



innOPAY

Trusted registry of Receivables

Blockchain application to prevent 'Double Financing' fraud

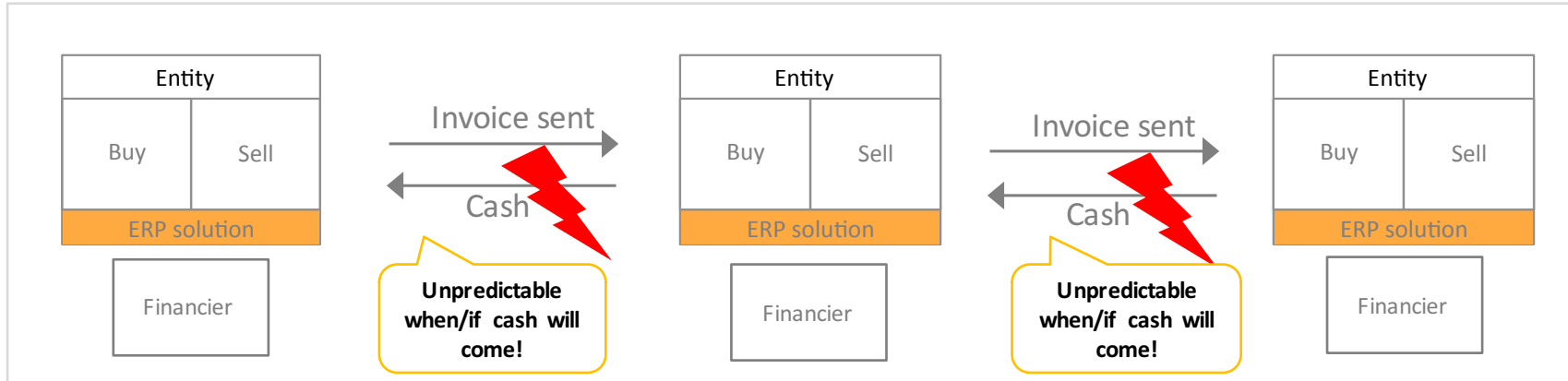
Pepijn Groen – 18/07/2016

tomorrow's transactions today

Document Content

1. **Relevance & origin of concept**
2. Introduction to project topic
3. Project goal & deliverables
4. Process and information flows
5. Design choices and functionality Blockchain
6. Screenshot

The problem: Unpredictability of payments lead to challenges for selling parties in managing their cash positions



- Cash flow forecasting can't be optimized due to **limited visibility** on invoice status and payments
- **Significant working capital** reserves to deal with trading risks (e.g. non-payment, disputes, performance)
- **The asymmetry** between Seller's **sent invoices** and Buyer's **payments** is associated with high costs of finance, and thus:
- **Limited access** for Seller's to Financiers receivables financing offerings (e.g. reverse factoring, asset-based financing)

Transparency of status information needed: we can learn from other industries

Usage of status information in an E-Commerce context:



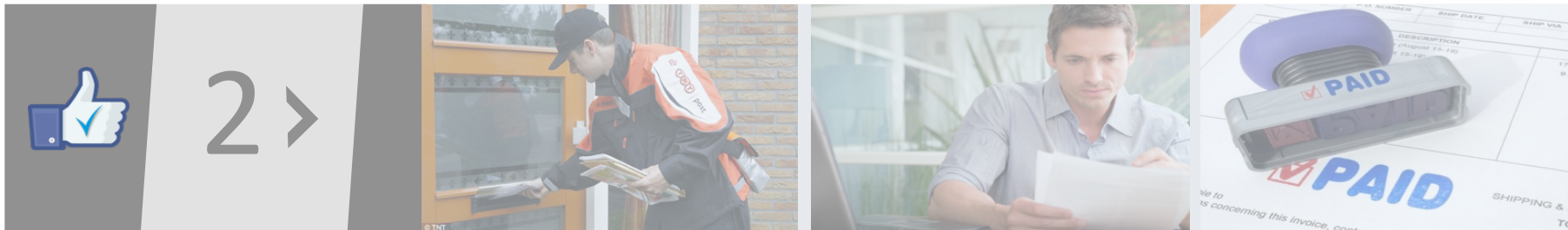
Status of shipment:

Accepted for shipment

Driver on his way

Delivery

Possible usage of status information in the invoicing and financing context:



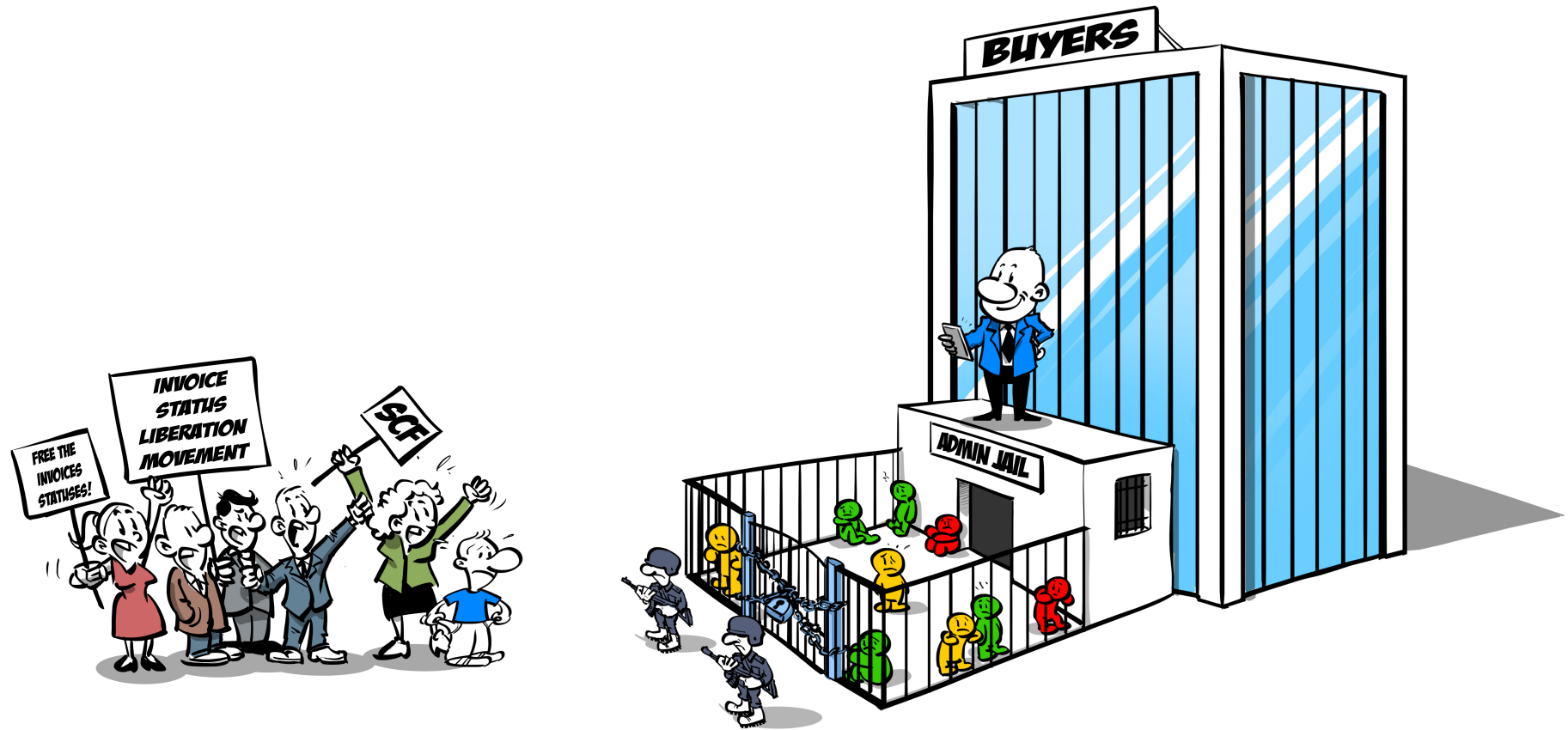
Status of invoice:

Received invoice

Approved invoice

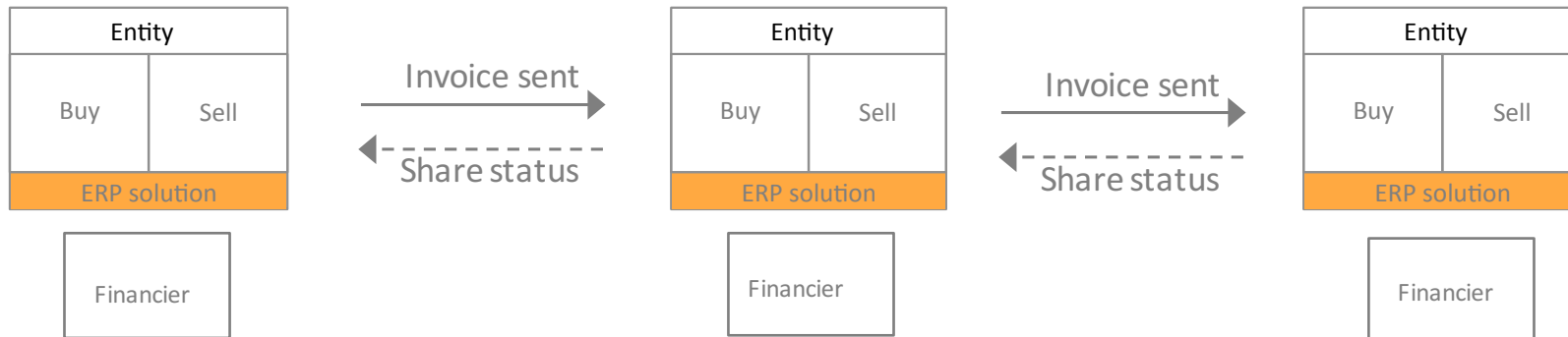
Guaranteed invoice

Why lock 'em up, if unleashing invoice statuses helps Sellers to find financing?
We have to free the invoice statuses!



Hypothesis: Cash position of Selling SMEs is positively influenced if Buyers share invoice status with selling parties and/or Financiers

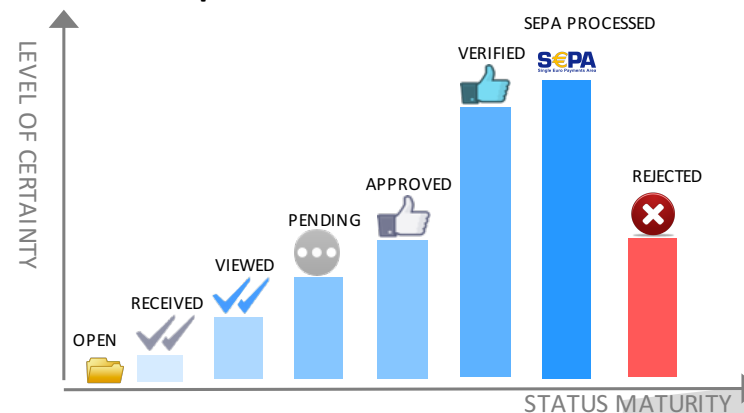
1. Example supply chain where invoice statuses are shared:



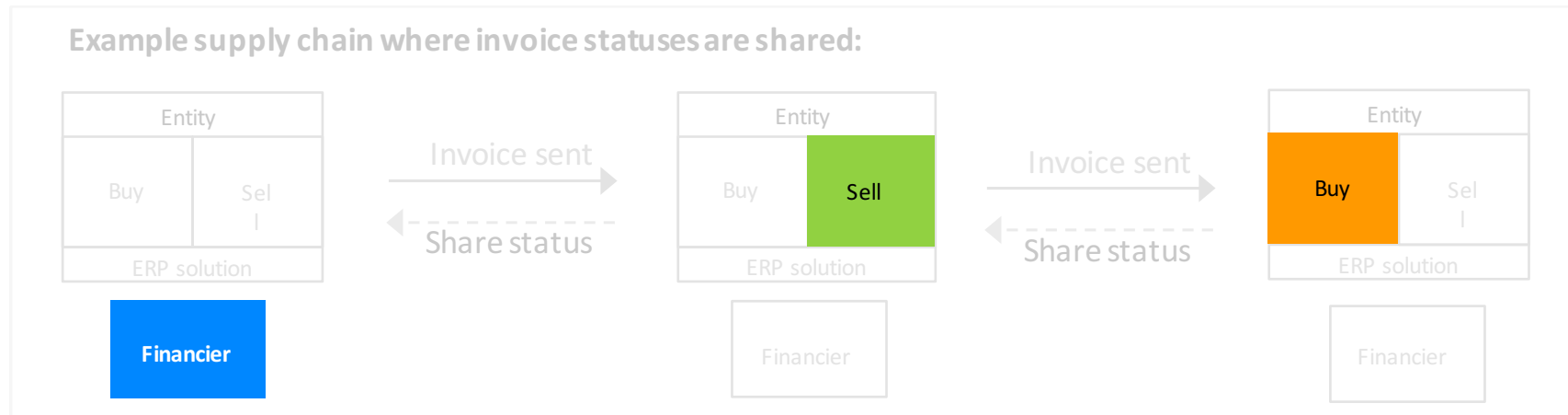
2. Sharing the invoice status leads to:

1. More **transparency** for Sellers
2. More **certainty** on invoice payments for Financiers and Sellers
3. **Improvement of core processes** of Financiers in terms of operational handlings and risks

3. Example invoice status classification:



All actors in the supply chain could benefit from sharing invoice statuses (financiers, selling party & buying party)



Key 'Financier' benefits

1. Lower risks costs managing disputes, performance and frauds of receivables
2. Operation efficiency (less manual handlings)
3. Digital seamless onboarding possibilities
4. **Ability to address new target groups (SMEs) with 'one-click' access to Finance**

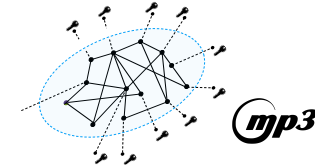
Key 'Seller' benefits:

1. Better cash flow forecasting
2. Less operational debtor handling
3. Better access to financing instruments: faster, more choice, easier, possible discounts

Key 'Buyer' benefits:

1. Invoice discount opportunities
2. Longer payment term potential
3. Less operation creditor handling
4. Strengthening of entity's supply chain
5. Optimise internal procurement and invoice approval processes

Project history



2012-2013

Concept of standardising invoice statuses across existing invoice solutions crystallising



ITERATION #0: 2014 SEP-DEC

Research: does standardization of invoice status info and its exchange improve financeability of receivables?

Concept model used:

Status Based Receivables Finance (SBRF)

Key outcomes:

- Benefits for Sellers and Financiers are recognised
- Buyer's invoice approval is key
- Buyer's risk assessment could be enriched
- Governance for trust is needed
- Invoice status flows evolves from 'self-declared' to 'guaranteed'

Recommendation

- Scope the minimum viable product and create European coalition of the willing for standardising invoice status exchange

ITERATION #1: 2015 OCT-JAN

"Demo" (proof) of concept and Coalition creation

Key outcomes:

- European coalition not feasible yet, different levels of engagement
- Start open and small
- Successful Proof of Concept NL

Recommendation

- Create PoC in other communities (e.g. Italy, Germany)
- Extend NL PoC
- Create governance for trust and adoption (i.e. Legal Operational Functional Technical)
- **Further improve financeability by creating a solution for "Double Financing"**
- Use experiences to further develop the scope of the initiative

ITERATION #2: 2016 MAY =>

"Extend (proof) of concept"

In the pipeline

- Extend NL PoC (expected July '16)
- iSCF Conference – Frankfurt (14 June)
- PoC in other communities GE/IT

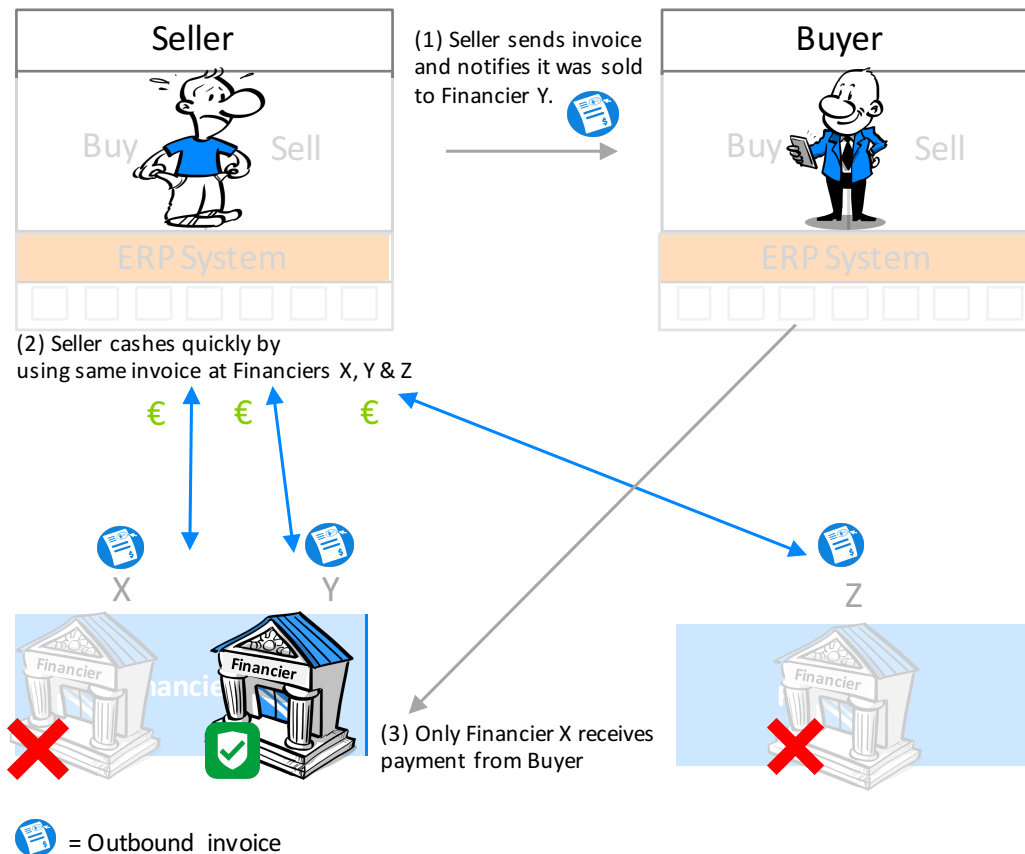


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Double Financing is the phenomenon that Sellers successfully use the same invoice to extract funds from multiple Financiers

FOR DISCUSSION



Double Financing:

- Double Financing comes to light when Financiers discover that the Buyer (i.e. debtor) did not fulfil its payment, a Seller goes bankrupt or a collusion between Seller and Buyer is discovered
- Either way, money is exchanged on collateral either belonging to one party or does not even exist at all (i.e. fake invoice)
- Exact numbers of Double Financing are not available, but in case of exposure, somebody has to bear the loss, resulting in significant losses or even bankruptcy
- Disputes boil down to the question: "who owns what to whom at what place and what time" (i.e. who's entitled to claim the lien)
- **Currently, there is no industry-wide solution to register receivables and verify what receivable is financed by whom at what time. A solution for this should be organised!**



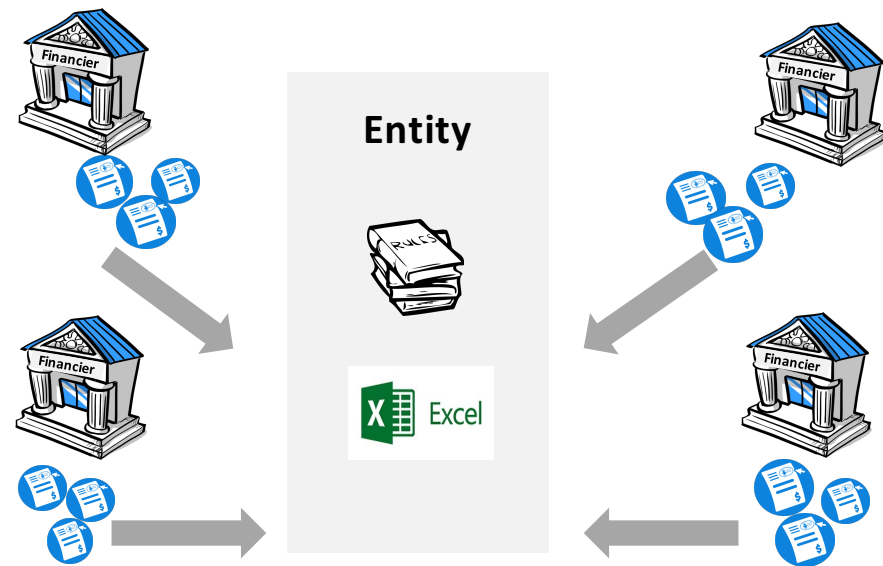
So, how is this organised in similar initiatives?


In similar initiatives, multiple users trust one entity to control a central registry


Existing initiatives where multiple authorities trust one central entity to manage valuable information:



This would work for receivables registry in the following manner:















A singly entity controlling receivables of multiple authorities based on one set of rules, increases chances of manipulation (i.e. reduces transparency, auditability & traceability) 

 Outbound invoice

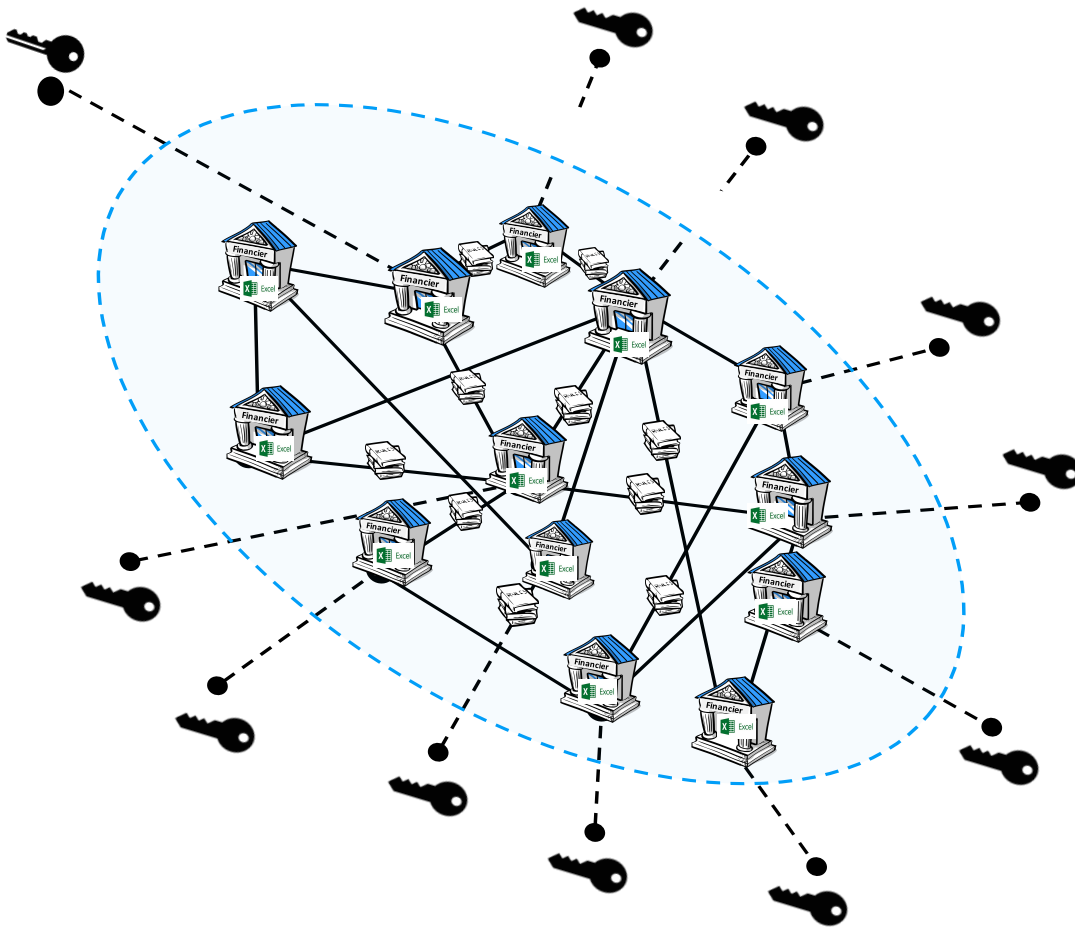
So, what does Blockchain technology change about this?

As to usual database toolings, a “Blockchain” is also a registry: it tells us who financed what seller and/or invoice

#	Signature	CoC / Invoice
	3HBrS6jzE3AJ4sZ3tFij1BmTcpFGgN86hA	-18756345 / 6453R
	9DMr6tHVzY7AJ832sZij1cXsc4GGgM51N	-8983462 / 8754
	1Jg2SkDtNnDTONM8FHKYpJvyUfYVbPaFiXk	-9724271 / 2876
	17zNnPEBZn	C-10038718 / 7645
	1KS2sWDuJ8	H-54327866 / 8868R
	1Kg4UwJNd	g-98234561 / 9985
	1BpoCkcr6y	3X-54392874 / 7643
	1DwJGY5sd	fH-1786452 / 9874R
	1Q744BpwuJEGS5aEp4wtXf8CsHyuZsMLjP	-89768723 / 9931
	123YKR2g5czuE3gjt6F14NqVLXJXf8Yfq	-76549876
	/1Ng3RGJo3D1KuJFUJSwzzxCZ4YccfuTd2k	-18974341 / 9818R
	1MPGXodxGDSeXVBjnP8n14WqKH	-98712345 / 9871



However, with Blockchain technology, all users collectively verify and update the registry contents based on the same set of rules

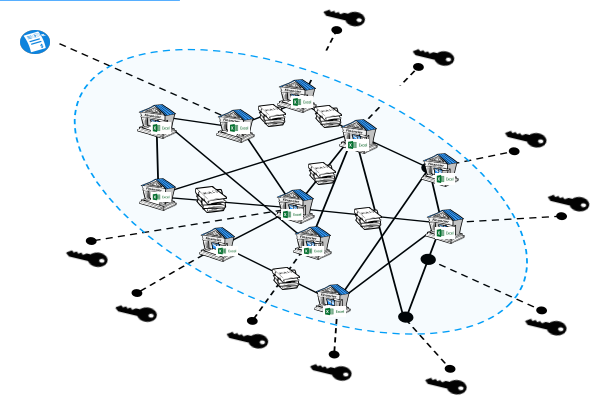




In short:
Blockchains are about
organising consensus on contents of a
shared registry in a decentralised &
distributed manner



Excel



Or as Preston Byrne puts it.....

"The magic of any Blockchain application is that it allows someone to **easily deploy an interactive application**, on the public Internet, that **runs itself automatically**, predictably and without **human supervision** or dedicated hardware. A **secure data infrastructure that doesn't require physical components** is the game-changer here. And it's going to be much, much bigger than just digital money."

- Preston Byrne, Eris Industries



eris
INDUSTRIES

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Project goals

*In this project participants (i.e. Financiers) will gain experience in a Proof of Concept project with developing a Blockchain solution to prevent **"Double Financing"**.*

The Blockchain will facilitate Financiers in

- *the unique recording of receivables in a registry*
- *offers insight in existence, ownership and funding status of peer's receivables.*

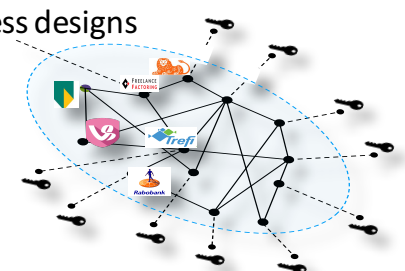
By the end of this project (at least) a prototype version of the Blockchain will be ready. This will be showcased to acquire new funding and interests to develop this into a matured product and service for the Dutch market.

Deliverables form basis for valorisation of concept and future industry efforts

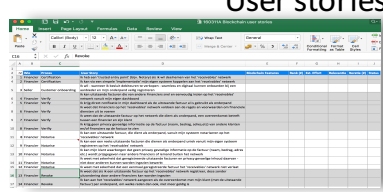
Deliverables in three phases:

1st: Designs and requirements

Process designs

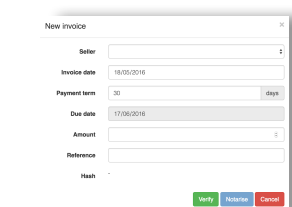


User stories

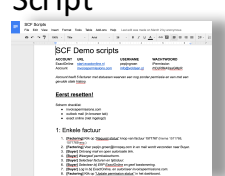


2nd: Demonstration toolings

Showcase app.




Script

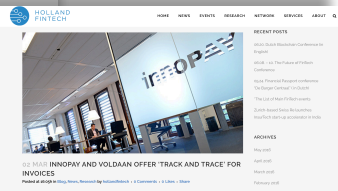


3rd: Valorisation documents and content

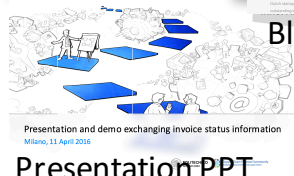
Report WORD



Blogs and media content



Presentation PPT





Who's involved in this project?

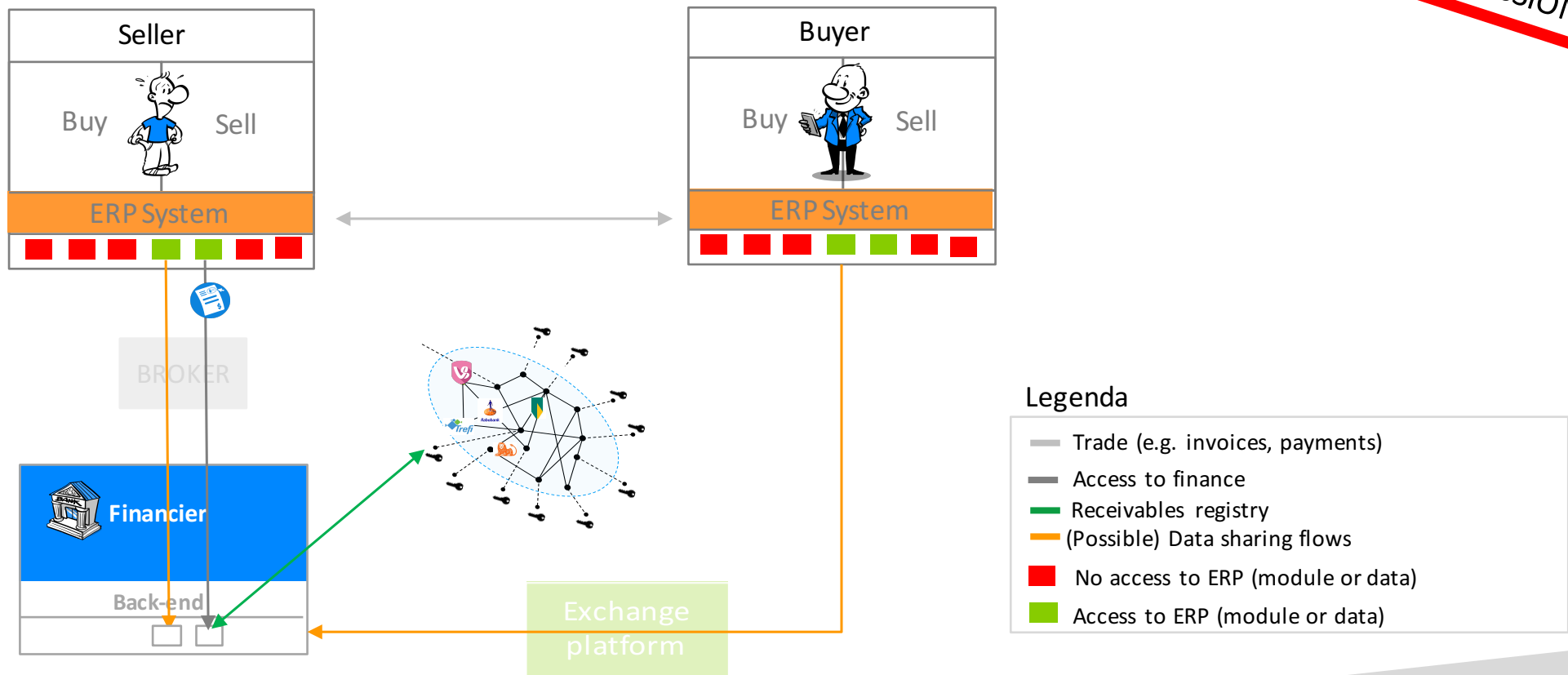


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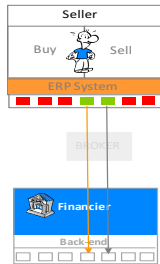
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To understand Blockchain's role the complete set of digital flow(s) in receivables finance should be taken into account

FOR DISCUSSION



Digital flows can be divided into three building blocks

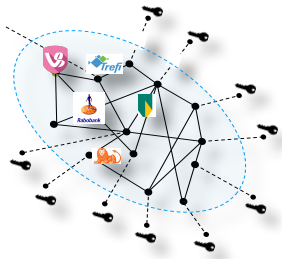


Building Block I: SMEs 'one-click' access to Finance

- SMEs instant access to finance by providing access to financial services through their ERP solution (i.e. Exact, Twinfield, Yuki, eVerbinding)
- New players enter market as broker between Financiers and SMEs (e.g. Loanstreet)
- Blockchain solution should be integrated in process to detect possible Double Financing attempt

Building Block II: Trusted receivables registry

- Financiers risk 'Double Financing', this creates the need for cross-organisational registry and transparency of receivables
- The only option for Financiers to establish lien on receivables is to register receivables at the Dutch Tax Authority. This is however, non-digital and not real-time. Blockchain with its key features could be an interesting opportunity,
- Blockchain will provide for distributed network to register and to verify the existence of receivables



Building Block III: Data sharing for benefits

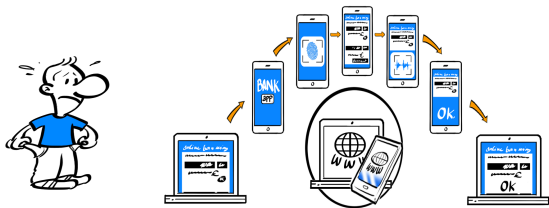
- Permission protocols and API technology could unlock the secure exchange of data and/or services
- This allow for benefits such as process efficiencies (e.g. less manual handlings) lower risks costs (i.e. performance, frauds, disputes of invoices) and better financing conditions for SMEs
- Sharing invoice statuses between sellers, buyers and their financiers could prove to beneficial



The Blockchain should be positioned in SMEs digital access to receivables finance

DIGITAL ACCESS DESCRIPTION

Digital access to receivables finance from own's ERP system using by selecting 'return favors' using Blockchain for verification and the latest authentication & autorisation technologies.

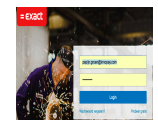
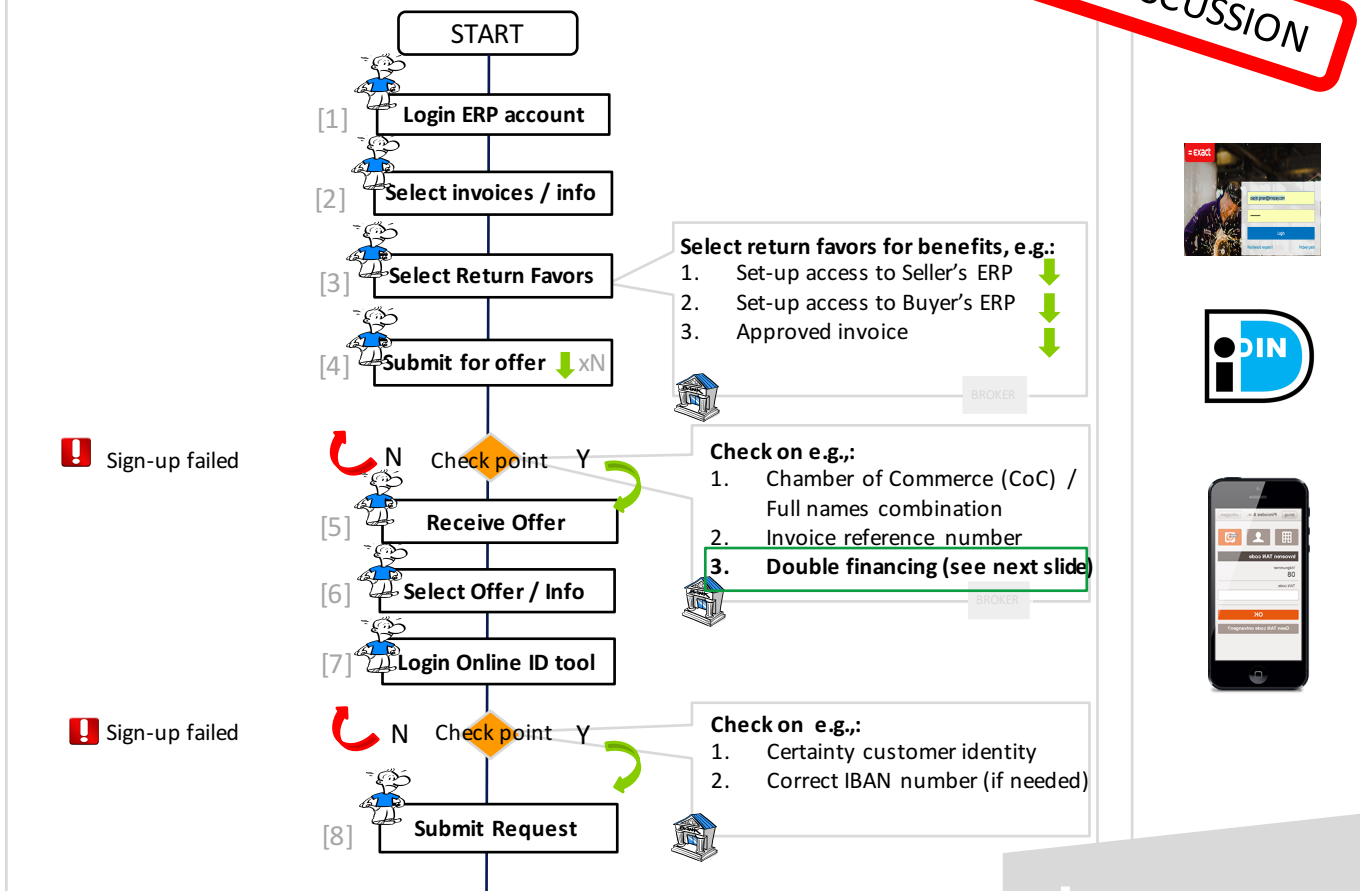


BENEFITS DIGITAL ACCESS

1. Enabling improved SME experience 'one-click finance'
2. Further reach and growth of invoice financing
3. Less paperwork, higher conversion
4. Increased trust by integrating Blockchain as mechanism to detect Double Financing
5. Increased security by online ID tooling: use for high level LoA

FLOW SELLER DIGITAL ACCESS (read top down)

FOR DISCUSSION

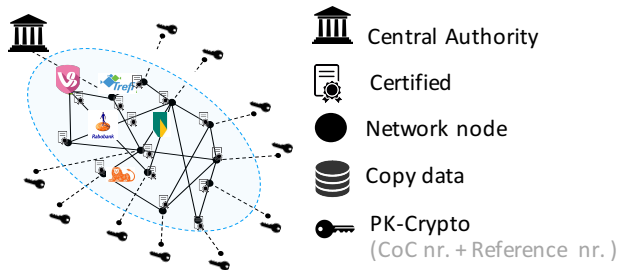


The Blockchain covers the trusted registry and verification of receivables

FOR DISCUSSION

DESCRIPTION

Blockchain 'private' network with distribution of shared databases per node. Components used are:

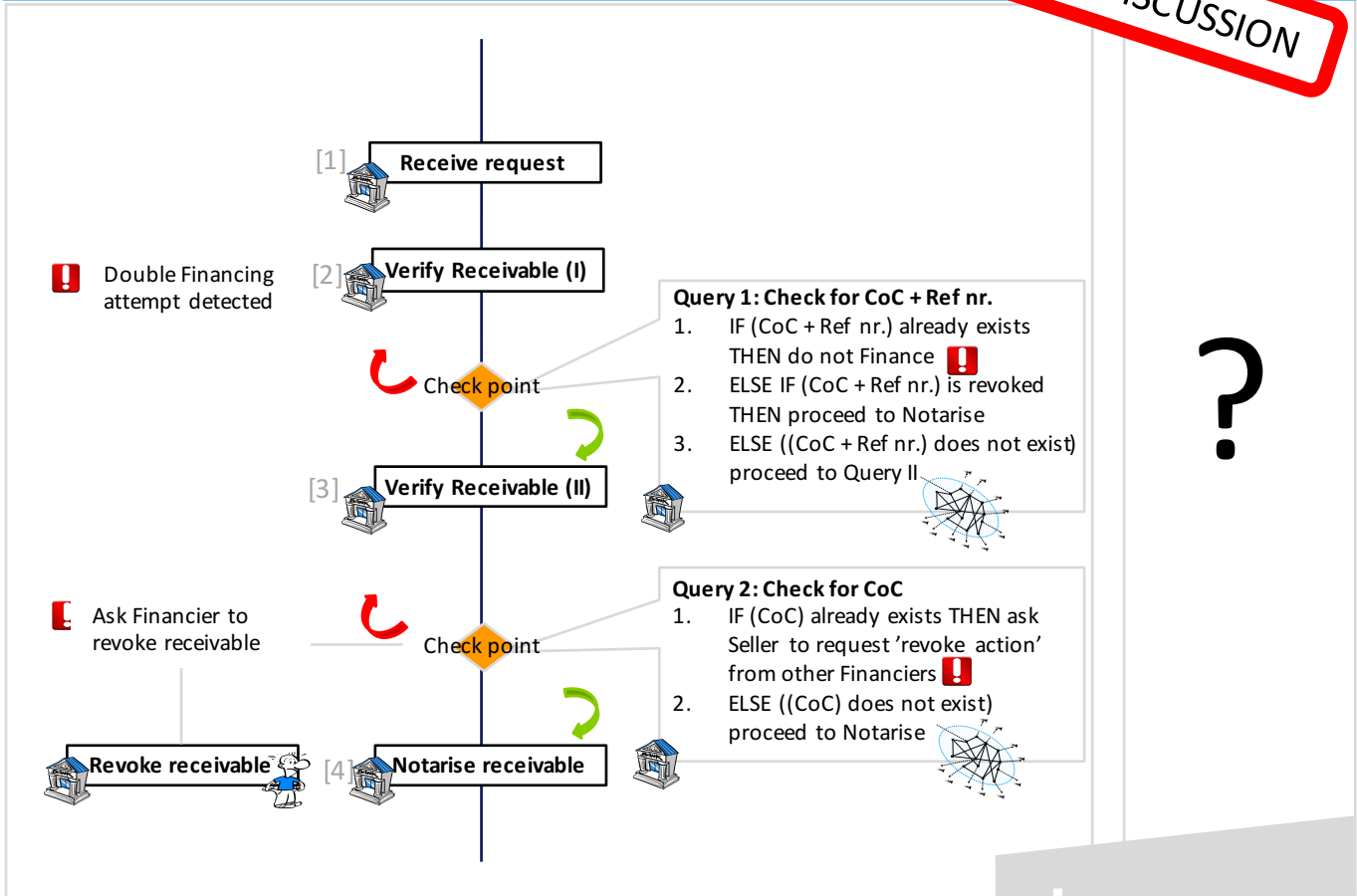


BENEFITS BLOCKCHAIN

Compared to regular databases technologies (e.g. Oracle, Postgres, MySQL) Blockchain offers:

1. Always accessible, because all parties hold the exact same copy of the data
2. Controlled and authenticated mutation of data
3. Immutable, cryptographically protected data
4. Possibility to run without one central owner
5. Cross-organisational transparency of data
6. Act on data using smart contracts (i.e. business rules)

FLOW TRUSTED RECEIVABLES REGISTRY (read top down)



?



Setting up connections between SMEs source systems and Financiers back-end system could further benefit network parties

FOR DISCUSSION

DESCRIPTION

Network data sharing

Enables Financiers (or other third parties) to connect to ERP systems of Sellers and/or Buyers.

Components used are:

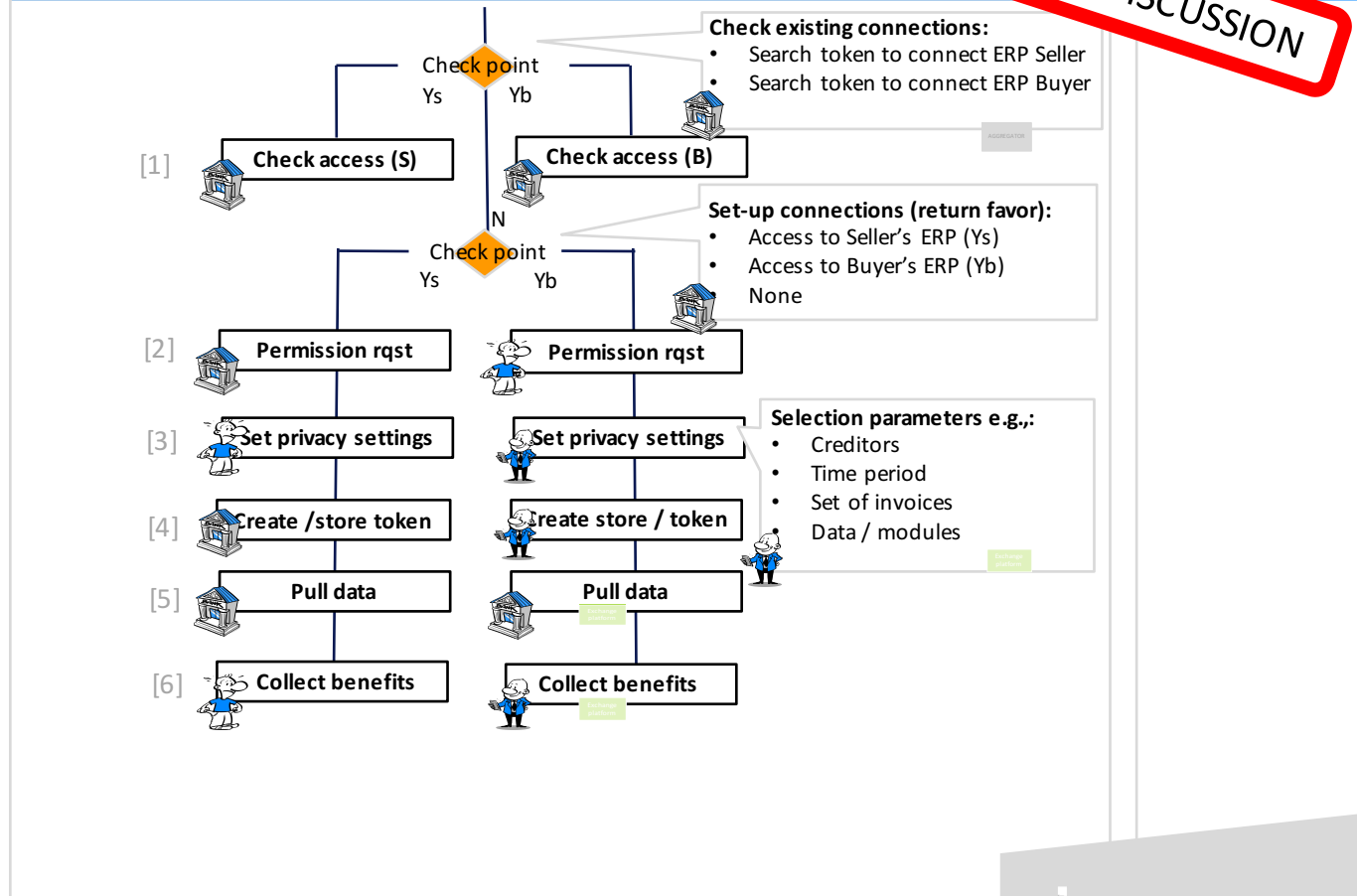
- Request mechanisms for access
- Authentication and autorisation toolings
- Privacy settings
- Creation and registration of tokens
- Data sharing through API 'pull' mechanisms

BENEFITS DATA SHARING

Benefits for all parties, and include:

1. SMEs – both in Seller and Buyer role - can utilise their existing data, by providing access to Financiers (i.e. or other third party)
2. Sharing this data (e.g. invoice status) improves core processes of Financiers
3. This is allow them to do better offerings to SMEs
4. Sharing data in this is also an opportunity to gain experience with 'Access' & 'API' economy.

SET-UP CONNECTIONS FOR BENEFITS (read top down)



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Blockchain's key features have certain characteristics that could solve Double Financing issues

Blockchain features seem particularly relevant when:

1. Multiple jurisdictions are involved
2. Multiple organizations are involved
3. When auditability of processes is important
4. When processes have been digitised but have not been automated
5. When information is involved that needs to be trustworthy and bears a certain value
6. When central authorities are part of the process or need to be trusted
7. When "server up-time" and redundancy is costly



Specific features for Double Financing:



Transfer of ownership



Record of ownership



Automatic business rule execution



Operational resilience



Shared and transparent data

Design choices Blockchain 'receivables' network based on key features

In agreement with Blockchain technology & market experts the 4 following design choices were made:

- 1. Managed by participants:** In the decentralised private Blockchain network, each node is represented by a financier (bank, non-bank) who each hold a copy of the same receivable data.
- 2. Certified participation:** Financiers have to be certified by a 'central authority'* to become a 'node' and participate on the Blockchain. This will prevent misuse of network information.
- 3. Effective in use:** Blockchain is interoperable with Financier's own systems, but limits its functionality to the registry (i.e. notarise), verification and revocation of receivables. It is not possible to extract information from the network.
- 4. Trusted time-stamped:** Securely keeping track of the creation and modification time of receivables by using Chamber of Commerce and unique invoice reference number

*To be established and governed

These result in the description of key functionalities from an user perspective contained in backlog

nr	Wie	Proces	User Story	Blockchain Features	Prio (#)	Est. Effort (h)	Iteratie (#)	Status
1	Financier	Certification	Ik kan een "Central Authority" aanspreken (bijv. FAAN) als ik wil deelnemen van het 'receivables' netwerk	PK-crypto	2	10		
2	Financier	Certification	Ik weet dat andere Financiers op het netwerk ook een certificaat dragen (en dus volgens dezelfde wijze receivables nummeren cf. sectorafpraak)	PK-crypto	1	3		[new]
3	Financier	Certification	Ik kan via een simpele 'implementatie' mijn eigen systeem koppelen aan het 'receivables' netwerk	Eenvoudige onboarding op nodes	3	14		
4	Financier	Verify	Ik kan 'receivables' van andere Financiers snel en eenvoudig inzien op het 'receivables' netwerk vanuit mijn eigen dashboard	Transparantie	3	5		
5	Financier	Verify	Ik krijg direct notificatie in mijn dashboard als de 'receivable' al is gebruikt als onderpand bij een andere Financier	Distributed consensus	1	3		
6	Financier	Verify	Ik weet dat 'receivables' op netwerk, altijd een overeenkomst betreft tussen een andere financier en zijn klant	PK-crypto	1	7		
7	Financier	Verify	Ik krijg geen privacy gevoelige informatie op de 'receivables' (naam, bedrag, adres, etc) van andere klanten en/of financiers op de factuur te zien	Hashen	2	2		
8	Financier	Notarise	Ik kan een 'receivable' vanuit mijn systeem notariseren op het 'receivables' netwerk	Publieke records	1	10		
9	Financier	Notarise	Ik kan een reeks 'receivables' die dienen als onderpand uniek vanuit mijn eigen systeem notariseren op het 'receivables' netwerk	Publieke records	2	6		
10	Financier	Notarise	Ik kan alle verwachte 'receivables' van een klant (onder 1 KVK nummer) voor een specifieke periode registreren	Publieke records	3	6		[new]
12	Financier	Notarise	Ik kan mijn klant waarborgen dat geen privacy gevoelige informatie op de 'receivable'(naam, bedrag, adres etc.) wordt prijsgegeven naar andere financiers of iemand buiten het netwerk	Hashen	2	2		
13	Financier	Notarise	Ik weet met zekerheid dat mijn 'receivables' en privacy gevoelige inhoud daarvan - niet door anderen kunnen worden ingezien of bewerkt	PK-crypto	2	10		
14	Financier	Notarise	Ik weet met zekerheid dat eenmaal geregistreerde 'receivable' het Blockchain netwerk niet verlaat	Immutability van een blockchain	1	8		
15	Financier	Revoke	Ik weet dat als ik een 'receivable' op het netwerk registreer, deze zonder uitzondering door andere financiers kan worden ingezien	Publieke records	3	5		
16	Financier	Revoke	Ik kan aan het 'netwerk aangeven als de overeenkomst met mijn klant over de 'receivable' of set van 'receivables', om welke reden dan ook, niet meer geldig is	Publieke records	2	3		
17	Andere partijen	Read-only	Ik kan als "niet-financier" een verzoek indienen aan de "Central Authority" als ik tbv vertrouwen en transparantie receivables wil inzien	Read-only API	1 ?			[new]

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Integration of Blockchain in Financier's back-end system

Blockchain		Search	English			
	Type	CoC number	Reference	Submitted	Status	Signature
Invoices	Invoice	24210356	16279	15 July 2016 at 16:04:09 GMT+2.584	Notarised	acbb9af5ae3b8f0eb682bc7d7a00f0610d1bc23f55132f829b74c2af9d2
Blockchain	Invoice	46456006	16569	15 July 2016 at 16:04:08 GMT+2.738	Notarised	73594abad017f5bafa3ae5eb7a496c1598f180daa518a54ca42e5bf19ft
	Invoice	49040471	16394	15 July 2016 at 16:04:08 GMT+2.372	Notarised	3a383f0e16660d8acd36fb61a3ac94b6eefb2ff8f05ae2104d8c408e232
Sellers	Collateral	35922562		15 July 2016 at 16:04:07 GMT+2.786	Notarised	f7a3e84dd5d6aaa89fed9357dbce6cdf7c26bce4f8439feb32a1284437
Buyers	Invoice	11417246	16186	15 July 2016 at 16:04:06 GMT+2.896	Notarised	c5a79c3a5998b66ffc3d1a107f952eb8dc827e1b9676f051dc5a45c107
	Invoice	25041932	16930	15 July 2016 at 16:04:05 GMT+2.985	Notarised	59528ae0f37040b6ebdb41f80f31ef1bcbfad16f7ce133001f9ff37137cc
	Invoice	84552462	16.684	15 July 2016 at 16:04:05 GMT+2.674	Notarised	538c0e18601cbbdbf241b1603c8fe5c6ee4304ce3070903d8f9442036
Settings	Invoice revocation	17890002	16.710	15 July 2016 at 16:04:05 GMT+2.324	Notarised	66d67d5d1df465122ff4429e7c19d87d847ed6f15e8494e045e1bdd2ff
	Collateral	67146603		15 July 2016 at 16:04:04 GMT+2.945	Notarised	5311a9b4a251b865a09cb207d4ee2df10bb81707ec4b538867f389b4c
	Invoice	15212331	16877	15 July 2016 at 16:04:04 GMT+2.731	Notarised	e185dfcb5c622d7b87fa1ad3530a3a38f9707fbafcdabb1be7b28dd974
	Invoice	20531031	16.725	15 July 2016 at 16:04:04 GMT+2.305	Notarised	f10c4df0900ed23e8eff51c63f1cccb44895b1187f9755f2429123752ef8
	Invoice	17816393	16.385	15 July 2016 at 16:04:03 GMT+2.515	Notarised	4252ca46fc6796ea6c85cb7b242df87e6f91c50345aa6709d28754bad
	Invoice revocation	92932023	16977	15 July 2016 at 16:04:03 GMT+2.16	Notarised	08af728186c05068fbc411f070734e0c346f81a99340780dc41c68de3e
	Invoice revocation	17657516	16590	15 July 2016 at 16:04:02 GMT+2.870	Notarised	6d3651e062b7a585d5e7c37580bb8a52d58a72e07b96968be4d87d02
	Invoice revocation	78129872	16.76	15 July 2016 at 16:04:01 GMT+2.961	Notarised	ad2dc07a2875f072df8f2dac7a2d157e3c0665003a3762cd947d0c8a4
	Invoice	56198250	16647	15 July 2016 at 16:04:01 GMT+2.934	Notarised	510b4655aeacf933213b7588ce39a8e9d210df0128caca424aa76ea26
	Invoice	30367061	16744	15 July 2016 at 16:04:00 GMT+2.930	Notarised	367941f2b247b4b0143783615be2a41732b58676f37231848f0a5e
	Invoice	56201317	16154	15 July 2016 at 16:04:00 GMT+2.854	Notarised	ec3be834efbcb5964e7fd0cb5655a5fabdabde97748f39c05a2f2f1





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Thank you
For your attention

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