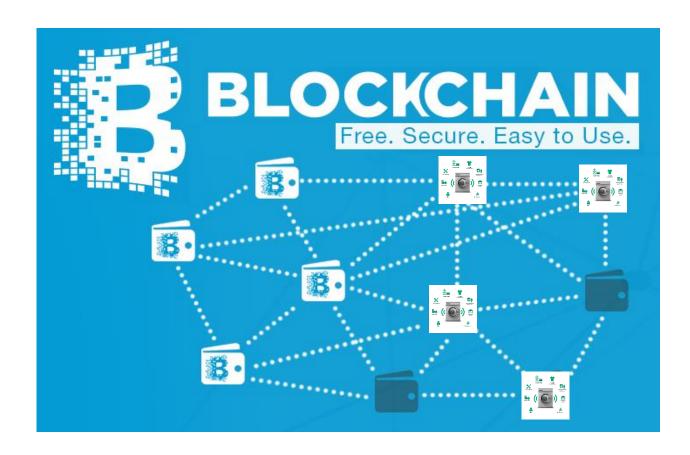# Blockchain voor Maintenance en Service Logistiek

Martijn Siebrand
Programma ontwikkelaar
Supply Chain Finance

Specialist Transport en
Logistiek Van Oers
Accountants & advies

Round-up

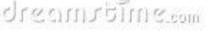# Hoeveel cryptocurrencies zijn er momenteel?

TU DELFT BOUWT BLOCKCHAIN HYPOTHEEK

T̃UDelft

TU-Delft heeft een werkend prototype ontwikkeld voor een op blockchain-technologie gebaseerde hypotheekmarktplaats.

9 februari 2017

EU Commission: We Plan to Boost Support for Blockchain Projects

Stan Higgins (@mpmcsweeney) | Published on February 15, 2017 at 15:00 GMT

Dubai to use blockchain technology for all government documents by 2020

The Dubai government is seeking to position the emirate as a leader in blockchain technoloav

FEBRUARY 7, 2017

Banking Is Only The Start: 27 Big Industries Where Blockchain Could Be Used

Blockchain is 5 Years From Mainstream, Post-Trade Consortium Members Say

Stan Higgins (@mpmcsweeney) | Published on February 13, 2017 at 13:30 GMT

NEWS

LATEST THINKING

BEYOND THE BUZZ: THE POTENTIAL OF BLOCKCHAIN TECHNOLOGY FOR AIRLINES

Blockchain technology can create new efficiencies and services models for airlines.

Maintenance. Blockchain technology can transform maintenance logs, which at best are in cumbersome databases and, at worst, are in paper binders. The blockchain can help the industry ensure that parts procured are legitimate and can offer a "virtual copy" immutable record of the provenance of every part on the plane, every time it has been handled and by whom, from the beginning of the aircraft's existence. This visibility is profound, and can take the practice of maintenance, safety and aircraft security to new levels.

https://www.accenture.com/us-en/insight-potential-blockchain-technology-for-airlines

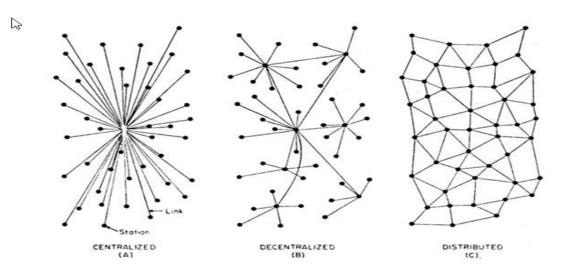# Blockchain

Wat is blockchain?

Blockchain is een decentraal netwerk van computers, die samen – volledig transparant – een open register of grootboek bijhouden.

Blockchain is een uitwisselingstechnologie die kan worden geschaard onder de verzamelnaam 'distributed ledgers', 'public ledgers' of 'shared ledgers'.

Een 'ledger' kan gezien worden als een soort openbaar kasboek, waarin transacties publiek worden bijgehouden.
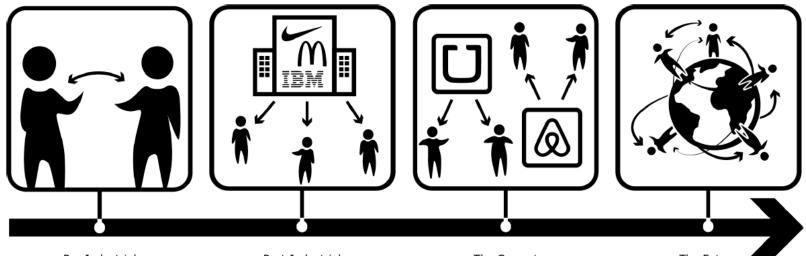
Promise of Blockchain/distributed ledger.

- 100% secure transactions. Robustness. Data integrity.
- Self executing processes. No central bottlenecks.
- No central control on access. Transparency. Flexibility.

CENTRALIZED (A)   DECENTRALIZED (B)   DISTRIBUTED (C)

Evolution of creating trust

Pre-Industrial Revolution

Post-Industrial Revolution

The Current Sharing Economy

The Future Sharing Economy

Lock-in: reputation "owned" by single company

UBER

airbnb

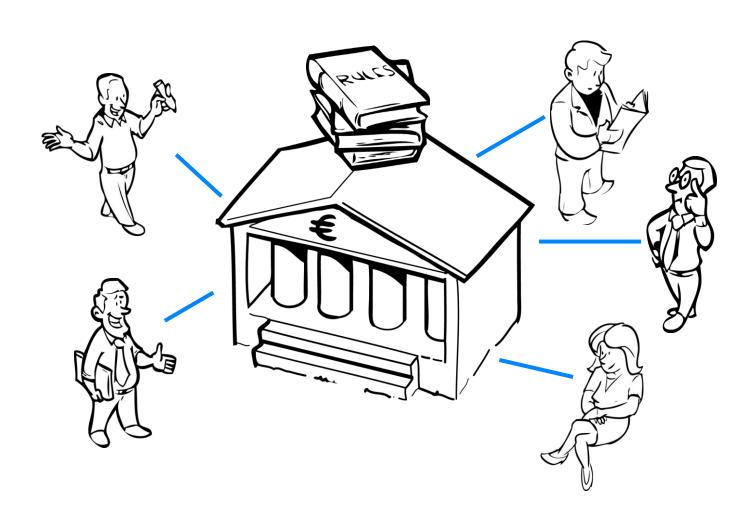generic trust mechanism

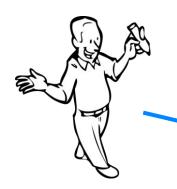https://youtu.be/r43LhSUUGTQ

We collectively agree that money has value

Value?

We trust the banks to keep score according to the rules

Meanwhile, banks keep spreadsheets that say how much is in your account: a Ledger

|	A	B	C	D	E	F	G
1	14104000	Base Rent					
2							
3	Date	Description	Tp	Ref.	Batch	Amount	Balance
4	9/30/2000	Balance Forward				-142,189.89	-142,189.89
5	10/2/2000	Breathless Aerobics Corp.	PM	650	22363	-3,766.25	-145,956.14
6	10/2/2000	Calla				0.00	-146,736.14
7	10/2/2000	Dr. R				3.50	-151,129.64
8	10/2/2000	Ralph				2.50	-155,202.14
9	10/4/2000	Bend				1.67	-157,053.81
10	10/5/2000	Breat				0.00	-158,203.81
11	10/11/2000	Pisa				8.33	-158,992.14
12	11/1/2000	Breat				0.00	-160,142.14
13	11/1/2000	Calla				0.00	-160,922.14
14	11/1/2000	Dr. R				3.50	-165,315.64
15	11/1/2000	Ralph				2.50	-169,200.14
16	11/3/2000	Bendum Chiropractic	PM	1469	22824	1,851.67	-171,239.81
17	11/7/2000	Pisa Architectural	PM	543	22823	-788.33	-172,028.14
18	11/14/2000	Ralph Taxar, CPA	PM	8713	22831	-325.65	-172,353.79
19	12/4/2000	Breathless Aerobics Corp.	PM	1596	22956	-1,150.00	-173,503.79
20	12/4/2000	Callaway Exports	PM	8364	22956	-780.00	-174,283.79
21	12/4/2000	Dr. Robert Synder	PM	514	22956	-4,393.50	-178,677.29
22	12/4/2000	Pisa Architectural	PM	263	22956	-788.33	-179,465.62
23	12/4/2000	Ralph Taxar, CPA	PM	300	22956	-4,223.33	-183,688.95
24	12/6/2000	Bendum Chiropractic	PM	1497	23148	-1,851.67	-185,540.62
25	12/31/2000	Breathless Aerobics Corp.	PM		23138	-72.23	-185,612.85
26	12/31/2000	Year-End Close:	**			185,612.85	.00
27	1/2/2001	Bendum Chiropractic	PM	1530	23317	-1,851.67	-1,851.67
28	1/2/2001	Callaway Exports	PM	264	23317	-780.00	-2,631.67
29	1/2/2001	Dr. William J. Kaplan	PM	813	23317	-2,431.67	-5,063.34
30	1/3/2001	Breathless Aerobics Corp.	PM	360	23315	-1,150.00	-6,213.34
31	1/8/2001	The Law Office	PM	331	23311	-2,762.50	-8,975.84
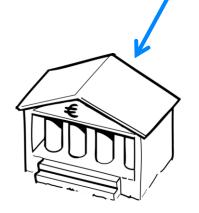
Conclusion:
Money is about collectively trusting central entities to manage a shared ledger.

There are many examples where we need to trust entities to keep a ledger

So, what does the blockchain change about this?

A "Blockchain" also contains a ledger: it tells us which addresses contain what information
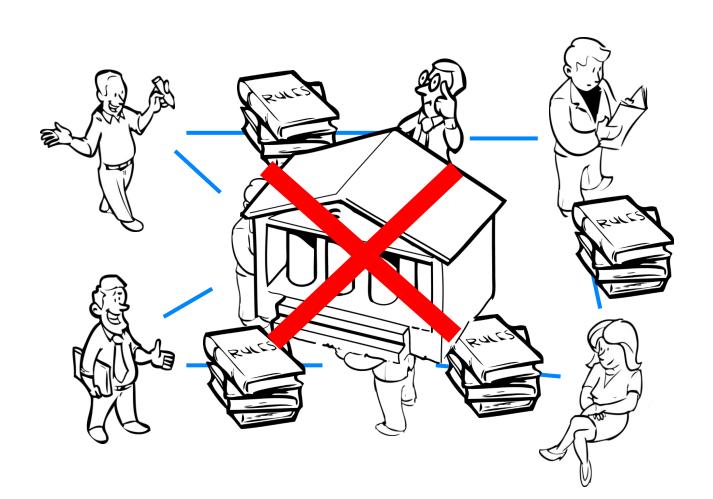
- 3HBrS6jzE3AJ4sZ3tFij1BmTcpFGgN86hA - 3.87 bitcoins
- 9DMr6tHVzY7AJ832sZij1cXsc4GGgM51N - 0.56 bitcoins
- 1Jg2SkDtNnDTQM8FHKYpJyyUfYVbPaFiXk – 1.20 bitcoins
- 17zNnPEB7poNmDPS5M53xjL1szvHhjqeQC – 100.76 bitcoins
- 1KS2sWDu... f5H – 2000.00 bitcoins
- 1Kg4UwJN... 58g - 5.56 bitcoins
- 1BpoCkcr... NGX – 3.94 bitcoins
- 1DwJGY5s... kfH – 321.53 bitcoins
- 1Q744Bp... LjP – 75846.32 bitcoins
- 123YKR2g5czuE3gjt6F14NqVLXLJXf8Yfq – 3.12 bitcoins
- 1Ng3RGJo3D1KuJFUJSwzzxCZ4YccfuTd2k – 8.34 bitcoins
- 1MPGXodxGDSeXVBJnP8n14WqKH – 8.02 bitcoins

However, with blockchain technology, all participants collectively
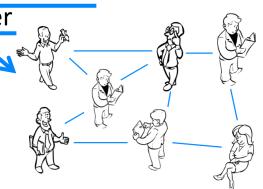check and update the shared ledger

Conclusion:
Blockchains are about
organizing consensus on the contents
of a shared ledger in a decentralized
& distributed manner

Tamper-proof blockchain

Block 434297 — Block 434298 — Block 434299
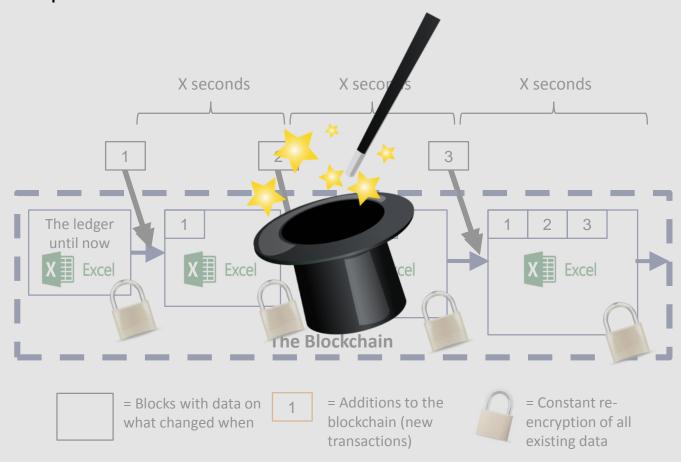
The technical part: how the blockchain works with Bitcoin

X seconds   X seconds   X seconds

The ledger until now — Excel

1 — Excel

The Blockchain

1 | 2 | 3 — Excel

= Blocks with data on what changed when

1 = Additions to the blockchain (new transactions)

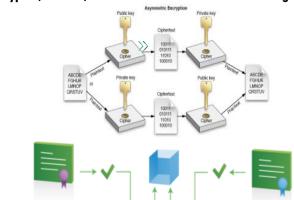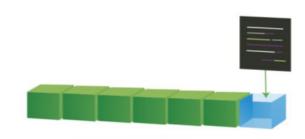= Constant re-encryption of all existing data

Key aspects blockchain

» **In essence it is a shared, trusted, public/permissioned ledger that everyone can inspect, but which no single user controls.**

Distributed shared ledger

» **Ability to protect records with a personal digital signature — the blockchain generates a private and public key to seal that record. It is encrypted, hashed, and sent to the network of validating nodes**

Cryptography

Consensus

Smart contracts

» **Entries in the ledger are synchronized to all ledgers in the network. Consensus ensures that these shared ledgers are exact copies, and lowers the risk of fraudulent transactions since tampering would have to occur across many places at the exact same time.**
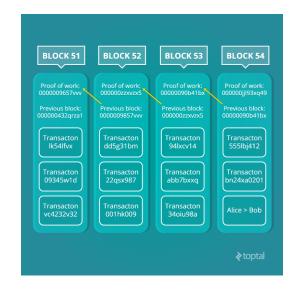
» **A smart contract is a computer program that can automatically execute the terms of a contract**

Some key facts Bitcoin- Blockchain

Bitcoin is a way to digitally transfer ownership without a middleman
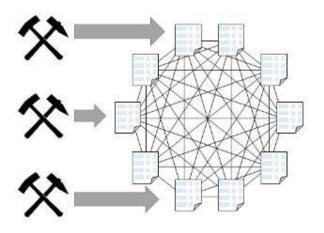
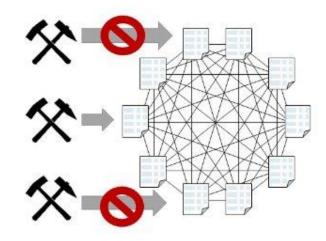Blockchain is a database that records ownership throughout time

Public versus private

Permissionless Blockchain

Permissioned Blockchain

Public, make the world better

Private, make processes more efficient

Blockchain & logistics innovation

Blockchain only for financial transactions?

THE WALL STREET JOURNAL.

Could Blockchain Technology Disrupt

Finance   Blockchain   Bitcoin   Fintech

Shipping giant Maersk tests blockchain-powered bill of lading

▪ Maersk took part in a proof of concept, with blockchain expertise from the IT Unive... of Copenhagen.

By Ian Allison
October 12, 2016 09:10 BST

blockchain-based share sale

... break ground with

INTERVIEW K+N vernieuwt, maar blijft expediteur

8. Januar 2016, 12:02 Uhr   Blockchains

Diese Technologie wird die digitale Welt verändern

Marine Transport International

InterConnect 2016
The Premier Cloud & Mobile Conference

Blockchain in logistics industry:
Project SmartLog

Mika Lammi
Head of IoT Business Development
Kouvola Innovation Oy, Finland

email: mika.lammi@kinno.fi
LinkedIn: https://www.linkedin.com/in/mikalammi

MTI Rolls Out First Blockchain Project For Global Shipping Industry

Richard Kastelein · September 24, 2016

UK company Marine Transport International (MTI) is deploying the world's first public Blockchain solution in the global shipping industry. An industry-leading freight forwarder based in the United...

Wij zijn er niet om d
maar om geld te ve

ke businessmodellen hierdoor mogelijk gemaakt worden. En dan gaat het niet meer over de traditionele expeditie. We gaan ervan uit dat rond de supply chain steeds meer extra services ontstaan, naast businessmodellen die op het delen van data gebaseerd zijn, bijvoorbeeld ook financiering en factuurstromen. Als voorbeeld: wij stellen jaarlijks ongeveer 1,5 miljoen elektronische facturen op in 23 landen. Met die block-chain-technologie zullen geheel nieuwe mogelijkheden ontstaan.

AANDACHTSGEBIEDEN & AMBITIES

Nieuwe service ontwikkelingen

Pooling en Partnership

Life-cycle Engineering & Management

Generiek Spare Parts Management

Generiek onderhoud

Servicisation:
Transitie van productketens naar op product gebaseerde serviceketens

Voorspelbaarheid:
Voorspelbaar faalgedrag door Condition Based Maintenance en Big Data

Internet of Things:
Volledige verbondenheid van systemen voor optimaal ver- en gebruik

Mass Service customization:
Online aanbod van individuele service transacties

TRENDS & DRIVERS

"**Global footprint of OEMs**, requiring global service logistics organization with increasing complexity within short service times and with service and repair locations shifting (e.g. in Europe to Eastern Europe)."

"**Emerging technologies** in sensors, Internet-of-Everything and Big Data, impacting monitoring and diagnostics, and for example 3D printing and augmented reality, enabling on-site printing of spare parts and repair."

"**Aging of society**, leading to increased use of robotics and digital solutions in healthcare, with changed service landscapes."

MARKT:
Servicisation
Klant differentiatie
Samenwerking
Deeleconomie
Nieuwe toeleveranciers
Nieuwe markten
E-commerce
24/7 economie

TECHNOLOGIE:
Internet of Things
Connectiviteit
Big Data
Product design
Smart service
3D Printing
Drones
Augmented reality
Robotica
Apps

DUURZAAMHEID:
Grondstoffen
Levenscyclus
Hergebruik
Circulaire economie

"Global **visibility and transparency** in supply chains by increased implementation of ICT, creating opportunities for service logistics optimization."

"Increased **pressure on environmental impact,** energy use and material reuse, with increasing regulation, e.g. in return logistics and remote diagnostics and repair, and remanufacturing."

Connected Drone

Chronicled Demos Blockchain-Connected Delivery Drone

By *Jamie Redman* - October 18, 2016   👁 2773   💬 0
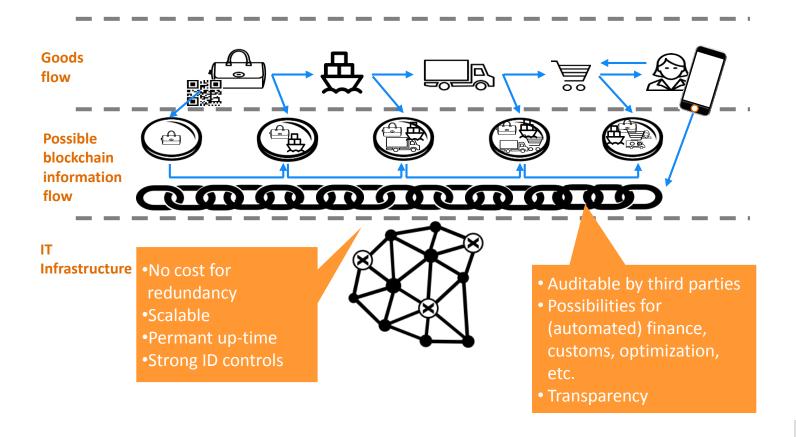
For instance: how a consumer could check the authenticity of a bag on the blockchain

Goods flow

Possible blockchain information flow

IT Infrastructure

- No cost for redundancy
- Scalable
- Permant up-time
- Strong ID controls

- Auditable by third parties
- Possibilities for (automated) finance, customs, optimization, etc.
- Transparency

Blockchain & logistics innovation

Overall project objective:

The combination of the ledger technology with smart contracts have the potential to form a powerful logistics innovation platform. We will use existing, deployed, and proven blockchain technology as the foundations of our "core business infrastructure", to be tested with 3 use cases. The aim of this project is to unequivocally show the business value of the blockchain in logistics.

Projectlead:

TU Delft: DR.IR. J.A. (JOHAN) POUWELSE

Blockchain & logistics innovation
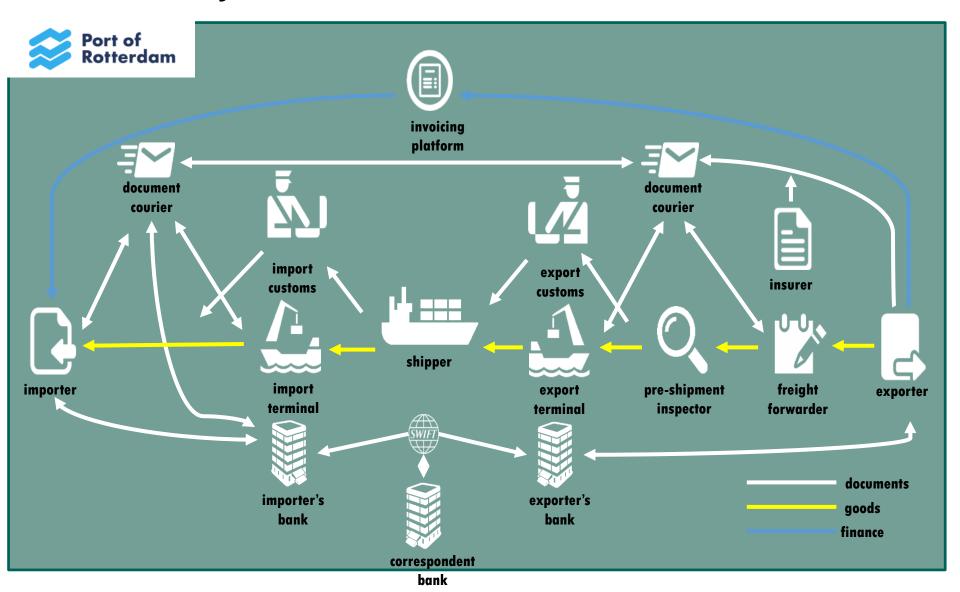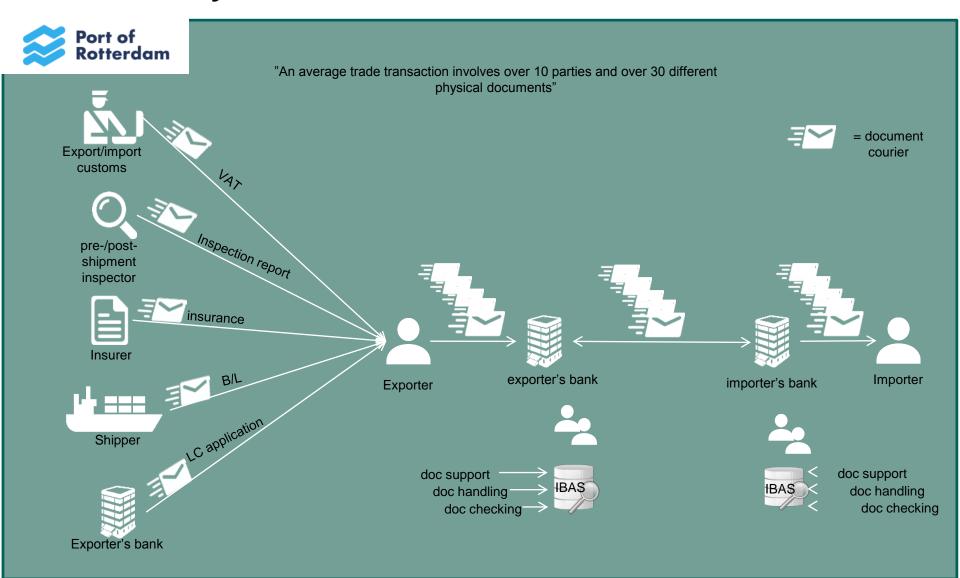
Current ecosystem

Current ecosystem

"An average trade transaction involves over 10 parties and over 30 different physical documents"

= document courier

Export/import customs

VAT

pre-/post-shipment inspector

Inspection report

Insurer

insurance

Shipper

B/L

Exporter's bank

LC application

Exporter

exporter's bank

importer's bank

Importer

doc support
doc handling
doc checking

IBAS

IBAS

doc support
doc handling
doc checking

Blockchain based ecosystem

correspondent bank

importer's bank

import customs

export customs

insurer

exporter's bank

importer

TRANSPARENT AND PAPERLESS SYSTEM

INFORMATION DISTRIBUTED VIA STRAIGHT THROUGH PROCESSING

ONLINE REAL TIME TRACK & TRACE OF TRANSACTIONS AND PHYSICAL FLOW

REDUCED RISKS THROUGHOUT THE CHAIN

exporter

import terminal

shipper

export terminal

pre-shipment inspector

freight forwarder

Research Project: Smart Objects and Smart Finance Fraunhofer

Autonomous Supply Chain

Alternative route direct transport

Smart Payment

Event

Supplier

Consolidated transport

Event

Warehouse (Logistics Service Provider)

Event

Event

Manufacturer

Event

Alternative route milkrun

Smart Payment

Supplier

Supplier

Bundesministerium für Bildung und Forschung

Smart Finance

- Digitalization & autonomization of transactions
- Management of smart objects (decision support)
- Digitalization of accounting processes
- Digitalization of financial processes
  - Working Capital (Smart Finance)
  - Incoterms (Smart Finance)
  - etc.

Blockchain products

Elektronische factuurstatusuitwisseling+ Blockchain

In the context of SCF Innopay developed two innovations for the factoring community to lower risk and operational costs

Track & trace of invoice statuses

- A technique for financiers to improve authenticity of (factored) invoices and to track invoice statuses from Buyer's ERP. Both will lower invoice risks (e.g. fake invoice, performance, collusions)
- Track & trace is enabled through a special permissions protocol and API technology
- A first a Proof of Concept has been realised in 2015 (i.e. invoicePermissions)
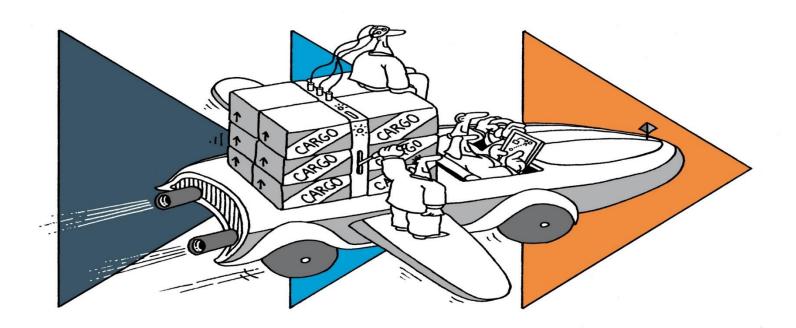
Anti-double financing register

- The register prevents fraudulent SMEs to extract funds from multiple financiers by using the same invoice
- A blockchain solution allows for a clear and secure record of receivables 'ownership' to be managed cost-effectively
- A first prototype of the anti-double financing register has been realised in 2016

TKI-Dinalog driven by open innovation

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siebrand@dinalog.nl