TU Delft

APRIL 16TH, 2021

SABER

SHIPMENT AMORTIZATION BY BLOCKCHAIN ENABLED REPO

AGENDA

1. Problem introduction
   5 min
2. Our solution
   5 min
3. Implementation
   10 min
4. Project Demo
   5 min
5. Division of work, and responsibility
   5 min
6. Individual reflections
   5 min
7. Questions and answers
   25 min

TU Delft

AGENDA

1. Problem introduction
   2 min
2. Our solution
   4 min
3. Implementation
   7 min
4. Project Demo
   5 min
5. Division of work, and responsibility
   1 min
6. Individual reflections
   1 min
7. Questions and answers
   30 min

PROBLEM INTRODUCTION

INTRODUCTION

Manufacturer

Produces goods to sell.

Importer

Buys goods from manufacturer to import into another country.

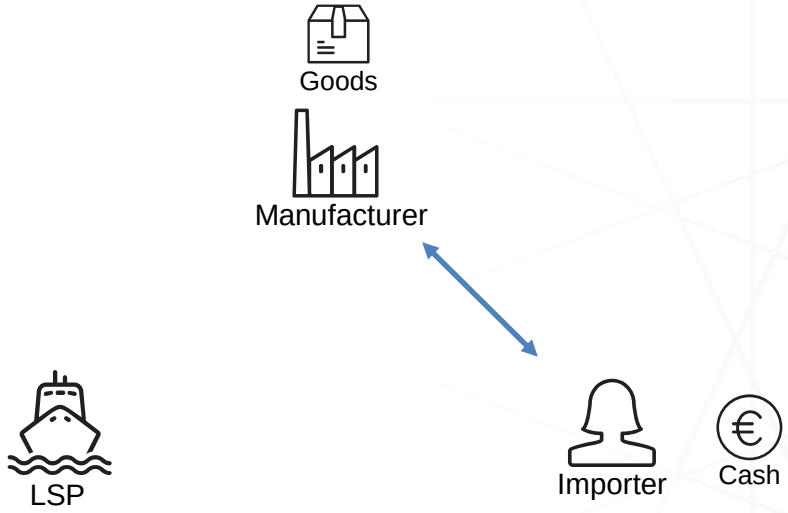
LSP

Logistical Service Provider enables the logistic process of shipping the goods between places.

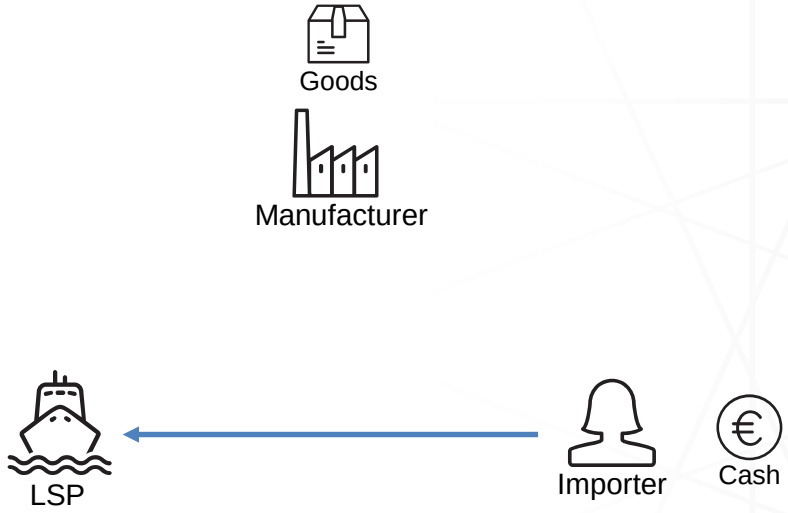
Financers

Individuals or organizations that have cash that they want to utilize.

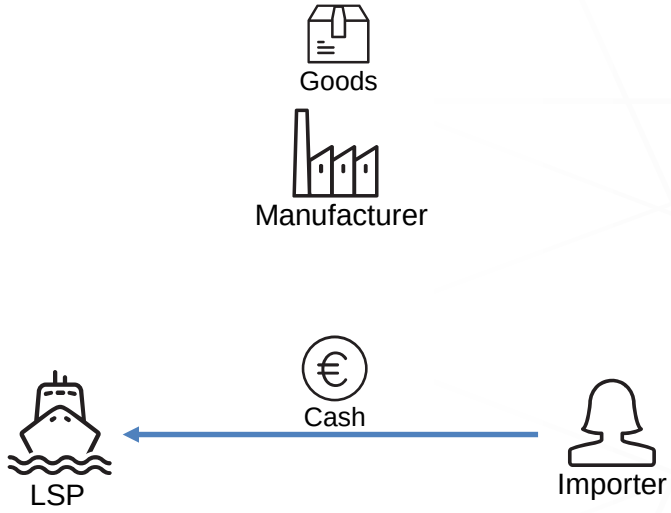
DEAL MADE



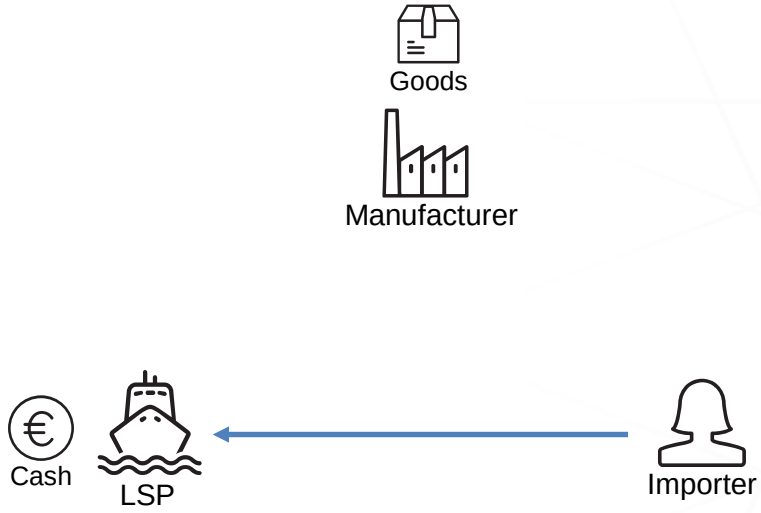
ESCROW ACCOUNT AT LSP



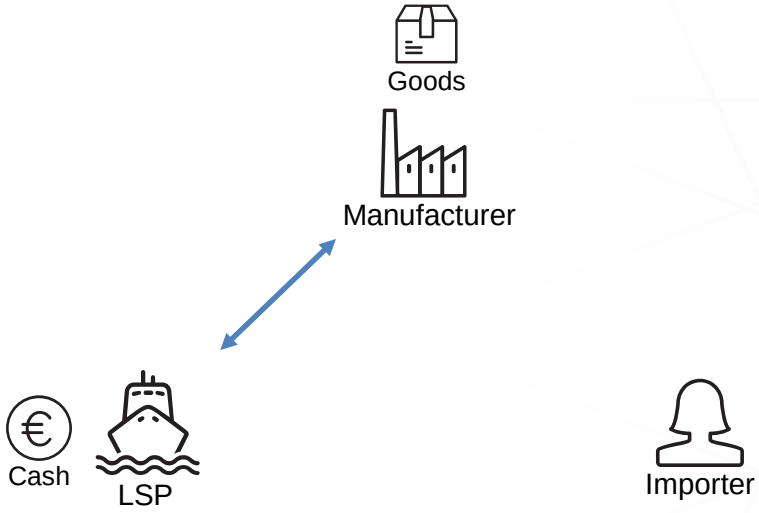
ESCROW ACCOUNT AT LSP



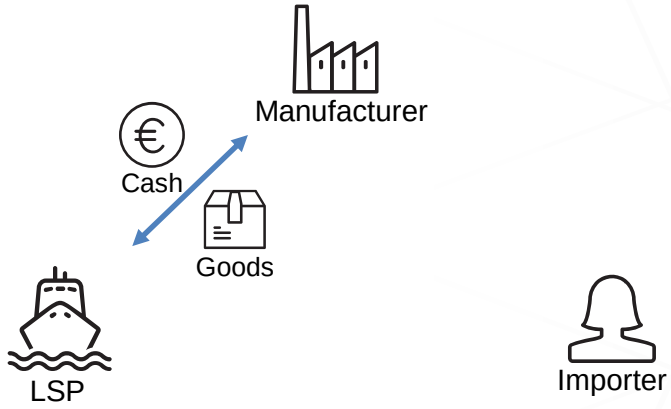
ESCROW ACCOUNT AT LSP



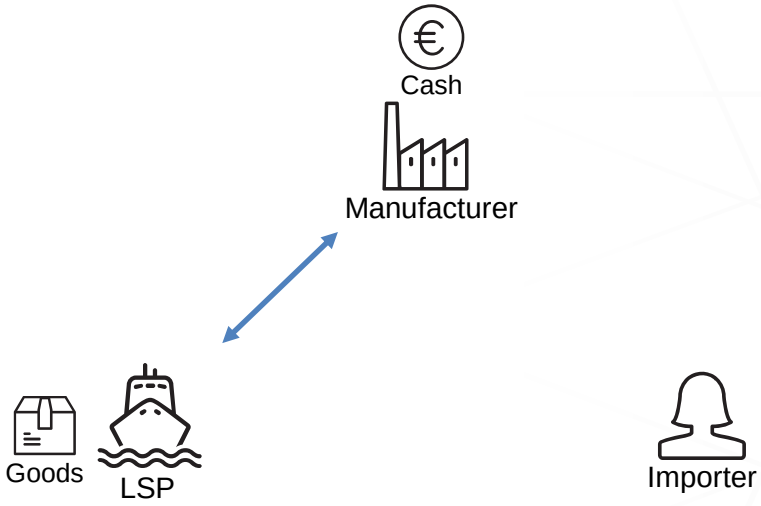
TRADE GOODS FOR PAYMENT



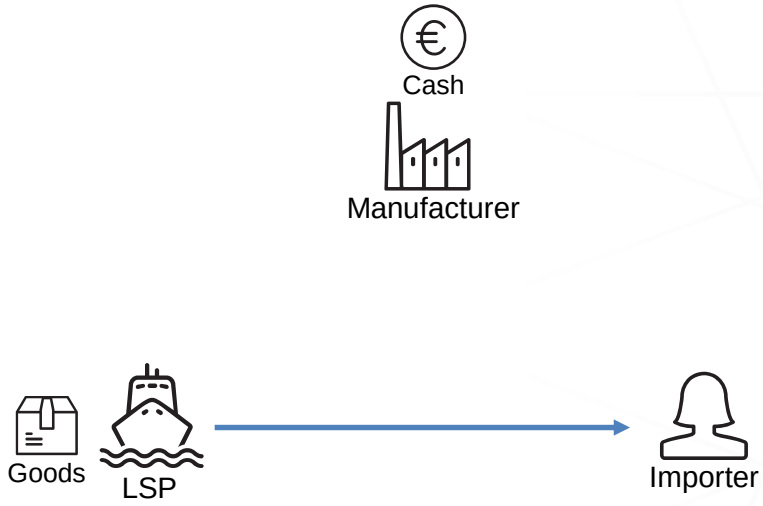
TRADE GOODS FOR PAYMENT



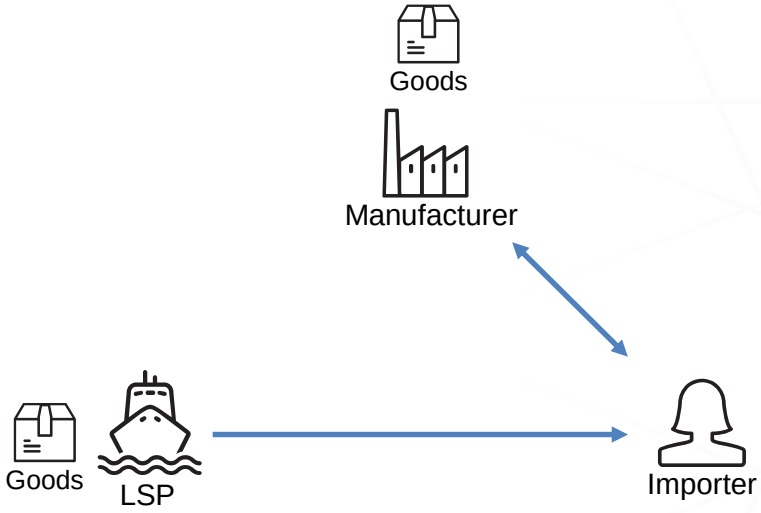
TRADE GOODS FOR PAYMENT



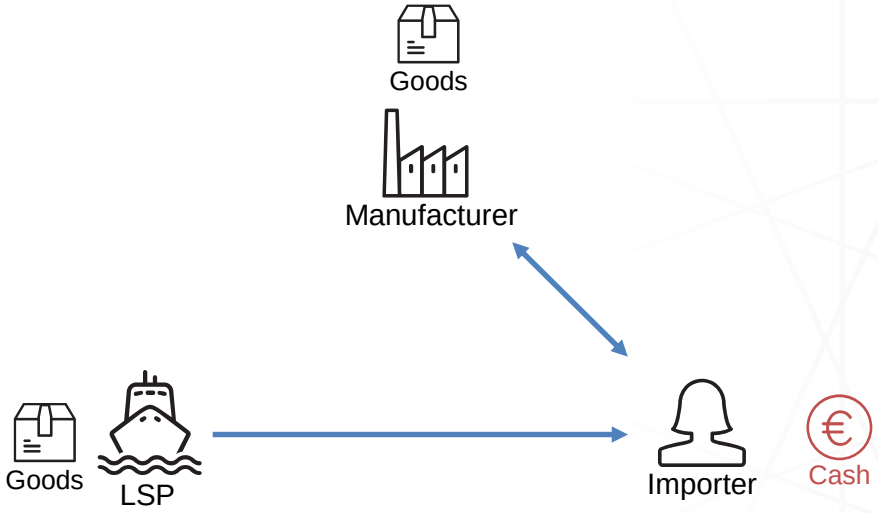
GOODS ARE IN TRANSIT



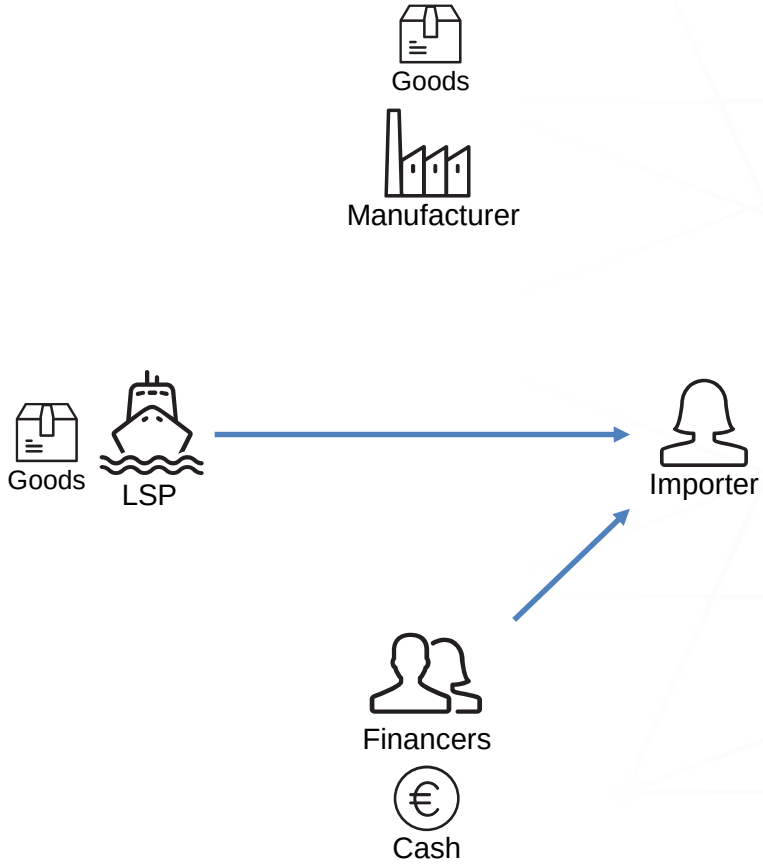
NEW DEAL



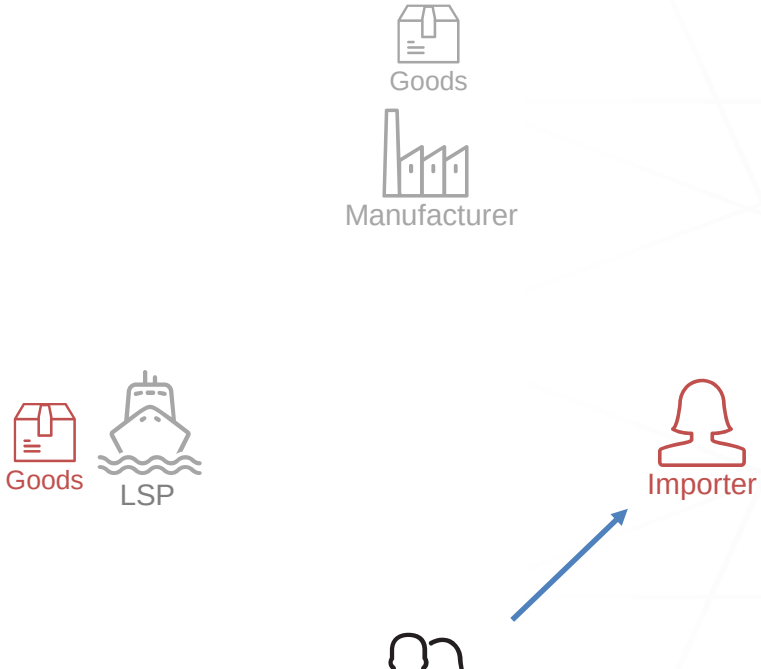
NO CASH FOR NEW DEAL



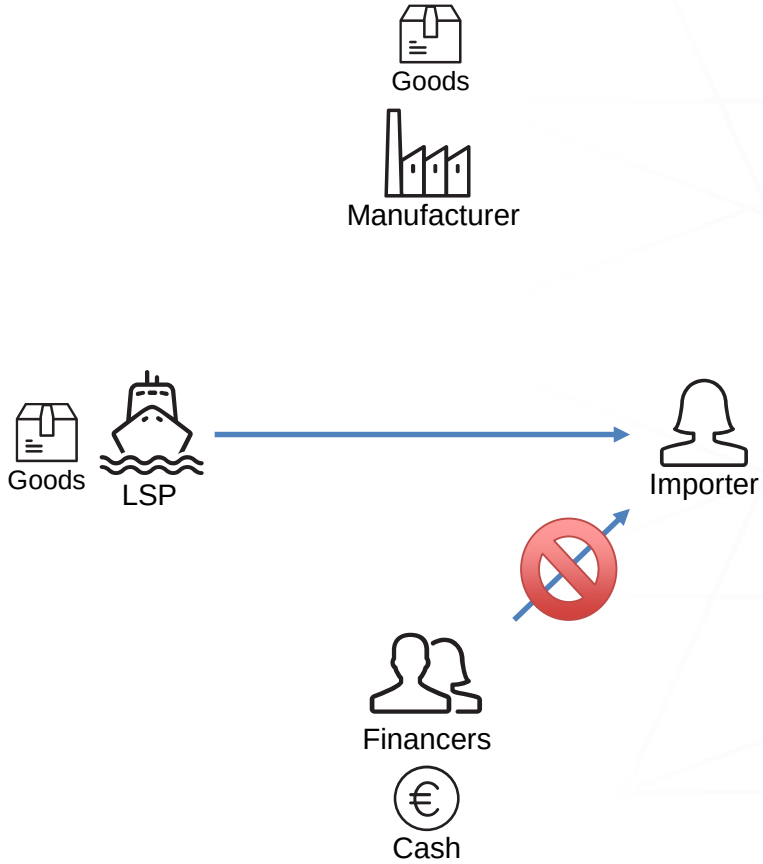
TRY TO BORROW



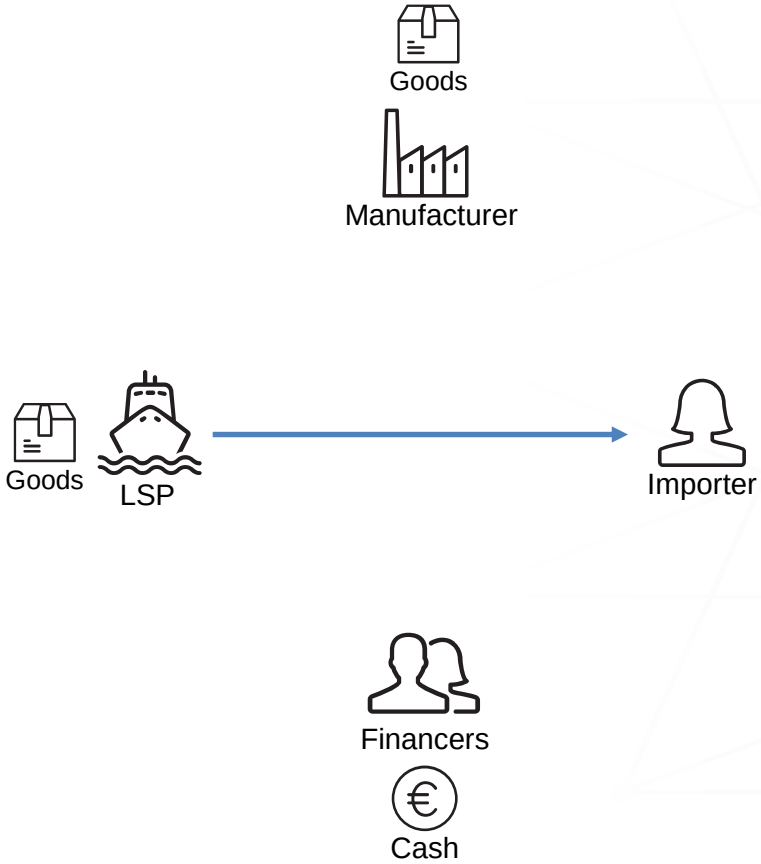
RISKS FOR FINANCER



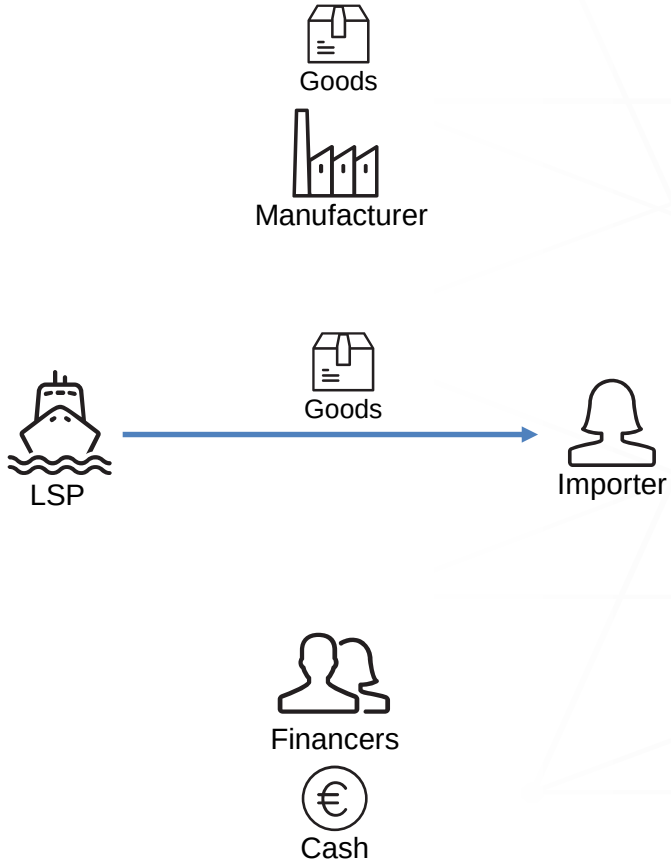
TRY TO BORROW



WAIT FOR GOODS

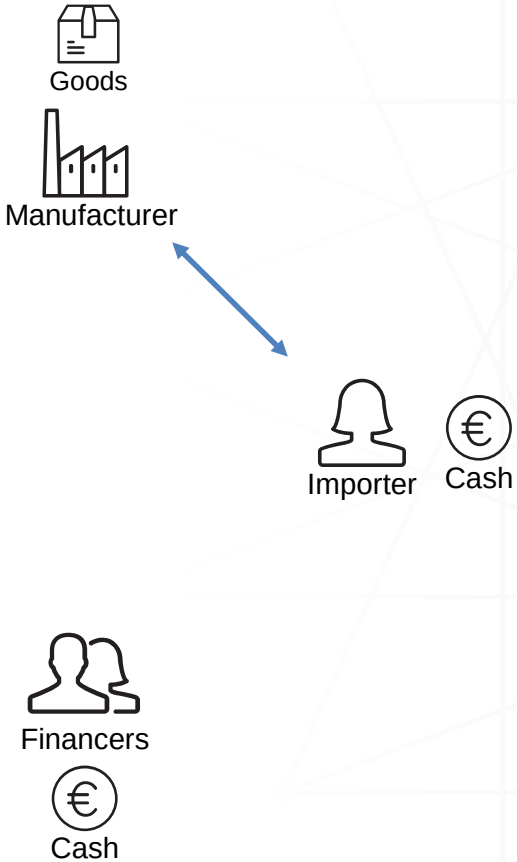


WAIT FOR GOODS



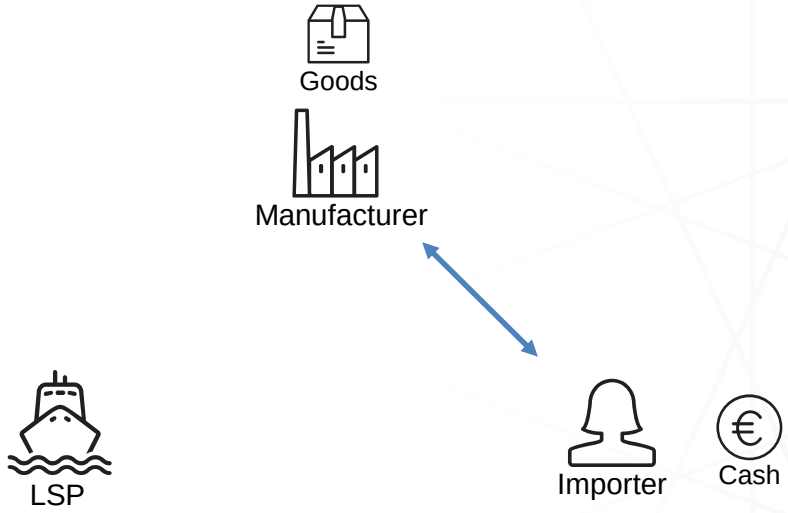
GOODS HAVE ARRIVED

SELL GOODS AND MAKE DEAL

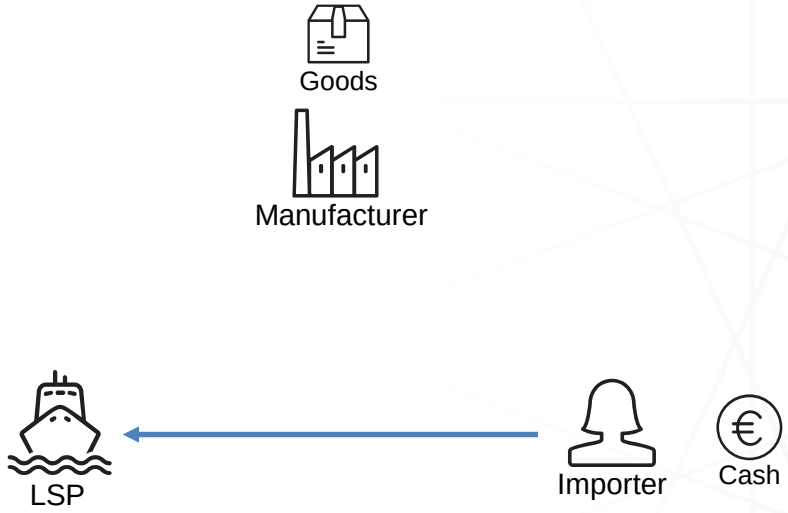


OUR SOLUTION

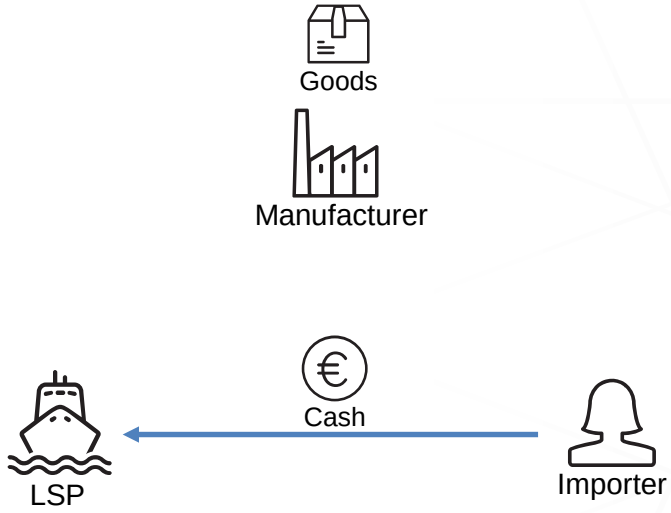
DEAL MADE



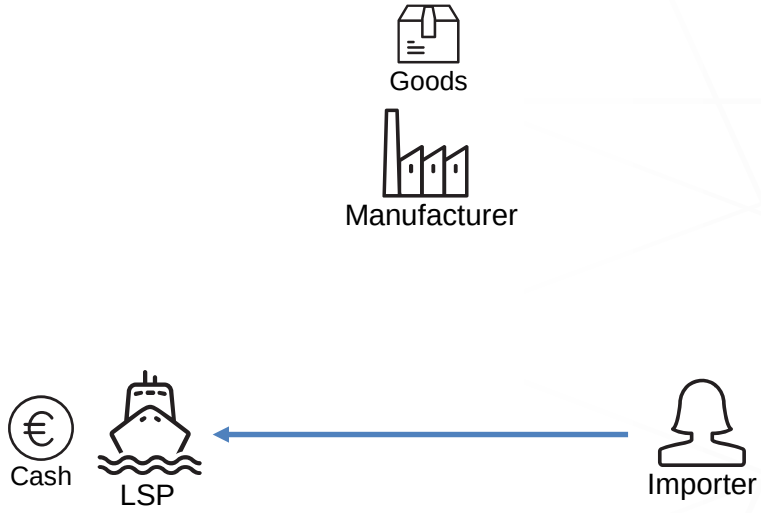
ESCROW ACCOUNT AT LSP



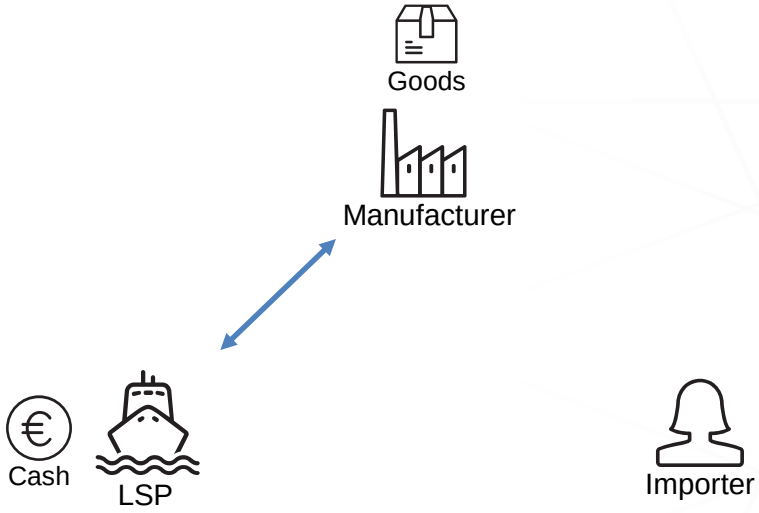
ESCROW ACCOUNT AT LSP



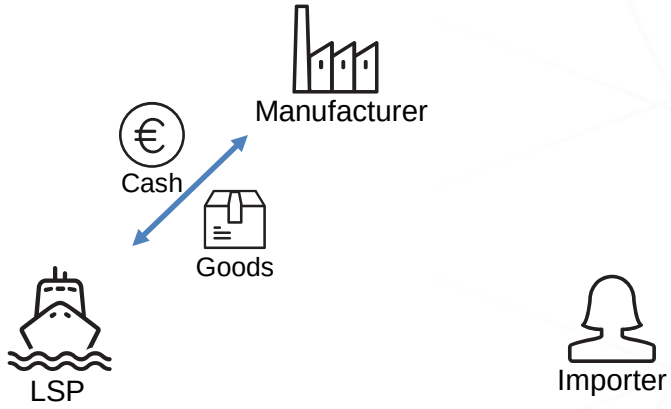
ESCROW ACCOUNT AT LSP



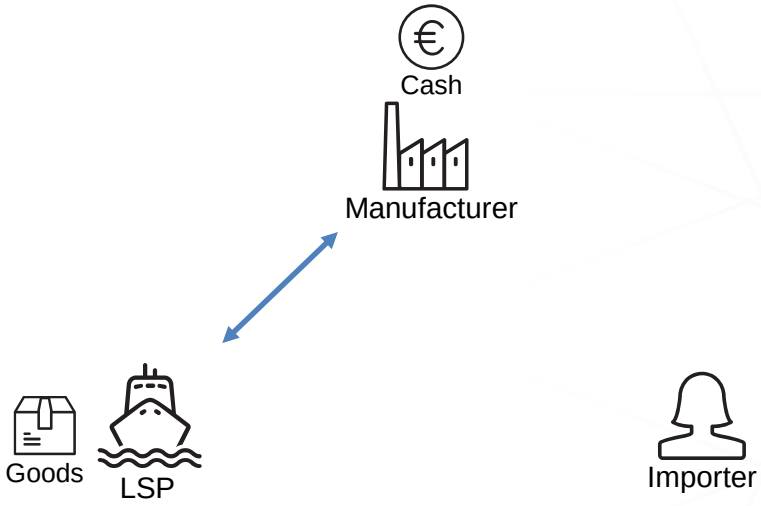
TRADE GOODS FOR PAYMENT



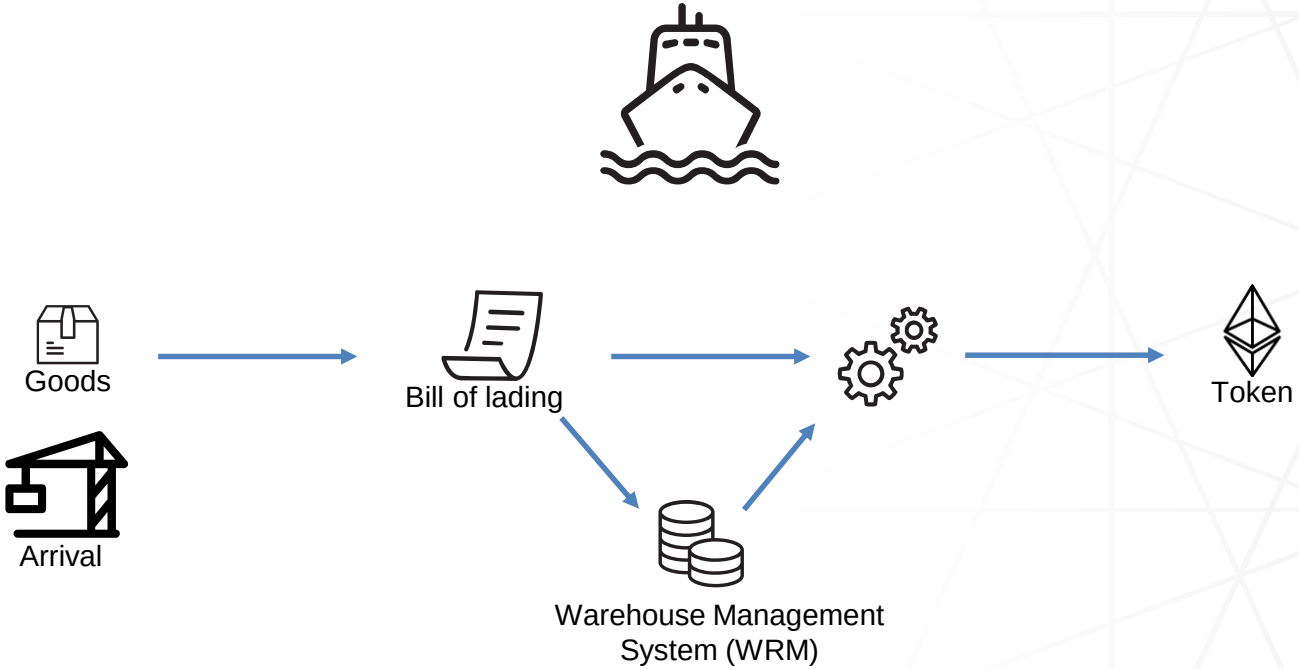
TRADE GOODS FOR PAYMENT



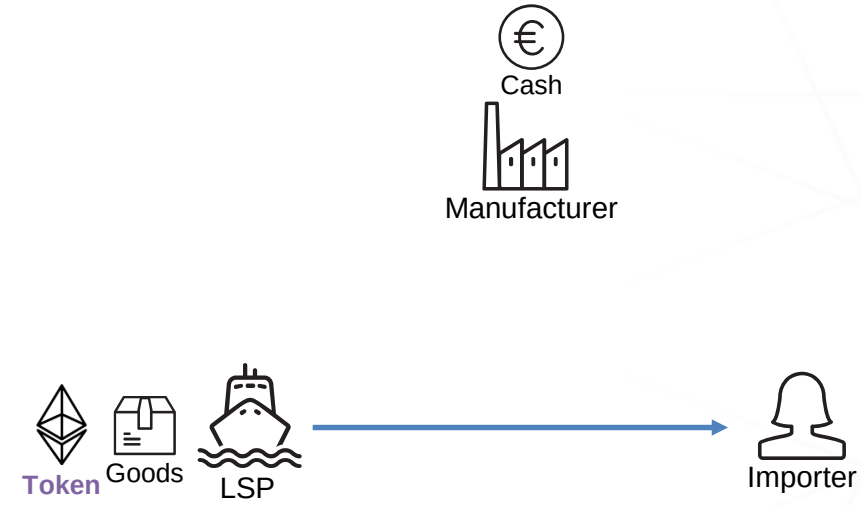
TRADE GOODS FOR PAYMENT



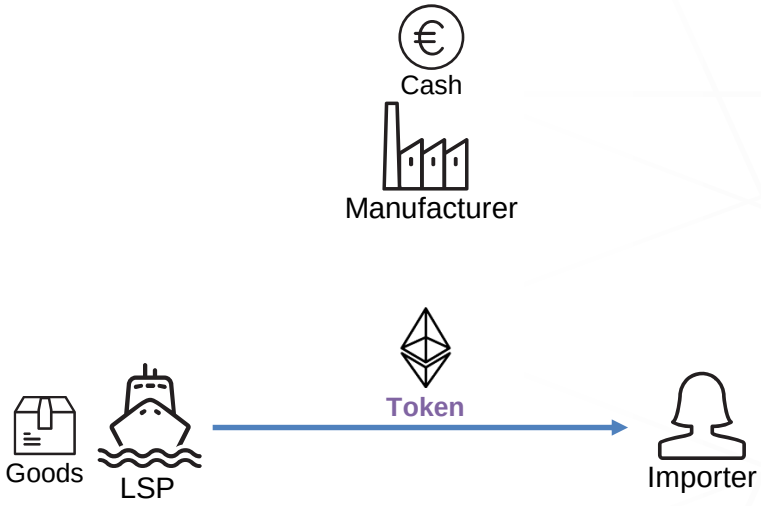
RECEIVEMENT PROCESS TOKEN GENERATION



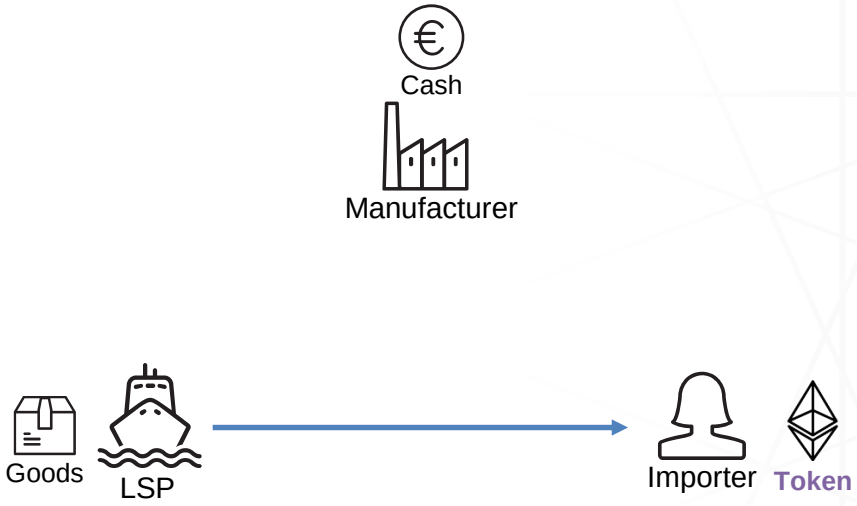
GOODS ARE IN TRANSIT



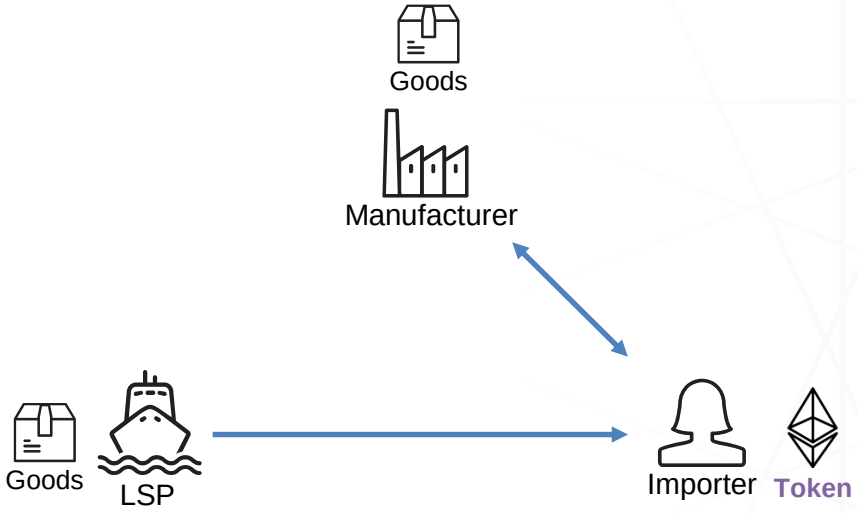
TOKEN TRANSFER



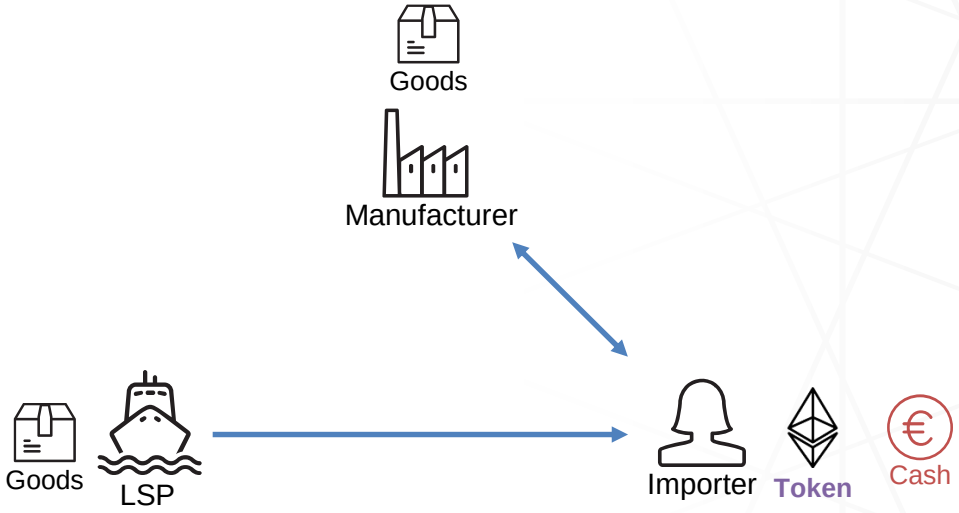
TOKEN TRANSFER



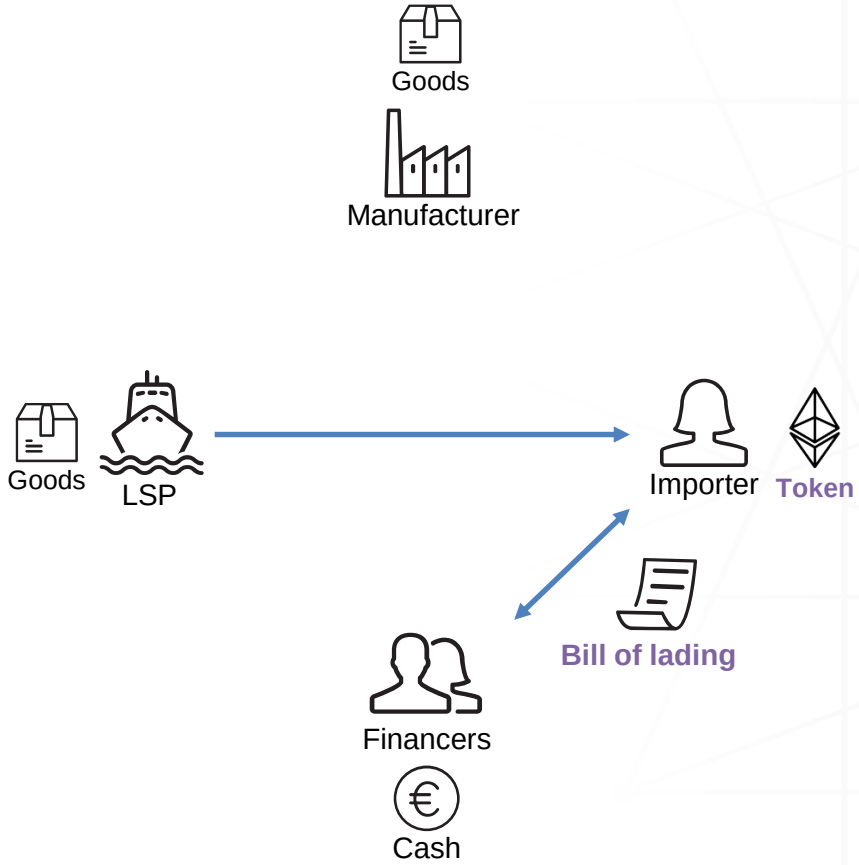
NEW DEAL



NO CASH FOR NEW DEAL

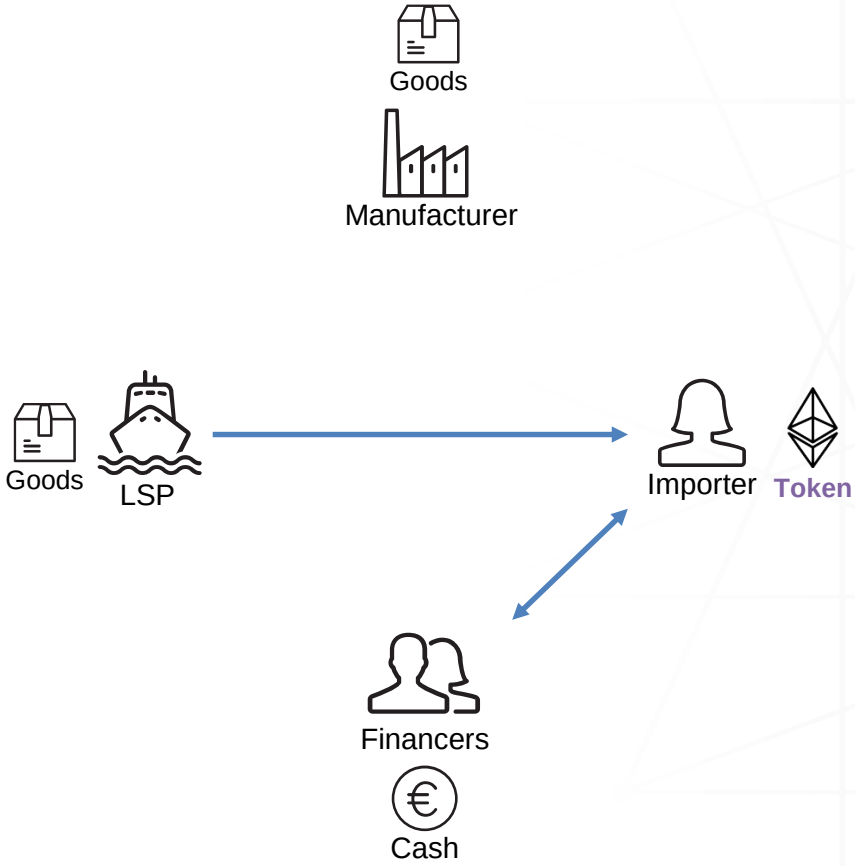


TRY TO BORROW

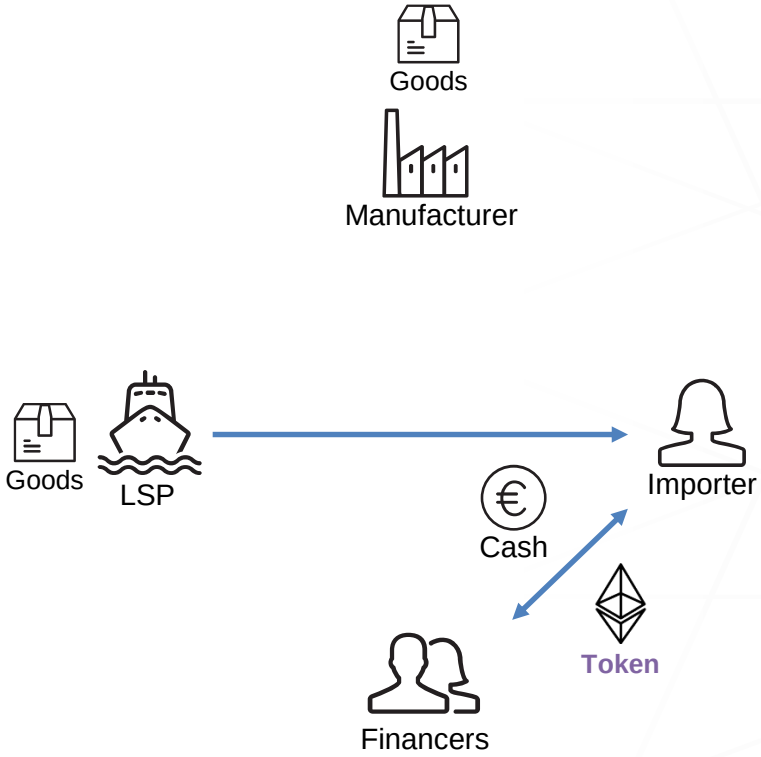


RISKS FOR FINANCER

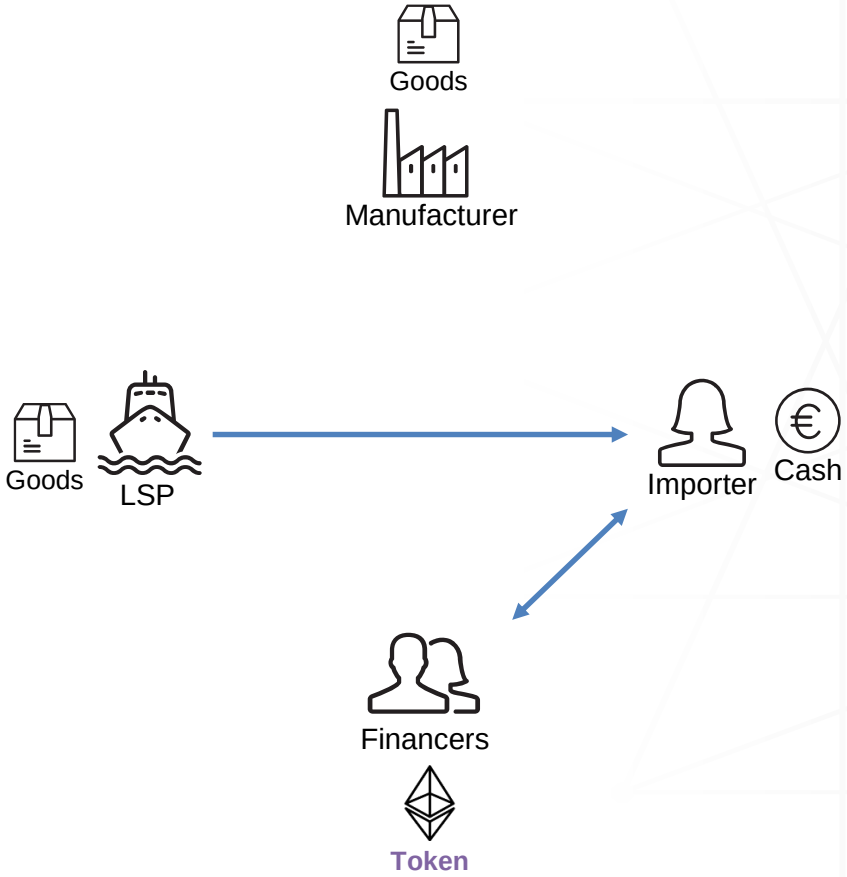
FINANCING


Goods
Manufacturer
Goods
LSP
Importer
Token
Financers
Cash

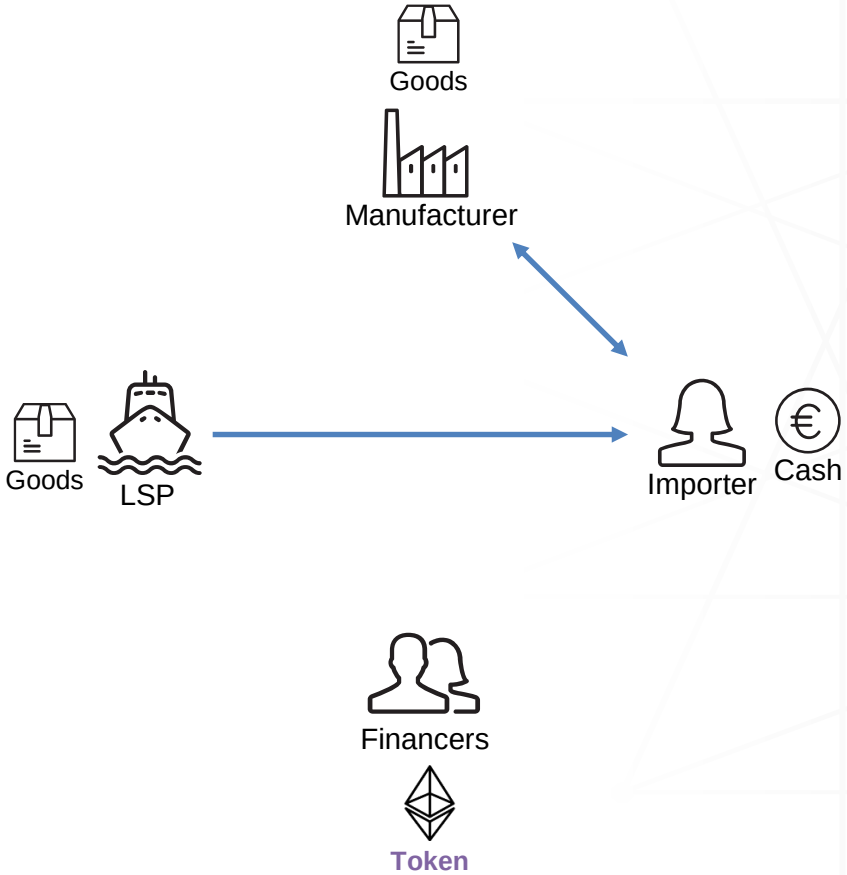
FINANCING


Goods
Manufacturer
Goods
LSP
Importer
Cash
Token
Financers

FINANCING


Goods
Manufacturer
Goods
LSP
Importer
Cash
Financers
Token

FINANCING

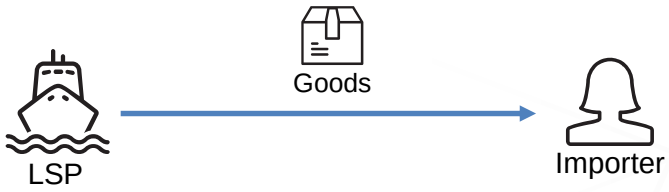

Goods
Manufacturer
Goods
LSP
Importer
Cash
Financers
Token

OUR SOLUTION

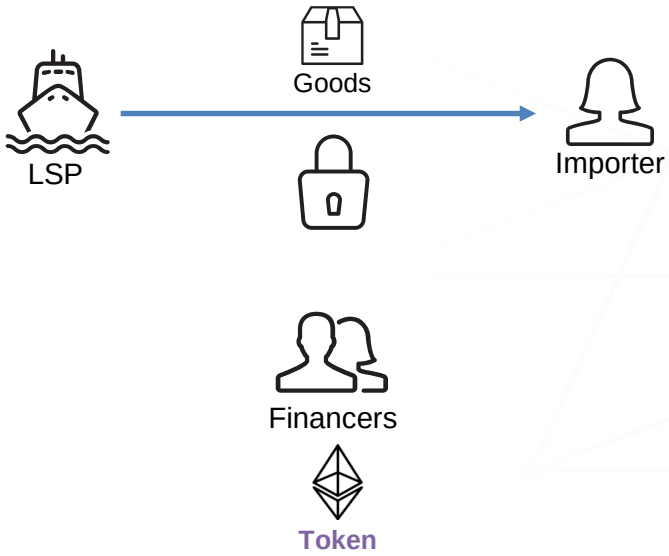
Release

GOODS IN TRANSIT

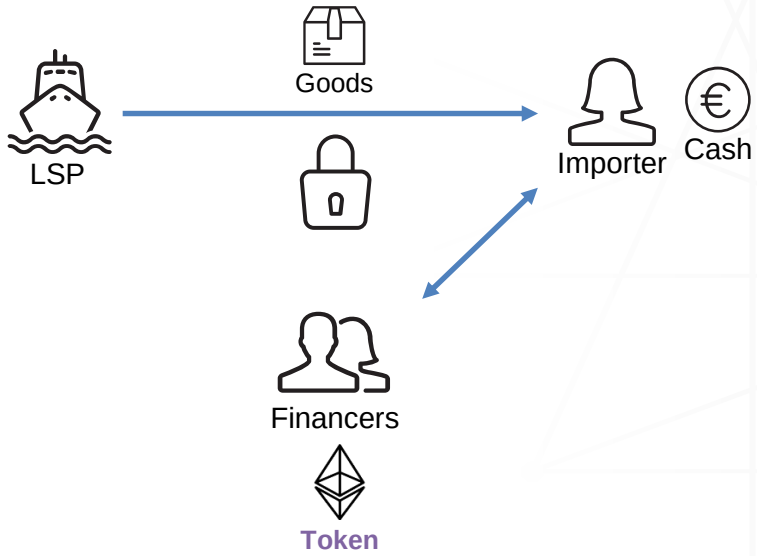
GOODS IN TRANSIT



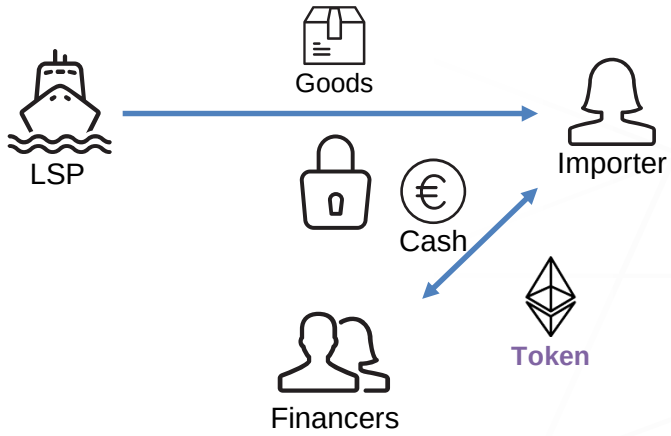
TOKEN REQUIRED FOR RELEASE



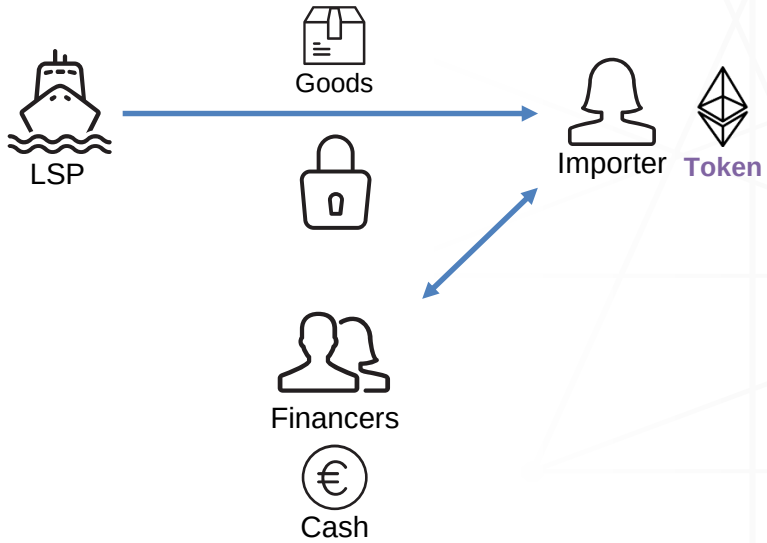
PAY FINANCERS



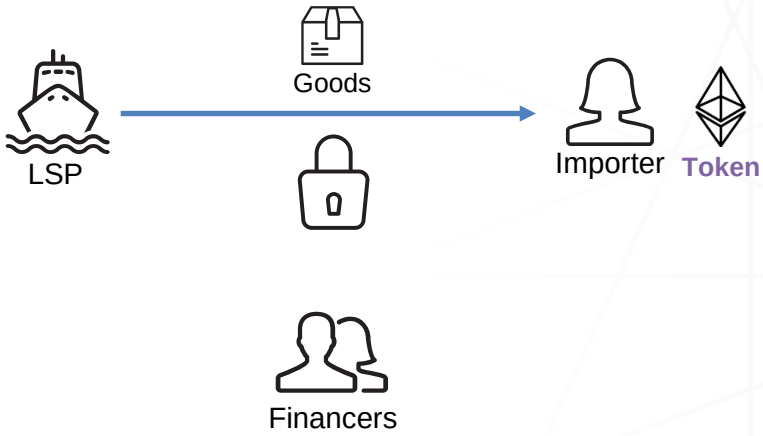
PAY FINANCERS



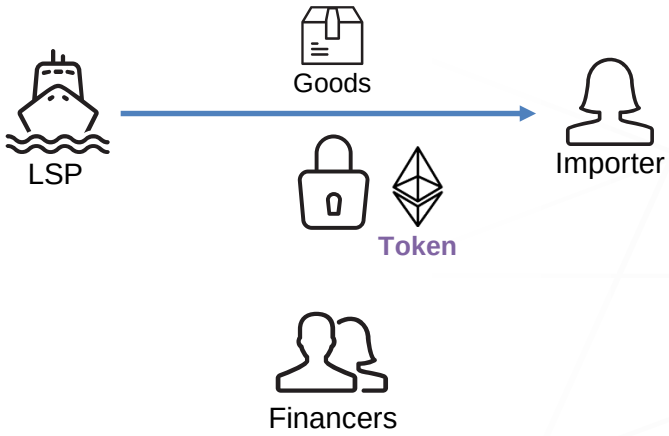
PAY FINANCERS



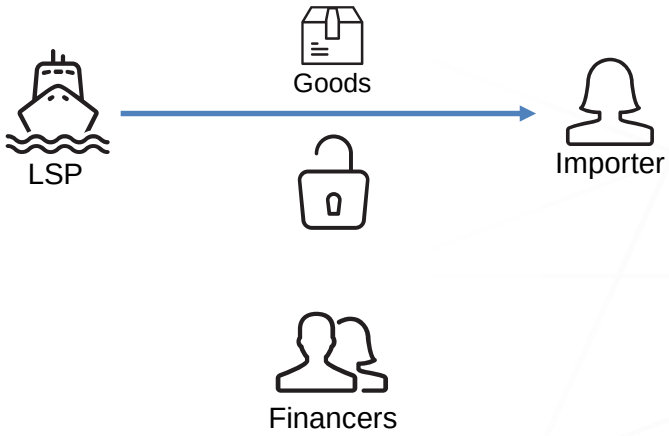
RELEASE GOODS



RELEASE GOODS

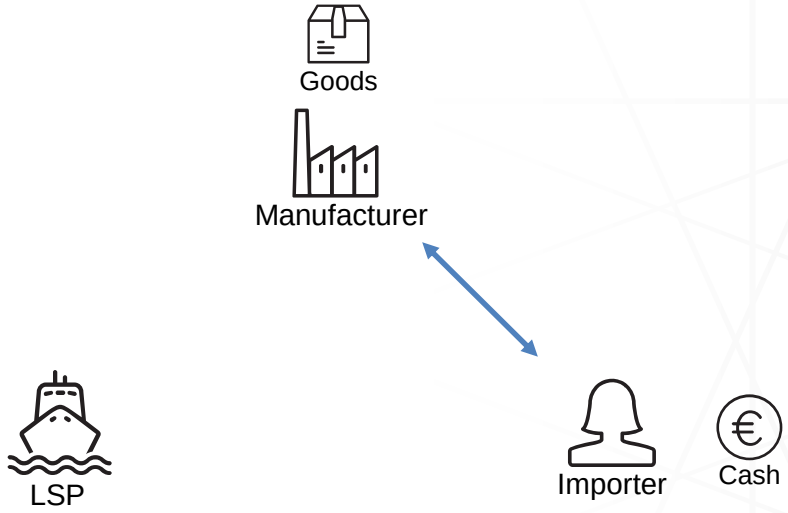


RELEASE GOODS



GOODS IN TRANSIT

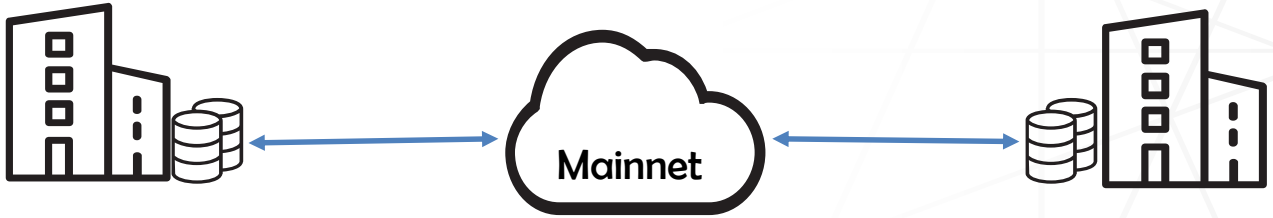
START ALL OVER



TECHNICAL IMPLEMENTATION

BASELINE PROTOCOL

- B2B workflows using a Mainnet
- Mainnet as common frame of reference
- No sensitive data on-chain
- Integrates with any local system of record



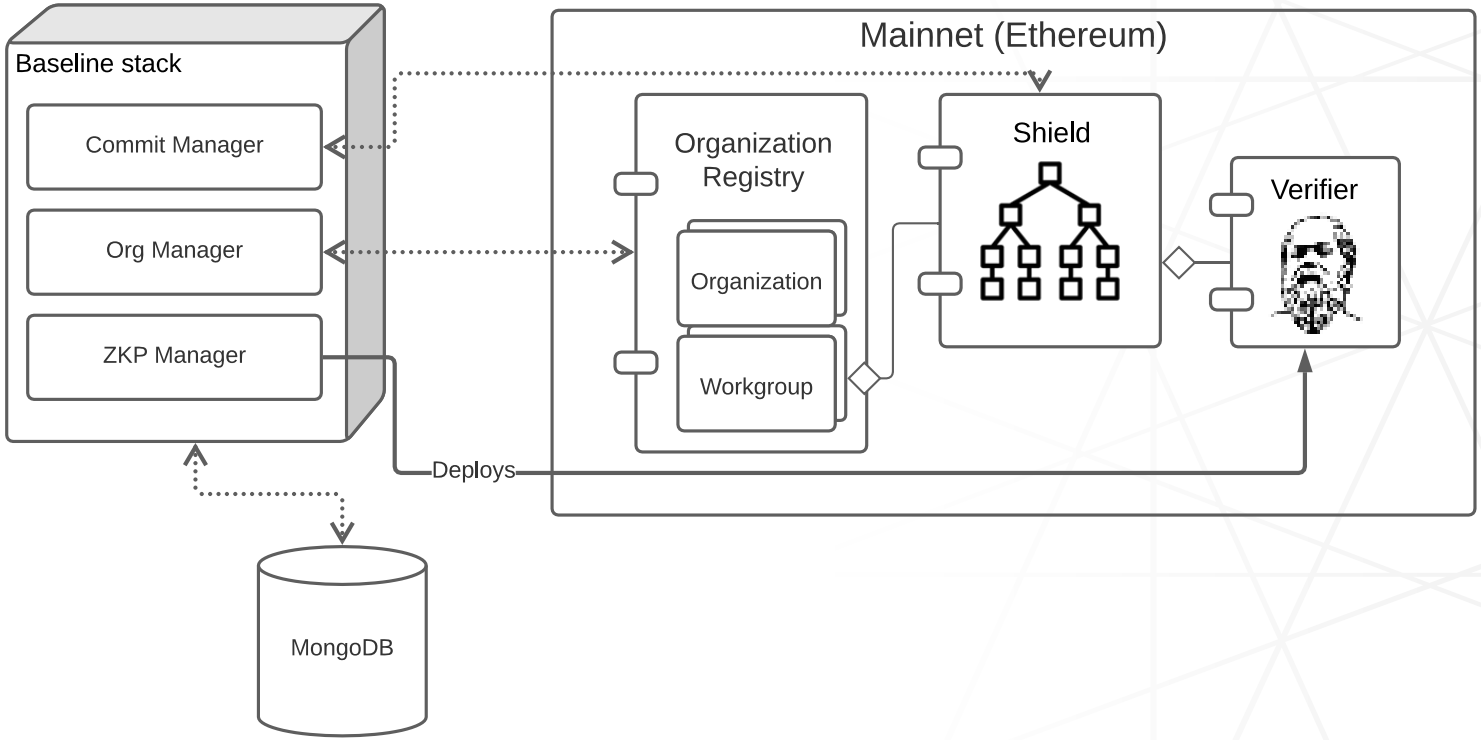
BASELINE PROTOCOL

- How does it assure privacy?
  - Zero knowledge proofs
  - Proof computed off-chain
  - On-chain merkle tree with commitment hashes
  - Commitments can only be pushed if proof is given
  - Can be verified by participants of workflow

BASELINE PROTOCOL

- Reference implementations: BRI-1, BRI-2
- Decent examples, but can't be built upon
- Services:
  - Organization Manager
  - Zero Knowledge Proof Manager
  - Commitment Manager
- Components:
  - Blockchain Manager

BASELINE PROTOCOL



BASELINE PROTOCOL

- How it is used in our product:
  - LSP pushes commitment for each shipment
  - Hash(bill of lading, public key importer)
  - Commitment hash used as token id for NFT
- Possible extensions:
  - Commitments as state markers for shipments
  - Signed financing deal circuit:
    - Attach private metadata
    - Trigger NFT deal

TU Delft

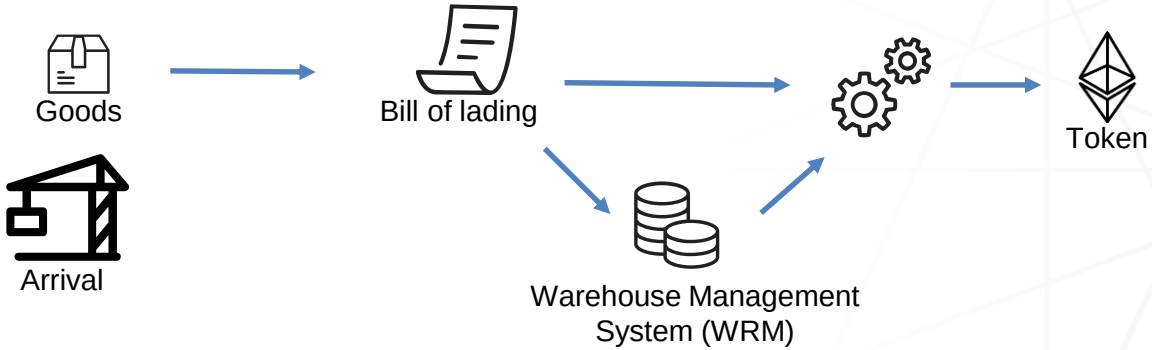
TOKENIZATION

- Trade Trust
- ERC – 721
  Class of unique tokens

TOKENIZATION

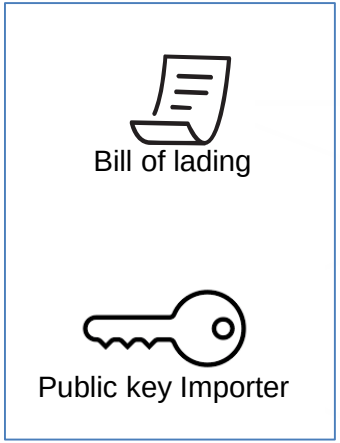
LSP guarantees:

- Goods of NFT present
- NFT and Bill of lading coupling
- Ownership of the goods



TOKEN COMPONENTS

- Token ID



Create

ERC-721

- Proof of Ownership

Token Registry

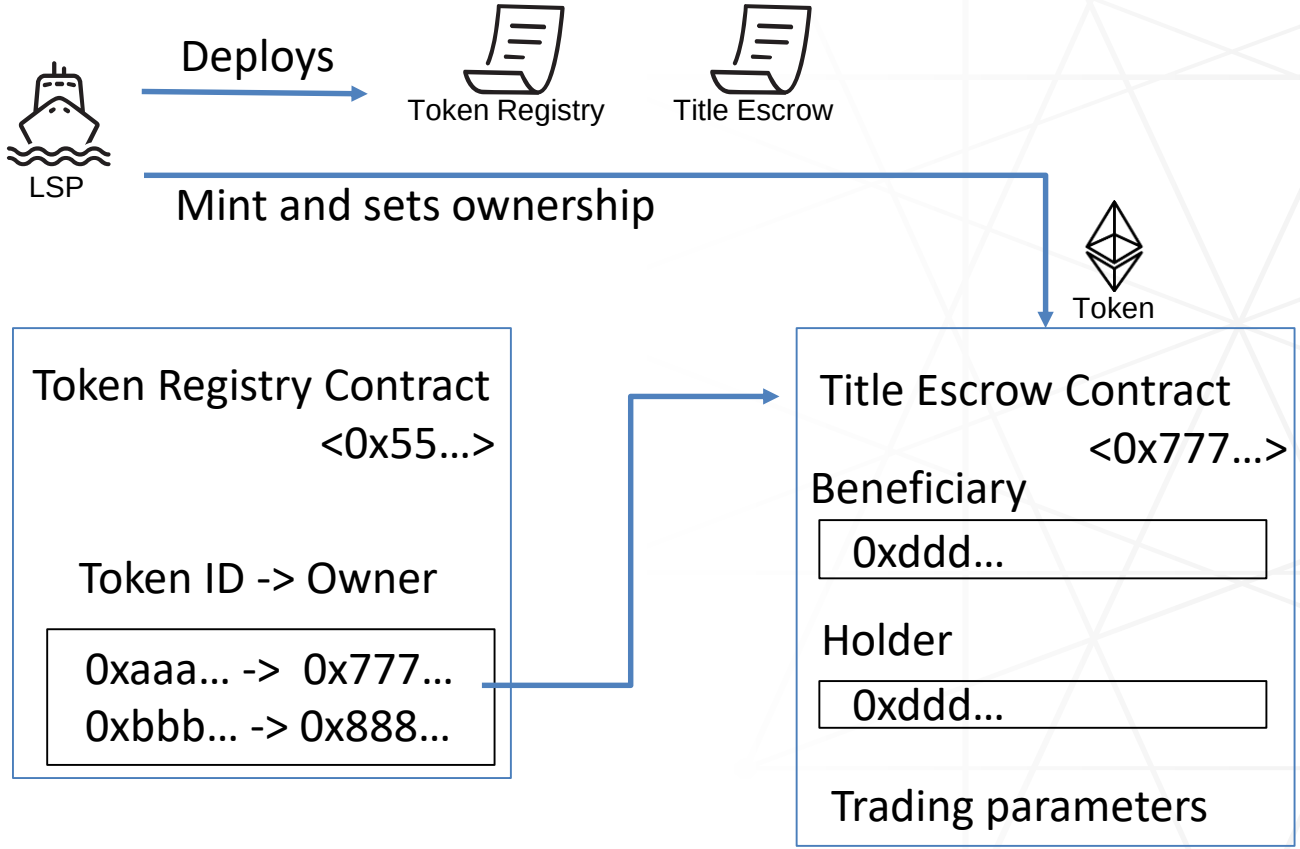
Title Escrow

- Trading

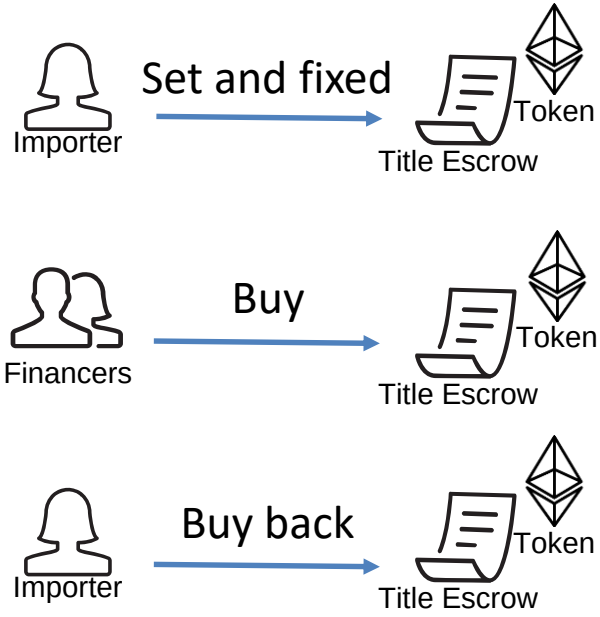
Title Escrow

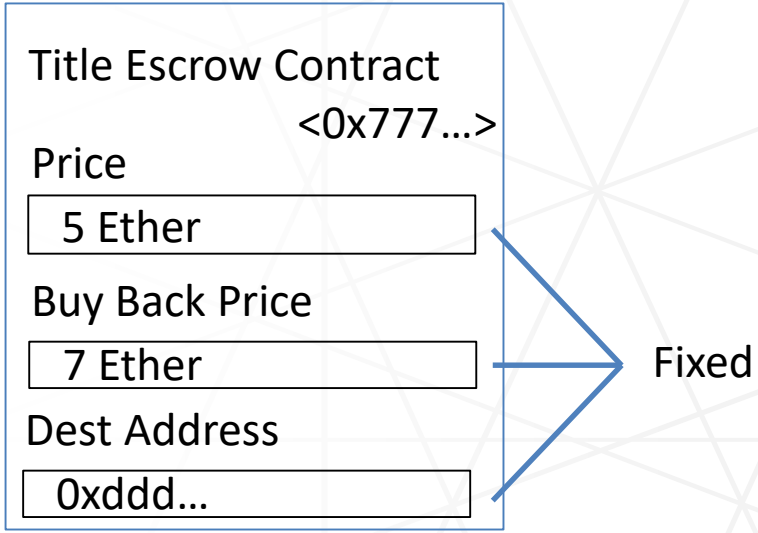
TU Delft

TOKEN IMPLEMENTATION



TRADING TOKENS





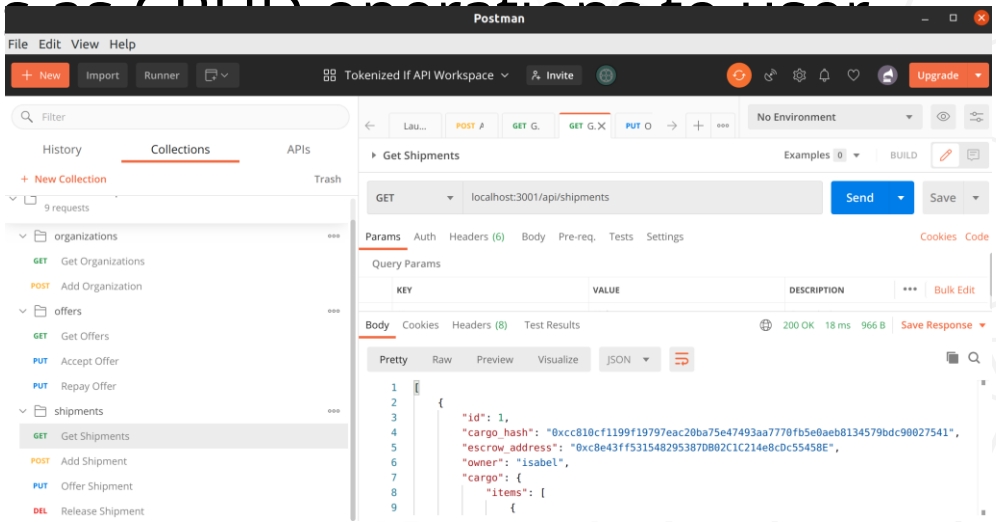
TU Delft

MESSAGING

- Used to share private information off-chain
- Wrapper over NATS messaging
- LSP messaging endpoint start of trust boundary

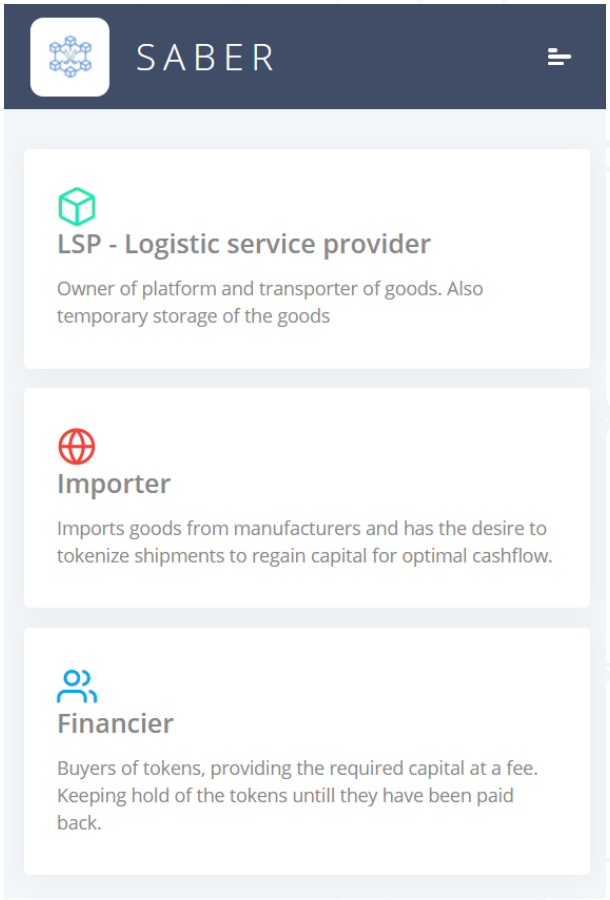
REST API

- Integrates baseline, tokenization and messaging
- Exposes features as CRUD operations to user
- GUI, WMS, …



FRONT END

- Usable for all roles
- Responsive design
- Secret management
  - (Metamask)
- No authentication



PRODUCT DEMO

DIVISON OF WORK AND RESPONSIBILITY

TIME/WORK DIVISION

Week #	Date	Actions	Notes
1	8/2	Research on the topic Preparing questions for client	Form groups
2	15/2	Researching possible tech solutions Creating draft design document Creating process flow diagram	First meeting client
3	22/2	Bart & Björn: Setup dev environment baseline Joas & Mike: Finalize design document	Discuss draft design document. Blocklab feedback: 'good questions asked and good faith'.
4	1/3	Bart: Running BRI-1 Björn: Add use cases and UML, BRI-1 Joas: Research baseline and create workflow chart baseline Mike: Setup Ganache	Discussed design document and reference projects with Blocklab.
5	8/3	Bart & Joas: CI/CD, NATS as msg service Björn: Research TradeTrust SDK, initial stab Mike: Initial stab front-end, design document	Further improve design document. Technical discussion with Hamza.
6	15/3	Bart: NATS/Whisper Björn: Token ownership and transfer Joas: Baseline Mike: Front-end	Technical discussion with Hamza.
7	22/3	Bart: Setup REST API Björn: Token buying/selling Joas: Baseline Mike: Front-end	Short meeting. Discussion about token creation with Blocklab.
8	29/3	Finishing and integrating all components	Meeting cancelled, Blocklab unavailable.
9	5/4	Integrating all components + report	**Deadline**

TU Delft

FEATURE SUGGESTIONS

WMS coupling

The interface currently is an UI. However, Baseline can link to a WMS, making the process automatic.

Backend authentication

Currently no authentication or authorization mechanism is present within the api.

Metamask

Secret management could be greatly improved. Ideally private keys would not be transferred to our system. This is possible with the use of Metamask.

Expanding zero knowledge proofs

Currently the commitment is solely focused on the bill of lading. By using this as an input for further proofs the process could be made into a workflow.

Multiple tokens

Add multiple tokens per shipment. Reducing the level of capital required for financer to join the process.

Negotiation function

Currently the prices of a deal are fixed. Negotiation between importer and financer would create more opportunities.

TU Delft

RECAP

- Usable basis with working PoC
- Most importantly concept behind the technology works.

INDIVIDUAL REFLECTIONS

Bart

- Spent too long with BRIs at start
- Sparked interest for Blockchain

Björn

- Spent too much time troubleshooting with Tokens
- Integration hard

Joas

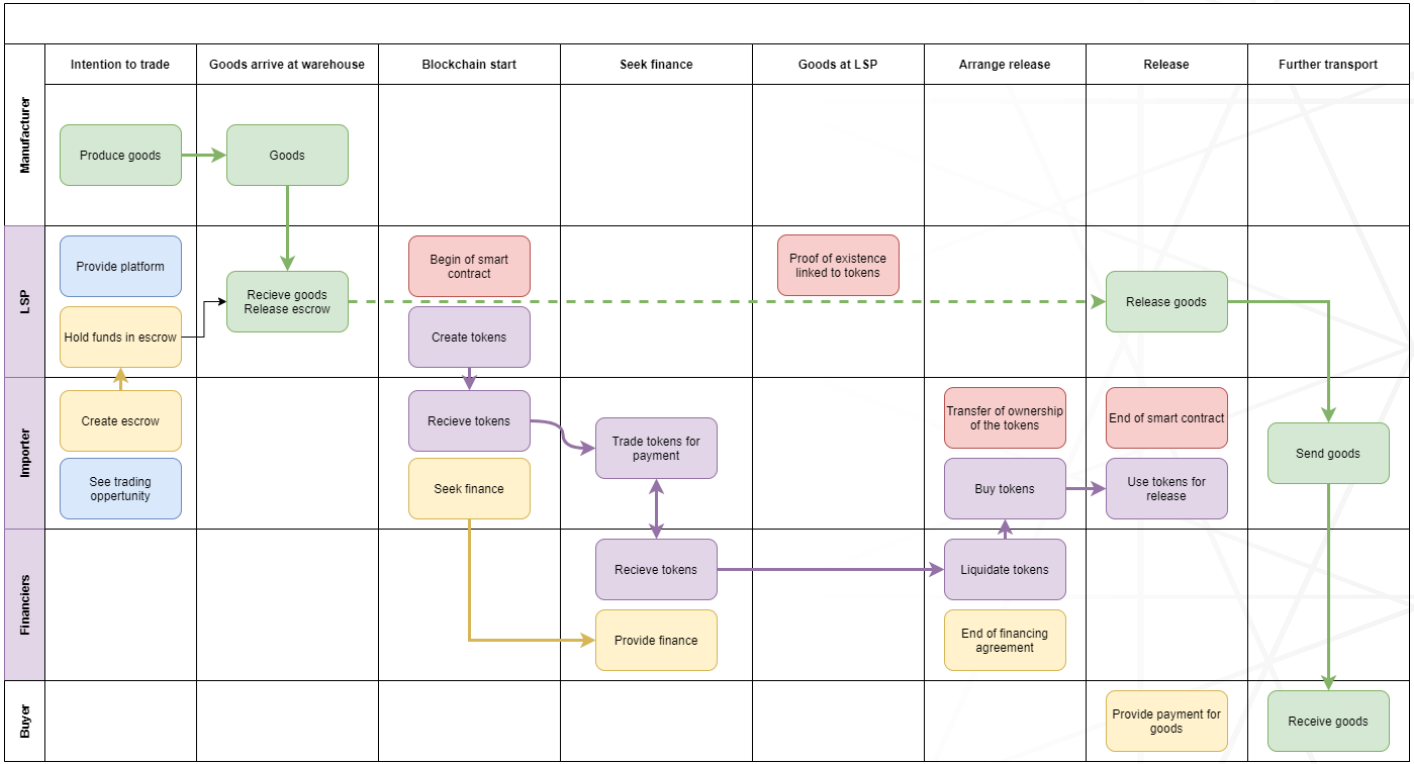
- Lack of knowledge
- Communication
- Coordination

Mike

- Underestimated web-development
- Blockchain technology ability to integrate gradually

EXTRA SLIDES

DIAGRAM


Intention to trade
Goods arrive at warehouse
Blockchain start
Seek finance
Goods at LSP
Arrange release
Release
Further transport
Manufacturer
LSP
Importer
Financiers
Buyer
Produce goods
Goods
Provide platform
Hold funds in escrow
Recieve goods
Release escrow
Begin of smart contract
Create tokens
Proof of existence linked to tokens
Release goods
Create escrow
See trading oppertunity
Recieve tokens
Seek finance
Trade tokens for payment
Transfer of ownership of the tokens
Buy tokens
End of smart contract
Use tokens for release
Send goods
Recieve tokens
Provide finance
Liquidate tokens
End of financing agreement
Provide payment for goods
Receive goods

CREDITS

- Logo
  - 'image: Flaticon.com'. This logo has been designed using resources from Flaticon.com