, etc)

Retailer (Product received, storage compliance check-out, etc)

Consumer Food Provenance Application

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Core Elements of "Business Blockchains"



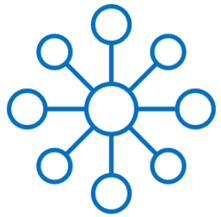
SHARED LEDGER(S)

Participants decide which assets to share



TRUSTED IDENTITIES

Participants know who they are dealing with



ENDORSEMENT(s)

Participants give provable endorsement



CONFIDENTIALITY

Information shared only on a need-to-know basis

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Never Locked in: Run Your Blockchain Apps Across, and on, Any Cloud

IBM Blockchain Platform is built on Hyperledger Fabric

- **Multi-cloud Ready**
- **Your IBM Blockchain Applications will run in AWS, Azure, IBM Cloud and more**

HYPERLEDGER

amazon web services | Microsoft Azure | Google Cloud | IBM Cloud

THE LINUX FOUNDATION

Hyperledger Fabric establishes trust, transparency and accountability



Permissioned network

Provides collectively defined membership and access rights within your business network



Confidential transactions

Gives businesses the flexibility and security to make transactions visible to select parties with the correct



No cryptocurrency

Does not require mining and expensive computations to assure transactions



Programmable

Leverage the embedded logic in smart contracts to automate business processes across your network

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Blockchain Centres of gravity are forming around five capability groups*

WORLD ECONOMIC FORUM

Digital Identity & Authentication

Identity, persona, device and systems management in the digital world by providing an immutable and contextual identity management through rigorous, multi-layered authentication

Financial products

Methods of decentralised payments **(not restricted to cryptocurrency**; including other means for embedding transparency, cost efficiency and regulation into existing financial products

Blockchain

Centres of gravity

Provenance

Recording a physical product's digital history, allowing traceability and verification of its origins, attributes and ownership while passing through Supply Chains

Asset Management

Through its transactional capabilities, Blockchain helps to co-ordinate loosely coupled assets, companies and individuals in order to achieve collective goals

Socio-economic coordination

Enhancement to current models of digital interaction with improved and embedded trust leads to local and end-user communities peer-to-peer coordination without intermediaries

**Source: IBM analysis and World Economic Forum*

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Sovrin & IBM are partnering on Digital Identities for all

sovrin

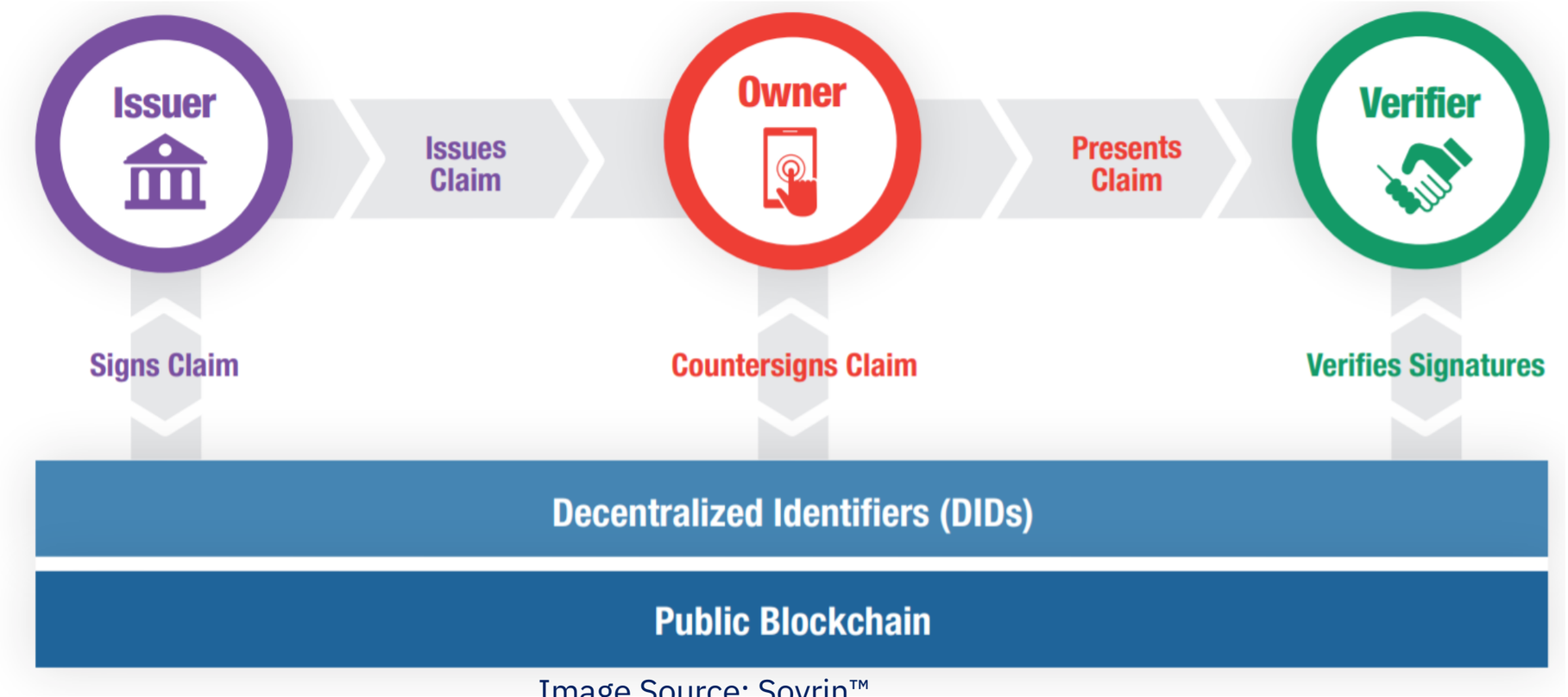


Image Source: Sovrin™

Sovrin™: A Protocol and Token for SelfSovereign Identity and Decentralized Trust

sovrin.org

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What makes a good Blockchain use case...



- Is a business problem involved?



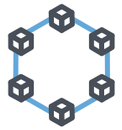
- Is a Business Community/Network involved with your business processes?



- Is an audit trail, provenance or reporting consensus required?



- Is there a need for trust across Enterprises, Personnel, Systems and Devices?



- Must the record of transactions be immutable & tamper proof?

If you answered yes to at least one of the above, then your use case(s) would likely benefit from applying private & permissioned Blockchain technology.

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Dispute Avoidance Use Case

What?

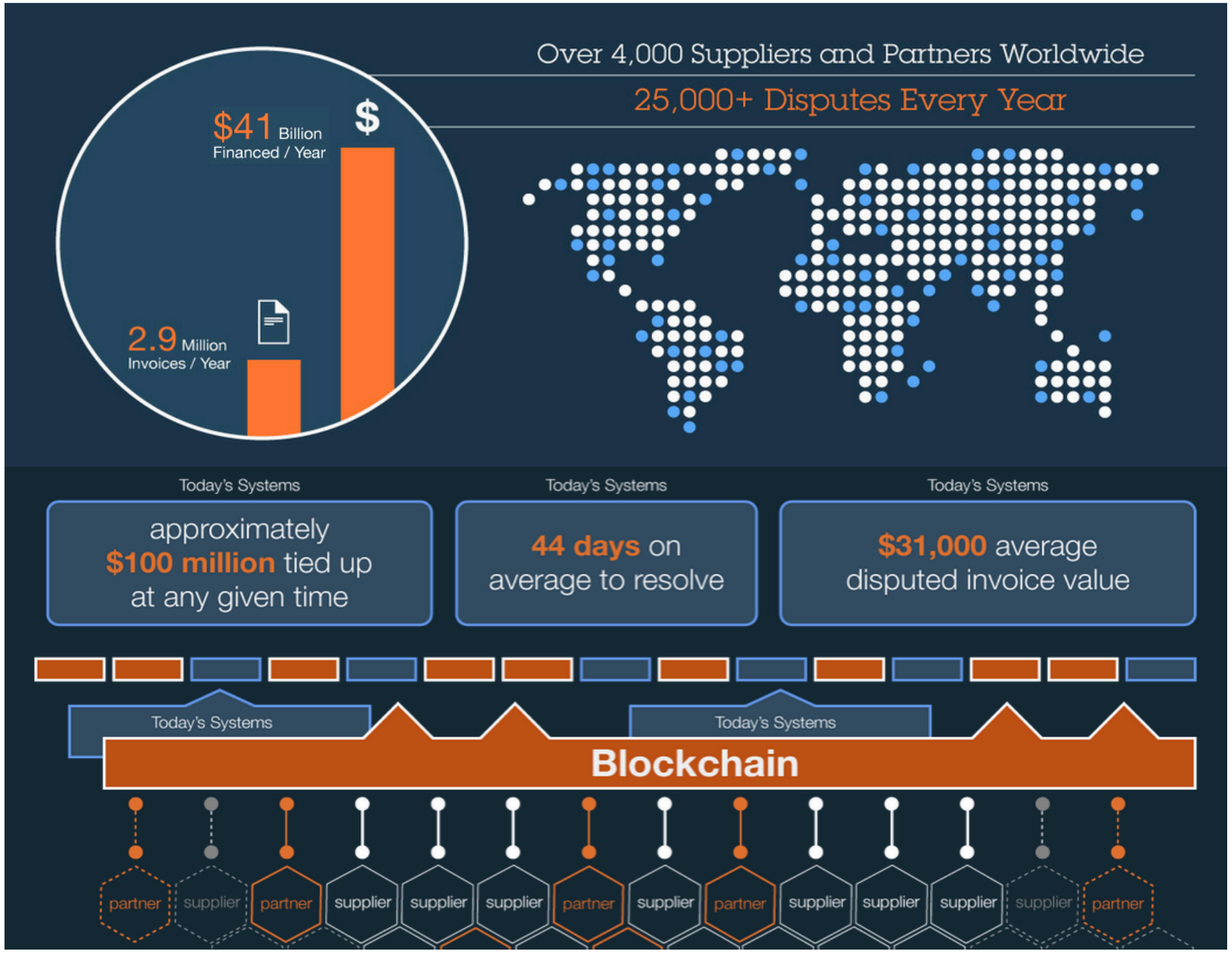
- IBM Global Finance (IGF) provides a $41B financing/year
- × **IGF had 25,000 Disputes / Year**
- × **$31K average value of disputed invoice**
- × **44 day average to resolve**
- × **$100 Million tied up at any given time**

How?

- Supplier & Partner Platforms powered by Blockchain provides visibility and provenance end-to-end across supply chain

Benefits

- ✓ **Reduced dispute resolution time by 75%**
- ✓ **Released $100m of working capital**
- ✓ Combined IGF and Supplier info to further expand benefits further



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About IBM Food Trust

IBM Food Trust: (www.ibm.com/blockchain/solutions/food-trust)

- **Geography:** Global
- **Members:** 100+
- **Industry:** Agriculture, Food, Distribution
- **Member Types:** Farmers, Food Manufacturers, Food Wholesalers, Food Distributers, Food Logistics, Food Retailers & Restaurants, Industrial Equipment OEMs & Consumers

IBM Blockchain Platform

IBM Food Trust™

Making the food supply chain more efficient, transparent and safer

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IBM Food Trust applies blockchain across the Food value chain

Food Safety (Provenance) | **Supply Chain Optimization** | **Food Waste** | **Consumer Demand (Quality)**

IBM Food Trust

Modules: **Trace** | **Certification** | **Freshness** | **Consumer**

Blockchain Technology

Food Supply Chain Ecosystem

Growers | Food Suppliers & Traders | Food Processors | Regulators | Logistics | Retailers | Consumers

Albertsons Companies, Dole, McCormick, McLane, Tyson, Driscoll's Only the Finest Berries, Carrefour, Unilever, gsf golden state foods, Walmart Save money. Live better., Nestlé, Kroger, Producers Market, Smithfield Good food. Responsibly.

Trellis, Topco, Organo, centricity, Wakefern Food Corp., 3M Food Safety, Angulas Aguinaga, Emerson Climate Technologies, Scoular, Dennick FruitSource, BeefChain Blockchain Verified Beef & Sheep

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IBM Spans the Agri-Business Value Chain

Certification Bodies

- Reduce fraudulent certificates
- Increase renewal speed

Consumers

- Understand and trust their food better
- Learn about and act on recalls quickly

Regulators/ Standards

- Identify contamination quickly
- Reduce unnecessary testing

GS1

Food Manufacturers

- Build loyalty and engagement
- Manage inventory in real-time
- Automate & reduce manual certificate management
- Instill trust between retailers, suppliers & customers

Wholesalers / Distributors

- Manage inventory in real-time
- Conduct targeted recalls
- Enable internal data sharing

Food Logistics

- Manage inventory in real-time
- Enhance ability to meet compliance standards
- Reduce manual processes

Food Retailers

- Strengthens consumer relationship and increase brand loyalty
- Assure customers food is safe
- Conduct targeted recalls
- Extend shelf-life

Food Service

- Certify food sourcing practices
- Ensure safe food
- Reduce food waste

Growers

- Prove sustainable growth practices
- Satisfy compliance requirements and connect with consumers
- During a recall, show that farm is not source of contamination
- Ease of connectivity to the downstream supply chain

DANONE ONE PLANET. ONE HEALTH
Nestlé
Dole Powering You!
Driscoll's Only the Finest Berries
SUCAFINA
gsf golden state foods
Ahold Delhaize
Walmart
Carrefour
Kroger
HEIFER INTERNATIONAL
YARA

Fundamental value from Farm-to-Fork

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IBM Food Trust Use Cases



Food Safety



Provenance



Food Freshness



Sustainability



Brand Trust



Supply chain efficiencies & Inventory Optimization



Food waste



Food Fraud



Agricultural Commodity Trade Efficiency



Transportation & Warehousing Optimization

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About TradeLens

TradeLens (Tradelens.com)

- Geography: Global
- Members: 250 MARINE GATEWAYS + 150 GLOBAL COMPANIES
- Transactions: 600+ MILLION BLOCKCHAIN SHIPPING EVENTS PROCESSED TO-DATE
- 2 MILLION+ BLOCKCHAIN TRANSACTIONS/EVENTS/DAY
- 10 Million+ Blockchain Transactions Every Week
- 20 Million+ Containers Tracked & Managed Globally
- 60% of the World's Container Traffic expected by January 2020



IBM Blockchain Platform

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A sample of participants on the rapidly expanding ocean carrier network on TradeLens

TRADELENS

CMA CGM
msc
Hapag-Lloyd
ONE OCEAN NETWORK EXPRESS
MAERSK
PIL
APL
ANL
HAMBURG SÜD
SEALAND A MAERSK COMPANY
ZIM
Safmarine
Modern Terminals
BOLUDA CORPORACIÓN MARÍTIMA
CNC
NAMSUNG
Lifting Global Trade™ APM TERMINALS
Port of Halifax
CEVA
KMTC
SEABOARD MARINE

www.tradelens.com/ecosystem/

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TradeLens Network geographic Coverage / December 2019

TRADELENS

Ports and terminals directly integrated with TradeLens

Ports and terminals contributing data to TradeLens



www.tradelens.com/ecosystem/

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WORLD TRADE ORGANIZATION

The Weather Company An IBM Business

IBM Food Trust™
IBM Agritech Platform

(Partial) List of TradeLens Network as of December 2019

Shipping Events

+ 600M to-date + 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

www.tradelens.com/ecosystem/

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	◉
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	◉
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

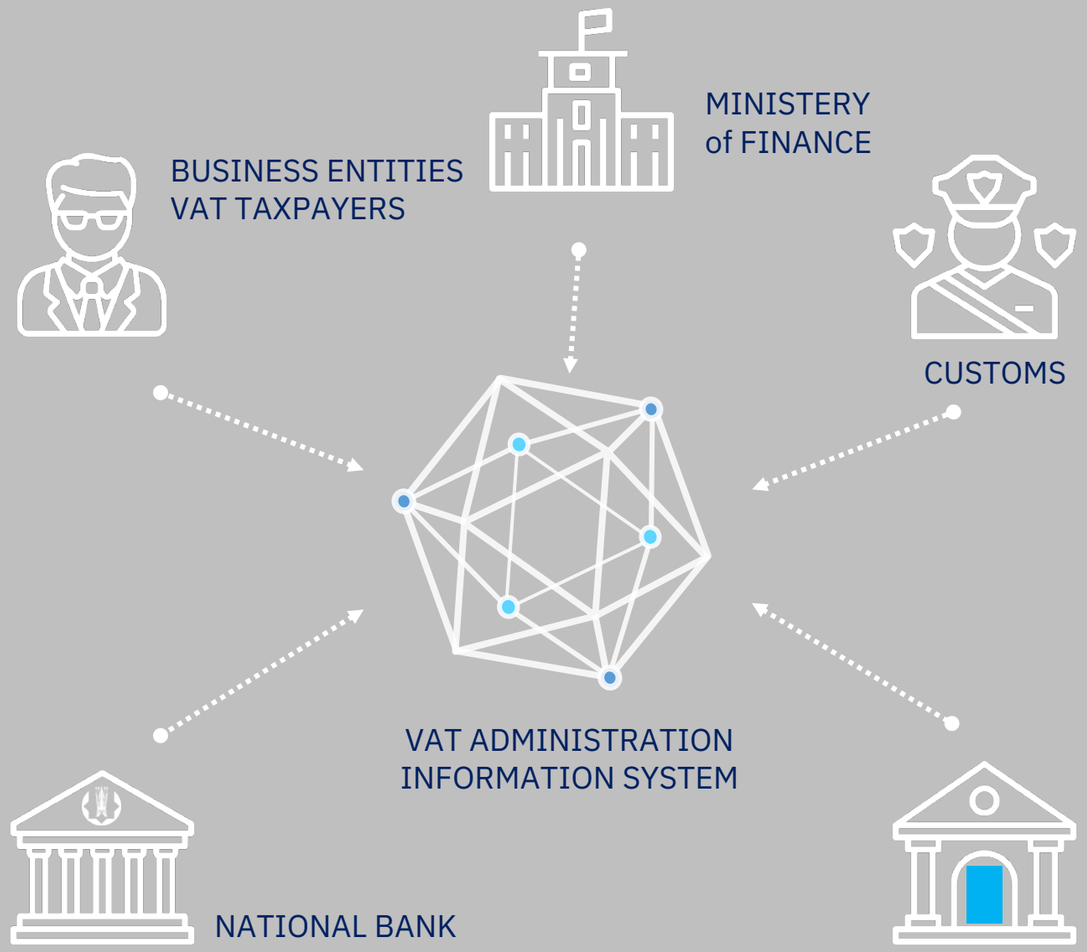
Authority	Status
Australia Home Affairs	◎
Bahrain Customs	◎
Canada Customs	◎
Dutch Customs	◎
Ghana / GCNET	◎
Saudi Arabia Customs	◎
Peru Customs	◎
Singapore Customs	◎
Turkey Customs	◎

Inland Transportation

Transportation Provider	Status
Ancotrans	◉
CN Rail	◎
IMCC	◉

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IBM Blockchain Use Case: VAT & Tax Mgt. @ Customs Boarder



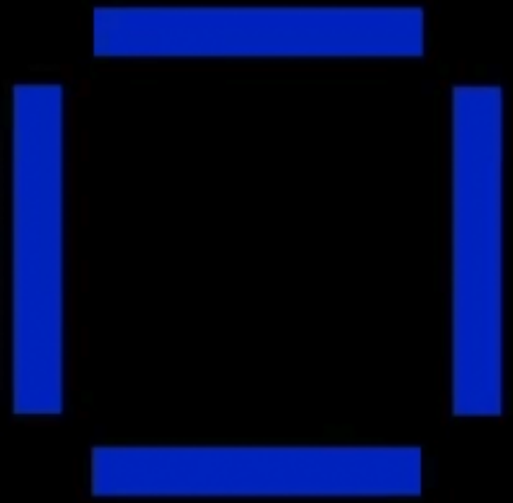
Business Requirements:

- ✓ **Taxation Secrecy**
- ✓ **Banking Secrecy**
- ✓ **Trade Secrecy**

Blockchain Systems Requirements:

- ✓ **High-Performance VAT Processing**
- ✓ **Scale from 100,000 to 1,500,000 VAT Tax payers**
- ✓ **4,000,000 VAT Payments Per Day**
- ✓ **15 Times more processing throughput than legacy model**

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About We-Trade

We.Trade (we-trade.com)

- **Geography:** Initiated in Europe and expanding Globally
- **Members:** Banks, Small & Medium Sized Buyers & Sellers, Insurance Companies & Shipping Companies
- **Industry:** Trade Finance
- **Services**: Multiple Payment Options, Multi-Lingual, Open APIs

we.trade

Simplifying trade financial transactions while increasing security

Deutsche Bank, UBS, Nordea, KBC, NATIXIS, Rabobank, SOCIETE GENERALE, Santander, UniCredit, HSBC, CaixaBank, ERSTE, Eurobank

IBM Blockchain Platform

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we.trade eco-system

Trust and a single source of the truth

IBM Blockchain Platform



Processing
costs reduced
by up to 80%[1]

- Single platform simplifying & standardizing trade chain
- "Smart contracts" – with all in the ecosystem party to the same multi-party contract
- Digital "events" trigger an action automatically
- All transactions are traceable and auditable
- Counter-parties are all KYC'ed
- Visibility of status of goods in transit (with IoT)
- Automatic payments
- Faster trade cycles with increased speed of reconciliation

[1] Bain & Company 2019

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Proposition

For each party in the value chain

IBM Blockchain Platform

Buyer



- Reduced costs
- No pre-payment required
- Increased trading partners

Buyer bank / Seller bank





- Reduced costs
- New revenue streams:
  1) each PO/invoice is new finance opportunity
  2) spreads increase – financing as % of invoice could go to 90%
  3) Financing can originate upstream, e.g. pre-shipment

Seller



- Payment risks mitigated
- Increased sales
- Easy access to trade finance
- Reduced costs
- Maintain liquidity & working capital

Shipper



- Increased cargo volumes
- Reduced costs

Insurer



- Increased policy volumes & value

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About the Responsible Sourcing Blockchain Network (RSBN)

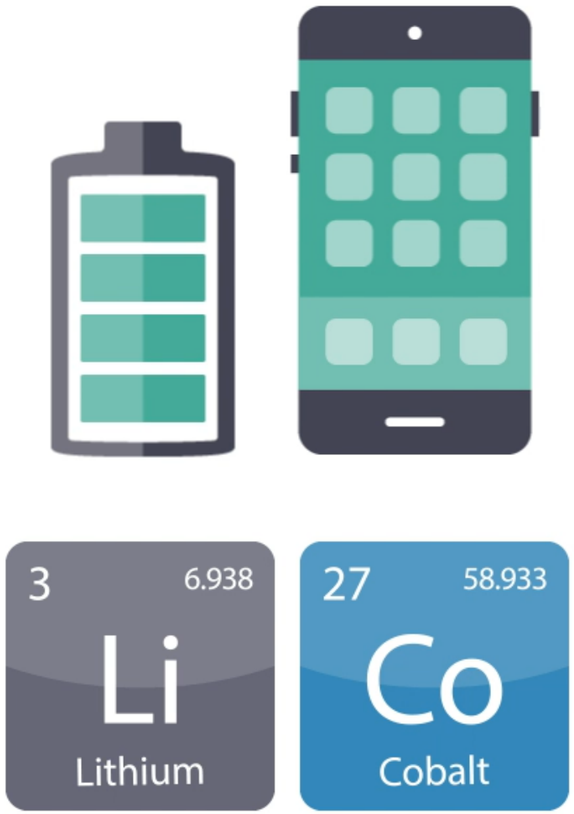
Responsible Sourcing Blockchain Network (RSBN)

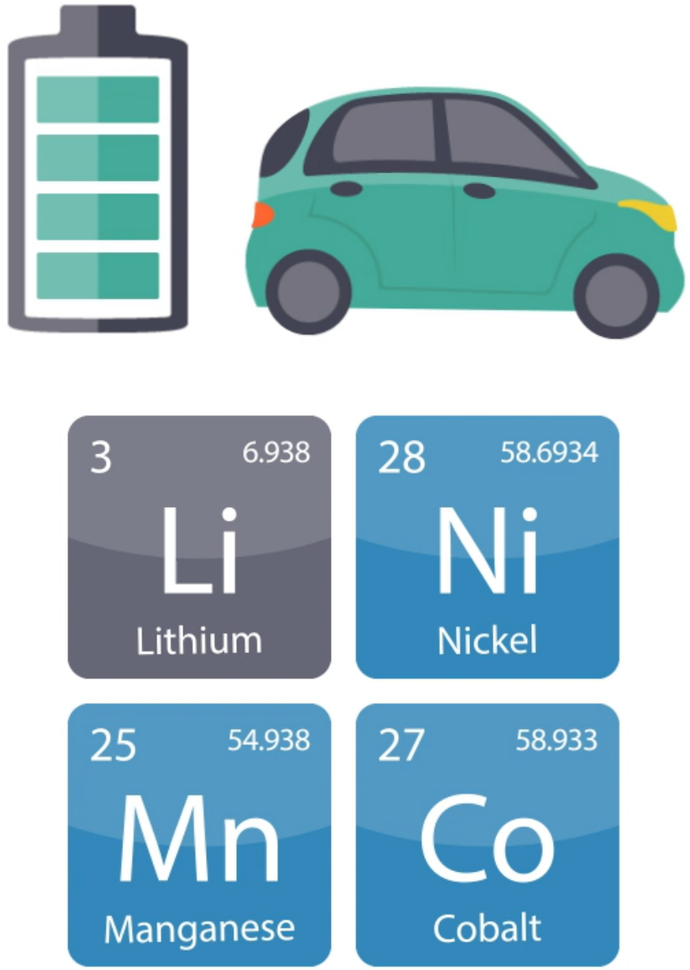
- **Geography:** Global
- **Members:** Miners, Smelters, Battery MFGs, Consumer OEMs
- **Industry:** Mining, Manufacturing and Consumer Goods
- **Services:** Responsible Mineral Sourcing Provenance

Ford
VOLVO
LG Chem
华友钴业 HUAYOU COBALT
RCS GLOBAL GROUP
IBM Blockchain Platform

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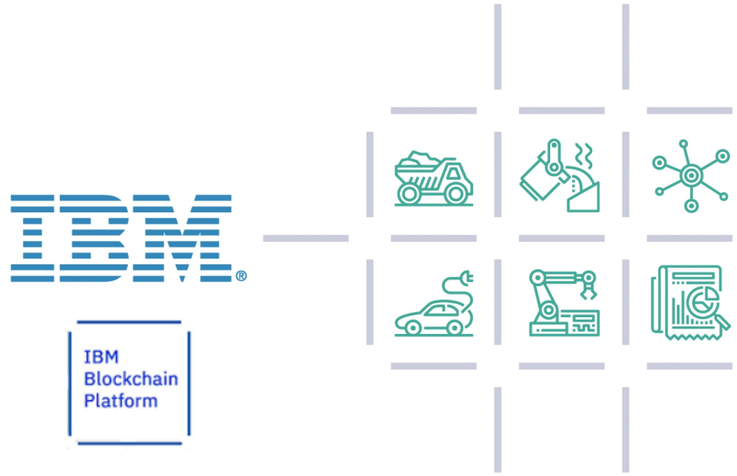
RSBN is starting with Cobalt and will add Conflict & Rare Earth, 3TG and other precious metals





3TG Minerals:
Tin, Tantalum, Tungsten





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About Trust Your Supplier

IBM launch's "Trust Your Supplier (TYS)", in August 2019

TRUST YOUR SUPPLIER

- ✓ Improve supplier qualification
- ✓ Supplier validation
- ✓ Supplier onboarding
- ✓ Supplier life cycle information management

SUPPLIERS

- Eliminates redundant collection and submission of the same information multiple times to different buyers
- Reduces time for a new buyer to onboard you and get to the 1st PO.
- Increased trust in your identity across the network due to validations by 3rd parties and up to date information

BUYERS

- Provides immediate access, real time to updated & current supplier data at a fraction of cost
- Greatly simplifies current technology and process, reducing supplier approval cycles
- Minimizes supplier risk and ensures compliance

VERIFIERS

- Easy, trusted access to supplier compliance data
- Provide credibility & compliance of network members
- Increased opportunity with visibility to the entire network of Buyers and Suppliers

IBM Blockchain Platform

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Why IBM for Agribusiness & B2B Blockchains

WORLD TRADE ORGANIZATION

The Weather Company An IBM Business

IBM **Food Trust™**
IBM **Agritech Platform**

IBM Farm-to-Fork Solutions

Sourcing & Production	Storage & Handling	Industrial Processing	Trading & Merchandising	Transportation & Distribution
• Precision Agriculture & Crop Yield Forecasting • Risk Mgt. Blight/Pests, Weather • Animal Welfare / Livestock Mgt. • Animal Feed Management • Compliance Management • Farm Equipment Monitoring/Mgt. • Contract Management • Farmer Services • Sourcing Loyalty Mgt. • Remote Asset Management • Quality & Inspection Services	▪ Warehouse Management ▪ Commodity Condition Monitoring ▪ In-land to port optimization ▪ Contract Compliance ▪ Cold Warehousing ▪ Inspection Mgt.	• Commodity Blending, Transformation & Optimization • Asset & Energy Mgt. • Predictive Equipment Maintenance, Repair & Optimization • Digital Twin Cognitive Plant Advisor • Farm-to-Factory Scheduling/Planning • Digital Health, Safety, Security & Environment (HSSE) • Quality & Inspection Services • Cold Processing	• Forecast & Demand Planning • Watson Advisors: Trader, Farmer, Logistic Operator • Market Intelligence • Digital Barter • B2B Commerce • Post-Trade Settlements • LC & BOL automation • Commodity Provenance	▪ In-land to port monitoring ▪ Port-to-Port Tracking ▪ Cognitive Demand, Sales & Operations Planning ▪ Geo & Time Arbitrage ▪ Digital Supply Chain Visibility ▪ Port Inspection & Certificate Services ▪ Cold Logistics
The IBM Weather Company Decision Platform for Agriculture™	IBM **FOOD TRUST™ & IBM MAXIMO™**	IBM **FOOD TRUST™ & IBM MAXIMO™**	**IBM Bank Consortia, Analytics & Commerce Services**	**TradeLens & IBM FOOD TRUST™**

IBM **Watson™ / IBM Oniqua™ /** IBM **Watson IoT™ / IBM Predictive Maintenance and Optimization**


Cognitive & Analytics


Security


Internet of Things

Innovative Enterprisee Class Technology:

Security / Privacy
Reliability
Scalability
Resilience
Auditability


Private & Permissioned Blockchains Powered by IBM & Hyperledger Fabric


Mobile


Hybrid Clouds & Commerce

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Today:

Bringing together the world's most advanced expertise, technology and ecosystem to transform industries

IBM **Blockchain**

Experts

Collaborate with comprehensive services teams from ideation all the way to production

Solutions

Solve critical industry challenges by building and joining new business networks

Platform

Develop, govern and operate enterprise blockchain networks with speed and security

Ecosytems

IBM has experience across more than 400 Blockchain projects where we facilitate and build ecosystems

Hyperledger

As a founding and premier member of Hyperledger, we're committed to open source, standards and governance

How IBM is aiding clients to transform their Industries & Business Processes

IBM Facilitation Services

Develop

Rapid, Iterative Application Development

Solutions

Collaborate / Co-Create / Build / Deploy your "Minimum Viable Product" (MVP) to Production

We Innovate & Co-Create	We Co-Design	We Build	We Deploy	We Integrate & Connect	We Manage	We Secure	We Transform

Govern

Create and govern blockchain consortiums for democratic, multi-party management

Ecosystems

Create, Invite and/or Manage your own "Minimum Viable Ecosystem" (MVE) with democratic business rules

We Build	We Expand	We Nurture	We Partner	We Invest	We Facilitate	We Orchestrate

Operate

Deploy and operate an always-on Blockchain network with enterprise and production-ready performance and security

Industry Platforms

Keeps your network running / Provides the control center & bulletproof security to grow with confidence

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The Weather Company An IBM Business

IBM Food Trust™

IBM Agritech Platform

IBM is investing heavily in Blockchains for Business

"IBM is clearly regarded as having the strongest credentials in the blockchain sector, well ahead of competitors" – Juniper Research

Our People

60,000+
People enabled through IBM blockchain training

5,000+
Trained Consultants at IBM

3,000+
Trained Developers

700+
SME's in hiring pipeline

Our Experience

108
Live Blockchain Consortia & Industry Platforms

600+
Blockchain Enterprise Engagements

9,100
Patents in 2018

Reducing Your Risk

FORRESTER® #1 JUNIPER RESEARCH

HfS BLUEPRINT REPORTS Everest Group® RESEARCH

#1 Enterprise Blockchain Provider

105+ Years
of being a safe and reliable brand

4+ Years
Supporting world's largest Blockchain networks

$30 Million
Value of Community
Code Contributions

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IBM’s Banking, Payment, Scale & Security Credentials

97%

of the world’s largest banks are IBM clients

90%

of global credit card transactions are processed on IBM mainframes

IBM runs 75% of world's financial transactions each and every day

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Why IBM is a unique partner

Continuous Innovation

25 years of invention & patent leadership

In 2017, IBM patented more than 9,000 innovations across cognitive solutions, cloud platforms and blockchain.

2017

Total number of US patents in 2017: **9,043**

Total IBM inventors: **8,500+**

46 different countries from which IBM inventors innovate

50 states from which IBM inventors create

105,000+ patents invented from 1993-2017

Cognitive Computing & IoT

Natural Language Computing

Machine Learning



The Weather Company An IBM Business

Evidence-based hypothesis

IBM **Watson IoT & Industry 4.0**

Industry Platforms & Hybrid Cloud

Red Hat

IBM Food Trust™

TRADELENS

we.trade

IBM Hybrid Cloud

IBM **Blockchain**



It's your data Handle it your way

Analytics Leadership

We have built the world's broadest and deepest portfolio in data and analytics.

$24 billion invested to date to build IBM's capabilities in Big Data and analytics, with $7 billion in organic investment

$17 billion of gross spend for Big Data and analytics acquisitions, including more than 30 acquired companies

15,000 analytics consultants and 400 mathematicians

40,000 client engagements to date

$1 billion investment in Flash technology, providing industry-leading speed and efficiency to enable data to be real-time ready for analytics

1,000 university partnerships, and 2,215 IBM Business Partners

500 analytics patents generated each year

2/3 of IBM Research is focused on data, analytics and cognitive computing

One of the world's Leading Digital Agencies

The Evolution of Experiences

"Good design is good business."

Thomas J. Watson Jr.

CognitiveBUILD

IBM **Interactive Experience**

5,700+ Designers Around the world

Co-Creation w/IBM Enterprise Design Thinking







Our Strategic Partnerships

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IBM **Analytics**

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IBM **Watson**

IBM **Blockchain**

IBM **Systems**

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Red Hat Software

Red Hat

IBM **Watson IoT**

IBM **Payments**

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IBM **MobileFirst**

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